Kerckhoff Hydroelectric Project
Draft Environmental Impact Report
April 2026

State Water Resources Control Board
State Clearinghouse # 2023050702



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Draft Environmental Impact Report

for the

Kerckhoff Hydroelectric Project

Prepared for:

State Water Resources Control Board

Division of Water Rights

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Draft Environmental Impact Report for the Kerckhoff 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 Kerckhoff Hydroelectric Project Draft Environmental Impact Report (EIR) is being made available to the public in accordance with the California Environmental Quality Act (CEQA).

Visit the State Water Resources Control Board's Kerckhoff Hydroelectric Project webpage, where you can view and download an electronic copy of this Draft EIR: https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/kerckhoff_hydroelectric_ferc96.html

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Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
AB	Assembly Bill
AE	Exclusive Agricultural District
AGC	Automated Generation Control
AIR	Additional Information Request
AIS	aquatic invasive species
AN	Above Normal
APE	Area of Potential Effect
Applicant	Pacific Gas and Electric Company
ARPA	Archaeological Resources Protection Act
B-RG	biological resources goal
BAU	business as usual
BCE	Before Common Era
BGEPA	Bald and Golden Eagle Protection Act
BLM	United States Bureau of Land Management
BLMS	United States Bureau of Land Management sensitive
BMI	benthic macroinvertebrate
BMP	best management practice
BN	Below Normal
BPS	best performance standard
Btu	British Thermal Unit
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standard
CAFE	Corporate Average Fuel Economy
CAISO	California Independent System Operator
Cal-IPC	California Invasive Plant Council
Caltrans	California Department of Transportation

CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
Cal/OSHA	California Division of Occupational Safety and Health
CALVEG	Classification and Assessment with Landsat of Visible Ecological Groupings
CARB	California Air Resources Board
CBC	California Building Code
CCAP	Climate Change Action Plan
CCR	California Code of Regulations
CD	Critically Dry
CDFA	California Department of Food and Agriculture
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CDPR	California Department of Pesticide Regulation
CDWR	California Department of Water Resources
CE	Common Era
CEC	California Energy Commission
CEDEN	California Environmental Data Exchange Network
Central Valley Regional Water Board	Central Valley Regional Water Quality Control Board
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFC	California Fire Code
CFP	California fully protected
CFR	Code of Federal Regulations
cfs	cubic feet per second
cfu	colony forming units
CGP	Construction General Permit

CH_4	methane
CNPS	California Native Plant Society
CNDDB	California Natural Diversity database
CNG	compressed natural gas
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
Commission	Federal Energy Regulatory Commission
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
CRS	Cultural Resources Specialist
CRWG	Cultural Resources Working Group
CSC	California species of special concern
CSCI	California Stream Condition Index
CT	Candidate Threatened
CWA	Clean Water Act
CWHR	California Wildlife Habitat Relationship
D	Dry
DOC	Department of Conservation
DTSC	Department of Toxic Substances Control
EIA	U.S. Energy Information Administration
EIR	environmental impact report
EO	Executive Order
EOS Flow Recession	End-of-Spill Flow Recession and Whitewater Flow Releases
ESA	Endangered Species Act
F	Failure
FAA	Federal Aviation Administration
FC	federal candidate
FCOG	Fresno Council of Governments

FE	federal endangered
FERC	Federal Energy Regulatory Commission
FGAR	first-generation anti-coagulant rodenticide
FHSZ	fire hazard severity zone
FHWA	Federal Highway Administration
FLA	Final License Application
FLPMA	Federal Land Policy and Management Act
FMMP	Farmland Mapping and Monitoring Program
FOCA	Swiss Federal Office of Civil Aviation
FPT	Federal Proposed Threatened
FPE	Federal Proposed Endangered
FRA	Federal Responsibility Area
FSS	USFS sensitive
FT	federal threatened
FTA	Federal Transit Administration
GHG	greenhouse gas
GIS	geographic information system
Guidance	Guidance for Assessing and Mitigating Air Quality Impacts
GWP	Global Warming Potential
H_2S	hydrogen sulfide
HEC-ResSim	Hydrologic Engineering Center’s Reservoir System Simulation
HFTD	high fire threat district
HLZ	helicopter landing zone
HMBP	Hazardous Materials Business Plan
hp	horsepower
HPMP	Historic Properties Management Plan
HQ	hazard quotient
HWCL	Hazardous Waste Control Law
IBC	International Building Code
IBI	Index of Biotic Integrity

IPaC	Information for Planning and Consultation
K1	Kerckhoff 1
K2	Kerckhoff 2
Kerckhoff Hydroelectric Project	existing Kerckhoff Hydroelectric Project
kV	kilovolt
KVA	key viewing area
kW	kilowatt
LiDAR	light detection and ranging
LLO	low-level outlet
LNG	liquefied natural gas
LOC	level of concern
LTOR	Long-Term Operating Rules
maf	million-acre feet
MBTA	Migratory Bird Treaty Act
MCTC	Madera County Transportation Commission
MCV	Manual of California Vegetation
MIF	minimum instream flow
MMT	million metric ton
MPN	most probable number
MPO	metropolitan planning organization
MRDS	Mineral Resources Data System
MRZ	Mineral Resource Zone
msl	above mean sea level
MT	metric ton
MW	megawatt
MWAT	maximum weekly average temperature
MWh	megawatt hour
NAAQS	National Ambient Air Quality Standard
NAHC	Native American Heritage Commission

NEPA	National Environmental Policy Act
NGO	non-governmental organization
NHPA	National Historic Preservation Act
NFS	National Forest System
NAGPRA	Native American Graves Protection and Repatriation Act
ND	No Data
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NO_X	nitrogen oxide
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
O_3	ozone
O&M	operations and maintenance
OEHHA	California Office of Environmental Health Hazard Assessment
OHV	off-highway vehicle
P	Partial Succes
Pb	lead
PBR	Project Bypass Reach
PCA	Pest Control Advisor
PCR	Pest Control Recommendation
Pd	pseudogymnoascus destructans
PERP	Portable Equipment Registration Program
PFYC	Potential Fossil Yield Classification
PG&E	Pacific Gas and Electric Company
$PM_{2.5}$	particulate matter smaller than 2.5 microns
PM_{10}	particulate matter smaller than 10 microns
PM&E	protection, mitigation, and enhancement
POM	Planned Outage Measure

ppb	parts per billion
ppth	parts per thousand
ppm	parts per million
PPV	peak particle velocity
PRC	Public Resources Code
PUP	Pesticide Use Permit
R-C	Resource Conservation District
RCRA	Resource Conservation and Recovery Act
RE	Recreational District
REA Notice	Ready for Environmental Analysis
Reclamation	United States Bureau of Reclamation
Regional Water Board	Regional Water Quality Control Board
RM	River Mile
RMP	resource management plan
RMZ	recreational management zone
ROZ	rough operating zone
RPS	Renewables Portfolio Standard
RTP	regional transportation plan
S	Success
SAV	submerged aquatic vegetation
SB	Senate Bill
SCADA	supervisory control and data acquisition
SCE	Southern California Edition
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SCS	Sustainable Communities Strategy
SE	state endangered
SERA	Syracuse Environmental Research Associates, Inc.
SGAR	second-generation anti-coagulant rodenticide
SHPO	State Historic Preservation Office
SIP	state implementation plan

SJR	San Joaquin River
SJR Gorge Recreation Area	San Joaquin River Gorge Special Recreation Management Area
SO_2	sulfur dioxide
SO_X	sulfur oxide
SR	state route
SR/SJR Basin Plan	Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin
SRA	State Responsibility Area
SRMA	Special Recreation Management Area
SSC	species of special concern
SSRD	Subsequent Spill Ramp Down
ST	state threatened
State Water Board	California State Water Resources Control Board
SWPPP	Storm Water Pollution Prevention Plan
TAC	toxic air contaminant
TCL	Traditional Cultural Landscape
TCP	traditional cultural place
TCR	Tribal cultural resource
TWh	terawatt-hour
UBC	Uniform Building Code
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USGCRP	United States Global Change Research Program
USGS	United States Geological Survey
USFWS	United States Fish and Wildlife Service

Valley Air District	San Joaquin Valley Air Pollution Control District
VMT	vehicle miles traveled
VMPCP	Vegetation Management and Pest Control Plan
VRM	visual resource management
W	Wet
WNS	National White-nose Syndrome
WQMP Plan	Water Quality Monitoring and Protection Plan
WY	water year
YOY	young-of-the-year

EXECUTIVE SUMMARY

INTRODUCTION

The California State Water Resources Control Board (State Water Board) prepared this Environmental Impact Report (EIR) in response to Pacific Gas and Electric Company's (PG&E or Applicant) application for a water quality certification for the continued operation of the Kerckhoff Hydroelectric Project, including construction of the new Vista Day Use Area and new inflow gage under a new Federal Energy Regulatory Commission (FERC or Commission) license. The Proposed Project, also known as FERC Project No. 96, would relicense the existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) for a new 50-year term, remove the Kerckhoff 1 (K1) Powerhouse from service, construct a new day use area, and implement new environmental plans and measures.

In accordance with the Federal Power Act (16 United States Code [USC] Section 791 et seq.) and FERC regulations, PG&E submitted a Final License Application (FLA) to FERC on November 24, 2020, with supplemental filings clarifying FERC Project Boundaries and updates on May 27, 2022, March 31, 2023, and February 16, 2024. Following FERC's Ready for Environmental Analysis determination on June 27, 2024, on August 22, 2024, PG&E filed with the State Water Board's Executive Director a Clean Water Act (CWA) Section 401 water quality certification application for relicensing the Proposed Project. On April 1, 2025, the Executive Director of the State Water Board determined that the water quality certification application did not provide sufficient information to assess the Kerckhoff Hydroelectric Project's potential impacts on water quality and denied PG&E's certification application request without prejudice. On July 16, 2025, PG&E filed with the State Water Board a revised certification application for relicensing of the Kerckhoff Hydroelectric Project with additional information. The State Water Board has two responsibilities regarding the Proposed Project: (1) ensuring compliance with water quality standards and other requirements of state law through its responsibility as the Clean Water Act (CWA) Section 401 water quality certification agency, 33 USC Section 1341; and (2) complying with the California Environmental

Quality Act (CEQA) as the CEQA lead agency (Public Resources Code Section 21067; California Code of Regulations Title 14, Section 15367).

The State Water Board has prepared this EIR to comply with CEQA. An EIR is a public document designed to inform the public and governmental agencies of a project's potential environmental impacts 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 (CEQA Guidelines Section 15161). As required by CEQA, this EIR discloses significant adverse impacts that may be caused by the Proposed Project, alternatives and, as applicable, identifies mitigation measures to reduce the significance of identified impacts. In preparing the EIR, the State Water Board considered PG&E's FLA and all amendments thereto; recommendations made by the California Department of Fish and Wildlife (CDFW), United States Fish and Wildlife Service (USFWS), pursuant to Section 10(j) of the Federal Power Act; requirements of the United States Bureau of Land Management (BLM) and the United States Forest Service (USFS) pursuant to Section 4(e); the *Project Operations Model – CEQA Alternatives 1 and 2* report prepared for the Kerckhoff Hydroelectric Project (included here as Appendix G); and technical studies in hydrology and water quality, geology and soils, aquatic and fisheries biological resources, cultural resources, Tribal cultural resources, recreation, terrestrial biological resources, and wildlife completed as part of the FERC licensing process

DEFINITION OF THE PROPOSED PROJECT IN THE EIR

For the purposes of the EIR and in accordance with CEQA Guidelines 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 the issuance to a person of a lease, permit, license, certificate, or other entitlement for use by one or more public agencies." (Cal. Code Regs., tit. 14, § 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.” (Cal. Code Regs., tit. 14, § 15378, subd. (c).) In this EIR, the Proposed Project is generally defined as the continued operation of the Kerckhoff Hydroelectric Project under a new FERC license, as outlined in PG&E’s application to FERC.

Section 2 *Proposed Project and Alternatives* of the EIR identifies two alternatives. Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1) is based on BLM’s previously issued mandatory 4(e) conditions as well as 10(j) recommendations from CDFW and USFWS. Similar comments were also filled by USFS. Alternative 2: Proposed Project with BLM Revised 4(e) Conditions (Alternative 2) was developed using BLM’s revised 4(e) conditions (BLM revised 4(e) Conditions 4 and 5), along with the No Project Alternative. Comments in response to the FERC-issued Ready for Environmental Analysis Notice were submitted to the online FERC docket on August 28, 2024 (USFS), September 9, 2024 (CDFW), and September 24, 2024 (BLM). BLM submitted a revised version of its 4(e) conditions on May 11, 2025.

PROPOSED PROJECT OBJECTIVES

The underlying purpose of the Proposed Project is to provide hydroelectric power. The State Water Board has identified the following Proposed Project objectives, as required by Section 15124, Subdivision (b) of the CEQA Guidelines:

1. Continue to provide renewable energy to help California meet its Renewables Portfolio Standard (RPS)
2. Improve the long-term water quality and associated beneficial use conditions for Kerckhoff Reservoir and the San Joaquin River (SJR)
3. Ensure safe contact and non-contact recreation opportunities for members of the public

OVERVIEW OF THE KERCKHOFF HYDROELECTRIC PROJECT

PG&E owns and operates the Kerckhoff Hydroelectric Project, which is composed of Kerckhoff Dam and Reservoir, K1 Powerhouse, Kerckhoff 2 (K2) Powerhouse, and associated ancillary facilities. The Kerckhoff Hydroelectric Project has an authorized

installed capacity of 162.72 megawatts (MW). PG&E proposes to continue to operate and maintain many of the existing license articles into a new FERC license. The Kerckhoff Hydroelectric Project is located on the SJR on the western slope of the Sierra Nevada Mountains in Fresno and Madera counties. The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by PG&E; on public land administered by the United State Forest Service, Sierra National Forest (USFS-SNF); and United States Bureau of Reclamation (Reclamation) lands managed under BLM.

The Kerckhoff Hydroelectric Project receives inflow into the Kerckhoff Reservoir from the Southern California Edison's (SCE) Big Creek No. 4 Project (FERC No. 2017), Willow Creek, and PG&E's Crane Valley Hydroelectric Project (FERC No. 1354). PG&E releases water at Kerckhoff Dam for instream flow requirements for the SJR. Water at the Kerckhoff Reservoir is directed over the dam, through the radial gates at the dam, through the penstocks to the powerhouses, or through the instream flow release pipe to provide minimum flows into the SJR.

Kerckhoff Dam is a concrete arch dam completed in 1920, standing at 114.5 feet high with a 507-foot crest length. The dam features 14 radial gates controlling spill, with Gates 1 through 9 operated manually and Gates 10 through 14 operating automatically. The gates have a combined spill capacity of approximately 43,700 cubic feet per second (cfs) when fully open. Additionally, the dam is equipped with three 72-inch-diameter low-level outlet pipes, offering a combined discharge capacity of 3,900 cfs.

Over the term of the previous 50-year FERC license, water from the Kerckhoff Reservoir was used for hydropower generation through the K1 and K2 powerhouses. The K1 Powerhouse began operating in 1920 and ceased operation in 2018. During operation of the K1 Powerhouse, water from Kerckhoff Reservoir was directed though a 16,913-foot-long tunnel and penstock and had an authorized installed capacity of 22.72 MW. The K2 Powerhouse began operation in 1983 and continues to operate today. The K2 Powerhouse is located approximately 1.8 miles downstream from K1 Powerhouse structures. Water from the Kerckhoff Reservoir is directed to the K2 Powerhouse

through a 21,632-foot-long tunnel and penstock with maximum flow of 5,100 cfs and has an authorized installed capacity of 140 MW.

Water released for minimum instream flow requirements is controlled through a 75-foot-long, 18-inch-diameter pipe connected to the North Adit, which flows into the SJR approximately 150 feet downstream of the dam. This is facilitated by the North Adit and its associated infrastructure, including a valve capable of releasing up to 50 cfs of water into the river. Table ES-1 provides a summary of license articles and proposed conditions in the FLA.

Table ES-1: Summary of License Articles and Proposed Conditions in the FLA

PG&E's Proposed Condition		Articles in the Current License with which PG&E's Proposed Condition Overlaps	Notes
1	Proposed Retirement Plan for Kerckhoff 1 Powerhouse and Associated Facilities	None	None in current license. The plan has not been modified since the filing of the FLA in November 2020. See Table 8.1-1 of March 2023 Supplemental FLA Filing.
2	American Shad Spawning Season Flow Release Regime Measure	Article 44 (order establishing permanent flow release regime 4/22/93)	Modified to account for the retirement of K1 PH. See Table 8.1-1 of March 2023 Supplemental FLA Filing. Order establishing permanent flow release regime issued April 22, 1993, allows for modification during operating emergencies or lack of inflow.
3	Aquatic Resources Plan (ARP, water temperature for fisheries and mussels)	Article 45. Also 1980 Fishery Agreement Between PG&E and CDFG	Proposed Project proposes different studies with different target species compared to current license. Includes evaluation criteria, sampling, and reporting schedules. Includes mechanism for responding to deleterious changes.

PG&E's Proposed Condition		Articles in the Current License with which PG&E's Proposed Condition Overlaps	Notes
4	Water Temperature Measure	Article 45, as amended. Also 1980 Fishery Agreement Between PG&E and CDFG	Proposed Project proposes change to focus on native fish instead of smallmouth bass. Different temperature criteria with maximum required release remaining at 50 cfs. Compliance point is J-7, which was relocated under current license with concurrence of CDFW per Article 45. Rationale for the new temperature targets is provided in ARP.
	Minimum Instream Flows and Water-Year Type (Not Proposed for Change except as specified in proposed Water Temperature Measure)	Article 45 was amended by the 10/10/88 Order, 1980 Fishery Agreement Between PG&E and CDFG	Specified in ARP and Table 8.1-1. PG&E will continue to implement the minimum instream flow requirement of the current Project license, which specifies that PG&E is required to discharge a minimum flow of 25 cfs during Normal WYs and a minimum of 15 cfs during Dry WYs. See Table 8.1-1 of March 2023 Supplemental FLA Filing, which states for MIF-ongoing (no change). The minimum flow may be modified temporarily: (a) to the extent required by operating emergencies beyond the control of

PG&E's Proposed Condition		Articles in the Current License with which PG&E's Proposed Condition Overlaps	Notes
			the licensee; and (b) for fishery management purposes, upon mutual consent between the licensee and the California Department of Fish and Game."
5	End-of-Spill Flow Recession and Whitewater Flow Releases Measure	None	Although not related Article 40, limits peaking. The Licensee shall operate the project during flood periods in a manner that will not cause peak river flows below Kerckhoff Dam and powerhouse to exceed the peak flows that would have occurred in the absence of the project.
6	Subsequent Spill Ramp Down Measure	None	

PROPOSED PROJECT AND PROPOSED PROJECT ALTERNATIVE EVALUATED IN THIS EIR

The Proposed Project proposes to renew the FERC license for the Kerckhoff Hydroelectric Project for a 50-year term. In general, under the Proposed Project, changes include:

- Retirement of the K1 Powerhouse and its associated facilities resulting in a reduction in hydroelectric energy generation
- Construction of a new recreation facility (Vista Day Use Area)
- Modifications to Proposed Project operations and maintenance activities
- Modifications of the existing FERC Project Boundary
- Implementation of new environmental management measures and monitoring plans
- Installation of one new flow gauge (SJR Above Kerckhoff Reservoir Inflow Gage)
- Upgrade of two manual radial gates on Kerckhoff Dam to be automatically operated

With the retirement of the K1 Powerhouse under the Proposed Project, the maximum diversion capacity for the Proposed Project would decrease by 1,156 cfs. Under the Proposed Project, PG&E would continue to operate in run-of-river mode pursuant to the terms of the current license to generate power and make use of available flow from upstream hydroelectric projects. With retirement of the K1 Powerhouse and appurtenances, up to 5,100 cfs of water would continue to be diverted from Kerckhoff Reservoir through the K2 Powerhouse to generate electricity. In addition to instream flow releases released via the instream flow release pipe, water that is not diverted to the K2 Powerhouse would be spilled at Kerckhoff Dam.

PG&E proposed to implement new environmental management measures over the term of the new license. The Proposed Project's environmental management measures and monitoring plans (refer to EIR Section 2.4.2 *New Environmental Management Measures* for detailed descriptions) are as follows:

- American Shad Spawning Season Flow Release Regime
- Aquatic Resources Plan

- Water Temperature Measure
- End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure
- Subsequent Spill Ramp Down Measure
- Spill Season Flow Measure
- Planned Outage Measure (POM)
- Flow Notifications Measure
- SJR Above Kerckhoff Reservoir Inflow Gage Measure
- Modification of Infrastructure and Procedures Measure
- Wildlife Management Plan
- Vegetation Management and Pest Control Plan
- Project Road and Trail Maintenance Plan
- Recreation Management Plan
- Whitewater Notification and Access Measure
- Historic Properties Management Plan
- Vista Day Use Area Measure

For a complete description of the Proposed Project, see EIR Section 2 *Proposed Project Description*.

PUBLIC INVOLVEMENT AND AGENCY CONSULTATION

The State Water Board initiated public involvement with Notice of Informal Consultation with Responsible and Trustee Agencies Regarding an Environmental Document for Water Quality Certification (Notice) on July 16, 2021. The Notice requested input on the Kerckhoff Hydroelectric Project relicensing CEQA process by August 16, 2021.

On May 30, 2023, the State Water Board released a Notice of Preparation of a Draft EIR for the Proposed Project and a scoping period from May 30 to July 3, 2023, to solicit input on the Proposed Project.

On June 15, 2023, two scoping meetings were held via Zoom. There were no verbal comments received during the scoping period. Four comment letters were received from Reclamation, American Whitewater, PG&E, and CDFW.

This Draft EIR is being circulated for agency and public review. The comment period concludes at 5:00 p.m. on May 26, 2026. The State Water Board will review all comments received on the Draft EIR and 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.

AREAS OF KNOWN CONTROVERSY AND ISSUES TO BE RESOLVED

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

- Number of proposed boating days and boater access at and below Kerckhoff Dam and Diversion Facility
- Feasibility of ramping rates
- Public safety associated with existing and Proposed Project flow releases
- Coordinated water management and operation between SCE's Big Creek 4 and the Proposed Project
- Potential biological resources impacts associated with the Proposed Project to federally and state-listed species including native fish and mollusk species, migratory birds, raptors, amphibians, and special status plants
- Potential ongoing impacts associated with Proposed Project operations to tribal cultural resources and tribal member access for mussel harvest

PROPOSED PROJECT ALTERNATIVE

EIR Section 3 *Alternatives Descriptions* 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.

EIR Section 4 *Environmental Analysis* provides a detailed discussion of the potential environmental impacts of the Proposed Project.

In accordance with CEQA Guidelines, Section 15126.6(e)(2) requires that an ”environmentally superior” alternative be identified. EIR Section 5 *Alternatives Summary* provides a summary of the alternatives analysis and identifies the environmentally superior alternative as Alternative 2 plus the Alternative 1 Ramp Up Measure.

The alternatives evaluated in the Draft EIR include the following:

No Project Alternative: The No Project Alternative analyzed in this document describes the environment should PG&E’s Proposed Project, relicensing the Kerckhoff Hydroelectric Project as proposed by PG&E, not proceed. Under the No Project Alternative, the existing environmental conditions and resources would be maintained as-is through annual licenses issued by FERC while a long-term disposition of the facilities is determined. While operating under annual licenses, the No Project Alternative would operate under the current conditions that are required in the November 8, 1979 FERC license, and any FERC approved amendments. None of the measures or plans developed during relicensing of the Kerckhoff Hydroelectric Project, which are proposed under the Proposed Project, would occur. In the long-term under the No Project Alternative, the final relicensing or disposition of the Kerckhoff Hydroelectric Project facilities is too speculative to analyze and if occurred, would require additional environmental analysis**.**

Alternative 1: Alternative Spill Recession and Flow Ramping: Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures, as described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*. The water years (WYs) in this Alternative are described as spill years versus non-spill years.

Under Alternative 1, the Long-Term Operating Rules (LTOR), which are also implemented upstream of the Kerckhoff Hydroelectric Project by SCE’s Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E’s-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the LTOR replace the down ramping components of the PG&E’s proposed Spill Season Flow Measure. The LTOR are a series of down ramping operations with specific WY’s and

implementation criteria. Under the LTOR, the Proposed Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills is performed in a manner than simultaneously provides boating flows. WY types are identified as spill year or non-spill years.

Since the Big Creek4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach (PBR) of the Proposed Project.

Alternative 1 also aims to increase the number of boating days compared to the Proposed Project. During spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available. The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam until daily flow drops below 1,600 cubic feet per second (cfs). A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, the Alternative 1 Ramp Up Measure would replace the up ramping components of the Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at two gage locations. The ramp up in the PBR cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient storage and powerhouse capacity[1] to meet this requirement.

[1] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

Alternative 2: Proposed Project with BLM Revised 4(e) Conditions: Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project, as described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type.

The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when spill flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type as described in Section 3.4.3.2 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2, implements initial release protocol, which is also a part of the Proposed Project with slightly different implementation criteria, and down ramping operations during planned K2 Powerhouse outages. The initial release protocol, which is subject to sufficient water availability, releases initial spill associated with the outage prior to 3:30 a.m. as measured at Gage J-2. The initial spill would be released when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and

replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

An analysis of the No Project Alternative is compared to the Proposed Project in EIR Section 5.

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, are in EIR Section 4 *Environmental Analysis*.

Table ES-2 summarizes the potential impacts analyzed in the EIR. For each potential impact, it lists the significance of the potential impact for the Proposed Project. Table ES-2 also presents mitigation measures that could reduce the severity of potentially significant impacts. All mitigation measures will be included in the Mitigation, Monitoring, and Reporting Program.

Table 5.1-1 in Section 5 of the EIR provides a comparison of the potential impacts of the Proposed Project and the No Project Alternative.

The EIR identifies potentially significant impacts for the following resources:

- Biological Resources – Aquatics and Fisheries
- Geology and Soils
- Hazards and Hazardous Materials
- Hydrology and Water Quality

These potential impacts are discussed in each resource area in Section 4. As part of the environmental impact analysis for each resource area, mitigation measures have been identified that reduce these potential impacts to less than significant levels.

SIGNIFICANT AND UNAVOIDABLE IMPACTS

The EIR identifies significant and unavoidable impacts for the following resources:

- Air Quality
- Biological Resources – Terrestrial
- Hydrology and Water Quality

CUMULATIVE IMPACTS

Potential cumulative impacts of the Proposed Project when combined with other past, present, and reasonably foreseeable future projects in the geographic area of the Proposed Project were evaluated. The scope of the analysis is 50 years into the future, which reflects the potential term of the FERC relicense. No significant cumulative impacts are anticipated to result from the Proposed Project, with implementation of proposed mitigation measures and environmental management measures and monitoring plans.

Section 6 *Cumulative Impacts* provides a detailed discussion of the potential cumulative impacts of the Proposed Project.

GROWTH-INDUCING IMPACTS

Section 7 *CEQA-Mandated Sections* includes a discussion of potential impacts found not to be significant, significant and unavoidable impacts, significant irreversible changes, and growth-inducing impacts.

Implementation of the Proposed Project would not permanently induce growth in the geographic area (Section 7.4 *Growth-Inducing Impacts*).

Table ES-2: Summary of Proposed Project Impacts and Mitigation Measures

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
Aesthetics					
AE-1) Would the Project have a substantial adverse effect on a scenic vista?	No Impact	None Required	No Impact	No Impact	No Impact
AE-2) Would the Project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	No Impact	None Required	No Impact	No Impact	No impact
AE-3) Would the Project substantially degrade the existing visual character or	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
quality of public views of the site and its surroundings?					
AE-4) Would the Project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	Less than Significant Impact	None Required	Less than Significant	Less than Significant Impact	Less than Significant Impact
Agricultural and Forest Resources					
AF-1) Would the Project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?					
AF-2) Would the Project conflict with existing zoning for agricultural use, or a Williamson Act contract?	No Impact	None Required	No Impact	No Impact	No Impact
AF-3) Would the Project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)),	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?					
AF-4) Would the Project result in the loss of forest land or conversion of forest land to non-forest use?	No Impact	None Required	No Impact	No Impact	No Impact
AF-5) Would the Project involve other changes in the existing environment which, due to their location or nature, could result in	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?					
Air Quality					
AQ-1) Would the Project conflict with or obstruct implementation of the applicable air quality plan?	Significant and Unavoidable Impact	Recommended Mitigation Measure AQ-1 Mitigation Measure GEO-1	Significant and Unavoidable Impact	Significant and Unavoidable Impact	Significant and Unavoidable Impact
AQ-2) Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
non-attainment under an applicable federal or state ambient air quality standard?					
AQ-3) Would the Project expose sensitive receptors to substantial pollutant concentrations?	No Impact	None Required	No Impact	No Impact	No Impact
AQ-4) Would the Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
Biological Resources – Aquatics and Fisheries					
BIO-1) Would the 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 California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	Potentially Significant Impact	Mitigation Measure BIO-1; Mitigation Measure BIO-3	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
BIO-2) Would the 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 California Department of Fish and Game or US Fish and Wildlife Service?	Potentially Significant Impact	Mitigation Measure BIO-3	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated
BIO-3) Would the Project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to,	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?					
BIO-4) Would the 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?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
BIO-5) Would the Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
BIO-6) Would the Project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plan?	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
Biological Resources – Terrestrial					
BIO-1) Would the 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 CDFW or USFWS?	Significant and Unavoidable Impact	Recommended Mitigation Measure BIO-2	Significant and Unavoidable Impact	Significant and Unavoidable Impact	Significant and Unavoidable Impact
BIO-2) Would the Project have a substantial adverse effect on any riparian	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFW or USFWS?					
BIO-3) Would the Project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
BIO-4) Would the 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?	No Impact	None Required	No Impact	No Impact	No Impact
BIO-5) Would the Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
BIO-6) Would the 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?	No Impact	None Required	No Impact	No Impact	No Impact
Cultural Resources					
CR-1) Would the Project cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
CR-2) Would the Project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
CR-3) Would the Project disturb any human remains, including those interred outside of dedicated cemeteries?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Energy					
EN-1) Would the Project result in potentially significant environmental impact due to wasteful,	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
inefficient, unnecessary consumption of energy resources during Project construction or operation?					
EN-2) Would the Project conflict with or obstruct state or local plan for renewable energy or energy efficiency?	No Impact	None Required	No Impact	No Impact	No Impact
Geology and Soils					
GEO-X) Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:					

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
GEO-1. 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?	No Impact	None Required	No Impact	No Impact	No Impact
GEO-2. Strong seismic ground shaking?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
GEO-3. Seismic-related ground failure, including liquefaction?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
GEO-4. Landslides?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
GEO-5) Would the Project result in substantial soil erosion or the loss of topsoil?	Potentially Significant Impact	Mitigation Measure GEO-1; Mitigation Measure WQ-3	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated
GEO-6) Would the Project 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,	Potentially Significant Impact	Mitigation Measure GEO-1	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
subsidence, liquefaction, or collapse?					
GEO-7) Would the Project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
GEO-8) Would the Project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
sewers are not available for the disposal of wastewater?					
GEO-9) Would the Project directory or indirectly destroy a unique paleontological resource or site or unique geologic feature?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Greenhouse Gas Emissions					
GHG-1) Would the Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
GHG-2) Would the Project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Hazards and Hazardous Materials					
HM-1) Would the Project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
HM-2) Would the Project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	Potentially Significant Impact	Mitigation Measure WQ-3	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated
HM-3) Would the Project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
mile of an existing or proposed school?					
HM-4) Would the Project be located on a site that 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?	No Impact	None Required	No Impact	No Impact	No Impact
HM-5) For a project located within an airport land use plan or, where such a plan has not been adopted,	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
within 2 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?					
HM-6) Would the Project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	No Impact	None Required	No Impact	No Impact	No Impact
HM-7) Would the Project expose people or structures, either directly or	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
indirectly, to a significant risk of loss, injury or death involved in wildland fires?					
Hydrology and Water Quality					
HYD-1) Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	Potentially Significant Impact	Mitigation Measure WQ-1; Mitigation Measure WQ-2; Mitigation Measure WQ-3; Mitigation Measure WQ-4	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated
HYD-2) Would the Project substantially decrease groundwater supplies or interfere substantially with	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
groundwater recharge such that the Project may impede sustainable groundwater management of the basin?					
HYD-3X) Would the Project 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 that would:					
HYD-3i. Result in substantial erosion or siltation on or off site?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
HYD-3ii. Substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
HYD-3iii. Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
HYD-3iv. Impede or redirect flood flows?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
HYD-4) In flood hazard, tsunami, or seiche zones, would the Project risk release of pollutants due to Project inundation?	No Impact	None Required	No Impact	No Impact	No Impact
HYD-5) Would the Project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	Potentially Significant Impact	Mitigation Measure WQ-1; Mitigation Measure WQ-2; Mitigation Measure WQ-3; Mitigation Measure WQ-4 Recommended Mitigation Measure WQ-5	Significant and Unavoidable	Significant and Unavoidable	Significant and Unavoidable

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
Land Use and Planning					
LAND-1) Would the Project physically divide an established community?	No Impact	None Required	No Impact	No Impact	No Impact
LAND-2) Would the Project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	No Impact	None Required	No Impact	No Impact	No Impact
Mineral Resources					
MIN-1) Would the Project result in the loss of	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
availability of a known mineral resource that would be a value to the region and the residents of the state?					
MIN-2) Would the Project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	No Impact	None Required	No Impact	No Impact	No Impact
Noise					
NOI-1) Would the Project result in generation of a substantial temporary or	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
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 standards of other agencies?					
NOI-2) Would the Project result in generation of excessive ground-borne vibration or ground-borne noise levels?	No Impact	None Required	No Impact	No Impact	No Impact
NOI-3) For a project located within the vicinity of a	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 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?					
Population and Housing					
PH-1) Would the Project induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
businesses) or indirectly (e.g., through extension of roads or other infrastructure)?					
PH-2) Would the Project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	No Impact	None Required	No Impact	No Impact	No Impact
Public Services					
PS-X) Would the Project result in substantial adverse physical impacts associated with the provision of new or					

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:					
PS-1) Fire protection?	No Impact	None Required	No Impact	No Impact	No Impact
PS-2) Police protection?	No Impact	None Required	No Impact	No Impact	No Impact
PS-3) Schools?	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
PS-4) Parks?	No Impact	None Required	No Impact	No Impact	No Impact
PS-5) Other public facilities?	No Impact	None Required	No Impact	No Impact	No Impact
Recreation					
REC-1) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that the substantial physical deterioration of the facility would occur or be accelerated?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
REC-2) Would the Project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Transportation					
TSP-1) Would the Project conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
TSP-2) Would the Project conflict or be inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b)?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
TSP-3) Would the Project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
TSP-4) Would the Project result in inadequate emergency access?	No Impact	None Required	No Impact	No Impact	No Impact
Tribal Cultural Resources					
TC-X) Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural					

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
value to a California Native American tribe and that is:					
TC-1. 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)	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
TC-2. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
in Subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in Subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.					
Utilities and Service Systems					
USS-1) Would the Project require or result in the relocation or construction of	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?					
USS-2) Would the Project have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry, and multiple dry years?	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
USS-3) Would the Project result in a determination by the wastewater treatment provider that serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the Provider's existing commitments?	No Impact	None Required	No Impact	No Impact	No Impact
USS-4) Would the Project generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
impair the attainment of solid waste reduction goals?					
USS-5) Would the Project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	No Impact	None Required	No Impact	No Impact	No Impact
Wildfire					
WF-1) Would the Project substantially impair an adopted emergency response plan or emergency evacuation plan?	No Impact	None Required	No Impact	No Impact	No Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
WF-2) Would the Project, 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?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
WF-3) Would the Project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities)	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Environmental Resource	Significance Before Mitigation	Mitigation Measures and Recommended Mitigation Measures	Significance After Mitigation: Proposed Project	Significance After Mitigation: Alternative 1. Proposed Project with Alternative Spill Recession and Flow Ramping	Significance After Mitigation: Alternative 2. Proposed Project with BLM Revised 4(e) Conditions
that may exacerbate fire risk or that may result in temporary or ongoing impacts of the environment?					
WF-4) Would the Project 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?	Less than Significant Impact	None Required	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

PG&E = Pacific Gas and Electric Company; State Water Board = California State Water Resources Control Board; TCR = Tribal cultural resource

LITERATURE CITED

FERC (Federal Energy Regulatory Commission). 1993. Order establishing permanent flow release regime for the Kerckhoff Hydroelectric Project (FERC Project No. 96). April. Federal Energy Regulatory Commission, Office of Hydropower Licensing, Washington D.C.

PG&E (Pacific Gas & Electric Company). 2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

1 INTRODUCTION

The California State Water Resources Control Board (State Water Board) prepared this Draft Environmental Impact Report (EIR) in response to Pacific Gas and Electric Company's (PG&E or Applicant) application for a water quality certification for the operation of the Kerckhoff Hydroelectric Project under a new Federal Energy Regulatory Commission (FERC or Commission) license (Proposed Project). The Proposed Project, described and assessed herein, includes continued operations of the existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) with modifications to the Kerckhoff Hydroelectric Project facilities, future operations, and implementation of relevant resource management plans and protection, mitigation, and enhancement (PM&E) measures for environmental resources under a new FERC license. This section provides background information on the Proposed Project and water quality certification process as well as the California Environmental Quality Act (CEQA) process. Figure 1.1-1 provides an overview of the Proposed Project.



PH = powerhouse

Figure 1.1-1: Geographic Overview of the Proposed Project

1.1 BACKGROUND

The Kerckhoff Hydroelectric Project (FERC Project No. 96) is located in the upper San Joaquin watershed, upstream of Lake Millerton in Fresno and Madera counties, California (Figure 1.1-1). The Kerckhoff Hydroelectric Project consists of Kerckhoff Reservoir; Kerckhoff Dam; two powerhouses, Kerckhoff 1 (K1) Powerhouse and Kerckhoff 2 (K2) Powerhouse; tunnels and K2 Powerhouse penstocks; and transmission, operation and maintenance, and access facilities. The K1 Powerhouse contains three Generating Units Nos. 1, 2, and 3. Generating Unit No. 2 is not operational and was removed from the Kerckhoff Hydroelectric Project license in 2013. Generating Units Nos. 1 and 3 are rated at 11.36 megawatts (MW), each at 360 revolutions per minute, for an authorized installed capacity of 22.72 MW. However, Generating Units Nos. 1 and 3 have not operated since 2017, and the K1 Powerhouse has not been in operation since 2018. The K2 Powerhouse includes one hydroelectric generating unit rated at 140 MW at 180 revolutions per minute. The two powerhouses combined have a total installed capacity of 162.72 MW.

As a federal agency, FERC licenses the construction, operation, and decommissioning of most non-federal hydroelectric dams in the United States. On November 8, 1979, FERC issued a 50-year license for the Kerckhoff Hydroelectric Project. The FERC license has an effective period from November 8, 1979, to November 30, 2022.

PG&E filed the a Notice of Intent (NOI) and Pre-Application Document (PAD) for the relicensing of the Kerckhoff Hydroelectric Project with FERC on November 16, 2017. On November 24, 2020, PG&E filed the Final License Application (FLA) with FERC proposing to relicense the Kerckhoff Hydroelectric Project (PG&E 2020).

PG&E subsequently filed a supplement to the FLA on May 27, 2022. On July 25, 2022, FERC issued an Additional Information Request (AIR), and PG&E responded on September 20, 2022, and provided a progress update on January 31, 2023. On March 21, 2023, PG&E updated the Proposed Project with the filing of a Second Supplemental Information Filing in Support of the FLA. The filing included 16 updated environmental management measures and monitoring plans for replacement in the filing from May 27,

2022, as well as an updated evaluation of the potential environmental impacts of the Proposed Project. On July 6, 2023, FERC issued an AIR, and PG&E responded on August 17, 2023, and notified FERC of its plan to update Exhibit G to include Proposed FERC Project Boundary changes that were part of the filing of the Second Supplemental Information Filing in Support of the FLA. On September 29, 2023, PG&E updated the Proposed Project with the filing of a revised Proposed FERC Project Boundary to encompass the expected footprint of the proposed recreation day use area and the proposed operational flow gage upstream of Kerckhoff Reservoir. On January 9, 2024, FERC issued a fourth AIR, to which PG&E responded on February 16, 2024, with clarifications to the existing FERC Project Boundary acreage, locations of PG&E's new instream flow gage, and updated exhibits. On June 27, 2024, FERC issued a Notice of Application Accepted for Filing, Soliciting Motions to Intervene and Protests, Ready for Environmental Analysis (REA) and Soliciting Comments, Recommendations, Preliminary Terms and Conditions, and Preliminary Fishway Prescriptions to solicit stakeholder/agency recommendations, terms and conditions, or prescriptions on the FLA. The United States Forest Service (USFS), the Department of the Interior (including the United States Bureau of Land Management [BLM], United States Fish and Wildlife Service [USFWS], and United States Bureau of Reclamation [Reclamation]), California Department of Fish and Wildlife (CDFW), State Water Board, and American Whitewater filed responses to the REA before the September 25, 2024 deadline. On October 24, 2024, PG&E submitted a request for trial-type hearing on disputed issues of material facts relating to the 4(e) conditions filed by BLM. PG&E and BLM entered into a stay process on December 4, 2024, which led to BLM submitting a revised version of its 4(e) conditions to FERC on May 11, 2025.

Overall, PG&E has applied and amended its application to FERC to relicense the Kerckhoff Hydroelectric Project for a 50-year term with new environmental protection and enhancement measures (Proposed Project). Before FERC can issue a new license, PG&E must obtain a water quality certification from the State Water Board pursuant to Section 401 of the Clean Water Act (CWA) (33 United States Code [USC] Section 1341). CEQA requires a public agency with discretionary authority to issue a certification, permit, or other approval to evaluate the potential environmental impacts of

its action. The State Water Board has prepared this EIR to comply with CEQA (Public Resources Code [PRC], Section 21000 et seq.) before acting on PG&E's application for water quality certification. The State Water Board will issue a determination of whether to issue a water quality certification for the operation of the Proposed Project. CEQA requires the lead agency to prepare an EIR when there is substantial evidence that a project could have a significant effect on the environment. This EIR focuses on potential impacts related to the Proposed Project along the San Joaquin River (SJR) from Kerckhoff Reservoir to the Millerton Lake in Fresno and Madera counties, California, including air quality, biological resources, hydrology and water quality, recreation, and greenhouse gas emissions.

The EIR process is specifically designed to evaluate and disclose the potentially significant direct, indirect, and cumulative effects of the Proposed Project and to describe reasonable alternatives to the Proposed Project that could avoid or reduce those effects, while feasibly attaining most, if not all, of the Proposed Project's basic objectives. These objectives are as follows: 1) Continue to provide renewable energy to help California meet its Renewable Portfolio Standards (RPS); 2) Improve the long-term water quality and associated beneficial use conditions for Kerckhoff Reservoir and the SJR; and 3) Ensure safe contact and non-contact recreation opportunities for members of the public. This EIR includes a discussion of the Proposed Project's compliance with the *Water Quality Control Plan (Basin Plan) for the Sacramento River Basin and the San Joaquin River* (SR/SJR Basin Plan) (Central Valley Regional Water Board 2019) and the protection of beneficial uses of water, as outlined in the SR/SJR Basin Plan. This discussion also serves to inform the public of the two separate and distinct responsibilities before the State Water Board, ensuring compliance with the CWA and complying with CEQA, when considering whether to issue a water quality certification for the Proposed Project, and what conditions to include in the certification.

1.2 WATER QUALITY CERTIFICATION

Section 401 of the Clean Water Act (33 U.S.C. § 1341) requires any applicant for a federal license or permit to conduct any activity which may result in a discharge into waters of the United States to provide the licensing or permitting federal agency with certification that the project will comply with specific provisions of the Clean Water Act, including water quality standards and implementation plans promulgated pursuant to section 303 of the Clean Water Act (33 U.S.C. § 1313). As part of the FERC licensing process, the State Water Board may issue or deny a water quality certification for the Proposed 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.

The Regional Water Quality Control Boards (Regional Water 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 CWA (33 USC Section 1313) and Sections 13240 and 13241 of the California Water Code. When establishing water quality objectives, the Regional Water Boards consider the past, present, and future beneficial uses of the waterbodies; 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 would comply with the applicable basin plan and whether the beneficial uses of the applicable waterbodies would be protected.

Therefore, issuance of a certification requires an analysis of the Proposed Project's potential impacts on water quality, including whether the designated beneficial uses of the SJR identified in the SR/SJR Basin Plan (Central Valley Regional Water Board 2019) would be adequately protected. The determination of the Proposed Project's ability to adequately protect these beneficial uses requires an understanding of Kerckhoff Reservoir 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 potential impacts.

1.3 PURPOSE OF THIS EIR

Under California law, CEQA requires a public agency with discretionary authority to issue a certification, permit, or other approval to evaluate the potential environmental impacts of its action (CEQA Guidelines Section 15002). Issuance of a certification is a discretionary action (PRC Section 21080; CEQA Guidelines Sections 15002(i), 15357).

The State Water Board has the principal responsibility for approving the Proposed Project and is, therefore, the lead agency under CEQA (PRC Section 21067; California Code of Regulations Title 14, Section 15367).

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

This EIR focuses on the changes in the environment that would result from the reissuance of a 50-year FERC license for the Proposed Project. Under CEQA, a project is analyzed for its potential environmental impacts relative to baseline or existing conditions (CEQA Guidelines Section 15125(a)). The existing conditions for this EIR are the physical environmental conditions at the time the Notice of Preparation (NOP) for this EIR was published, which was May 30, 2023.

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

The State Water Board used the following information and agency inputs to prepare this EIR: PG&E's FLA and all amendments thereto; recommendations made by the CDFW and USFWS pursuant to Section 10(j) of the Federal Power Act; requirements of BLM and USFS pursuant to Section 4(e); the *Project Operations Model – CEQA Alternatives 1 and 2* report prepared for the Kerckhoff Hydroelectric Project (included here as

Appendix G); and technical studies that were completed by PG&E as part of the FERC licensing process (PG&E 2020, 2022, 2023), listed as follows by resource area:

- Hydrology Resources
  - HYD 1 – Operations Simulations Model
  - HYD 2 – Hydrology With and Without the Project
- Geology Resources
  - GEO 1 – Channel Form and Fluvial Processes
  - GEO 1-S – Supplemental Channel Form and Fluvial Processes
  - GEO 2 – Project Related Sediment Management Practices in Kerckhoff Reservoir
  - GEO 2-S – Supplemental Project Related Sediment Management Practices in Kerckhoff Reservoir
  - GEO 3 – Project Related Erosion
- Water Quality Resources
  - WQ 1 – Water Temperatures in Kerckhoff Reservoir and Project Bypass Reach
  - WQ 2 – Water Quality Sampling in Project Bypass Reach and Kerckhoff Reservoir
  - WQ 3 – Bioaccumulation in Kerckhoff Reservoir
- Aquatic Resources
  - AQ 1 – Aquatic Habitat Mapping
  - AQ 2 – Fish Populations
  - AQ 3 – Mussels and Aquatic Mollusks
  - AQ 4 – Entrainment
  - AQ 5 – Western Pond Turtles
  - AQ 6 – Rare Aquatic Species
  - AQ 7 – Benthic Macroinvertebrates

- Cultural and Tribal Resources
  - CUL 1a – Archaeological Inventory
  - CUL 1b – Archaeological Resources Evaluation Report
  - CUL 1c – Cultural Resources, Historic-Era Built Environment Inventory and Evaluation
  - CUL 2 – Tribal Resources Inventory and Evaluation Report
- Land Resources
  - LAND 1 – Project Roads and Trails Assessment
- Recreation Resources
  - REC 1 – Whitewater Boating Assessment and Determination on Requests for the Modification of the Approved Whitewater Boating Assessment (REC 1) Revised Study Plan: Whitewater Boating Site Visit Report (2021)
  - REC 2 – Recreation Facility Assessment
  - REC 3 – Recreation Visitor Use
  - REC 4 – Recreation Visitor Use Surveys
- Botanical Resources
  - BOT 1 – Plant Communities, Special Status Plans, and Invasive Weeds
  - BOT 2 – Riparian and Wetland Resources
- Wildlife Resources
  - WILD 1 – Special Status Wildlife Species
  - WILD 1-S – Supplemental Special Status Wildlife Species

1.4 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 PG&E'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.

On July 16, 2021, State Water Board released a Notice of Informal Consultation with Responsible and Trustee Agencies Regarding an Environmental Document for Water Quality Certification for the Proposed Project and requested input by August 16, 2021. The State Water Board initiated further public involvement with the issuance of a Notice of Preparation of a Draft EIR for the Proposed Project (May 30, 2023) and a scoping period from May 30, 2023, to July 3, 2023, to solicit input on the Proposed Project. Two scoping meetings were held via Zoom on June 15, 2023. There were no verbal comments received during the scoping period. Four comment letters were received from Reclamation, American Whitewater, PG&E, and CDFW.

1.4.1 Areas of Known Controversy and Issues to be Resolved

The following are key issues raised during the public involvement and scoping processes:

- Number of boating days and access at the Kerckhoff Dam and Diversion Facility with the Whitewater Run Put-in Access Measure (revised as the Proposed Project's Whitewater Notification and Access Measure; PG&E 2023)
- Rationale for proposed ramping rates
- Public safety regarding ramping rates
- Rationale behind 500 cubic feet per second as the proposed flow level for visual cue flows (also known as deterrence flows)
- Spill Season Protocol Measure management and safe recreation (revised as the Proposed Project's Spill Season Flow Measure; PG&E 2023)
- Coordinated water management and operation between Southern California Edison's (SCE) Big Creek 4 (FERC Project No. P-2017) and the Proposed Project

- Rating curves for the downstream flows
- Potential biological resources impacts associated with the Proposed Project to federally and state-listed species including native fish and mollusk species, migratory birds, raptors, amphibians, and special status plants
- Potential ongoing impacts associated with Proposed Project operations to Tribal cultural resources and Tribal member access for mussel harvest

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 the National Environmental Policy Act (NEPA) (i.e., air quality, greenhouse gas emissions, energy consumption, noise not related to wildlife, transportation, wildfire, and Tribal cultural resources); and
- Determination of the level of significance of potential impacts under CEQA

This Draft EIR is being circulated for agency and public review. The comment period concludes at 5:00 p.m. on May 26, 2026. During the comment period, the State Water Board will also hold a public meeting on the Draft EIR, as described in the Notice of Availability of a Draft EIR. 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 the requirements of CEQA Guidelines Section 15088. The Final EIR will include responses to comments and any changes to the Draft EIR. Written responses will be sent to those public agencies that provided timely comments on the Draft EIR at least 10 days prior to certification of the Final EIR.

The State Water Board will review and consider the EIR, including comments and responses, prior to making a decision on issuance of a water quality certification. If the State Water Board concludes that the EIR reflects the State Water Board's independent judgment and has been prepared in accordance with CEQA and the CEQA Guidelines, the State Water Board will certify the Final EIR (CEQA Guidelines Section 15090). The State Water Board will make findings regarding each significant effect identified in the EIR (PRC Section 21081). The State Water Board will consider the information in the

EIR, along with any other available information, in making its decision on whether and under what conditions to issue water quality certification for the Proposed Project (CEQA Guidelines Section 15121).

1.5 ORGANIZATION OF THE EIR

This EIR is organized into the following sections:

- **Executive Summary:** This section provides an overview of the Proposed Project and the alternatives evaluated in the EIR, a summary of the potential environmental impacts and mitigation measures, and a discussion of areas of controversy and issues to be addressed. The Executive Summary also outlines the Proposed Project objectives.
- **Section 1 *Introduction*:** This section provides an overview of the EIR and the CEQA process and identifies agency responsibilities.
- **Section 2 *Proposed Project Description*:** This section provides the Proposed Project description and background.
- **Section 3 *Alternatives Descriptions*:** This section provides a description of the process used by the State Water Board to identify and select alternatives to be considered and describes each alternative.
- **Section 4 *Environmental Analysis*:** This section presents analysis and discussion of potential environmental impacts and mitigation measures, where applicable, for each resource: Aesthetics; Agriculture and Forestry Resources; Air Quality; Biological Resources – Aquatics and Fisheries; Biological Resources – Terrestrial; Cultural Resources; Energy; Geology and Soils; Greenhouse Gas Emissions; Hazards and Hazardous Materials; Hydrology and Water Quality; Land Use and Planning; Mineral Resources; Noise; Population and Housing; Public Services; Recreation; Transportation; Tribal Cultural Resources; Utilities and Service Systems; and Wildfire.
- **Section 5 *Alternatives Summary*:** This section revisits the alternatives mentioned in Section 3 and identifies an environmentally superior alternative.
- **Section 6 *Cumulative Impacts*:** This section discusses the potential cumulative impacts of the Proposed Project along with any other projects in the vicinity of the site.

- **Section 7 *CEQA-Mandated Sections*:** This section provides a discussion of other CEQA considerations related to the Proposed Project regarding potential growth-reducing impacts, significant irreversible changes, and growth-inducing impacts.
- **Section 8 *List of EIR Preparers*:** This section provides a list of all EIR preparers.
- **Appendices:**

  - Appendix A Project Facilities and Maps
    - Appendix A-1 Project Facilities
    - Appendix A-2 Maps, June 2023
    - Appendix A-3 Maps
  - Appendix B Flow Data
  - Appendix C License Articles and Orders
  - Appendix D Kerckhoff Air Emissions Modeling
    - Appendix D-1 Kerckhoff Summary
    - Appendix D-2 Kerckhoff Detailed Report
    - Appendix D-3 Construction Equipment Usage and Workforce
  - Appendix E Biological Resources – Terrestrial Data
    - Appendix E-1 IPaC Resources List
    - Appendix E-2 Figures
    - Appendix E-3 Tables
  - Appendix F Biological Resources – Aquatics and Fisheries Data
  - Appendix G Project Operations Model – CEQA Alternatives 1 and 2

1.6 INTENDED USES AND AGENCY RESPONSIBILITIES

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

The State Water Board will use this EIR in the issuance of a water quality certification for the Proposed Project. The State Water Board has the authority to issue water quality certifications under CWA Section 401 for FERC licensing decisions and may serve as the lead agency under CEQA. As previously discussed, CWA Section 401 requires any applicant for a federal license or permit to conduct any activity which may result in a discharge into waters of the United States to provide the licensing or permitting federal agency with certification that the project will comply with specific provisions of the Clean Water Act, including water quality standards and implementation plans promulgated pursuant to section 303 of the Clean Water Act (33 U.S.C. § 1313). Conditions of a certification would become conditions of the federal permit or license. Having authority over water quality certification under CWA Section 401, the State Water Board may issue a certification under certain water quality conditions or deny certification based on the Proposed Project's potential impact on the state's waters, as assessed within this EIR. Additionally, although this EIR analyzes potential impacts of the Proposed Project to a broad range of environmental resource areas, implementation of any mitigation measures for resources outside the State Water Board's purview are dependent on agreements to implement such mitigation measures by PG&E or FERC.

The Proposed Project may also be subject to other potential permit approval and consultation requirements with federal, state, and local agencies beyond FERC and the State Water Board. In these instances, information included in this EIR, such as the potential for significant impacts on environmental resources, may be considered.

Federal agencies that may require jurisdictional review, permit approvals, or consultations include the following:

- United States Environmental Protection Agency – regulates discharge of pollutants into waters of the United States via the Federal Water Pollution Control Act of 1972 and CWA
- NPS – regulates the Wild and Scenic River Act of 1968
- USFWS – has jurisdiction under the Endangered Species Act of 1973, Migratory Bird Treaty Act of 1918, Bald and Golden Eagle Protection Act of 1940, and Fish and Wildlife Coordination Act of 1934
- BLM – oversees implementation with the *Bakersfield Field Office Record of Decision and Approved Resource Management Plan* (BLM 2014) and additional oversight for the Wild and Scenic River Act of 1968
- USFS – oversees the implementation of the *Land Management Plan for the Sierra National Forest* (USFS 2023)

State agencies that may require jurisdictional review, permit approvals, or consultations include the following:

- State Water Board – Sections 401 and 402 of the CWA, including the National Pollutant Discharge Elimination System
- Central Valley Regional Water Board – adherence to the SR/SJR Basin Plan
- California State Office of Historic Preservation – Section 106 consultation and review and approval of the Proposed Project's Historic Properties Management Plan
- California Native American Heritage Commission – Section 106 consultation and review and approval of the Proposed Project's Historic Properties Management Plan
- CDFW – administering the California Endangered Species Act, Fish and Game Code, Fish and Wildlife Coordination Act, and Native Plant Protection Act

Regional and local agencies that may require jurisdictional review, permit approval, or consultations include the following:

- San Joaquin Valley Air Pollution Control District – responsible for developing plans, implementing control measures, and enforcing federal and state air quality standards, as well as commenting on the potential for adverse impacts to air quality under CEQA
- Madera County – responsible for county ordinances
- Fresno County – responsible for county ordinances

As summarized above, several agencies have responsibility for issuing permits or approvals for the Proposed Project or for resources that may be affected by the Proposed Project. FERC and the State Water Board expect their licensees will comply with all other federal, state, and local permitting processes, as appropriate.

1.7 LITERATURE CITED

BLM (United States Bureau of Land Management). 2014. *Bakersfield Field Office Record of Decision and Approved Resource Management Plan*. United States Department of the Interior, Bureau of Land Management. December. Accessed: April 3, 2026. Retrieved from: https://www.govinfo.gov/content/pkg/GOVPUB-I53-PURL-gpo83734/pdf/GOVPUB-I53-PURL-gpo83734.pdf.

Central Valley Regional Water Board (Central Valley Regional Water Quality Control Board). 2019. *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region*. Fifth Edition, Revised February 2019 (with Approved Amendments). The Sacramento River Basin and San Joaquin River Basin. Accessed: April 3, 2026. Retrieved from: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201902.pdf.

PG&E (Pacific Gas and Electric Company). 2020. *Final Application for New License for the Kerckhoff Hydroelectric Project, FERC No. 96*. November 20.

____. 2022. *Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96*. May 26.

____. 2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

USFS (United States Forest Service). 2023. *Land Management Plan for the Sierra National Forest: Fresno, Madera, and Mariposa Counties, California.* Accessed: April 3, 2026. Retrieved from: https://acconsensus.org/wp-content/uploads/2024/08/05-SNF_LMP_final_20230504_Web.pdf.

2 PROPOSED PROJECT DESCRIPTION

2.1 BACKGROUND

Pacific Gas and Electric Company (PG&E or Applicant) owns and operates the existing Kerckhoff Hydroelectric Project under a Federal Energy Regulatory Commission (FERC or Commission) license issued on November 8, 1979, for a 45-year term (Kerckhoff Hydroelectric Project). The FERC license expired November 30, 2022, and the Kerckhoff Hydroelectric Project has since been operating under annual licenses issued by FERC that include the same requirements as the 1979 FERC license. The Kerckhoff Hydroelectric Project is comprised of the Kerckhoff Dam and Reservoir, Kerckhoff 1 (K1) Powerhouse, Kerckhoff 2 (K2) Powerhouse, associated water conveyance structures, and a recreation facility (Smalley Cove Recreation Area) at the northeastern end of Kerckhoff Reservoir. The Kerckhoff Hydroelectric Project is located on the San Joaquin River (SJR) approximately 25 miles northeast of the city of Fresno, upstream of Lake Millerton in Fresno and Madera counties, California, and it has an authorized installed capacity of 162.72 megawatts (MW).

Prior to its FERC license expiration, on November 30, 2022, PG&E began the relicensing process by filing a Notice of Intent (NOI)[1] to File an Application for a New License and a Pre-Application Document to relicense (i.e., continue to operate) the Kerckhoff Hydroelectric Project. On November 24, 2020, PG&E filed its Final License Application (FLA) for a New License with FERC proposing to relicense the Kerckhoff Hydroelectric Project for a new 50-year term (PG&E 2020). PG&E subsequently filed updates to its FLA on May 27, 2022 (PG&E 2022), and March 31, 2023 (PG&E 2023a), as well as an updated Proposed FERC Project Boundary (PG&E 2023b, 2023c). The FLA and its subsequent updates propose continued operations of the Kerckhoff Hydroelectric Project with modifications to Kerckhoff Hydroelectric Project facilities and future operations, as well as 16 environmental management measures and monitoring

[1] PG&E's NOI FERC Filling from November 16, 2017, can be found at https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20171116-5044&optimized=false

plans. For the purposes of this Environmental Impact Report (EIR), PG&E's continued operation of the Kerckhoff Hydroelectric Project, including the modifications proposed in PG&E's FLA and subsequent filings, is referred to as the Proposed Project. PG&E filed an application with the California State Water Resources Control Board (State Water Board) for a Clean Water Act (CWA) Section 401 water quality certification for relicensing of the Proposed Project on July 16, 2025 (PG&E 2025).

2.2 LOCATION AND SETTING

The Kerckhoff Hydroelectric Project is defined as the existing Kerckhoff Hydroelectric Project as it is currently built and operated under the existing FERC license agreement. The Proposed Project Area is defined as all lands, waters, and facilities within the revised FERC Project Boundary (Proposed FERC Project Boundary), as described in Section 2.4.3 *FERC Project Boundary Modifications* and displayed in Appendix A *Project Facilities and Maps*. The Project Vicinity is defined as the overall surrounding area in which the Proposed Project is located; this includes the San Joaquin Valley and Madera and Fresno counties.

The Kerckhoff Hydroelectric Project is located in the foothills of the western slope of the Sierra Nevada on the SJR in a sparsely populated area of Fresno and Madera counties, California. The Kerckhoff Hydroelectric Project is in the San Joaquin Hydrologic Region of central California (Central Valley Regional Water Board 2019) and in the upper SJR drainage basin, which is highly developed for hydroelectric generation, flood control, and irrigation storage. The local drainage area is known as the Auberry watershed (Central Valley Regional Water Board 2019).

Upstream of the Kerckhoff Hydroelectric Project are two other hydroelectric projects: (1) the Big Creek No. 4 Project (FERC Project No. 2017) owned and operated by Southern California Edison (SCE); and (2) the Crane Valley Hydroelectric Project (FERC Project No. 1354), owned and operated by PG&E. The Big Creek No. 4 and Crane Valley Hydroelectric Projects currently operate independently and discharge water into Kerckhoff Reservoir. Figure 2.2-1 presents a geographic overview of the Kerckhoff Hydroelectric Project and shows its location in relation to other nearby hydroelectric projects.

Water passing through Kerckhoff Dam and the K1 and K2 powerhouses flows into the SJR and is captured downstream in Millerton Lake. Millerton Lake is located approximately 9.8 miles downstream of Kerckhoff Dam and is operated by the United States Bureau of Reclamation (Reclamation) (see Figure 2.2-1). A water flow schematic, including gage locations, is presented on Figure 2.2-2Figure 2.2-2.

The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by PG&E, and on public lands administered by the United States Forest Service, Sierra National Forest (USFS-SNF); United States Bureau of Land Management (BLM); and Reclamation under BLM management. Land ownership within the FERC Project Boundary of the existing Kerckhoff Hydroelectric Project (existing FERC Project Boundary) is summarized below and is based on owner and acreage information approved by FERC on February 9, 2007. Figure 2.2-3 displays land ownership within and around the existing FERC Project Boundary.

The following are the existing FERC Project Boundary lands:

- Federal land: 328.1 acres
- PG&E-owned land: 162.5 acres
- Other privately owned land: 41.1 acres
- Total acres: 531.7 acres



PH = powerhouse

Figure 2.2-1: Geographic Overview of the Kerckhoff Hydroelectric Project and Nearby Hydroelectric Projects

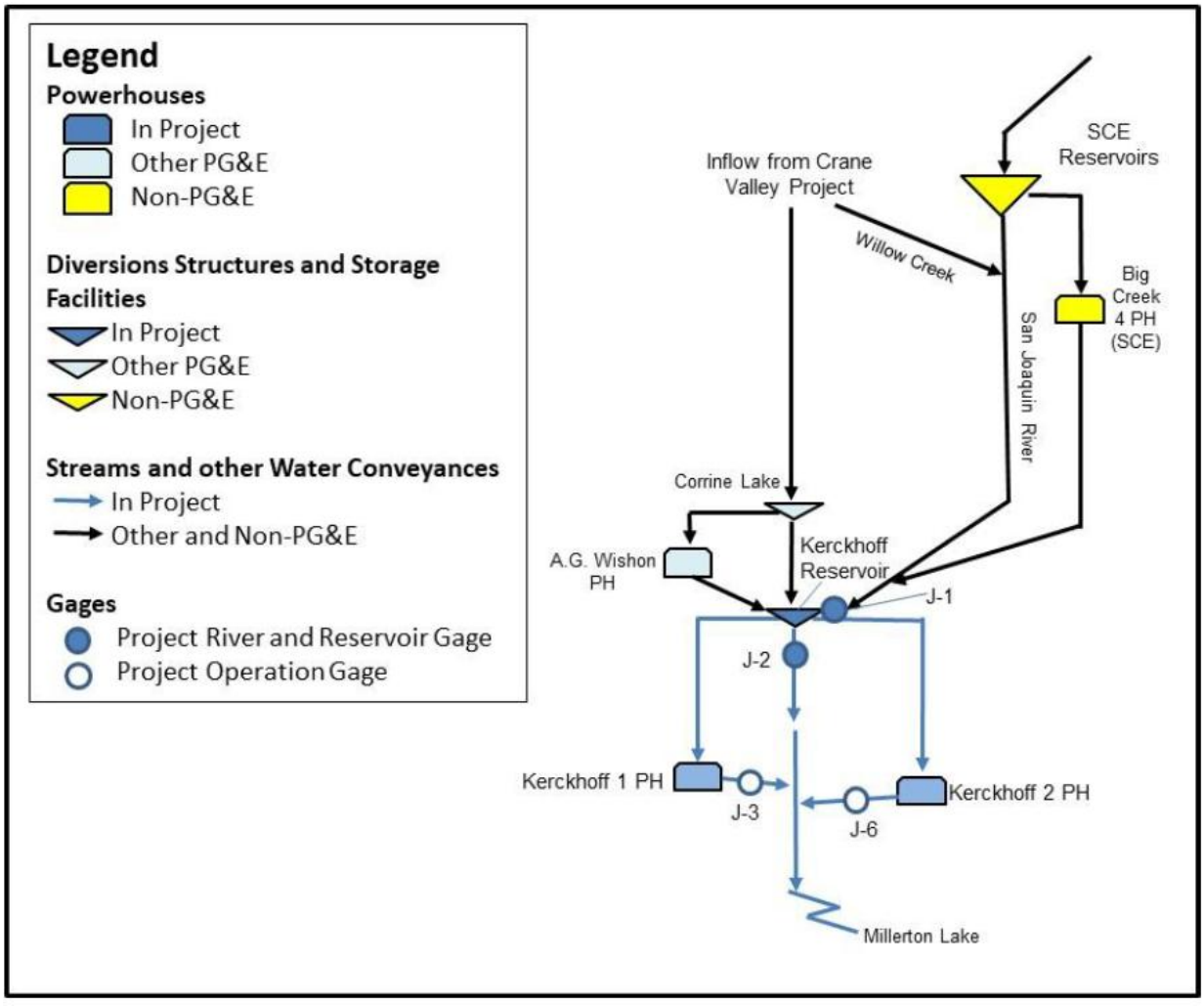


Figure 2.2-2: Project Schematic of Regional Flow and Gages

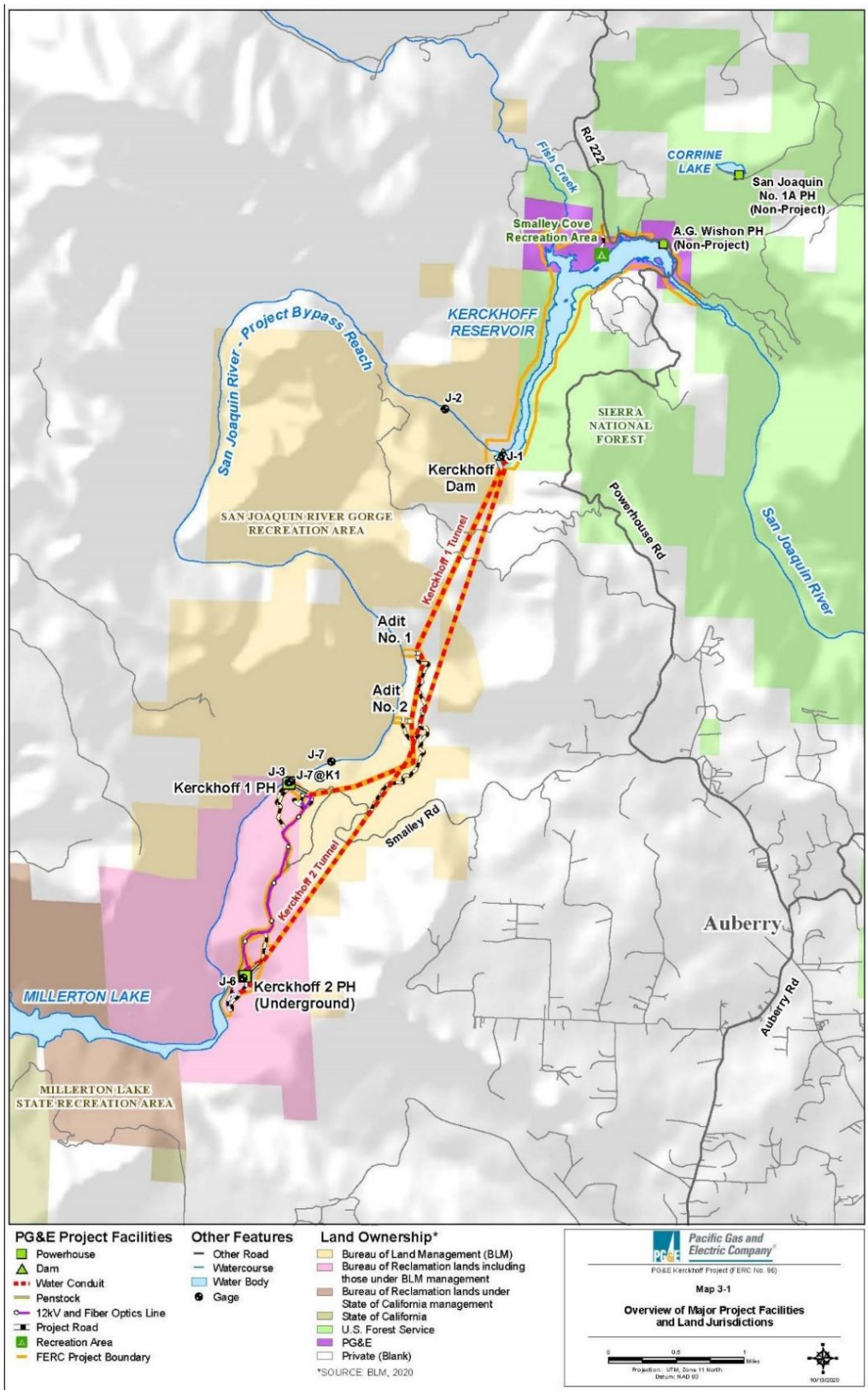


Figure 2.2-3: Overview of Major Project Facilities and Land Jurisdiction

2.3 EXISTING KERCKHOFF HYDROELECTRIC PROJECT

2.3.1 Existing Facilities

2.3.1.1 Kerckhoff Dam

Construction of Kerckhoff Dam was completed in 1920. The dam is a concrete arch dam with a crest length of 507 feet and a maximum height of 114.5 feet as measured from the base of the dam located at 880 feet above mean sea level (msl) to the top of the dam located at an elevation of 994.5 feet msl. The height of the dam from the base to the top of the spillway crest is 91 feet. Locked gates located at each end of the dam prevent the public from accessing or crossing the dam.

Fourteen radial gates control spill from the dam. These gates are 20.0 feet wide and 14.3 feet high, as measured from the top of the dam crest at 971.3 feet msl to the top of the gates at 985.7 feet msl. Spill Gates 1 through 9 are manually operated, and Gates 10 through 14 are automatically operated. Four stationary and two movable gate hoists located on a track above the gates are used to control the gates. The 5 automatic gates have a maximum discharge capacity of 2,800 cubic feet per second (cfs) each, and the 9 manual gates have a discharge capacity of 3,300 cfs each. Accordingly, when all the gates are fully open, they have a combined spill capacity of approximately 43,700 cfs.

The dam is equipped with 3 low-level outlet pipes, each with a 72-inch diameter, that are located at an invert elevation of 897.2 feet msl and have a maximum combined discharge capacity of 3,900 cfs. The gates are covered with a trashrack.

Two notable improvements were completed in late 2016: (1) the replacement of the Gates 3 and 4 trunnion assembly; and (2) the replacement of the low-level outlet control gates, which included a new steel liner, 72-inch by 72-inch cast iron slide gates, an adaptor plate anchored to the dam, stem and stem guides, actuator pedestals, electric actuators, a load control panel, and a trash rack (PG&E 2023b).

The current license requires PG&E to maintain a minimum instream flow (MIF) below the dam of 25 cfs during normal water years (WYs) and 15 cfs during dry WYs. MIFs

are provided through an approximately 75-foot-long, 18-inch-diameter instream flow release pipe connected to the North Adit, which originates from the K1 Tunnel. Water from the instream flow release pipe is released into the SJR approximately 150 feet downstream of the dam.

2.3.1.2 Kerckhoff Reservoir

Kerckhoff Reservoir is formed by Kerckhoff Dam. The normal daily operating range of the reservoir is 4.5 feet between the elevations of 980 feet msl and 984.5 feet msl. At a normal maximum water surface elevation of 985 feet msl, the reservoir has a surface area of 175 acres, is approximately 3.0 miles long, and has a shoreline length of approximately 10.3 miles based on recent high-resolution field data collection (e.g., light detection and ranging [LiDAR] sensing system). At an elevation of approximately 985.7 feet msl (the top of the gates), the reservoir originally had a gross storage capacity of 4,252 acre-feet. However, because of sedimentation that occurred primarily prior to 1940 (PG&E 2020), the Kerckhoff Reservoir currently has an estimated usable capacity of approximately 2,434 acre-feet at the normal maximum water surface elevation of 985 feet msl with an operational storage of 692 acre-feet.

2.3.1.3 K1 Powerhouse and Associated Facilities

The K1 Powerhouse and associated facilities include an intake structure located in the reservoir near the south shore, approximately 200 feet upstream of the dam within Kerckhoff Reservoir; a 16,913-foot-long tunnel; a surge chamber; two penstocks; the K1 Powerhouse containing two generating units; and a switchyard. The K1 Powerhouse is located approximately eight miles[2] downstream of Kerckhoff Dam. After passing through the powerhouse, water is discharged directly into the SJR. These facilities are described in the following subsections. Proposed changes to the K1 Powerhouse and associated facilities are included in Section 2.4.1.1 *Retirement of K1 Powerhouse and Modification of Associated Facilities*.

[2] Mileage reflects latest information based on geographic information system (GIS) analysis.

2.3.1.3.1 K1 Powerhouse

The K1 Powerhouse went into operation on August 15, 1920. The powerhouse is a reinforced concrete structure and approximately 45 feet long by 99 feet wide. The building that holds the K1 Powerhouse has multiple floors. The building floor where the turbines are located is below the ground surface and has rock walls. The powerhouse is operated semi-automatically with supervisory control from PG&E's Fresno Operating Center.

The powerhouse contains 3 vertical reaction-type Francis turbines with 15,000 horsepower (hp) each, known as Generating Units Nos. 1, 2, and 3. Generating Unit No. 2 is not operational and was removed from the Kerckhoff Hydroelectric Project license in 2013. Generating Units Nos. 1 and 3 have not operated since 2017. These two units are rated at 11.36 MW each, for an authorized installed capacity of 22.72 MW. When Generating Units No. 1 and 3 were operating, the total maximum flow through the powerhouse was 1,156 cfs. After passing through the powerhouse, water was discharged directly into the SJR.

2.3.1.3.2 K1 Intake Structure, Tunnel, Adits, and Surge Chamber

The K1 Intake Structure is located in Kerckhoff Reservoir, near the south shore, about 200 feet upstream of Kerckhoff Dam. The intake structure, constructed of reinforced concrete, is about 29.5 feet long by 26 feet wide and 74.3 feet high. The invert elevation of the intake is 942 feet msl.

The intake structure houses 2 steel slide gates, each approximately 8.5 feet wide and 21.4 feet high. These gates are operated with electric hoists located on a platform above the gates. The gate operation platform is accessible by a concrete walkway that extends from the bedrock that forms the south shore of the reservoir to the top of the intake structure. A 3-foot-long by 3-foot-wide bypass gate is located below the main gates just above the tunnel intake. This bypass gate is operated using a manual control located at the top of the intake structure, at the base of the gate operation platform. A trash rack located on the upstream side of the intake structure spans the gate openings and prevents debris from entering the tunnel through the gates.

Water passing through the gates enters the K1 Tunnel, which is approximately 16,913 feet long, as measured from the gatehouse to the surge chamber above the K1 Powerhouse. The tunnel cross section is square in shape with an arched top. The typical tunnel cross section has a bottom width and wall height of 17 feet and an arch top with a 19.3-foot radius. The tunnel is unlined, except for short sections at the intake and at the downstream portals. The tunnel has the capacity to convey 1,700 cfs of water.

Three adits intersect the K1 Tunnel and are located within the existing FERC Project Boundary. Adit 1 is located approximately 8,164 feet downstream of the intake, and Adit 2 is located approximately 11,097 feet downstream of the intake. Both adits are approximately 120 feet long and measure approximately 20 feet in cross section. The adits have been sealed with concrete walls about 200 feet from their entrance, so the adits and the access to the tunnel via the adits are no longer accessible. A 20-inch-diameter steel pipe passes through the concrete seal in Adit 2.

The North Adit intersects the K1 Tunnel approximately 366 feet downstream of the intake structure. This adit is 16 to 18 feet wide in cross section and is approximately 507.5 feet long with an 18-inch concrete shaft that connects to the instream flow release pipe. The MIFs are provided through an approximately 75-foot-long, 18-inch-diameter instream flow release pipe connected to the North Adit. In July 2021, PG&E replaced the instream flow release valve that controls flow from the tunnel into the instream flow release pipe, which extends down to a release point at the SJR. This work entailed replacing the valve and piping sections; upgrading tunnel lighting; improving the walkway, wiring, and pipe supports; replacing the existing gate access; and configuring the new valve for remote operation. The instream flow release valve is capable of releasing up to 50 cfs. Water from the instream flow release pipe would continue to be released into the SJR approximately 150 feet downstream of the dam.

A surge chamber is located near the downstream tunnel portal. It is an unlined vertical shaft consisting of two sections. The lower section has a maximum diameter of 40 feet at the bottom (elevation of 930 feet msl). The upper section is approximately 17 feet in

diameter from an elevation of 980 feet msl to the surface at an elevation of 1,005 feet msl. The top of the surge chamber is covered by a chain-link mesh, and it is enclosed by an 8-foot-high, chain-link fence to prevent public access.

2.3.1.3.3 K1 Penstocks

The K1 Tunnel connects to 2 steel pipes with 96-inch diameters at a bulkhead located at the top of the penstocks. Below the bulkhead, the buried penstocks are constructed of riveted steel pipe that varies in diameter from 96 to 84 inches and has a plate thickness that varies from 0.3125 inch to 0.6875 inch. Water entering the penstocks can be controlled by rising stem, electric motor-powered, 96-inch-diameter valves located on a platform structure above the steel pipes. Penstock No. 1 is 913 feet long, and Penstock No. 3 is 946 feet long.

The K1 Penstock No. 2 is not operational and is no longer a part of the Kerckhoff Hydroelectric Project license. PG&E permanently closed and sealed the main shutoff and bypass valves at K1 Penstock No. 2 (i.e., the Generating Unit No. 2 penstock), removed an approximately 12-foot-long section of the penstock immediately downstream of the shutoff valve, removed exposed air valves and cap, and permanently closed the turbine shutoff valve.

2.3.1.3.4 K1 Switchyard

The K1 Switchyard is located on a steep hillside immediately behind the K1 Powerhouse. The transformers are located on a concrete-floored bench carved into the hillside on the south rear exterior of the building. The system has two outdoor transformer banks consisting of one three-phase and seven single-phase 6.6/115-kilovolt (kV) transformers (one spare, three in-place spares from retired Generating Unit No. 2, and three in service for Generating Unit No. 3). Three 115 kV circuit breakers are provided for outgoing transmission circuits. Three sets of 115 kV transmission lines exit the switchyard, but these transmission lines are not part of the Kerckhoff Hydroelectric Project license (FERC 1998).

2.3.1.4 K2 Powerhouse and Associated Facilities

The K2 Powerhouse and associated facilities include an intake structure located within the reservoir, near the south shore; a 21,632-foot-long tunnel; a surge tank/chamber; a penstock; and the K2 Powerhouse, containing 1 generating unit; and a switchyard. The K2 Powerhouse is located underground, approximately 9.8 miles downstream of Kerckhoff Dam, and 1.8 miles downstream from the K1 Powerhouse (refer to Appendix A *Project Facilities and Maps*: Appendix A-2 *Maps, June 2023*, Maps A2-2a through A2-2e). After passing through the powerhouse, water is discharged into the SJR via a discharge tunnel and channel. These facilities are described in the following subsections.

2.3.1.4.1 K2 Powerhouse

The K2 Powerhouse is an underground circular chamber that is approximately 85 feet in diameter and 124 feet high. The powerhouse has three floors—a basement floor, a turbine floor, and a generator floor. The powerhouse contains 1 vertical Francis-type turbine with 190,000 hp and a generator unit rated at 140 MW. An underground chamber, housing transformers and switching gear, connects to the powerhouse.

The total maximum flow through the powerhouse is 5,100 cfs. After passing through the powerhouse, water is discharged into the SJR by a concrete-lined discharge tunnel and tailrace channel. The discharge tunnel is 25 feet in diameter and approximately 531 feet long. It connects to an open tailrace channel that has a base width of 40 feet and 4:1 side slopes. Flow from the discharge tunnel into the tailrace channel is controlled by 2 hydraulically operated, 13-foot-wide by 19-foot-high gates housed in a discharge structure located near the east bank of the SJR.

There are operational limitations of the K2 Powerhouse stemming from a rough operating zone (ROZ) between diversions of 1,744 cfs and 3,117 cfs and derating of the K2 Powerhouse. The ROZ causes excessive cavitation to the runner and substantial vibration that damages equipment, resulting in costly repairs and increased outage durations. Additionally, excessive start/stop cycling and cycling through high stress zones is infeasible from an asset health and reliability perspective. Operating strategies

that would require repeated short-interval oscillations across the ROZ are not part of the current operating regime, because it can increase cycling wear and raise reliability or maintenance risk even if each individual crossing is brief (personal email communication, J. Hartman and C. McCormick, March 5, 2026). As a practical indication of existing operations, the K2 Powerhouse typically passes through the ROZ a limited number of times per day. When Millerton Lake levels exceed the K2 Tailrace elevation (approximately 545 feet msl), there is a reduction of the effective head on the unit, limiting output and reducing efficiency. When Millerton Lake is at its maximum water surface elevation, K2 Powerhouse throughput is reduced by approximately 750 cfs. The reduction of the effective head of the K2 Powerhouse due to Millerton Lake elevations results. Additionally, to operate the K2 Powerhouse requires a minimum reservoir elevation of 980 feet msl and a minimum flow of 580 cfs (PG&E 2020). If the reservoir drops below this elevation or minimum flows are not available, flows are not diverted through the K2 Powerhouse. These factors add additional constraints to K2 Powerhouse operations.

2.3.1.4.2 K2 Intake Structure, Tunnel, and Surge Tank/Chamber

The K2 Intake Structure is located in Kerckhoff Reservoir, at the south shore, about 100 feet upstream of the K1 Intake Structure. The K2 Intake Structure is constructed of reinforced concrete that measures approximately 43 feet long by 52 feet wide and 63 feet high. The bottom of the structure is located at an elevation of 934 feet msl, and the top of the structure is located at 997 feet msl; so, at the normal maximum operating water surface elevation, all but the top 12 feet of the structure is submerged. The intake structure is equipped with two fixed-wheeled steel gates. Both gates are 10.6 feet wide by 24.6 inches high, and they are designed to close under flowing conditions and open (crack open) under differential pressure for tunnel fill only. The gates are closed under gravity with a hydraulic motor providing breaking force and are opened using a common cable hoist located in the gatehouse on top of the intake structure, immediately above the gates. A slanted steel trashrack located on the upstream side of the intake structure spans the gate openings and prevents debris from entering the tunnel through the

gates. The trashrack is fitted with a mechanical trash rake to remove debris from the rack.

A 25-foot-long, reinforced transition connects the intake structure to the K2 Tunnel. The K2 Tunnel has a circular, machine-excavated cross section, which is 24 feet in diameter. The K2 Tunnel is unlined and is approximately 21,632 feet long, as measured from the end of the transition to the centerline of the surge chamber located near the top of the penstocks. A rock trap is located in the main tunnel, just upstream of the surge chamber. An 8-foot-diameter adit tunnel intersects the main tunnel just upstream of the rock trap. The adit is closed with a plug and has a locked steel gate to prevent unauthorized access to the plug.

The surge chamber is a 216.8-foot-high, vertical shaft that extends from the K2 Tunnel to the ground surface. The surge chamber includes three sections. The lowest elevation section is 20 feet in diameter where it intersects the K2 Tunnel. The middle section is 71 feet in diameter, and the upper section is 110 feet in diameter. The surge chamber is capped at the surface by a 34-foot-high, 111.5-foot-diameter, above-ground steel surge tank. A 9.5-foot-diameter orifice located just above the intersection of the tunnel and the surge chamber is used to control flow into the surge tank.

2.3.1.4.3 K2 Penstock

The K2 Tunnel connects to the buried K2 Penstock, which is approximately 1,013 feet long. The penstock includes three sections. The upper section is 20 feet in diameter, 481 feet long, and concrete-lined. The middle section is 18 feet in diameter, 338 feet long, and concrete-lined. The lower section, which enters the powerhouse chamber, is 15 feet in diameter, 194 feet long, and steel-lined. A penstock construction access tunnel intersects the penstock. PG&E has blocked off this construction access tunnel because it is no longer in use. According to PG&E, approximately once every 10 years, PG&E drains the water from the K2 Penstock via the K2 Penstock Construction Access Tunnel Drainage Channel to the SJR for planned maintenance or emergency circumstances.

2.3.1.4.4 K2 Switchyard

The K2 Switchyard is located at ground level immediately above the underground powerhouse near the east bank of the SJR, occupying an area that measures approximately 152 feet long and 177 feet wide. The switchyard contains the main transformer and four 115 kV circuit breakers. Two sets of 115 kV transmission lines exit the switchyard, but these transmission lines are not part of the Kerckhoff Hydroelectric Project license (FERC 1998).

2.3.1.5 Kerckhoff Hydroelectric Project Roads and Trails

The roads and trails used to access Kerckhoff Hydroelectric Project facilities are listed in Appendix A *Project Facilities and Maps:* Appendix A-1 *Project Facilities*, Table A1-1. PG&E performs maintenance on Kerckhoff Hydroelectric Project roads based on an annually generated maintenance program. In addition, corrective actions and maintenance are performed on an as-needed basis for other roads and trails. The locations of the Kerckhoff Hydroelectric Project roads and trails are shown in Appendix A *Project Facilities and Maps:* Appendix A-2 *Maps, June 2023*, Maps A2-2a through A2-2e.

2.3.1.6 Ancillary Support Facilities and Features

The following ancillary facilities and features are used to support operation of the Kerckhoff Hydroelectric Project.

2.3.1.6.1 Runoff Piping above K2 Intake Structure (at Kerckhoff Reservoir)

The K2 Intake Structure is situated in an alcove between two bedrock walls and below a relatively steep natural drainage, which discharges into Kerckhoff Reservoir. An approximate 5-foot-diameter corrugated metal pipe is installed in the drainage, upstream of the K2 Intake Structure. The pipe is used to collect water from the drainage and direct it around the intake, discharging into Kerckhoff Reservoir.

2.3.1.6.2 Boat Docks on Kerckhoff Reservoir

Kerckhoff Dam is only accessible by boat or helicopter. Boats are launched from a dock on the north end of the reservoir near the A.G. Wishon Powerhouse, which is a part of

PG&E's Crane Valley Hydroelectric Project, for transit to a small private dock located on the south shore of the reservoir near Kerckhoff Dam. At Kerckhoff Dam, a series of trails and stairways extends from the dock and the intake structures to the south abutment of the dam. Fencing between the boat dock and the intake structures and dam prevents public access from the dock to these facilities.

2.3.1.6.3 Wood Storage Building on Slope above Intake Structures

A small wooden storage building is located on the hillslope above the intake structures on the south end of Kerckhoff Reservoir. The building is accessed by a stairway near the dam.

2.3.1.6.4 Metal Storage Building between Boat Dock and K2 Intake Structure

A small metal storage building is located between the boat dock on the south end of Kerckhoff Reservoir and the K2 Intake Structure.

2.3.1.6.5 K1 Headworks and Control House near K1 Powerhouse

Two buildings are located near the K1 Powerhouse at the end of Access Road 6C at the K1 penstocks.

2.3.1.6.6 Communication Building

The Communication Building was formerly used as a hoist house to operate a tramway for construction and operation of the K1 Powerhouse and is now used to support communications. Originally developed in 1919, the Communication Building is located near the intersection of Access Road 6 and Access Road 5. The building, built of reinforced concrete, located at the top of the old tramway alignment, is 21 feet long by 17 feet wide. All that remains of the tramway are short spans of wooden ties and cable guide towers.

2.3.1.6.7 Warehouse and Laydown Storage Area near the K1 Powerhouse

A small warehouse building is located near the K1 Powerhouse near the intersection of Access Road 5 and Access Road 7. A laydown storage area is located at the end of Access Road 5.

2.3.1.6.8 Flood Wall at the K1 Powerhouse

A protective flood wall approximately 45 feet long is located near the K1 Powerhouse to the northeast.

2.3.1.6.9 K2 Tunnel Vent

The K2 Tunnel vent is located along the north side of Access Road 2 within the alignment of the K2 Tunnel. The vent is installed on an approximately 15-square-foot concrete pad.

2.3.1.6.10 Staging Area near the K2 Tunnel Portal

A staging area is located at the end of Access Road 6A.

2.3.1.7 Helicopter Landing Zones

PG&E uses six helicopter landing zones (HLZs) in the Kerckhoff Hydroelectric Project vicinity for operation. Four HLZs (J-1, J-2, the J-2 low-flow measurement site, and J-7) are used to access gaging stations. One HLZ is located near Smalley Cove Campground within the Smalley Cove Recreation Area, and another HLZ is located near the K2 Powerhouse (Appendix A *Project Facilities and Maps:* Appendix A-2 *Maps, June 2023*, Maps A2-2a through A2-2e). On May 4, 2023, a landslide was reported to FERC at the HLZ near Kerckhoff Dam. This site is continuously monitored for further movement and is included in the Dam Safety Surveillance and Monitoring Plan which is filed with FERC as part of ongoing dam safety compliance.

2.3.2 Mechanical, Electrical, and Transmission Equipment

In addition to the facilities and equipment discussed in Section 2.3.1 *Existing Facilities*, the Kerckhoff Hydroelectric Project also includes communication and distribution lines and gages as summarized below.

2.3.2.1 Communication, Distribution, and Transmission Lines

The Kerckhoff Hydroelectric Project includes the fiberoptics and 12 kV pole line, which extends approximately 1.7 miles from the K2 Switchyard to a non-Kerckhoff Hydroelectric Project substation near the K1 Headworks, including a 240-foot spur near

the Communication Building at the intersection of Access Road 6 and Access Road 7. In addition, a 6.6 kV overhead line extends approximately 700 feet from this substation to the K1 Powerhouse (specifically the powerhouse bus work). No primary transmission lines are associated with the Kerckhoff Hydroelectric Project.

2.3.2.2 Gages

PG&E currently maintains a network of gaging stations that measure the water elevation of the reservoir and discharge rates in the SJR. No instrumentation is available on Kerckhoff Dam. All leakage flows directly into the SJR and is measured with the instream flow release at Gage J-2. Table 2.3-1 lists the Kerckhoff Hydroelectric Project reservoir, river, and operational gages. PG&E has two Kerckhoff Hydroelectric Project operation gages:

- Gage J-3 (United States Geological Survey [USGS] Gage No. 11246950) measures the outflow from the K1 Powerhouse
- Gage J-6 (USGS Gage No. 11247050) measures the outflow from the K2 Powerhouse
- The following three gages are used for license compliance:
    - Gage J-2 measures MIFs per Article 45
    - Gage J-7 monitors water temperature upstream of the K1 Powerhouse per License Article 45[3]
    - Gage J-5 (USGS Gage No. 11250100 at Millerton Lake), a non-Kerckhoff Hydroelectric Project gage, monitors American shad (*Alosa sapidissima*) flow compliance per License Article 45

PG&E relocated the J-7 water temperature gage to the K1 Powerhouse (J7@K1 site) in 2020 with concurrence from the California Department of Fish and Wildlife (CDFW). Measurement information for Gages J-2 and J-7 are publicly accessible online at the

[3] Since 2015, PG&E has been monitoring water temperature at Gage J-2 location downstream of Kerckhoff Dam and at Gage J-7.

California Department of Water Resources (CDWR) California Data Exchange Center (CDEC).

Table 2.3-1: Kerckhoff Hydroelectric Project Reservoir, River, and Operational Existing Gages

Gage	PG&E Gage Name	USGS Gage No.	USGS Gage Name	Purpose
Reservoir Gage	J-1	11246650	Kerckhoff Reservoir	Compliance gage that measures the water surface elevation in Kerckhoff Reservoir.
River Gage	J-2	11246700	San Joaquin River near Auberry, California	Full range streamflow record. Compliance gage for MIF releases per Article 45.
Operation Gage	J-3	11246950	Kerckhoff Powerhouse No. 1	Outflow from the K1 Powerhouse.
Operation Gage	J-6	11247050	Kerckhoff Powerhouse No. 2	Outflow from the K2 Powerhouse.
Water Temperature Gage for License Compliance	J-7	—	—	Water temperature monitoring location per License Article 45. Gage moved to the K1 Powerhouse in 2020 (J-7@K1 site).
Non-Project Gage for License Compliance	J-5	11250100	Millerton Lake	Non-Kerckhoff Hydroelectric Project gage used for compliance to provide American shad

Gage	PG&E Gage Name	USGS Gage No.	USGS Gage Name	Purpose
				spawning flows per License Article 45.

No. = number; PG&E = Pacific Gas and Electric Company; USGS = United States Geological Survey

2.3.3 Turbines and Generators

The Kerckhoff Hydroelectric Project includes two powerhouses—K1 and K2—as described in Section 2.3.1.3 *K1 Powerhouse and Associated Facilities* and Section 2.3.1.4, *K2 Powerhouse and Associated Facilities*. A summary of the number, type, and rated capacity of the existing turbines and generators associated with the Kerckhoff Hydroelectric Project is provided below. The turbines and generators in the K1 Powerhouse are proposed for retirement.

- **K1 Powerhouse**. The K1 Powerhouse originally contained 3 vertical reaction-type Francis turbines with 15,000 hp each. However, Generating Unit No. 2, which is not operational, is no longer part of the Kerckhoff Hydroelectric Project FERC license. Generating Units Nos. 1 and 3 are rated at 11.36 MW, each at 360 revolutions per minute, for an authorized installed capacity of 22.72 MW. However, neither of these units is currently operational, and PG&E proposes to retire the turbines and generators in the K1 Powerhouse as part of the Proposed Project
- **K2 Powerhouse**. The K2 Powerhouse contains 1 vertical Francis-type turbine with 190,000 hp with a generator unit rated at 140 MW at 180 revolutions per minute. A ROZ occurs during flows of approximately 1,600 to 3,200 cfs that generate 42 to 92 MW. Operating within the ROZ causes excessive cavitation on the runner and significant vibration that damages equipment, requiring repairs and increasing the duration of outages. As such, the unit is programmed to minimize the amount of time in this range and does not allow the operator to select a load within this range. The K2 Powerhouse requires a minimum flow of approximately 580 cfs to generate electricity. When Millerton Lake levels are high, these create a backwater at the K2

Powerhouse tailrace resulting in the de-rating of the K2 Powerhouse until Millerton Lake water surface elevations have decreased

2.3.4 Routine Maintenance Activities

As part of the Kerckhoff Hydroelectric Project maintenance (PG&E 2020), PG&E implements routine maintenance activities to do the following:

- Ensure safe and reliable operation of Kerckhoff Hydroelectric Project facilities
- Protect worker and public health and safety by implementing vegetation management, pest management, and erosion control measures
- Provide facility access by maintaining roads and trails
- Maintain facilities by implementing equipment maintenance and facility painting

Routine maintenance activities conducted in the vicinity of Kerckhoff Hydroelectric Project facilities include inspections and maintenance, sediment management, vegetation management, pest management, road and trail maintenance, recreation facility maintenance, power line and communication maintenance, facility painting, and other activities (PG&E 2020).

2.3.5 Existing Operation

2.3.5.1 Minimum Stream Flows

The existing FERC license, issued in 1979, and subsequent FERC orders and amendments govern Kerckhoff Hydroelectric Project operations. PG&E operates the Kerckhoff Hydroelectric Project pursuant to the terms of the current license to generate power and to make use of available flow from upstream hydroelectric projects. The Kerckhoff Hydroelectric Project is operated to provide the required MIFs, flows to protect American shad, and flows to maintain water temperatures for the protection of smallmouth bass (*Micropterus dolomieu*), as described in Article 45 of the Kerckhoff Hydroelectric Project license, as amended by the April 22, 1993 Order Establishing Permanent Flow Release Regime (FERC 1993):

- PG&E shall discharge a minimum flow of 25 cfs downstream of Kerckhoff Dam during normal years and a minimum flow of 15 cfs during dry years, with additional releases as determined necessary in consultation with CDFW (formerly California Department of Fish and Game [CDFG]) to: (1) maintain stream temperatures at or below 27 degrees Celsius (°C) upstream of the K2 Powerhouse, and (2) flush sediments that may accumulate in the streambed below Kerckhoff Dam
- A "dry year" shall be defined as any 12-month period beginning May 1 in which the unimpaired runoff of the SJR at Millerton Lake from April 1 to July 31, as forecast by the CDWR on April 1 and as may be adjusted by the State on May 1 or June 1, will be 45 percent or less of the average April-through-July period. The average April-through-July period will be computed by CDWR for the 50-year period used at the time
- If during a designated dry year (i.e. 2015), the February 1 or later water prediction indicates that dry year conditions no longer prevail, normal year flow releases will resume immediately (i.e. 2017)
- The minimum flow may be modified temporarily: (a) to the extent required by operating emergencies beyond the control of PG&E; and (b) for fishery management purposes, upon mutual agreement between PG&E and CDFW

The permanent spawning season flow release regime should be implemented each year from May 15 through June 30, as shown in Table 2.3-2.

Table 2.3-2: Flow Release Regime during American Shad Spawning Season

Timeframe	Reservoir Elevation	Time (hours)	Flow (cfs)	Powerhouse
May 15–June 30	Below 545 feet msl	10 p.m. to 2 a.m.	775 cfs	K2 Powerhouse
		Remaining hours	400 cfs	K2 or K1 Powerhouse
	At/above 545 feet msl	10 p.m. to 2 a.m.	1,200 cfs	K2 Powerhouse
		Remaining hours	775 cfs or 400 cfs	K2 or K1 Powerhouse

cfs = cubic feet per second; msl = mean sea level

Based on an agreement between CDFW and PG&E,[4] up to a total of 50 cfs may be released downstream of Kerckhoff Dam to hold stream temperatures to 80.6 degrees Fahrenheit (°F) (27°C) or less between Kerckhoff Dam and the K2 Powerhouse. The additional releases would be made when the water temperature exceeds 80.6°F (27°C) for a minimum of four hours per day for five consecutive days.

In addition, PG&E operates the Kerckhoff Hydroelectric Project pursuant to the terms of Article 40 of the license: "[PG&E] shall operate the project during flood periods in a manner that will not cause peak river flows below Kerckhoff Dam and powerhouse to exceed the peak flows that would have occurred in the absence of the project."

2.3.6 License Articles

PG&E maintains environmental programs, plans, and measures for the Kerckhoff Hydroelectric Project. Appendix C *License Articles and Orders* provides a complete list of FERC license articles and related FERC orders for the Kerckhoff Hydroelectric Project. Below is a summary of applicable license articles and relevant agreements for the Kerckhoff Hydroelectric Project:

- Recreation Plan (Article 17)
- Emergency Action Plan (Article 38)
- Operation during Flood Periods (Article 40)
- Protection of Sensitive Wildlife and Plant Species (Articles 42, 43, and 44)
- MIF Requirements (Article 45)
- Flows for Flushing Sediments below Kerckhoff Dam (Article 45)

[4] The 1980 Fishery Agreement between PG&E and CDFG required four years of preoperational studies of striped bass and American shad to identify the requirements that trigger spawning and the frequency, duration, and location of spawning. Additionally, the 1980 Fishery Agreement included instream flow release and water temperature requirements.

- 1980 Fishery Agreement between PG&E and CDFG: Maintain Stream Temperatures below 27°C Upstream of the K2 Powerhouse (Article 45)[5]
- Plan to Minimize the Quantity of Inorganic Sediments or Other Pollutants Resulting from Construction, Operation, or Maintenance of the Kerckhoff Hydroelectric Project (Article 46)
- Protection of Archaeological Resources (Article 48)
- Protection of Natural, Scenic, and Historic Values (Article 49)
- Sewage Disposal and Solid Waste Management (Articles 51 and 52)
- Wildlife Habitat Plan (Article 44)
- 1980 Wildlife Habitat Agreement between PG&E and CDFG
- 1993 Order Establishing Permanent Flow Release Regime for American Shad

[5] PG&E and CDFW have agreed (1980 Fishery Agreement) that when stream temperature above the K2 Powerhouse exceeds 27°C for 4 hours per day for 5 consecutive days, additional releases will be made up to a maximum required release rate of 50 cfs.

2.4 DESCRIPTION OF THE PROPOSED PROJECT

Under the Proposed Project, facilities and operations of the Kerckhoff Hydroelectric Project would remain unchanged, with the exception of the following:

- The removal and modification of existing facilities and features (Section 2.4.1 *Removal and Modification of Existing Facilities and Features*)
- New environmental management measures and plans (Section 2.4.2 *New Environmental Management Measures*) FERC Project Boundary modifications (Section 2.4.3 *FERC Project Boundary Modifications*)

2.4.1 Removal and Modification of Existing Facilities and Features

2.4.1.1 Retirement of K1 Powerhouse and Modification of Associated Facilities

The K1 Powerhouse and its associated facilities include an intake structure; a tunnel; a surge chamber; two penstocks; the K1 Powerhouse containing two generating units; and a switchyard. The Proposed Project includes retirement of most components of the K1 Powerhouse and facilities, retaining some facilities to support the ongoing operation of the Proposed Project. See **Error! Reference source not found.**, below, and detailed descriptions in the following subsections). All facilities would remain within the Proposed FERC Project Boundary.

Table 2.4-1: Summary of Proposed Modifications/Retirement Actions

Project Facility	Proposed Modification/Retirement Actions	Retained Use
K1 Powerhouse	Turbine pits would be lined with concrete or other suitable material. Turbine shutoff valve would be permanently closed. A water-tight plug would be installed inside the draft tube and pressure-relief valve to prevent water from entering the building through the tailrace.	The building would be used for Kerckhoff Hydroelectric Project operation support purposes.

Project Facility	Proposed Modification/Retirement Actions	Retained Use
	Openings for electrical connections would be sealed with foam-type plywood, depending on size. Doors and windows would be closed and locked but not permanently sealed.	
K1 Intake Structure	This structure would be renamed to the "instream flow release intake."	Structure would continue to provide instream flow releases. Maximum flow at the K1 Intake Structure is 1,156 cfs.
K1 Tunnel, Instream Flow Release Pipe and North Adit	The North Adit intersects the K1 Tunnel approximately 366 feet downstream of the K1 Intake Structure. The North Adit is approximately 507.5 feet long with an 18-inch concrete shaft that connects to the instream flow release pipe. The downstream portion of the tunnel would be depressurized and plugged with approximately 350 (cubic?) yards of concrete and sealed for public safety purposes.	The upstream portion of the K1 Tunnel would not be modified or retired, and the North Adit and instream flow release pipe would continue to provide water for instream flow releases.
Adits 1 and 2[a]	The two adits would be abandoned in place and gated for public and environmental protection.	None
Surge Chamber[a]	The surge chamber would be capped, secured for public and environmental protection, and abandoned in place.	None

Project Facility	Proposed Modification/Retirement Actions	Retained Use
Penstocks and Headworks[a]	K1 Penstocks No. 1 and No. 3 would be permanently closed, and the main shutoff and bypass valves would be sealed. The exposed air valves and caps would be removed. The K1 Headworks would be capped and secured for public safety purposes. Equipment structures at the headworks would be removed.	The building would be retained for future use.
K1 Switchyard	None	The switchyard would be left in place because it is part of the electric transmission system and is required to power continued operation of the Kerckhoff Hydroelectric Project.

No. = number; PG&E = Pacific Gas and Electric Company

[a] As part of the Proposed Project, most facilities would remain as facilities used to maintain the Proposed Project, as described in the version of the Proposed Retirement Plan for K1 Powerhouse and Associated Facilities in the FLA (PG&E 2020). PG&E's retirement plan development measure states that a more finalized version will be developed that includes best management practices (BMPs) for water quality protection,

erosion control measures, and a finalized timeline for construction activities after the FERC license is issued.

2.4.1.1.1 K1 Intake Structure

The K1 Intake Structure would be maintained to provide future instream flow releases and would be referred to as the "instream flow release intake."

2.4.1.1.2 K1 Powerhouse

The K1 Powerhouse would be abandoned in place. The turbine pits would be lined with concrete or other suitable material, and the turbine shutoff valve would be permanently closed. A water-tight plug would be installed inside the draft tube and pressure-relief valve to prevent water from entering the building through the tailrace. Openings for electrical connections would be sealed with foam-type plywood, depending on size. Doors and windows of the K1 Powerhouse would be closed and locked but not permanently sealed.

2.4.1.1.3 K1 Tunnel and Adits

The K1 Tunnel is approximately 16,900 feet long to the surge chamber of the K1 Powerhouse. Three adits intersect the K1 Tunnel; the North Adit, Adit 1, and Adit 2. The North Adit intersects the K1 Tunnel approximately 366 feet downstream of the K1 Intake Structure and contains the instream flow release pipe. The North Adit is approximately 507.5 feet long with an 18-inch concrete shaft that connects to the instream flow release pipe. Adits 1 and 2 are both approximately 120 feet long and measure approximately 20 feet in their cross section. Both Adit 1 and Adit 2 have been sealed with concrete around 200 feet from the entrances. All adits would be abandoned in place and gated for public safety.

The upper portion of the K1 Tunnel would continue to be used for the instream flow releases, but the downstream portion would be decommissioned. A concrete plug would be placed in the tunnel downstream of the instream flow release pipe and upstream of Adit 1. The specific location would be determined during PG&E's detailed engineering design, if the Proposed Project were to be approved. It is estimated that 350 yards of

concrete would be required for the plug, assuming a plug length of approximately 35 feet and a cross-sectional area of 289 square feet. No additional permanent infrastructure is planned for the tunnel plug; however, temporary infrastructure could be required during construction.

PG&E plans to perform concrete work during dry conditions to avoid the release of wet material. Transportation of concrete to the tunnel plug site involves concrete trucks, helicopters, and concrete line pumps. It is anticipated that a helicopter would extract wet concrete from the delivery truck at the delivery truck laydown area, and the concrete would be released via a concrete line pipe into a concrete pump inlet near the North Adit entrance. The wet concrete would then be pumped to the proposed plug location. Both trucks and helicopters would be used to mobilize equipment and materials to the site.

2.4.1.1.4 K1 Surge Chamber and Headworks

The surge chamber is located at the downstream portion of the K1 Tunnel and would be decommissioned as part of the Proposed Project. The surface of the surge chamber is located at an elevation of 1,000 feet msl and is currently surrounded by a chain-link mesh fence to prevent public access. The K1 Tunnel trifurcates into penstocks at the headworks where the shutoff valves are located. Equipment structures at the headworks would be removed as part of the Proposed Project. Both the K1 Surge Chamber and K1 Headworks would be capped with a metal covering and secured to prevent public access.

2.4.1.1.5 Switchyard

The switchyard is located on a hillside behind the existing K1 Powerhouse. This switchyard would be left in place, as it is part of the electric transmission system required to power portions of the Kerckhoff Hydroelectric Project.

PG&E is still developing its Proposed Retirement Plan for K1 Powerhouse and Associated Facilities. PG&E would provide the State Water Board with a detailed retirement schedule and description of erosion control measures and BMPs to reduce potential effects on surface waters after the FERC license is issued. As of the release of

this EIR, no BMPs have been presented to the State Water Board. Thus, there are currently no established BMPs within the Proposed Retirement Plan for K1 Powerhouse and Associated Facilities.

2.4.1.2 Upgrade of Manual Radial Gates on Kerckhoff Dam

Several upgrades at Kerckhoff Dam would be necessary for compliance with the flow measures for the Proposed Project. Specifically, PG&E is proposing to automate two gates that are currently operated manually. To accomplish this, PG&E would add a remote terminal unit to connect to the supervisory control and data acquisition (SCADA) system and add a generator to provide backup power.

2.4.2 New Environmental Management Measures

2.4.2.1 Proposed Project Environmental Management Measures

As part of the Proposed Project, PG&E has proposed to implement new flow management measures to better address aquatic communities, recreational opportunities, and Kerckhoff Hydroelectric Project operations within the Proposed FERC Project Boundary. These flow management measures include the following:

- Water Temperature Measure
- American Shad Spawning Season Flow Release Regime Measure
- End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure
- Subsequent Spill Ramp Down Measure
- Spill Season Flow Measure
- Planned Outage Measure (POM)
- Flow Notifications Measure
- San Joaquin River Above Kerckhoff Reservoir Inflow Gage Measure
- Modification of Infrastructure and Procedures Measure
- Whitewater Notification and Access Measure

These measures are described in more detail in the following subsections.

2.4.2.1.1 Water Temperature Measure

Starting within 60 days of license issuance and continuing for the term of the new Proposed Project license, PG&E is proposing the following:

- From May 1 through October 31, release additional flows to the Kerckhoff Hydroelectric Project Bypass Reach (PBR) below Kerckhoff Dam to (a) maintain a maximum weekly average temperature (MWAT)[6] of less than or equal to 25°C, and (b) ensure that the daily maximum water temperature remains less than or equal to 30°C, as measured at Gage J-7. PG&E would round temperature criteria to the nearest whole degree Celsius
- Release up to a maximum flow not to exceed a total of 50 cfs as measured at Gage J-2. PG&E would release these flows subject to the following caveats:
  - A. The maximum required release shall consist of the MIF plus any additional flow released to meet the criteria
  - B. PG&E shall not be required to release more than the previous day's daily average inflow to Kerckhoff Reservoir
- PG&E would implement the following reporting and notification requirements:
  - A. For the duration of the license, PG&E shall make water temperatures recorded at Gage J-7 available through the CDEC or its successor
  - B. Reporting of water temperatures will take place as specified under the Aquatic Resources Plan Section 3.5.2 of the FLA
- Notification of exceedance of water temperature criteria is as follows:

If the MWAT exceeds 25°C or the daily maximum water temperatures exceed 30°C at Gage J-7 during May 1 through October 31, PG&E shall notify the State Water Board, CDFW, BLM, and FERC by email within three business days. The notification shall include measured water temperature data at Gage J-7 and flows measured at Gage J-2

[6] As defined by Brungs and Jones (1977), MWAT is the mathematical mean of multiple, equally spaced, daily temperatures over a seven-day consecutive period.

released to respond to the MWAT exceeding 25°C or daily maximum water temperature exceeding 30°C. Temperature criteria are rounded to the nearest whole degree Celsius.

2.4.2.1.2 American Shad Spawning Season Flow Release Regime Measure

The Proposed Project includes the implementation of the American Shad Spawning Season Flow Release Regime Measure. The American Shad Spawning Season Flow Release Regime Measure would increase MIFs at either the Kerckhoff Dam or the K2 Powerhouse to support American shad spawning from May 15 through June 30. PG&E would release 775 cfs through the K2 Powerhouse from 10 p.m. to 2 a.m., and 400 cfs during the remaining hours, or 400 cfs or more from Kerckhoff Dam for that day, when Millerton Lake elevation is below 545 feet msl. When the Millerton Lake elevation is at or above 545 feet msl, PG&E would release 1,200 cfs through the K2 Powerhouse from 10 p.m. to 2 a.m. and 775 cfs during the remaining hours, or 400 cfs or more from Kerckhoff Dam for that day. If daily average inflow to Kerckhoff Reservoir is less than the sum of the required MIF and the permanent spawning season flow during May 15 through June 30, PG&E would release the MIF at the instream flow release point and release the remainder of inflows to Kerckhoff Reservoir at Kerckhoff Dam or at the K2 Powerhouse.

In the event of operating emergencies beyond PG&E control, PG&E is proposing the ability to temporarily modify flows and would notify the CDFW and the United States Fish and Wildlife Service (USFWS) within 72 hours. The flows may also be modified for short periods upon agreement with the CDFW and USFWS.

2.4.2.1.3 End-of-Spill Flow Recession and Whitewater Flow Releases Measure

PG&E's proposed measure would provide an annual end-of-spill flow recession in conjunction with and immediately following the whitewater boating flow releases to the SJR below Kerckhoff Dam. The EOS Flow Recession would be scheduled to occur between May 1 and August 31 of each year. The EOS Flow Recession would be scheduled annually by PG&E for the forecasted final flow recession from spill after flow is forecasted by PG&E to decrease below 2,500 cfs. In non-spill years, the EOS Flow Recession would be scheduled based on PG&E's forecast of water availability. PG&E

would provide notification 10 days in advance of the planned EOS Flow Recession (as required under the Whitewater Notification and Access Measure). PG&E would release water from Kerckhoff Dam to provide the whitewater boating flows, consisting of 2 days annually (9:00 a.m. to 6:00 p.m.) of whitewater boating flows with target flows of 2,500–2,000 cfs on the first day and 2,000–1,600 cfs on the second day, followed by a ramp down to MIF, or as close as feasible based on inflow to Kerckhoff Reservoir, as shown in Table 2.4-2:

Table 2.4-2: EOS Flow Recession Measure Down Ramping Schedule

Day 1 (9 a.m.)	2,500–2,000 cfs for minimum 9 hours
Day 1 (6 p.m.)	2,000–1,600 cfs for minimum 24 hours
Day 2 (6 p.m.)	1,600–1,200 cfs for minimum 10 hours
Day 3 (4 a.m.)	1,200–800 cfs for minimum 5 hours
Day 3 (9 a.m.)	800–600 cfs for minimum 5 hours
Day 3 (2 p.m.)	600–400 cfs for minimum 5 hours
Day 3 (7 p.m.)	400–200 cfs for minimum 5 hours
Day 4 (12 a.m.)	200 cfs–MIF

Compliance with the EOS Flow Recession requires that PG&E meet the following conditions:

- The ramp down must be maintained for at least the number of hours (duration) identified in the schedule, subject to the availability of sufficient water.[7] Each step of the ramp down can have a duration longer than specified
- Once the flows are set at the beginning of a ramp down step, average flow[8] during each time step in the schedule must always be compliant with the flow range specified. If average flow falls below the flow range identified in the schedule, flow

[7] Sufficient water availability is dependent on combined accessible volume of water from inflow, storage within the normal operating range, or current powerhouse diversions.

[8] All flows are expressed as average hourly flow unless otherwise specified.

would be returned, as soon as practical, to the original flow range for at least the time step identified in the schedule and then continued according to the schedule. If average flow exceeds the flow range identified in the schedule, flow would be returned, as soon as practical, to the original flow range for the step that was being implemented for at least the step duration specified in the schedule, then the ramp down would resume according to the schedule

- PG&E proposes to be excused from the ramp down requirements in the event of law enforcement or search and rescue activities, regulatory compliance, or equipment malfunction or failure directly related to providing the specified ramping rates or flows. In such cases, PG&E would notify the Secretary of the Commission at FERC as soon as possible, but no later than 14 calendar days after such an event. The notification would include (1) the reasons for the event and whether operations were modified, (2) the duration and magnitude of the event, and (3) any observed or reported environmental effects.

2.4.2.1.4 Subsequent Spill Ramp Down Measure

PG&E would implement the Subsequent Spill Ramp Down Measure for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types, except during K2 Powerhouse outages. PG&E has stated the purpose of the Subsequent Spill Ramp Down Measure is to reduce potential stranding for those infrequent spills resulting from unexpected high flows originating upstream of the Proposed Project that may occur following the EOS Flow Recession. Subsequent to the conclusion of the EOS Flow Recession, for daily average[9] flows exceeding 500 cfs, PG&E would ramp down the declining limb of spills when daily average flow at PG&E's Gage J-2 declines below 1,600 cfs as shown in Table 2.4-3.

Table 2.4-3: Subsequent Spill Ramp Down Measure Down Ramping Schedule

Step 1	Maintain flow within a range of 1,600–1,200 cfs for 2 hours
Step 2	Reduce the flow within a range of 1,200–800 cfs for 2 hours

[9] PG&E proposes to calculate daily average flow from midnight to midnight.

Step 3	Reduce the flow within a range of 800–600 cfs for 2 hours
Step 4	Reduce the flow within a range of 600–400 cfs for 2 hours
Step 5	Reduce the flow within a range of 400–200 cfs for 2 hours
Step 6	Reduce the flow within a range of 200 cfs–MIF

- PG&E proposes the following caveats for compliance with the Subsequent Spill Ramp Down Measure:
- The ramp down must be maintained for at least the number of hours (duration) identified in the schedule, subject to the availability of sufficient water.[10] Each step of the ramp down can have a duration longer than that specified
- Once the flows are set at the beginning of a ramp down step, average flow during each time step in the schedule must always comply with the flow range specified. If average flow falls below the flow range identified in the schedule, flow would be returned, as soon as practical, to the original flow range for at least the time step identified in the schedule and then continued according to the schedule. If average flow exceeds the flow range identified in the schedule, flow would be returned, as soon as practical, to the original flow range for the step that was being implemented for at least the step duration specified in the schedule, and then the ramp down will resume according to the schedule

    - If the flows do not return to the flow step within four hours from a higher flow, the ramp down may be terminated and restarted if the triggering conditions are met subsequently
    - If a subsequent spill event occurs in the months of May through October after the EOS Flow Recession that does not exceed 1,200 cfs average daily flow, then the spill would be down ramped according to the Subsequent Spill Ramp Down Schedule beginning at the step that includes the largest flow observed (e.g., if

[10] PG&E proposes to define sufficient water availability as the combined accessible volume of water from inflow, storage within the normal operating range, or current powerhouse diversions.

the spill flow equals 700 cfs average daily flow, the down ramping begins at Step 4). Spills that do not exceed 500 cfs (average daily flow) will not be ramped down

- PG&E proposes to be excused from the ramp down requirements in the event of law enforcement or search and rescue activities, regulatory compliance, or equipment malfunction or failure that is directly related to providing the specified ramping rates or flows. In such cases, PG&E would notify the Secretary of the Commission at FERC as soon as possible, but no later than 14 calendar days after such an event. The notification will include (1) the reasons for the event and whether operations were modified, (2) the duration and magnitude of the event, and (3) any observed or reported environmental effects

2.4.2.1.5 Spill Season Flow Measure

PG&E's proposed Spill Season Flow Measure would be implemented during the March 1 through August 31 spill season, when the Proposed Project is in operation and not including K2 Powerhouse outages. PG&E has stated the measure is designed to provide the recreating public with visual cues as to water conditions when Kerckhoff Dam is spilling and to provide benefit to aquatic life. The Spill Season Flow Measure also includes a ramp down once spill has subsided and when flows can be reduced to MIF. When sustained spills measured at Gage J-2 are 500 cfs[11] or more for at least 5 hours of continuous duration and neither the EOS Flow Recession nor the Subsequent Spill Ramp Down is being implemented, subject to sufficient water[12] availability, PG&E would release flows below Kerckhoff Dam as shown in Table 2.4-4.

[11] Proposed Project flows are expressed as average hourly flows unless otherwise specified.

[12] PG&E proposes to define sufficient water availability as the combined accessible volume of water from inflow, storage within the normal operating range, or current powerhouse diversions.

Table 2.4-4: Spill Season Flow Measure Down Ramping Schedule

Step 1	Maintain a 500-cfs target hourly average flow (600–400 cfs) for a minimum of 5 hours
Step 2	Reduce the flow to a target hourly average flow of 300 cfs (400–200 cfs) for a minimum of 5 hours
Step 3	Reduce target hourly average flow range to 200 cfs – MIF

Compliance with the Spill Season Flow Measure requires that PG&E meet the following conditions:

- If flow drops below a target flow range during a release under this measure, return the flow to that target flow range as soon as practical and continue the measure until complete
- If average flow exceeds the flow range identified in the schedule, flow would be returned, as soon as practical, to the original flow range for the step that was being implemented for at least the step duration specified in the schedule, then the ramp down would resume according to the schedule. If inflows continue to exceed the target flow resulting in a pause of the ramp down for more than 10 hours, the ramp down may be terminated and restarted if the triggering conditions are met subsequently

PG&E proposes to be excused from complying with the Spill Season Flow Measure requirements in the event of law enforcement or search and rescue activities, regulatory compliance, or equipment malfunction or failure that is directly related to providing the specified ramping rates or flows. In such cases, PG&E proposes to notify the Secretary of the Commission at FERC as soon as possible, but no later than 14 calendar days after such an event. The notification would include (1) the reasons for the event and whether operations were modified, (2) the duration and magnitude of the event, and (3) any observed or reported environmental effects.

2.4.2.1.6 Planned Outage Measure

For planned outages[13] of the K2 Powerhouse occurring at any time of year, with flows below Kerckhoff Dam expected to exceed a daily average flow[14] of 500 cfs, as measured at Gage J-2, PG&E would implement the following for the proposed POM:

- **Signage Protocol**: Post signage at least one week prior to the planned outage at the bulletin boards at the Ya-Gub-Weh-Tuh trailhead, Smalley Cove and Aholul campgrounds, BLM river access trailhead, and the north side of the BLM bridge near K1 Powerhouse. PG&E would contact BLM-provided email addresses prior to a planned outage, if possible, to coordinate signage and notification details
- **Notifications Protocol**: Send notification by email at least one week prior to the planned outage to the resource agencies (BLM, CDFW, State Water Board, and USFWS) and members of the Cultural Resources Working Group
- **Initial Release Protocol**: Release initial spill associated with the outage prior to 3:30 a.m. as measured at Gage J-2, subject to sufficient water availability.[15] If this release timing is not practical, a roving Proposed Project patrol person would alert people of the impending high flows in the areas of the trail to the BLM footbridge and the trailhead to the K2 Tailrace during daylight hours.
- **Planned Release Protocol**: PG&E would provide advance 48-hour notification to BLM for planned releases[16] from Kerckhoff Dam that would result in flows exceeding 4,200 cfs

[13] Planned outages are planned maintenance events that are scheduled at least 14 days prior to the outage; all other outages are considered unplanned.

[14] Daily average flow calculated from midnight to midnight.

[15] The initial spill will begin the previous night or early morning day hours of the next day so that spill arrives downstream near the K1 Powerhouse by approximately 8:30 a.m.

[16] Planned releases are defined as flows that are greater than inflow due to planned Kerckhoff Hydroelectric Project operations and maintenance. Not applicable during unplanned events including but not limited to extreme weather, emergencies, and dam safety events.

- Within 10 days following the start of an unplanned outage, if practicable given the nature of the outage, PG&E would implement the applicable POM protocols, except PG&E would send notification by email to resource agencies and members of the Cultural Resources Working Group within four days following the start of the unplanned outage

Planned Outage Measure Ramping Schedules

- **POM Ramp Up Schedule.** Implement the ramp up for planned outages occurring from March 1 to October 31
- **POM Ramp Down Schedule**. Following high flow releases (greater than target flow of 500 cfs), implement the ramp down from the end-of-spill to October 31 during planned outages
- **POM Winter Ramp Down Schedule.** Following high flow releases (greater than target flow of 500 cfs), implement 500 cfs releases and ramp down from November 1 to February 28/29 during planned outages

- During planned outages occurring from March 1 to October 31, if flows below Kerckhoff Dam, as measured at Gage J-2, are forecasted to exceed 1,000 cfs hourly average flow, PG&E shall release a two-step planned outage ramp up of flow. The POM Ramp Up would be contingent on available Kerckhoff Reservoir capacity to detain flows. The POM Ramp Up would be implemented in conjunction with the sounding of a safety horn to cue recreationalists that flows are increasing. The POM Ramp Up schedule would be implemented below Kerckhoff Dam as shown in Table 2.4-5

Table 2.4-5: POM Ramp Up Schedule

Step 1	Release a target hourly average flow of 500 cfs (400–600 cfs) for 1 hour minimum below Kerckhoff Dam, unless flows measured at Gage J-2 are between 500 and 800 cfs for at least 1 hour minimum
Step 2	Following Step 1, or if flows are equal to or greater than 800 cfs, increase the flow to target hourly average flow of 1,000 cfs (800–1,200 cfs) for minimum 1 hour
Step 3	Flows greater than 1,000 cfs may be released following Step 2

Compliance with the POM Ramp Up requires that PG&E meet the following conditions:

- If average hourly inflows drop and flows below Kerckhoff Dam are no longer projected to exceed 1,000 cfs hourly average, the ramp up would be terminated. Depending upon the date, a ramp down would be implemented according to the identified implementation period
- If inflow to Kerckhoff Reservoir exceeds 3,800 cfs, PG&E would be excused from complying with the specified ramp up
- PG&E would be excused from complying with the ramp up requirements in the event of law enforcement or search and rescue activities, regulatory compliance, testing of the K2 Powerhouse, or equipment malfunction or failure that is directly related to providing the specified ramping rates or flows. In such cases, PG&E would notify the Secretary of the Commission at FERC as soon as possible, but no later than 14 calendar days after such an event. The notification would include (1) the reasons for the event and whether operations were modified; (2) the duration and magnitude of the event; and (3) any observed or reported environmental effects

PG&E would release a planned outage ramp down during planned outages from the conclusion of the EOS Flow Recession to October 31, following conclusion of flow releases below Kerckhoff Dam greater than an hourly average of 500 cfs, as measured at Gage J-2. PG&E would release a POM Ramp Down as flows decrease to an hourly average target flow of 500 cfs within a range of 400–600 cfs, as shown in Table 2.4-6, subject to sufficient water availability.

Table 2.4-6: POM Down Ramping Schedule

Step 1	Maintain a target hourly average flow of 500 cfs (600–400 cfs) for minimum 2 hours
Step 2	Reduce the flow to a target hourly average flow of 300 cfs (400–200 cfs) for minimum 2 hours
Step 3	Reduce the flow to a target hourly average flow of 200 cfs–MIF

PG&E proposes that compliance with the POM Ramp Down would require meeting the following conditions:

- During the implementation of the ramp down, if inflows[17] increase and exceed POM Ramp Down target flows, ramp down would be terminated. If the triggering conditions are met subsequently, ramp down would be restarted
- If flow drops below a desired target flow range during a release under this POM Ramp Down schedule, return the flow to that target flow range as soon as practical, subject to sufficient water availability, and continue the schedule until complete

PG&E proposes to be excused from complying with the ramp down requirements in the event of law enforcement or search and rescue activities, regulatory compliance, testing of the K2 Powerhouse, or equipment malfunction or failure that is directly related to providing the specified ramping rates or flows. In such cases, PG&E would notify the Secretary of the Commission at FERC as soon as possible, but no later than 14 calendar days after such an event. The notification would include (1) the reasons for the event and whether operations were modified; (2) the duration and magnitude of the event; and (3) any observed or reported environmental effects.

During planned outages from November 1 to February 28/29, PG&E would target a 500 cfs flow below Kerckhoff Dam as measured at Gage J-2, as sufficient water availability allows. When water availability would be insufficient to sustain a 500 cfs release, PG&E would release a POM Winter Ramp Down below Kerckhoff Dam to decrease from an hourly average target flow of 500 cfs within a range of 400–600 cfs, as shown in Table 2.4-7:

Table 2.4-7: POM Winter Down Ramping Schedule

Step 1	Release a target hourly average flow of 500 cfs (600–400 cfs) for minimum 5 hours

[17] All flows are expressed as average hourly flow unless otherwise specified.

Step 2	Reduce flow to a target hourly average flow of 300 cfs (400–200 cfs) for minimum 5 hours
Step 3	Reduce the flow to the target hourly average flow range of 200 cfs–MIF

PG&E proposes that compliance with the POM Winter Ramp Down requires meeting the following conditions:

- If flow drops below a target flow range during a release under this schedule, return the flow to that target flow range as soon as practical and continue the schedule until complete. If average flow exceeds the flow range identified in the schedule, flow would be returned, as soon as practical, to the original flow range for the step that was being implemented for at least the step duration specified in the schedule, then the ramp down would resume according to the schedule. If inflows continue to exceed the target flow resulting in a pause of the ramp down for more than 10 hours, the ramp down may be terminated and restarted if the triggering conditions are met subsequently
- PG&E proposes to be excused from complying with the winter ramp down requirements in the event of law enforcement or search and rescue activities, regulatory compliance, testing of the K2 Powerhouse, or equipment malfunction or failure that is directly related to providing the specified ramping rates or flows. In such cases, PG&E would notify the Secretary of the Commission at FERC as soon as possible, but no later than 14 calendar days after such an event. The notification would include (1) the reasons for the event and whether operations were modified; (2) the duration and magnitude of the event; and (3) any observed or reported environmental effects

2.4.2.1.7 Flow Notification Measure

The Flow Notification Measure provides notification requirements for PG&E for deviations from mandatory condition flow requirements not covered by other requirements.

Requirement to Notify the Commission of Planned, Temporary Modifications to Mandatory Condition Requirements

Planned, temporary modifications to mandatory condition requirements including but not limited to MIFs, down ramping, up ramping, managed spills, or the POM as required by the new FERC license, may be temporarily modified if required by operating emergencies beyond the control of PG&E, or for short periods, up to three weeks, after consultation among PG&E and the State Water Board, BLM, CDFW, and USFWS (resource agencies) and agreement by BLM and the State Water Board. PG&E must file a report with the Secretary of the Commission at FERC as soon as possible, but no later than 14 calendar days after the onset of the planned deviation. Each report must include: (1) the reasons for the deviation and whether operations were modified; (2) the duration and magnitude of the deviation; (3) any observed or reported environmental effects; and (4) documentation of consultation with the resource agencies. For planned deviations exceeding three weeks, PG&E must file an application for a temporary amendment of minimum flow releases and receive FERC approval prior to implementation.

Requirement to Notify the Commission of Unplanned Deviations from Mandatory Condition Requirement(s) Lasting More Than Three Hours or Resulting in Environmental Effects

For any unplanned deviation from MIFs, down ramping, up ramping, managed spills, and POM requirements that last longer than three hours or results in visible environmental effects such as a fish kill, PG&E must notify the resource agencies within 24 hours or following business day, and the Commission within 14 days, and file a report as soon as possible, but no later than 30 days after each such incident. The report must include: (1) the cause of the deviation; (2) the duration and magnitude of the deviation; (3) any pertinent operational and/or monitoring data; (4) a timeline of the incident and PG&E's response to each deviation; (5) any comments or correspondence received from the resource agencies, or confirmation that no comments were received from the resource agencies; and (6) a description of measures implemented to prevent similar deviations in the future.

Requirement to Notify the Commission of Unplanned Deviations from Mandatory Condition Requirement(s) Lasting Three Hours or Less with No Environmental Effects

For unplanned deviations from MIFs, down ramping, up ramping, managed spills, and POM requirements lasting three hours or less that do not result in visible environmental effects, PG&E must file an annual report, by March 1, describing each incident that occurred during the prior January 1 through December 31 time period. The report must include for each deviation of three hours or less: (1) the cause of the deviation; (2) the duration and magnitude of the deviation; (3) any pertinent operational and/or monitoring data; (4) a timeline of the incident and PG&E's response to each deviation; (5) any comments or correspondence received from the resource agencies, or confirmation that no comments were received from the resource agencies; and (6) a description of measures implemented to prevent similar deviations in the future.

2.4.2.1.8 San Joaquin River Above Kerckhoff Reservoir Inflow Gage Measure

PG&E proposes to install, rate (calibrate), and operate a stream gage to measure flows in the SJR above the high-water mark of Kerckhoff Reservoir and downstream of Southern California Edition's (SCE) Big Creek 4 Powerhouse within four years of license issuance. The gage would be designated "San Joaquin River Above Kerckhoff Reservoir," unless otherwise designated. The gage would be operated to USGS standards, and results would be made publicly available via the internet. Upon completion of installation and calibration of the new stream gage, PG&E would confirm to FERC that the gage is in operation and will comply with USGS standards. After the gage goes into operation, PG&E would submit mean daily flow data to USGS annually.

2.4.2.1.9 Modification of Infrastructure and Procedures Measure

Flow Management Measures require PG&E to manage flow releases, ramp downs, and ramp up at various times. To comply with Flow Management Measures, PG&E would complete infrastructure upgrades to release structures and install a new inflow gage (see Section 2.4.2.1.8 *San Joaquin River Above Kerckhoff Reservoir Inflow Gage Measure*) within four years of license issuance.

Flow Management Measures would be initially implemented within one year following completion of infrastructure improvements and the Modification of Infrastructure and Procedures Measure after license issuance.

Interim Protocols

Within six months of license issuance and for the duration of the time needed to complete construction, modification, experimental testing, and adjustments necessary for the implementation of the Flow Management Measures, PG&E would make a good faith effort to continue to implement the following interim protocols. When attempting to implement interim protocols, PG&E will not be considered out of compliance, if not able to fully comply with those protocols.

During Planned Outages of the K2 Powerhouse:

- To the extent practical, PG&E would implement Signage, Notification, and Initial Release protocols included in the POM
- To the extent practical, PG&E would make a good faith effort to provide a 500 cfs flow release below Kerckhoff Dam when sufficient water is available and providing the release is within normal capabilities of the current infrastructure. This release is not considered a mandatory condition, and the inability to provide such flows will not be considered a deviation nor requiring notification

Experimental Testing and Adjustment Period

To implement release flow requirements for flow management, including ramp down and ramp up, infrastructure modifications will need to be completed and assessed, and the procedures will need to be adjusted to comply with the Flow Management Measures. The use of modified infrastructure and new procedures will necessitate testing and adjustment by PG&E to enable compliance with Flow Management Measures.

To allow time for testing and adjusting the modified infrastructure and establishing new procedures during the implementation of flow measures, a period of two years (at least one of which must include a WY in which spill occurs due to inflow exceeding K2

Powerhouse capacity) will be allocated for testing. If a spill year does not occur during the first two years, the testing period would be suspended until the first subsequent spill year and then resumed for the duration of that WY. The testing period following completion of infrastructure modifications will be designated an *experimental testing and adjustment period.* During this period, PG&E will operate the Kerckhoff Hydroelectric Project to comply with Flow Management Measures but will be able to adjust procedures and infrastructure without being considered out of compliance with the Flow Management Measures. Any deviations from the specified schedules during this period will not be considered a compliance violation; however, any deviation will be reported to the resource agencies (BLM, United States Forest Service [USFS], USFWS, CDFW, and State Water Board) and FERC as identified in the notification requirements.

Experimental Testing and Adjustment Operations Reporting

At the end of each year of the experimental testing and adjustment period, prior to the conclusion of the testing and adjustment period, PG&E will prepare a progress report on work accomplished to comply with the Flow Management Measures. The progress report will include a description of PG&E's progress in their work to comply with the Flow Management Measures. A draft of the interim report will be provided to the resource agencies, the Cultural Resources Working Group, and other interested stakeholders by January 31 of the subsequent year.

- Resource agencies, the Cultural Resources Working Group, and other interested stakeholders that have comments will provide them to PG&E within 45 days of receipt of the report
- PG&E will respond to comments within 45 days of receipt of comments
- PG&E will finalize the report and file it with FERC and distribute copies to resource agencies, the Cultural Resources Working Group, and other interested stakeholders by June 30 of each applicable year

At the end of the experimental testing and adjustment period, PG&E will prepare an experimental testing and adjustment operations report on work accomplished and its ability to comply with the Flow Management Measures.

The draft report will do the following:

- Identify any operations or compliance issues encountered by PG&E
- Identify modifications made during the experimental testing and adjustment period to facilitate compliance with Flow Management Measures
- Identify any recommended additional modifications to the Flow Management Measures to facilitate compliance
- Include a potential schedule for implementation of recommended modifications
- Be provided to the resource agencies (BLM, USFS, USFWS, CDFW, and State Water Board) within 90 days of the conclusion of the experimental testing and adjustment period for review

    - Resource agencies that have comments will provide them to PG&E within 45 days of receipt of the report
    - PG&E will respond to comments within 45 days of receipt of comments
    - Following responding to comments, PG&E would finalize and file report.

2.4.2.1.10 Whitewater Notification and Access Measure

Following the completion of the requirements of the Modification of Infrastructure and Procedures Measure, PG&E will implement the EOS Flow Recession Measure to release water from Kerckhoff Dam to provide two days of whitewater boating opportunities each year on the SJR downstream of Kerckhoff Reservoir.

This section of the SJR from PG&E's J-2 Stream Gage (River Mile [RM] 292) to just upstream of the K2 Powerhouse (RM 282.75) is considered to be a Class V scale of difficulty and requires expert-level whitewater boating skills. The Class V rating is intended to serve as guidance only, and whitewater boaters should assess their ability to run this section of river based on their individual skill level, river flow level, and weather conditions.

This measure specifies that PG&E will provide advanced notification of the upcoming whitewater boating flow releases and provide escorted access through the operational

footprint to the PG&E's J-2 Stream Gage access trail below the dam on each day of the whitewater boating flow release, as specified in *Whitewater Run Put-in Access*.

Public Notification

PG&E would provide email notification 10 days in advance of the planned whitewater flow release to resource agencies (BLM, CDFW, State Water Board, and USFWS), American Whitewater, and members of the Cultural Resources Working Group.

Whitewater Run Put-in Access

PG&E will provide escorted access to PG&E's J-2 Stream Gage access trail on the day of the whitewater boating flow release. Access to the river channel will be at PG&E's J-2 Stream Gage location.

Access to the whitewater run put-in will be from PG&E's dock on the southwestern end of Kerckhoff Reservoir. Upon arrival at the dock, boaters and equipment will be escorted by PG&E staff through the operational footprint of the facility. PG&E staff will be onsite from 7:00 a.m. through 12:00 p.m. to escort boaters and equipment through the operational footprint to PG&E's J-2 Stream Gage access trail, after which time, this area will be resecured and closed to public access.

J-2 Stream Gage Trail Assessment

Prior to the first scheduled flow release, PG&E will conduct a field assessment of PG&E's J-2 Stream Gage access trail from Kerckhoff Dam to the J-2 Stream Gage (RM 292). This assessment will identify trail upgrades to improve safety for whitewater boating access to the SJR at the J-2 Stream Gage location (put-in). Following the field assessment, PG&E will develop a J-2 Stream Gage Access Trail Plan that presents the trail alignment and specific trail improvement measures as determined by the field assessment. The plan will be submitted to BLM for review and comment and to FERC for approval prior to implementation of trail improvement activities.

Trail improvements may include the following:

- Widening the trail to up to three feet wide, unless precluded by rock outcroppings, vegetation, or other topographical constraints
- Leveling trail cross-slopes to a maximum cross-slope of 15 percent, unless precluded by rock outcroppings, vegetation, or other topographical constraints
- Trimming vegetation that is encroaching on the trail corridor or overhanging the trail corridor below a height of 10 feet
- Installing handrail(s) at specific location(s)

Except as altered by trail improvement activities, no change will be made to trail longitudinal grades.

Before implementing trail improvement measures, an assessment of potential effects on terrestrial, biological, and/or cultural resources will be conducted to ensure trail improvement activities will not adversely affect terrestrial, biological, and/or cultural resources. If trail improvement activities to a section of trail were to potentially adversely affect a sensitive resource, that section of trail will be excluded from trail improvement activities. Trail improvements identified in the J-2 Stream Gage Access Trail Plan will be implemented prior to the first scheduled flow release under this measure.

2.4.2.2 Proposed Project Environmental Management Plans

As a part of PG&E's license application, PG&E has proposed the implementation of the following new environmental management plans:

- Aquatic Resources Plan
- Wildlife Management Plan
- Vegetation Management and Pest Control Plan
- Road and Trail Maintenance Plan
- Recreation Management Plan
- Historic Properties Management Plan

These plans are proposed to protect the beneficial uses and environmental resources within the Proposed FERC Project Boundary. The plans also contain monitoring requirements for each environmental resource.

2.4.2.2.1 Aquatic Resources Plan

The Aquatic Resources Plan describes PG&E's responsibilities related to the management of aquatic resources over the course of the license term and includes fish community and water temperature monitoring. The objective of the water temperature element of the plan is to collect information to manage water temperatures in the PBR to support the native species present in the PBR. The measure specifies maintaining the water temperatures in the PBR at Gage J-7 at or below a MWAT of 25°C and ensuring that the daily maximum temperature remains less than or equal to 30°C to protect growth of native fish.

A secondary objective is to provide supplemental information to support fish and mussel monitoring efforts. This objective includes monitoring of the fish community that currently exists in the PBR. The PBR has four documented native fish species including Sacramento sucker (*Catostomus occidentalis*), prickly sculpin (*Cottus asper*), hardhead (*Mylopharodon conocephalus*), and Sacramento pikeminnow (*Ptychocheilus grandis*). Introduced species include spotted bass (*Micropterus punctulatus*), smallmouth bass (*Micropterus dolomieu*), green sunfish (*Lepomis cyanellus*), and Western mosquitofish (*Gambusia affinis*), with seasonal appearances by American shad and striped bass (*Morone saxatilis*) in the lower part of the reach. The objective of the mussel monitoring is to observe any long-term trends for the western pearlshell mussel (*Margaritifera falcata*). Periodic monitoring and management objectives in the PBR will be used to assess trends (if any) in the fish community and western pearlshell mussel abundance over the term of the new license in response to any changes in operation.

2.4.2.2.2 Wildlife Management Plan

This plan describes PG&E's responsibilities to minimize the potential for impacts on wildlife resources including bald eagles (*Haliaeetus leucocephalus*), other nesting birds, and special-status bats during Proposed Project operation and routine and non-routine heavy maintenance activities and construction.

The management objective for bald eagles is to minimize the potential for disturbance to bald eagles by implementing limited operating periods and/or avoidance buffers during helicopter use, hazard tree removal, and non-routine heavy maintenance activities.

The management objectives for other nesting birds are to minimize the potential for disturbance of nesting birds (including golden eagles [*Aquila chrysaetos*]). This will be executed through implementation of limited operating periods and/or avoidance buffers when conducting vegetation removal, including removal of hazard trees, and non-routine heavy maintenance or construction activities and via use of avian-safe pole configurations to reduce electrocution of birds on distribution lines.

The management objectives for special-status bats are to minimize the potential for disturbance of special-status bat maternity or day roosts when implementing non-routine heavy maintenance activities in the vicinity of facilities identified as providing suitable roosting habitat and minimizing the potential for introduction or spread of white-nose syndrome.

2.4.2.2.3 Vegetation Management and Pest Control Plan

The Vegetation Management and Pest Control Plan describes PG&E's responsibilities for invasive weed management, vegetation and fuels management, and the protection of environmental and cultural resources during these activities over the license term. Use of pesticides to treat invasive weeds or minimize human health and facility safety concerns related to rodents is also included. In addition, this plan describes resource monitoring to support sound management decisions over the license term.

This plan serves to achieve the following:

- Provide a system to identify locations of special-status plant populations over the term of the license and modify operation activities, where necessary, to avoid potential impacts on these populations, if found
- Minimize the potential for the spread or introduction of invasive weeds resulting from Proposed Project operation activities or Proposed Project-related recreational use

- Minimize the potential for impacts on non-target resources resulting from use of pesticides
- Avoid cultural resources, including culturally significant plant gathering sites, during vegetation management activities

2.4.2.2.4 Road and Trail Maintenance Plan

The Road and Trail Maintenance Plan describes PG&E's responsibilities to maintain Proposed Project roads and trails in good condition to allow safe access to Proposed Project facilities, protect the health and safety of workers and the public who use the Proposed Project roads and trails, and prevent excessive erosion and sedimentation associated with Proposed Project roads and trails. The plan includes environmental management measures for regular inspection and maintenance of the Proposed Project roads and trails to ensure safe access to Proposed Project facilities, conducting routine maintenance, and monitoring. In addition, non-routine maintenance of the Proposed Project roads and trails is designed to protect water quality, special-status plants and wildlife, and cultural resources.

2.4.2.2.5 Recreation Management Plan

PG&E would implement a Recreation Management Plan to operate and maintain developed Proposed Project recreation facilities, increase boat-in reservoir shoreline access, and manage Kerckhoff Reservoir shoreline for dispersed day use, with the following plan goals: (1) provide for public safety and security at the Proposed Project: (2) manage public recreation use of the Proposed Project's recreation facilities; and (3) eliminate or minimize Proposed Project-related effects on environmental and cultural resources on Proposed Project lands. The Recreation Management Plan's objectives to fulfill the goals of the plan include providing recreation facilities that meet the needs of recreation users at the Proposed Project and are consistent with state and federal land management guidance; minimize effects of Proposed Project-related recreation use on environmental and cultural resources; and discourage the exploration of Proposed Project facilities by the recreating public by developing alternative recreational facilities (Vista Day Use Area).

The Recreational Management Plan will be implemented by (1) conducting heavy and routine maintenance at Proposed Project recreational facilities over the term of the license; (2) monitoring recreational visitor use and impacts to resources caused by recreation activities; and (3) implementing appropriate BMPs and avoidance and minimization measures that may be necessary to protect water quality, special-status plants, special-status wildlife, and cultural resources. This plan also describes PG&E's responsibilities to manage the public recreation use of the Proposed Project's recreation facilities over the term of the license and eliminate or minimize Proposed Project-related potential impacts on environmental and cultural resources on Proposed Project lands. In addition, this plan includes the development of a day use facility in the vicinity of the K2 Powerhouse (Vista Day Use Area) with picnic sites and views of the SJR and reconstructing an existing BLM trail that connects the day use area to BLM's SJR Trail.

Vista Day Use Area Measure

PG&E will construct a Vista Day Use Area with a connecting trail to BLM's SJR trail. This area is referred to in this plan as the Vista Day Use Area, but eventually BLM will officially name the development during the facility planning phase in consultation with representatives of the local Tribe. The objective of this development is to discourage visitor use and trespassing near the K2 Powerhouse by providing recreation facilities in appropriate locations. The Vista Day Use Area will have multiple amenities that are outlined within the Proposed Recreation Management Plan (PG&E 2023a). PG&E proposes within one year of construction, or as otherwise agreed on by PG&E and BLM, PG&E will convey ownership of the constructed facility to BLM. Maintenance responsibilities will be divided, with PG&E being responsible for heavy maintenance activities and BLM being responsible for routine maintenance activities. These activities are outlined within the Proposed Recreation Management Plan (PG&E 2023a, *Exhibit E, Plans and Measures*).

A concept drawing of the Vista Day Use Area with the trail and other features is shown in Appendix A *Project Facilities and Maps:* Appendix A-3 *Maps*, Map A3-3. The main features of the Vista Day Use Area would include the following amenities:

- Paved access road between Access Road 6A and the Vista Day Use Area
- Four picnic sites with shade structures overlooking the SJR; at least two sites would comply with the outdoor recreation area accessibility guidelines of the Architectural Barriers Act
- One accessible, double-vault restroom
- One accessible, two-panel information bulletin board
- One safety sign to warn visitors about the potential for rapidly increasing flows in the SJR
- Paved parking area with no more than 20 spaces that are delineated with parking wheel stop blocks or other equivalent barriers
- Iron ranger for fee collection

Additionally, development of the Vista Day Use Area would include the following:

- Reconstructing an approximately 470-foot-long, foot-only trail segment that extends east from the Vista Day Use Area and retain the ability to close the gate as may be necessary for Proposed Project operation
- Installing a gate, signs, and fencing across Access Road 6A at the intersection of the day use area access road to prohibit all public access on Access Road 6A beyond the gate
- Installing fencing and vehicle control barriers to control public access near the K2 Switchyard and K2 Penstock Construction Access Tunnel to provide for public safety and Proposed Project security
- Installing *No Parking* signs and vehicle control barriers along Access Road 6A between the K2 Switchyard and day use area access road to maintain access to the Proposed Project and protect resources adjacent to the road
- Revising the Proposed FERC Project Boundary to include the day use area, connector trail, and access road

2.4.2.2.6 Historic Properties Management Plan

The Historic Properties Management Plan (HPMP) describes PG&E's responsibilities to preserve particular cultural and Tribal resource types found in the Area of Potential

Effect (APE), including archaeological sites, the Squaw Leap Archaeological District, traditional cultural places (TCPs), and Traditional Cultural Landscapes (TCLs), and the process for how the implementation of the Proposed Project resource monitoring plans would interact with the Proposed Project's HPMP to protect these cultural and Tribal resources. The plan identifies all known historic properties and unevaluated cultural and Tribal resources in the Proposed Project APE so that potential environmental impacts can be determined, management and treatment protocols can be established, a decision-making and consultation process can be established under Section 106 for considering potential impacts on historic properties, and a process for ongoing consultation with Proposed Project stakeholders, including annual meetings to discuss implementation of the plan and ongoing coordination with other resource plans, can be determined.

2.4.3 FERC Project Boundary Modifications

The existing FERC Project Boundary would be modified to do the following:

- Include all lands necessary for the operation of the Proposed Project, including the expected footprints of the proposed Vista Day Use Area and the proposed new operational flow gage upstream of Kerckhoff Reservoir and downstream of SCE's Big Creek No. 4 Powerhouse
- Remove lands no longer necessary for operation of the Proposed Project
- Correct the 1986 Exhibit G drawings on file with FERC

2.4.3.1 Existing FERC Project Boundary

Presently, the total acreage within the existing FERC Project Boundary is 531.7 acres, which includes 328.1 acres on federal land, 162.5 acres on PG&E-owned land, and 41.1 acres on other privately owned land. The federal land consists of public lands administered by USFS-SNF; BLM; and Reclamation under BLM management.

2.4.3.2 Proposed FERC Project Boundary Modifications

An initial comparison of the existing FERC Project Boundary with the Proposed FERC Project Boundary is depicted in Appendix A *Project Facilities and Maps:* Appendix A-3 *Maps*, Map A3-1 and Maps A3-2a through A3-2o.

The Proposed FERC Project Boundary acreage would be reduced by approximately 24 percent from the existing FERC Project Boundary (PG&E 2023c). The Proposed FERC Project Boundary revisions would add 9.08 acres of public land to the area within the Proposed FERC Project Boundary.[18] This includes 2.72 additional acres of land under Reclamation jurisdiction that is managed by BLM that would be encompassed by the Vista Day Use Area (Appendix A-3 *Maps*, Map A3-3) and 6.36 acres of USFS land that would be encompassed by the new flow gage (Appendix A-3 *Maps*, Map A3-4). In summary, the Proposed FERC Project Boundary would include the following:

- Federal land: 227.6 acres
- PG&E-owned land: 125.6 acres
- Other privately owned land: 49.4 acres
- Total acres: 402.6 acres

2.4.3.2.1 Boundary Reductions

The primary FERC Project Boundary reductions under the Proposed Project would include the following:

- Reducing the buffer around most of Kerckhoff Reservoir, from the dam upstream to the Road 222/Powerhouse Road bridge, to 50 feet from the normal maximum water surface elevation (985 feet msl) of the reservoir, except in the vicinity of Kerckhoff Dam, Smalley Cove Recreation Area, and the dispersed day use area
- Reducing the buffer around Kerckhoff Reservoir to the normal maximum water surface elevation of the reservoir, from the Road 222/Powerhouse Road bridge to its farthest upstream extent

[18] The additional Vista Day Use Area acreage includes 0.094 acre of area formally proposed for removal.

- Reducing the boundary around Smalley Cove Recreation Area and the adjacent dispersed day use area to generally limit the boundary to the area used by the recreating public and PG&E (e.g., between the shoreline and Road 222/Powerhouse Road)
- Reducing the boundary around the K1 Development and K2 Development to the areas necessary for operation
- Reducing the boundary around the fiberoptics and 12 kV distribution line (Kerckhoff 1101) running from the K2 Switchyard to a non-Project substation near the K1 Headworks, since the current boundary represents the lines as diverging in places where they are actually co-located on the same poles
- Eliminating the boundary associated with Access Road 6, which is shared with the public and BLM, between the intersection with Access Road 5 near the K1 Powerhouse and the gate to Access Road 6A near the K2 Powerhouse

2.4.3.2.2 Boundary Expansions

The primary FERC Project Boundary expansions under the Proposed Project would include the following:

- Expanding the boundary to encompass the Gage J-2 site, J-2 HLZ, Gage J-2 low-flow measurement site, J-2 low-flow HLZ, and trail to Gage J-2
- Expanding the boundary to encompass the new flow gage upstream of Kerckhoff Reservoir and downstream of the SCE Big Creek No. 4 Powerhouse
- Expanding the boundary to encompass the upstream extent of Kerckhoff Reservoir at its normal maximum surface water elevation based on 2018 topo bathymetric LiDAR data and 2020 field verification of the normal maximum water surface elevation as it relates to the LiDAR data
- Expanding the boundary to encompass a small drainage at the end of a designed discharge culvert that extends downstream from the K2 Switchyard (K2 Penstock Construction Access Tunnel Drainage Channel) and releases excess water from the K2 Penstock
- Expanding the boundary to encompass the Vista Day Use Area, including the Vista Connector Trail

2.4.3.3 Proposed FERC Project Boundary Corrections

Improved technology, including aerial imagery and improved accuracy of publicly available geographic information system (GIS) information (i.e., Public Land Survey System data and land ownership lines), has resulted in better location accuracy of Kerckhoff Hydroelectric Project facilities and led to the following adjustments to the existing FERC Project Boundary:

- Correcting the boundary around facilities and along boundary corridors representing distance offset from the centerline of linear Proposed Project infrastructure, especially access roads
- Removing the boundary corridor near the A.G. Wishon Powerhouse that includes a segment of the Madera County 12 kV line and a telephone line (Wishon 1101), which are not part of the Proposed Project
- Correcting the boundary around the Kerckhoff Dam to the documented metes/bounds depicted on the 1986 Exhibit G submittal approved by FERC

2.4.4 License Article Carried forward in the Proposed Project

2.4.4.1 Minimum Stream Flows

Under the Proposed Project, PG&E would continue to provide the required MIFs as described in Article 45 of the Kerckhoff Hydroelectric Project license, as amended by the April 22, 1993 Order Establishing Permanent Flow Release Regime (FERC 1993), but amended to split the American shad spawning flows into another condition:

- [PG&E] shall discharge a minimum flow of 25 cfs downstream of Kerckhoff Dam during Normal WYs) and a minimum flow of 15 cfs during Dry WYs
- A “dry year” shall be defined as any 12-month period beginning May 1 in which the unimpaired runoff of the SJR at Millerton Lake from April 1 to July 31, as forecast by CDWR on April 1 and as may be adjusted by the state on May 1 or June 1, will be 45 percent or less of the average April–July period. The average April–July period will be computed by CDWR for the 50-year period used at the time

- If during a designated dry year, the February 1 or later water prediction indicates that dry year conditions no longer prevail, then normal year flow releases will resume immediately

The MIFs are provided through an approximate 75-foot-long, 18-inch-diameter instream flow release pipe connected to the North Adit, which originates from the K1 Tunnel. Water from the instream flow release pipe is released into the SJR approximately 150 feet downstream of the dam.

The North Adit intersects the K1 Tunnel approximately 366 feet downstream of the intake structure. The North Adit is 16 to 18 feet in cross section and is approximately 507.5 feet long with an 18-inch concrete shaft that connects to the instream flow release pipe. PG&E replaced the in-stream flow release valve that controls flow from the tunnel into the instream flow release valve in 2021. The instream flow release valve is capable of releasing up to 50 cfs.

PG&E proposes to continue to use three gages to ensure flow compliance as outlined by the license requirements:

- Gage J-2, located downstream of Kerckhoff Dam, is used to measure MIF per Article 45
- Gage J-7, located upstream of the K1 Powerhouse, is a water temperature gage that monitors compliance with the Water Temperature Measure
- A non-project gage, Gage J-5, monitors American shad flow compliance per license Article 45
- Table 2.4-8 summarizes the articles in the current license for the Kerckhoff Hydroelectric Project with which PG&E’s proposed measures overlap

Table 2.4-8: Kerckhoff Hydroelectric Project License Condition Comparisons for the Proposed Project

PG&E's Proposed Condition		Articles in the Current License with which PG&E's Proposed Condition Overlaps	Notes
1	Proposed Retirement Plan for K1 Powerhouse and Associated Facilities	None	None in current license. The plan has not been modified since the filing of the FLA in November 2020. See Table 8.1-1 of March 2023 Supplemental FLA Filing
2	American Shad Spawning Season Flow Release Regime Measure	Article 44 (order establishing permanent flow release regime April 22, 1993)	Modified to account for the retirement of K1 Powerhouse. See Table 8.1-1 of March 2023 Supplemental FLA Filing. Order establishing permanent flow release regime issued April 22, 1993, allows for modification during operating emergencies or lack of inflow
3	Aquatic Resources Plan (water temperature for fisheries and mussels)	Article 45. Also 1980 Fishery Agreement Between PG&E and CDFG	The Proposed Project would include different studies with different target species compared to current license for the Kerckhoff Hydroelectric Project. Includes evaluation criteria, sampling, and reporting schedules. Includes mechanism for responding to deleterious changes

PG&E's Proposed Condition		Articles in the Current License with which PG&E's Proposed Condition Overlaps	Notes
4	Water Temperature Measure	Article 45, as amended. Also 1980 Fishery Agreement Between PG&E and CDFG	The Proposed Project would include a change to focus on native fish instead of smallmouth bass. Different temperature criteria with maximum required release remaining at 50 cfs. Compliance point is J-7, which was relocated under current license with concurrence of CDFW per Article 45. Rationale for the new temperature targets is provided in Aquatic Resources Plan

PG&E's Proposed Condition		Articles in the Current License with which PG&E's Proposed Condition Overlaps	Notes
5	Minimum Instream Flows and WY Type (Not Proposed for Change except as specified in proposed Water Temperature Measure)	Article 45 was amended by the October 10, 1988 Order, 1980 Fishery Agreement Between PG&E and CDFG	Specified in Aquatic Resources Plan and Table 8.1-1. PG&E will continue to implement the MIF requirement of the current Kerckhoff Hydroelectric Project license, which specifies that PG&E is required to discharge a minimum flow of 25 cfs during Normal WYs and a minimum of 15 cfs during Dry WYs. See Table 8.1-1 of March 2023 Supplemental FLA Filing, which states for MIF- ongoing (no change). The minimum flow may be modified temporarily: (a) to the extent required by operating emergencies beyond the control of PG&E; and (b) for fishery management purposes, upon mutual consent between PG&E and CGFD

PG&E's Proposed Condition		Articles in the Current License with which PG&E's Proposed Condition Overlaps	Notes
6	End-of-Spill Flow Recession and Whitewater Flow Releases Measure	None	Although not related, Article 40 limits peaking. PG&E shall operate the Proposed Project during flood periods in a manner that will not cause peak river flows below Kerckhoff Dam and powerhouse to exceed the peak flows that would have occurred in the absence of the Proposed Project
7	Subsequent Spill Ramp Down Measure	None	Although not related, Article 40 limits peaking. PG&E shall operate the Proposed Project during flood periods in a manner that will not cause peak river flows below Kerckhoff Dam and powerhouse to exceed the peak flows that would have occurred in the absence of the Proposed Project
8	Spill Season Flow Measure	None	Free public access was mandated in Article 18 and installation of signs and sirens required in Article 39
9	Planned Outage Measure	None	Installation and operation of signs and horns devices required in Article 39

PG&E's Proposed Condition		Articles in the Current License with which PG&E's Proposed Condition Overlaps	Notes
10	Flow Notifications Measure	None	Article 45 includes: The minimum flow may be modified temporarily: (a) to the extent required by operating emergencies beyond the control of PG&E; and (b) for fishery management purposes, upon mutual consent between PG&E and CDFG
11	San Joaquin River Above Kerckhoff Reservoir Inflow Gage Measure	None	Article 8 is standard article to monitor stream gages but does not specify type or location
12	Modification of Infrastructure and Procedures Measure	None	This measure is specific to the construction and testing of new infrastructure under the Proposed Action
13	Wildlife Management Plan	Article 44 Wildlife Management Plan focusing on habitat	This management plan is for bald eagle, birds, and bats; Note that Article 44 includes a requirement for a comprehensive plan for the mitigation and enhancement of the wildlife resources affected by the operation and maintenance of the Proposed Project and estimated costs, and the portions to be paid by PG&E, and others, for implementing the fish and wildlife mitigation plans

PG&E's Proposed Condition		Articles in the Current License with which PG&E's Proposed Condition Overlaps	Notes
14	Vegetation Management and Pest Control Plan	None	Standard Article 20 does require clearing trees and Article 46 management of inorganic sediments or pollutants)
15	Project Road and Trail Maintenance Plan	None	Access roads to recreation facilities are covered in Article 17, Article 29 addresses liability, Article 31 addresses construction and maintenance of roads must have the approval of the appropriate land management agency
16	Recreation Management Plan	Article 17	This is the Standard article to construct, maintain and operate Recreation facilities
17	Whitewater Notification and Access Measure	None	None in current Kerckhoff Hydroelectric Project license
18	Historic Properties Management Plan	Article 48	Ongoing consultation would occur under the Proposed Project with preservation of cultural and tribal resources found in the APE

2.4.4.2 Proposed Project Maintenance

PG&E would continue to conduct routine maintenance activities at the existing Kerckhoff Hydroelectric Project facilities, as described in Section 2.3.4 *Routine Maintenance Activities*. PG&E proposes to include the following additional activities, some of which have been incorporated within the monitoring plans. Listed below are the monitoring plans prepared for the Proposed Project:

- Project road and trail maintenance. PG&E would implement a Project Road and Trail Maintenance Plan, which includes regularly inspecting and maintaining the Proposed Project roads, as can be seen in Figure 2.4-1, and trails to enable safe access to Kerckhoff Hydroelectric Project and Proposed Project facilities
- Vegetation management and pest control. PG&E would implement a Vegetation Management and Pest Control Plan to minimize the potential for impacts on environmental and cultural resources during implementation of vegetation management activities and to control the introduction or spread of target invasive weed species

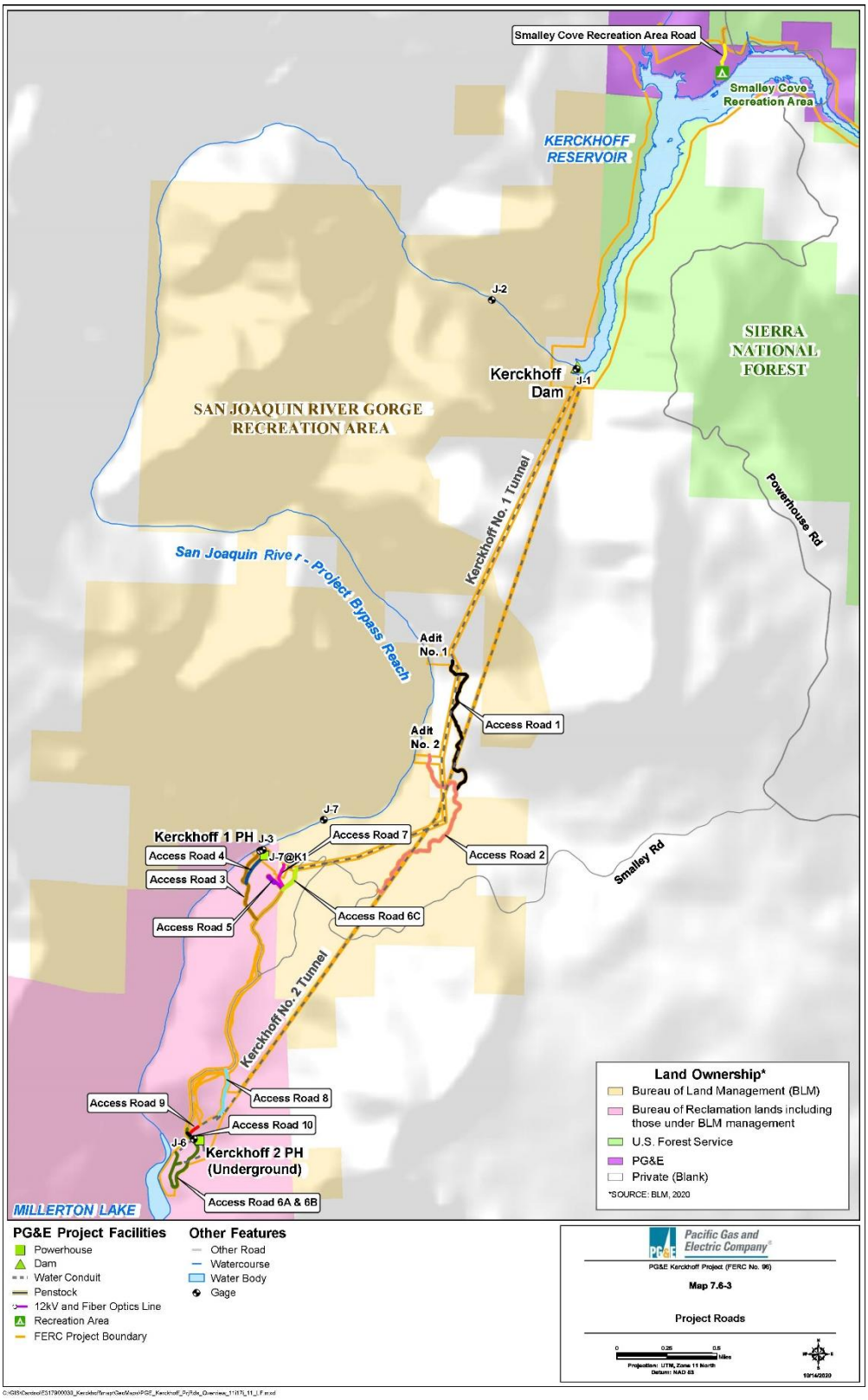


Figure 2.4-1: Project Roads

2.5 LITERATURE CITED

Brungs, W.A., and B.R. Jones. 1977. *Temperature Criteria for Freshwater Fish: Protocol and Procedures.* EPA-600/3-77-061. Ecological Research Series. Environmental Research Laboratory, Office of Research and Development, United States Environmental Protection Agency.

Central Valley Regional Water Board (Central Valley Regional Water Quality Control Board). 2019. *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region*. Fifth Edition, Revised February 2019 (with Approved Amendments). The Sacramento River Basin and San Joaquin River Basin. Accessed: April 3, 2026. Retrieved from: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201902.pdf.

FERC (Federal Energy Regulatory Commission). 1993. Order establishing permanent flow release regime for the Kerckhoff Hydroelectric Project (FERC Project No. 96). April. Federal Energy Regulatory Commission, Office of Hydropower Licensing, Washington D.C.

_____. 1998. *Pacific Gas and Electric Company*, Project Nos. 96-028, 137-022, 184-056, 233-066, 619-075, 803-044, 1121-045, 1333-029, 1354-021, 1962-026, 1988-023, 2105-069, 2107-005, 2130-025, and 2310-093. 85 FERC ¶ 61,411 (December 22, 1998). *Order Granting License Amendments*.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas & Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “K2 PH impacts from Cycling and Stop Starts,” on March 5, 2026.

PG&E (Pacific Gas and Electric Company). 2020. *Final Application for New License for the Kerckhoff Hydroelectric Project, FERC No. 96*. November 20.

_____. 2022. *Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. May 26.

_____. 2023a. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

_____. 2023b. *Third Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048.* August 17.

_____. 2023c. *Kerckhoff Hydroelectric Project (FERC Project No. 96) Updated Exhibit G FERC Docket Number: P-96-048*. September 29.

_____. 2025. *Kerckhoff Hydroelectric Project (FERC Project No. 96) Water Quality Certificate Application*. July 18.

3 ALTERNATIVES DESCRIPTIONS

3.1 INTRODUCTION

This section describes California Environmental Quality Act (CEQA) Guidelines related to the development and screening of alternatives, potential alternatives considered but eliminated from further evaluation, and 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 or Commission) licensing proceeding. The analysis focuses only on the resource areas potentially affected by the Alternatives presented in this section. Section 5 *Alternatives Summary* provides a summary of the alternatives analysis and identifies the Environmentally Superior Alternative.

3.2 ALTERNATIVES ANALYSIS AND SCREENING PROCESS

Section 15126.6 of the CEQA Guidelines 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 potential impacts 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 potential impacts. The “no project” analysis shall discuss the existing conditions at the time the Notice of Preparation (NOP) was published (May 30, 2023), as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services
- The range of alternatives required in an Environmental Impact Report (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

Alternatives must be “feasible,” meaning that they can be successfully implemented to accomplish the project’s overall purpose and objectives in a reasonable amount of time, considering elements including cost, existing technology, social factors, legal factors, and environmental issues (CEQA Guidelines Section 15364). Therefore, “an EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative” (CEQA Guidelines Section 15126.6, Subdivision (f)(3)). The EIR should include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison.

According to the Governor’s Office of Planning and Research, 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 EIR was based on (a) a thorough

review of recommendations by other parties proposed during licensing of the Proposed Project, (b) comments received during the California State Water Resources Control Board (State Water Board) public scoping meetings, and (c) independent analysis completed by the State Water Board staff. The underlying Proposed Project purpose is to provide hydroelectric power. In furtherance of this underlying purpose, the State Water Board has identified the following Proposed Project objectives (see Executive Summary: *Proposed Project Objectives*):

1) Continuing to provide renewable energy to help California meet its Renewable Portfolio Standards
2) Improving the long-term water quality and associated beneficial use conditions for Kerckhoff Reservoir and the San Joaquin River (SJR)
3) Ensuring safe contact and non-contact recreation opportunities for members of the public

3.3 ALTERNATIVES CONSIDERED BUT ELIMINATED

Section 15126.6(c) of the CEQA Guidelines requires that draft EIRs explain briefly why other alternatives were rejected. The State Water Board considered the following alternatives that were eliminated from further analysis:

- Federal government takeover
- Issuing a non-power license
- Kerckhoff Hydroelectric Project decommissioning
- Dedicated trail access at Gage J-2

The current license for the existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) expired on November 30, 2022. When a license expires, and a new license application is pending with FERC, FERC will administratively extend the term and conditions of the existing license until a new license is issued. Other alternatives to new license issuance include: the federal government takeover of the project; issuance of a license to a new licensee, in the situation where there is a competing applicant; or the project may be decommissioned (FERC 2004). In addition, the suggested addition of dedicated trail access by American Whitewater was evaluated but eliminated from further analysis for the reasons provided in this section.

3.3.1 Federal Government Takeover

No party has suggested that federal government takeover of the Kerckhoff Hydroelectric Project would be appropriate, and no federal agency has expressed an interest in operating the Kerckhoff Hydroelectric Project. Federal government takeover and operation of the Kerckhoff Hydroelectric Project would require Congressional approval, and no evidence has indicated that federal government takeover should be recommended to United States Congress or that it would receive Congressional approval. Therefore, federal government takeover of the Kerckhoff Hydroelectric Project has been eliminated from further consideration.

3.3.2 Issuing a Non-Power License

A non-power license is a temporary license that FERC would terminate when it determines that another government agency will assume regulatory authority and supervision over the lands and facilities covered by the non-power license. At this point, no agency has suggested a willingness or ability to do so, and no party has sought a non-power license. As such, issuing a non-power license is not a feasible alternative to relicensing the Proposed Project and has been eliminated from further consideration.

3.3.3 Kerckhoff Hydroelectric Project Decommissioning

Decommissioning the Kerckhoff Hydroelectric Project could be accomplished with or without dam removal. Either means would require denial of the application for license and surrender or termination of the existing license with appropriate conditions. One party (including FERC, an agency, Native American Tribes, non-governmental organizations [NGO], and the public) has suggested that dam removal may be appropriate. This sentiment was expressed in a comment letter from the North Fork Mono Tribe's Motion to Intervene letter for the Proposed Project, dated May 5, 2024. Dam removal would result in the loss of power generation and recreational opportunities, in addition to significant costs—financially and environmentally—to remove the dam and associated sediment.

While Pacific Gas and Electric Company (PG&E or Applicant) intends to retire the Kerckhoff 1 (K1) Powerhouse as part of the Proposed Project, no agency or private entity has expressed interest in assuming regulatory control and supervision of the Kerckhoff Hydroelectric Project if it were entirely retired with or without dam removal, and no resource agency, Native American Tribe, NGO, member of the public, or other interested party has advocated this alternative, likely because the disadvantages would be too great. Thus, retirement of the Kerckhoff Hydroelectric Project with or without dam removal is not a reasonable alternative and has been eliminated from further consideration.

3.4 ALTERNATIVES EVALUATED IN THIS EIR

Each alternative evaluated in Section 5 *Alternatives Summary* is described below.

3.4.1 No Project Alternative

Section 16126.2(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 Proposed Project, as proposed, were not approved and implemented.

If the Proposed Project is not implemented, existing environmental conditions and resources would be maintained or unchanged in the future. Section 2.3 *Existing Kerckhoff Hydroelectric Project* describes the existing facilities and operations that would be maintained as part of the No Project Alternative. The State Water Board developed the following assumptions regarding reasonable events that would occur under the No Project Alternative if selected:

- The Kerckhoff Hydroelectric Project would continue to operate as described in the existing FERC license and amendments
- The K1 Powerhouse and associated facilities would remain in their current state and would not be formally decommissioned
- The Vista Day Use Area would not be developed for recreation
- The FERC Project Boundary would not be revised
- Proposed environmental management measures would not be implemented, including the Water Temperature Measure, American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, Planned Outage Measure (POM), Flow Notifications Measure, San Joaquin River (SJR) Above Kerckhoff Reservoir Inflow Gage Measure, Modification of Infrastructure and Procedures Measure, and Whitewater Notification and Access Measure

- Proposed new and revised management plans would not be implemented including the Aquatic Resources Plan, Wildlife Management Plan, Vegetation Management and Pest Control Plan, Project Road and Trail Maintenance Plan, Recreation Management Plan, and Historic Properties Management Plan
- Further stakeholder engagement and negotiations would occur until a decision on relicensing is reached

The short-term scenario under the No-Project Alternative is anticipated for a period of one to five years with annual license renewals of the existing FERC license and until a new proposal is put forth for the Kerckhoff Hydroelectric Project.

Forecasting one specific No Project scenario for a longer term, greater than five years, would be speculative and would be contrary to the CEQA Guidelines' mandate to disclose and assess the environmental impacts that would "reasonably be expected to occur in the foreseeable future." The potential future for the existing hydroelectric facilities could include transferring, decommissioning, or relicensing with modifications of all or some of the dams and associated facilities.

3.4.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1) maintains all activities associated with the Proposed Project with the exception of fully or partially replacing the flow measures described under Section 2.4.2.1 *Proposed Project Environmental Management Measures*. This alternative was designed with the goal of reducing flow fluctuations below Kerckhoff Dam, which would better mimic the natural hydrograph while also providing whitewater boating opportunities in the Kerckhoff Hydroelectric Project Bypass Reach (PBR). Alternative 1 was designed based on the United States Bureau of Land Management (BLM) Federal Power Act 4(e) Conditions filed with FERC on September 24, 2024 (DOI 2024).

There are two components to Alternative 1 that differ from the Proposed Project, down ramping operations and up ramping operations of water released from Kerckhoff Dam into the PBR.

The first component of Alternative 1 is the Proposed Project with the implementation of BLM 4(e) Condition 4 (DOI 2024), which requires the passage of Southern California Edison's (SCE) Long-term Operating Rules (LTOR) flows through the Kerckhoff Hydroelectric PBR of the SJR. SCE's Big Creek 4 Hydroelectric Project (FERC Project No. 2017) utilizes the same LTOR for releases from Redinger Dam. Releases from Redinger Dam enter the SJR and eventually flow into Kerckhoff Reservoir. The intent of Alternative 1 is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the PBR of the Proposed Project. The LTOR would replace multiple down ramping measures included within the Proposed Project as described below in Section 3.4.2.1.

The LTOR under Alternative 1 dictate down ramping operations off spill flows and simultaneously provide boating flows.

The second component of Alternative 1 is the Proposed Project with the implementation of a modified version of BLM's 4(e) Condition 5 Ramp Up for Protection of Public Safety and Aquatic Life Stage (Alternative 1 Ramp Up Measure). This would replace ramp up components of the Proposed Projects flow management measures.

3.4.2.1 Passage of Southern California Edison's Long-term Operating Rules Flows through the Kerckhoff Hydroelectric Project Bypass Reach of the San Joaquin River

The LTOR dictate down ramping operations for spill flows through the PBR on the SJR and are based on SCE's spill recession flows. The LTOR replace PG&E's proposed EOS Flow Recession Measure, the Subsequent Spill Ramp Down Measure, and the down ramping components of the Spill Season Flow Measure. The LTOR designated water year (WY) type schedule determines the boating flows and down ramping of spill flows operations for a given spill year. The LTOR use the WY type Schedules A-D from the Mammoth Pool Contract to designate the appropriate down ramping schedule for spill flows (spill year schedule). Boating flows are provided as a part of the spill year

schedule. The April Forecast of Friant Natural Runoff during April through July is used, in part, to designate the applicable spill year type (Table 3.4-1).

Table 3.4-1: Water Year Type Schedules A-D in Mammoth Pool Contract

Schedule	Criteria
A	April Forecast of Friant Natural Runoff during April–July not more than 650,000 acre-feet
B (Low Storage)	April Forecast of Friant Natural Runoff during April–July more than 650,000 acre- feet and WY Forecast Runoff not more than 1.2 million acre-feet with a September aggregate storage requirement less than 325,000 acre-feet
B (High Storage)	April Forecast of Friant Natural Runoff during April–July more than 650,000 acre-feet and WY Forecast Runoff not more than 1.2 million acre-feet with a September aggregate storage requirement greater than or equal to 325,000 acre- feet
C	April Forecast of Friant Natural Runoff during WY more than 1.2 million acre-feet but not more than 1.6 million acre-feet
D	April Forecast of Friant Natural Runoff during WY more than 1.6 million acre-feet

Due to Dam No. 7 of the Big Creek 4 Project having a much larger storage capacity than Kerckhoff Dam, PG&E would review SCE's public notification regarding whether it would be a predicted spill or non-spill year no later than May 1 each year. PG&E would then provide notification no later than May 4 each year regarding its own spill year type for the Proposed Project. This would allow the two projects' flow operations to have common ground and still allow PG&E to operate the Proposed Project as run-of-the-river, as it would ideally be passing the scheduled flows from Dam No. 7 downstream into the PBR.

3.4.2.1.1 Boating Flows and Notifications

Under the LTOR, boating flows would be provided to the public during the spring or summer months. Optimal boating flows through the PBR would be provided within each ramp down schedule (A through D) when flows are between 2,500 and 1,600 cubic feet per second (cfs). During spill years, boating flows would be provided following a declining limb of spill between May 1 through August 31, with a minimum of two boating days provided per year. During non-spill years, boating flows would be provided on the

weekends between May 15 to June 15 starting at 9 a.m. on Saturday, if sufficient flows are available.

During spill years, PG&E must provide estimates regarding the timing, magnitude (average daily flow), and duration of boating flows on a weekly basis from May 4 through August 31, or until no additional boating flows are forecasted. During non-spill years, PG&E must provide notification a minimum of two weeks prior to the boating flow release. The Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure and Non-Spill Year Boating Flows and Down Ramping Measure are described in the following sections.

3.4.2.1.2 Spill Year Schedule Boating Flows and Down Ramping of Spill Flows

From May 1 through August 31, PG&E would ramp down flows in the PBR after SCE has identified when down ramping of spill flows at Big Creek 4's Dam No. 7 will start. PG&E would reduce spill flows from Kerckhoff Dam according to the following schedule and may start at lower base flows depending on schedule type. Schedules for the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure are shown in Table 3.4-2, Table 3.4-3, and Table 3.4-4. As stated above, boating flows are incorporated into the down ramping schedule. Down ramping of spill flows to the appropriate flow range in the schedule would occur by 9 a.m. unless otherwise specified.

Table 3.4-2: Schedule A or B (Low Storage)

Day 1	Maintain the flow within a range of 2,500–2,000 cfs
Day 3	At 6 p.m., reduce the flow within a range of 2,000–1,600 cfs
Day 4	At 2 a.m., reduce the flow within a range of 1,600–1,200 cfs
Day 4	At 12 p.m., reduce the flow within a range of 1,200–800 cfs
Day 4	At 5 p.m., reduce the flow within a range of 800–600 cfs
Day 4	At 10 p.m., reduce the flow within a range of 600–400 cfs
Day 5	At 3 a.m., reduce the flow within a range of 400–200 cfs
Day 5	At 8 a.m., reduce the flow within a range of 200 cfs – minimum instream flow (MIF)

Table 3.4-3: Schedule C or B (High Storage)

Day 1	Maintain the flow within a range of 3,500–3,000 cfs
Day 2	Reduce the flow within a range of 3,000–2,500 cfs
Day 3	Reduce the flow within a range of 2,500–2,000 cfs
Day 5	Reduce the flow within a range of 2,000–1,600 cfs
Day 6	At 6 p.m., reduce the flow within a range of 1,600–1,200 cfs
Day 7	At 2 a.m., reduce the flow within a range of 1,200–800 cfs
Day 7	At 12 p.m., reduce the flow within a range of 800–600 cfs
Day 7	At 5 p.m., reduce the flow within a range of 600–400 cfs
Day 7	At 10 p.m., reduce the flow within a range of 400–200 cfs
Day 8	At 3 a.m., reduce the flow within a range of 200 cfs – MIF

Table 3.4-4: Schedule D

Day 1	Maintain the flow within a range of 3,500–3,000 cfs
Day 2	Reduce the flow within a range of 3,000–2,500 cfs
Day 3	Reduce the flow within a range of 2,500–2,000 cfs
Day 8	Reduce the flow within a range of 2,000–1,600 cfs
Day 10	Reduce the flow within a range of 1,600–1,300 cfs
Day 12	Reduce the flow within a range of 1,300–1,000 cfs
Day 14	Reduce the flow within a range of 1,000–750 cfs
Day 16	Reduce the flow within a range of 750–500 cfs
Day 18	Reduce the flow within a range of 500–250 cfs
Day 20	Reduce the flow within a range of 250–100 cfs
Day 21	Reduce the flow within a range of 100 cfs – MIF

3.4.2.1.3 Non-Spill Year Boating Flows and Down Ramping

Between May 15 and June 15 of a non-spill year beginning on Saturday, PG&E would provide boating flows. The Non-Spill Year Boating Flows and Down Ramping Measure would be scheduled based on PG&E's forecast of water availability. PG&E would provide notification 10 days in advance. PG&E would release water from Kerckhoff Dam to provide the whitewater boating flows, consisting of 2 days (9 a.m. to 6 p.m.) of whitewater boating flows with target flows of 2,500–2,000 cfs on the first day and 2,000–1,600 cfs on the second day, followed by a ramp down minimum instream flow (MIF). PG&E would provide the boating flow and down ramp from Kerckhoff Dam according to the schedule outlined in Table 3.4-5.

Table 3.4-5: Non-Spill Year Boating Flows and Down Ramping

Day 0	Flows ramped up to the Day 1 release level during the night, before 9 a.m.
Day 1	At 9 a.m., maintain the flow within an hourly avg. range of 2,500-2,000 cfs
Day 1	After min. 9 hours, reduce flow within an hourly avg. range of 2,000-1,600 cfs
Day 2	After min. 24 hours, reduce flow within an hourly avg. range of 1,600-1,200 cfs
Day 3	After min. 10 hours, reduce flow within an hourly avg. range of 1,200-800 cfs
Day 3	After min. 5 hours, reduce flow within an hourly avg. range of 800-600 cfs
Day 3	After min. 5 hours, reduce flow within an hourly avg. range of 600-400 cfs
Day 3	After min. 5 hours, reduce flow within an hourly avg. range of 400-200 cfs

3.4.2.1.4 Stranding Protection Down Ramping

For initial and subsequent spills from May 1 through August 31, PG&E would implement the Stranding Protection Down Ramping Measure. The AB, BC, and D ramp down schedules discussed above are designated for major spill events, while all other spill events are managed under this Stranding Protection Down Ramping Measure. For example, if the Applicant's weekly forecast indicates that an initial spill would be followed by a larger magnitude spill, the Applicant would down ramp the initial spill according to the Stranding Protection Down Ramping schedule. The larger magnitude spill would be down ramped according to Schedule A/B. If a spill(s) occurs after the Applicant has completed the down ramp in Schedule A/B, the subsequent spill(s) would be down ramped according to the Stranding Protection Down Ramping schedule.

This measure would ramp down the declining limb of an initial or subsequent spill(s), as described above, once the average daily flow declines below 1,600 cfs. PG&E will make a good faith effort to initiate the down ramp prior to average hourly flow declining below 1,200 cfs. PG&E would down ramp spill flows from Kerckhoff Dam according to the schedule in Table 3.4-6. If a subsequent spill event occurs in the months of May through August that does not exceed 1,200 cfs average daily flow, then the spill would be down ramped according to the Standing Protection Down Ramping Schedule beginning at the step that includes the largest flow observed. Spills that do not exceed 500 cfs (average daily flow) will not be down ramped.

Table 3.4-6: Stranding Protection Down Ramping Schedule

Step 1	Maintain flow within a range of 1,600–1,200 cfs for 10 hours
Step 2	Reduce the flow within a range of 1,200–800 cfs for 10 hours
Step 3	Reduce the flow within a range of 800–600 cfs for 5 hours
Step 4	Reduce the flow within a range of 600–400 cfs for 5 hours
Step 5	Reduce the flow within a range of 400–200 cfs for 5 hours
Step 6	Reduce the flow within a range of 200 cfs – MIF

3.4.2.1.5 Down Ramp of Spills September 1 to October 31

From September 1 through October 31 in all WY types, PG&E would down ramp the declining limb of spills once the average daily flow declines below 1,600 cfs. PG&E would ramp spill flows from Kerckhoff Dam according to the schedule in Table 3.4-7. If a spill event occurs from September 1 to October 31 that does not exceed 1,200 cfs average daily flow, then the spill would be down ramped beginning at the step that includes the largest flow observed. Spills that do not exceed 500 cfs (average daily flow) will not be down ramped.

Table 3.4-7: September 1 to October 1 Down Ramping Schedule

Step 1	Maintain flow within a range of 1,600–1,200 cfs for 2 hours
Step 2	Reduce the flow within a range of 1,200–800 cfs for 2 hours
Step 3	Reduce the flow within a range of 800–600 cfs for 2 hours
Step 4	Reduce the flow within a range of 600–400 cfs for 2 hours
Step 5	Reduce the flow within a range of 400–200 cfs for 2 hours
Step 6	Reduce the flow within a range of 200 cfs – MIF

3.4.2.1.6 Finalization of Schedules and Changes

PG&E would implement the flow schedules after completion of the Infrastructure Testing and Adjustment Period and FERC approval of the Final Infrastructure Testing and Adjustment Operations Report (Proposed Project Modification of Infrastructure and Procedures Measure). PG&E in consultation with BLM, USFWS, California Department of Fish and Wildlife, State Water Board, Tribes, and interested stakeholders would review, update, and revise the plan as needed.

3.4.2.2 Alternative 1 Ramp Up Measure

The second component of Alternative 1 implements a modified version of BLM's 4(e) Condition 5 Ramp Up for Protection of Public Safety and Aquatic Life (Alternative 1

Ramp Up Measure) as a part of the Proposed Project. The Alternative 1 Ramp Up Measure replaces the ramp up components of the Proposed Project's Spill Season Flow Measure and POM. The measure is designed to gradually ramp up spill flows for the protection of recreators' public safety, as feasible, with supplemental benefits to aquatic life. Under this measure, PG&E would implement a ramp up with a stage change of 1 foot or less per hour, measured at Gage J-2 in the PBR, for flows above MIFs and below 4,000 cfs, provided there is sufficient reservoir storage and powerhouse capacity to meet this requirement.[9]

3.4.3 Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions

Alternative 2: Proposed Project with BLM Revised 4(e) Conditions (Alternative 2) maintains all activities associated with the Proposed Project with the exception of modifying the Proposed Project's flow measures. There are two components to Alternative 2. The first component is the Proposed Project with the implementation of revised BLM 4(e) Condition 4 (DOI 2025). The revised 4(e) Condition 4 requires the implementation of a Modified EOS Flow Recession Measure and the Proposed Project's Subsequent Spill Ramp Down Measure.[10] The second component is the Proposed Project with the implementation of revised BLM 4(e) Condition 5, which includes a Modified Spill Season Flow Measure and Modified POM (DOI 2025).

The goal of Alternative 2 is to reduce flow fluctuations below Kerckhoff Dam to better mimic the natural hydrograph while also providing whitewater boating opportunities in the PBR.

[9] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

[10] The Alternative 2 BLM Condition 4 Subsequent Spill Ramp Down Measure is the same as the Subsequent Spill Ramp Down Measure under the Proposed Project.

3.4.3.1 Modified End-of-Spill Flow Recession and Whitewater Flow Release Measure

The Modified EOS Flow Recession would modify PG&E's Proposed Project EOS Flow Recession Measure. Under this Alternative, WYs are categorized as either Above Average (AA) WY or Below Average (BA) WY, as describe in Table 3.4-8. The EOS Flow Recession Measure is implemented once annually between May 1 and August 31 during the last large spill event of the year and provides boating flows during the first initial ramp down days.

Table 3.4-8: Water Year Description for Implementation of Condition 4 (Revised)

Schedule	Criteria
Above Average (AA)	April 1 forecast of SJR below Friant Unimpaired Runoff during April-July is predicted to be equal to or more than 1.2 million acre-feet based on publication in Department of Water Resources Bulletin B120 or future equivalent. If the May 1 forecast alters the below Friant Unimpaired Runoff during April-July to a different WY classification, that WY classification will be used as soon as feasible following its publication
Below Average (BA)	April 1 forecast of SJR below Friant Unimpaired Runoff during April-July is predicted to be less than 1.2 million acre-feet based on publication in Department of Water Resources Bulletin B120 or future equivalent. If the May 1 forecast alters the below Friant Unimpaired Runoff during April-July to a different WY classification, that WY classification will be used as soon as feasible following its publication

If Alternative 2 were selected, PG&E in consultation with the United States Department of Interior (DOI) would monitor boating use beginning in Year 3 after license issuance and continuing for a period of either 15 years, or 5 AA WYs, whichever comes first. Boaters would be counted at the Kerckhoff Dam access point between the hours of 8:00 a.m. and 4:00 p.m. on flow release days. Boaters would only be counted during AA WYs and not in BA WYs. An average of daily use on an annual basis would be calculated, and then annual averages would be averaged. If the average of the annual averages in AA WYs falls below an average of 20 boaters per day, PG&E may reduce the number of 1,600–2,000 cfs boating days by 1 boating day (24 hours). Boating days during Schedule BA would not be adjusted.

3.4.3.1.1 Above Average Water Year – Modified EOS Flow Recession Measure

In AA WYs, PG&E would increase optimal whitewater boating opportunities and functional flows based on the ramp down operational released outlined in Table 3.4-9. High flows (2,500–2,000 cfs) are provided for whitewater boating opportunities on Day 1 for 9 hours, which then ramps down to boating flows of 2,000–1,600 cfs for 2 days, followed by the EOS Flow Recession ramp down.

Table 3.4-9: Above Average Water Year Down Ramping Schedule

Day 1 (9 a.m.)	2,500–2,000 cfs for minimum 9 hours, boating flow
Day 1 (6 p.m.)	2,000–1,600 cfs for minimum 48 hours, boating flow
Day 3 (6 p.m.)	1,600–1,200 cfs for minimum 10 hours, ramp down
Day 4 (4 a.m.)	1,200–800 cfs for minimum 5 hours
Day 4 (9 a.m.)	800–600 cfs for minimum 5 hours
Day 4 (2 p.m.)	600–400 cfs for minimum 5 hours
Day 4 (7 p.m.)	400–200 cfs for minimum 5 hours
Day 5 (12 a.m.)	200 cfs – MIF

3.4.3.1.2 Below Average Water Year – Modified EOS Flow Recession Measure

In BA WYs, the EOS Flow Recession would be scheduled based on PG&E's forecast of water availability. In a BA WY, PG&E would provide whitewater boating opportunities and functional flows based on the ramp down operational released outlined in Table 3.4-10. High flows (2,500–2,000 cfs) are provided for whitewater boating opportunities on Day 1 for 9 hours, which then ramps down to boating flows of 2,000–1,600 cfs for 1 day, followed by the EOS Flow Recession ramp down (Table 3.4-10).

Table 3.4-10: Below Average Water Year Down Ramping Schedule

Day 1 (9 a.m.)	2,500–2,000 cfs for minimum 9 hours, boating flow
Day 1 (6 p.m.)	2,000–1,600 cfs for minimum 24 hours, boating flow
Day 2 (6 p.m.)	1,600–1,200 cfs for minimum 10 hours, ramp down
Day 3 (4 a.m.)	1,200–800 cfs for minimum 5 hours
Day 3 (9 a.m.)	800–600 cfs for minimum 5 hours
Day 3 (2 p.m.)	600–400 cfs for minimum 5 hours
Day 3 (7 p.m.)	400–200 cfs for minimum 5 hours
Day 4 (12 a.m.)	200 cfs – MIF

3.4.3.2 Subsequent Spill Ramp Down Measure

A Subsequent Spill Ramp Down Measure is implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types, except during powerhouse outages. Ramp downs begin when daily average flow at Gage J-2 declines below 1,600 cfs. If any subsequent spill event does not exceed 1,200 cfs, then the Subsequent Spill Ramp Down would begin at the step that includes the largest flow observed. Spills that do not exceed 500 cfs would not be ramped down. The schedule for the Subsequent Spill Ramp Down Measure is in Table 3.4-11.

Table 3.4-11: Subsequent Spill Ramp Down Hourly Releases

Step 1	Maintain flow within a range of 1,600–1,200 cfs for 2 hours
Step 2	Reduce the flow within a range of 1,200–800 cfs for 2 hours
Step 3	Reduce the flow within a range of 800–600 cfs for 2 hours
Step 4	Reduce the flow within a range of 600–400 cfs for 2 hours
Step 5	Reduce the flow within a range of 400–200 cfs for 2 hours
Step 6	Reduce the flow within a range of 200 cfs – MIF

3.4.3.3 Modified Spill Season Flow Measure

PG&E's proposed Spill Season Flow Measure would be implemented during the March 1 through August 31 spill season, when neither the EOS Flow Recession nor the Subsequent Spill Ramp Down is being implemented. The measure is designed to provide the recreating public with visual cues as to water conditions when Kerckhoff Dam is spilling and to provide benefit to aquatic life. Flows and down ramping would depend on the WY type, as described in the subsections below.

3.4.3.3.1 Above Average Water Year – Modified Spill Season Flow Measure

When sustained spills measured at Gage J-2 are 1,000 cfs or more for at least 5 hours of continuous duration, the flows would be released based on the schedule outlined in Table 3.4-12, if sufficient water is available. Sufficient water availability is dependent on combined accessible volume of water from inflow, storage within the normal operating range of Kerckhoff Reservoir, or current powerhouse diversions to complete the specified ramp down to minimum flow without decreasing below the normal operating range of 980 feet msl water surface elevation in the Kerckhoff Reservoir.

Table 3.4-12: Above Average Water Year – Modified Spill Season Flow Measure

Step 1	Maintain hourly average flow within a range of 1,200–800 cfs for a minimum of 4 hours
Step 2	Reduce the flow within a range of 600–400 cfs for 4 hours
Step 3	Reduce the flow within a range of 400–200 cfs for 4 hours
Step 4	Reduce the flow within a range of 200 cfs – MIF

3.4.3.3.2 Below Average Water Year – Modified Spill Season Flow Measure

When sustained spills measured at Gage J-2 are 500 cfs or more for at least 5 hours of continuous duration, the flows would be released based on the schedule outlined in Table 3.4-13, if sufficient water is available.

Table 3.4-13: Below Average Water Year – Modified Spill Season Flow Measure

Step 1	Maintain hourly average flow within a range of 1,200–800 cfs for a minimum of 4 hours
Step 2	Reduce the flow within a range of 600–400 cfs for 4 hours
Step 3	Reduce the flow within a range of 400–200 cfs for 4 hours
Step 4	Reduce the flow within a range of 200 cfs – MIF

3.4.3.4 Modified Planned Outage Measure (POM Initial Release Protocol and Modified POM Ramp Down)

3.4.3.4.1 POM Initial Release Protocol

The Modified POM under Alternative 2 implements an initial release protocol, which is also a part of the Proposed Project's POM but with slightly different implementation criteria. The modified POM also contains a Modified POM Ramp Down operation during planned K2 Powerhouse outages. The POM Initial Release Protocol begins the initiation of a spill event that falls within a planned K2 Powerhouse outage. The initial spill would be released when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs.

The intent of the POM Initial Release Protocol is to release the initial spill during late night or early morning hours (prior to 3:30 a.m.) so that spill arrives downstream near the K1 Powerhouse by approximately 8:30 a.m. This component of the measure works to minimize the risk of sudden flow increases from spill during times of the day when the public would be reasonably expected to be in or near the PBR.

The planned outage ramp up protocol described under the Proposed Project would be eliminated and replaced with a higher flow step during AA WYs as a deterrence flow under Alternative 2 (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

3.4.3.4.2 Modified POM Ramp Down

Above Average Water Year Schedule

When sustained spills measured at Gage J-2 are 1,000 cfs or more for at least 4 hours of continuous duration subject to sufficient water availability, PG&E would release flows below Kerckhoff Dam as described in Table 3.4-14. The measure was modified from the Proposed Project POM to include an extra flow step (1,200-800 cfs) in AA WYs, to act as a deterrent flow for recreators during planned outages.

Table 3.4-14: Above Average Water Year Down Ramping Schedule – Modified POM Ramp Down

Step 1	Maintain hourly average flow within a range of 1,200–800 cfs for as long as sufficient water is available
Step 2	Reduce the flow within a range of 600–400 cfs for minimum 4 hours
Step 3	Reduce the flow within a range of 400–200 cfs for minimum 4 hours
Step 4	Reduce the flow within a range of 200 cfs – MIF

Below Average Water Year Schedule

When sustained spills measured at Gage J-2 are 500 cfs or more for at least 4 hours of continuous duration subject to sufficient water availability, PG&E would release flows below Kerckhoff Dam as shown in Table 3.4-15.

Table 3.4-15: Below Average Water Year Down Ramping Schedule – Modified POM Ramp Down

Step 1	Maintain hourly average flow within a range of 600–400 cfs for as long as sufficient water is available
Step 2	Reduce the flow within a range of 400–200 cfs for minimum 4 hours
Step 3	Reduce the flow within a range of 200 cfs – MIF

3.4.4 Alternatives Proposed by Other State/Federal Resource Agencies and Public

The following entities submitted comment letters in response to the State Water Board's NOP for the EIR:

- American Whitewater (July 5, 2023)
- United States Bureau of Reclamation (June 30, 2023)
- California Department of Fish and Wildlife (June 27, 2023)
- PG&E (June 30, 2023)

All comments received have been reviewed and considered. Corrections to the Kerckhoff Hydroelectric Project description and to the Proposed Project description identified in PG&E's comment letter from June 30, 2023, have been incorporated, as applicable. American Whitewater proposed specific alternatives for consideration in this EIR; these alternatives are addressed below and incorporated where appropriate.

3.4.4.1 End-of-Spill Flow Recession and Whitewater Flow Release Measure

American Whitewater submitted comments in response to the NOP for the Kerckhoff Hydroelectric Project Relicensing EIR, requesting an analysis of how PG&E's Proposed Project operations would affect the number of boating day opportunities in Below Normal, Above Normal, and Wet WYs. Specifically, American Whitewater asked that this EIR evaluate operational adjustments PG&E could implement to provide additional whitewater recreation releases, beyond the two days currently offered, using flows available under the LTOR.

In response to this request, under Alternative 1, boating flows and down ramps would be based on the WY type Schedules A-D and could result in two to eight days of whitewater and boating flows under the spill year schedule depending on the WY. Additionally, under the Non-Spill Year Boating Flows and Down Ramping Measure, two days (9 a.m. to 6 p.m.) of whitewater boating flows are provided on weekends between May 15 to June 15. A Project Operations Model was developed by the State Water Board to assess potential modifications to Proposed Project operations and to analyze

reasonable alternatives. The results of this modeling effort are presented and discussed in the relevant sections of this EIR (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0).

3.4.4.2 Spill Season Flow Measure

In their comments in response to the NOP, American Whitewater recommended a measure for ramping rates in combination with or as a replacement of PG&E's proposed Spill Season Flow Measure that would result in no more than a one-foot stage height change per hour at the Gage J-2 site. This request is implemented under Alternative 1 as the Alternative 1 Ramp Up Measure for flows above MIFs and below 4,000 cfs.

3.4.4.3 Whitewater Run Put-in Access

In their comments in response to the NOP, American Whitewater requested consideration of a measure to construct a dedicated trail around the Proposed Project facilities that accommodates visitors who boat or paddle across Kerckhoff Lake from Smalley Cove to hike the J-2 Stream Gage access trail and gain river access below the dam. American Whitewater has stated that the purpose of this trail would be to allow for continuous use of the whitewater boating run below Kerckhoff Dam, referred to as Run 2 in the Final License Application (FLA). This comment asks that a formal assessment be included within the Whitewater Notification and Access Measure. Additionally, comments submitted in response to the FERC Environmental Assessment for the Kerckhoff Hydroelectric Project on January 30, 2026, by American Whitewater et al. (2026) further emphasized the need for meaningful recreational access downstream of Kerckhoff Dam. This request has been considered but eliminated from further analysis within this EIR due to a combination of environmental disturbance, unpredictable flows, operational uncertainties, and limited opportunities for safe portage presenting significant public safety risks. These reasons are further detailed in the following paragraphs.

The existing route to reach the J-2 Stream Gage access trail is wide enough to accommodate one person as it goes through a gated area, following the perimeter of the facility, and requires hikers to dip under the trashrack conveyor system and past the

intake system, and down several flights of stairs. This trail has been reported as becoming seasonally slippery and not suitable for carrying heavy loads (PG&E 2021). Sections of the J-2 Stream Gage access trail are narrow and located on a steep embankment with boulders and slippery rock faces near the water, as can be seen in Figure 3.4-1. Current photos of the J-2 Stream Gage access trail and vicinity can be found in the FLA, Appendix C (*Technical Study Report [TSR-05]: Whitewater Boating Assessment [REC 1]*; PG&E 2020).



Figure 3.4-1: Photo of J-2 Stream Gage Access Trail

Currently, access to the J-2 Stream Gage access trail is gated for public safety and protection of Kerckhoff Hydroelectric Project infrastructure. As discussed and analyzed

within this EIR, flows below the Kerckhoff Dam may be unpredictable and unsafe, due in part to PG&E's lack of control over upstream operations. This presents a safety risk to downstream recreators under the Proposed Project. To mitigate public safety concerns, this EIR analyzes several Alternatives for Proposed Project operations. Nevertheless, safety hazards to boaters and members of the public persist under all Alternatives. The primary purpose of the trail to Gage J-2 is to support Kerckhoff Hydroelectric Project operation of the Gage J-2 site. It is reasonable to conclude that construction of an additional river access portage trail would have significant environmental impacts due to trail length and trail access requirements. Potential impacts include ground disturbance, vegetation clearing, and work near the river on cultural and Tribal resources, water quality, geology and soils, and biological resources.

Run 2 is a Class IV+ (V) run, generally appropriate only for expert boaters and specific craft, which in practical terms restricts recreational use of this river reach to a narrow user group (refer to Section 4.17 *Recreation* for a discussion of whitewater boating and visitor demand in the Proposed Project Area). PG&E declined to conduct a formal assessment for an alternative access route around Kerckhoff Dam facilities, as requested within American Whitewater comments. PG&E conducted a Whitewater Boating Assessment and Flow Study for the Proposed Project during which interviews were conducted with boaters who have completed the runs in the Proposed Project Area. The study dataset was small and qualitative with a total of nine participants, centered on a single flow study event rather than a broad survey or multi-season data collection. Results from those surveys, although subject to inherent dataset limitations, indicated that use of the Proposed Project Area is low as compared to other regional rivers such as the Merced, Kings, and Tuolumne rivers (PG&E 2021).

The hydrology in the PBR has the potential to vary throughout the day with rapid up ramping and down ramping of flows, as well as throughout the year depending on WY type; more specifically, this includes the potential for unexpected high flows downstream of Kerckhoff Dam and corresponding rapid decreasing inflows in the PBR. Although this EIR includes discussion of mitigation for flow variability under the existing Kerckhoff Hydroelectric Project, the unpredictability of the inflows, potential powerhouse outages,

and limited locations for portaging out of the river make unrestricted access a potentially significant public safety risk.

Under CEQA, alternatives should be considered that would be capable of avoiding or substantially lessening any significant impacts of a project. This alternative would not substantially reduce or avoid environmental impacts and would likely result in increased impacts and public safety concerns. For these reasons, this alternative has been eliminated from further consideration. The Proposed Project includes, under the Whitewater Notification and Access Measure, a trail assessment to improve the safety of trail conditions along the J-2 Stream Gage access trail for whitewater boating access to the SJR at the Gage J-2 location, if needed. PG&E would provide escorted access on the J-2 Stream Gage access trail on designated boating days under all Alternatives, as specified in the Whitewater Notification and Access Measure.

3.5 LITERATURE CITED

American Whitewater, the California Sportfishing Protection Alliance, and Friends of the River. 2026. *Comments on the Environmental Assessment for the Kerckhoff Hydroelectric Project* (Project No. 96-048). Submitted to FERC on January 30, 2026.

DOI (United States Department of Interior). 2024. *Department of the Interior COMMENTS, RECOMMENDATIONS, PRELIMINARY TERMS AND CONDITIONS, and PRELIMINARY FISHWAY PRESCRIPTIONS on the Federal Energy Regulatory Commission Ready for Environmental Analysis Notice for the Kerckhoff Hydroelectric Project, Federal Energy Regulatory Commission Project No. P-96-048, San Joaquin River, Fresno and Madera Counties, California.* ER 24/0300 4111. September 24.

_____. 2025. *U.S. Department of the Interior Revised Conditions and Recommendations for the Kerckhoff Hydroelectric Project, Federal Energy Regulatory Commission Project No. P-96-048, San Joaquin River, Fresno and Madera Counties, California.* E ER 24/0465 4111. May 11.

FERC (Federal Energy Regulatory Commission). 2004. *Handbook for Hydroelectric Project Licensing and 5 MW Exemptions from Licensing*. April. Accessed: April 5, 2026. Retrieved from: https://www.ferc.gov/sites/default/files/2020-04/licensing-handbook.pdf.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

PG&E (Pacific Gas and Electric Company). 2020. *Technical Study Report (TSR-05): Whitewater Boating Assessment (REC 1).* Kerckhoff Hydroelectric Project, FERC Project No. 96. In Final License Application Volume III, Exhibit E, Supporting Document B, Appendix C. June.

_____. 2021. *Kerckhoff Hydroelectric Project, FERC Project No. 96 Determination on Requests for the Modification of the Approved Whitewater Boating Assessment (REC 1) Revised Study Plan: Whitewater Boating Site Visit Report*. January.

4 ENVIRONMENTAL ANALYSIS

This section provides the environmental analysis of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). All resources in the California Environmental Quality Act (CEQA) Guidelines were analyzed, which includes aesthetics, agriculture and forestry resources, air quality, biological resources (aquatics and terrestrial), cultural resources, energy, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, transportation, Tribal cultural resources, utilities and service systems, and wildfire.

The environmental analysis describes the current environmental setting and regulatory background for each resource to characterize the conditions that could be affected by, or applied to, the Proposed Project, Alternative 1, and Alternative 2. Additionally, each section outlines the analytical methodology and criteria employed to determine the level of potential impacts. Further, the environmental analysis then identifies potential impacts of the Proposed Project, Alternative 1, and Alternative 2 separately. Recommendations for mitigation measures are provided, if necessary, to minimize or eliminate, when possible, the potential significant impacts of the Proposed Project, Alternative 1, and Alternative 2, in cases where Pacific Gas and Electric Company's (PG&E or Applicant) environmental monitoring plans and environmental management measures are not sufficient to eliminate or reduce potential impacts to less than significant levels on their own.

4.1 AESTHETICS

This section describes existing conditions and analyzes potential impacts on aesthetics as a result of implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts on aesthetics from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.1-1).

Table 4.1-1: CEQA Checklist for Aesthetics

Would the Project:	**Proposed Project**	**Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping**	**Alternative 2: Proposed Project with BLM Revised 4(e) Conditions**
Impact AE-1: Have a substantial adverse effect on a scenic vista?	No Impact	No Impact	No Impact
Impact AE-2: Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	No Impact	No Impact	No Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact AE-3: In nonurbanized 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 a publicly accessible vantage point)? In urbanized areas, conflict with applicable zoning and other regulations governing scenic quality?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Impact AE-4: Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

4.1.1 Environmental Setting

4.1.1.1 Regional Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located in the foothills of the western slope of the Sierra Nevada on the San Joaquin River (SJR) in unincorporated Fresno and Madera counties, California. Elevations range between 500 and 1,000 feet above mean sea level (msl). The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public lands administered by the United

States Forest Service, Sierra National Forest (USFS-SNF); BLM; and the United States Bureau of Reclamation (Reclamation) managed by the BLM.

The Kerckhoff Hydroelectric Project Area is defined as all areas within the existing Federal Energy Regulatory Commission (FERC or Commission) Project Boundary. Generally, the Kerckhoff Hydroelectric Project Area is characterized by steep terrain incised by the SJR and limited road access. There is public land near the Kerckhoff Hydroelectric Project and accessible recreation areas along the SJR. The Kerckhoff Hydroelectric Project and surrounding landscape are sparsely populated and mostly undeveloped, having only a few scattered rural residences. The closest concentrations of high public use are approximately four miles south of the Kerckhoff Hydroelectric Project, in the community of Auberry. Land use in the vicinity of the Kerckhoff Hydroelectric Project primarily consists of hydroelectric and water resources development, recreation use, and grazing.

Recreational activities around Kerckhoff Reservoir include hiking, swimming, boating, camping, and other day use activities. These activities primarily occur along the upper one-third of the reservoir. The shores of the lower two-thirds of the reservoir are steep, densely vegetated, and rocky, making most of this shoreline inaccessible. The SJR canyon downstream of Kerckhoff Dam is steep and densely vegetated and has almost no road access. The Kerckhoff Hydroelectric Project facilities are in a remote scenic setting with minimal road and public access and are not visible from any freeway or highway. Kerckhoff Reservoir is only accessible by vehicle via one road, which Fresno County refers to as Powerhouse Road and Madera County refers to as County Road 222; however, most of the Kerckhoff Hydroelectric Project facilities are not visible from this road. There are some parking areas and private residences accessible from Powerhouse Road/County Road 222.

Existing Kerckhoff Hydroelectric Project facilities are visible to the public in the Kerckhoff Hydroelectric Project Area. The following four locations are key viewing areas (KVA) for the Kerckhoff Hydroelectric Project:

- Kerckhoff Reservoir is visible from the Powerhouse Road Bridge crossing the SJR (KVA 1; Figure 4.1-1)
- Kerckhoff Reservoir is visible from Smalley Cove Recreation Area (KVA 2; Figure 4.1-2)
- The Kerckhoff 1 (K1) Powerhouse and Switchyard are visible from the BLM footbridge crossing the SJR just downstream of the powerhouse (KVA 3;Figure 4.1-3)
- The K1 Powerhouse and Switchyard and proposed Vista Day Use Area are or would be visible from the BLM-owned Ya-Gub-Weh-Tuh Trail across from the SJR (KVA 4; Figure 4.1-4)
- The proposed Vista Day Use Area, including machinery and trucks during the construction phase, would also be visible from KVA 3 and KVA 4

The following subsections describe the existing structures and visual environment of facilities modified under the Proposed Project and both Alternatives (PG&E 2020).

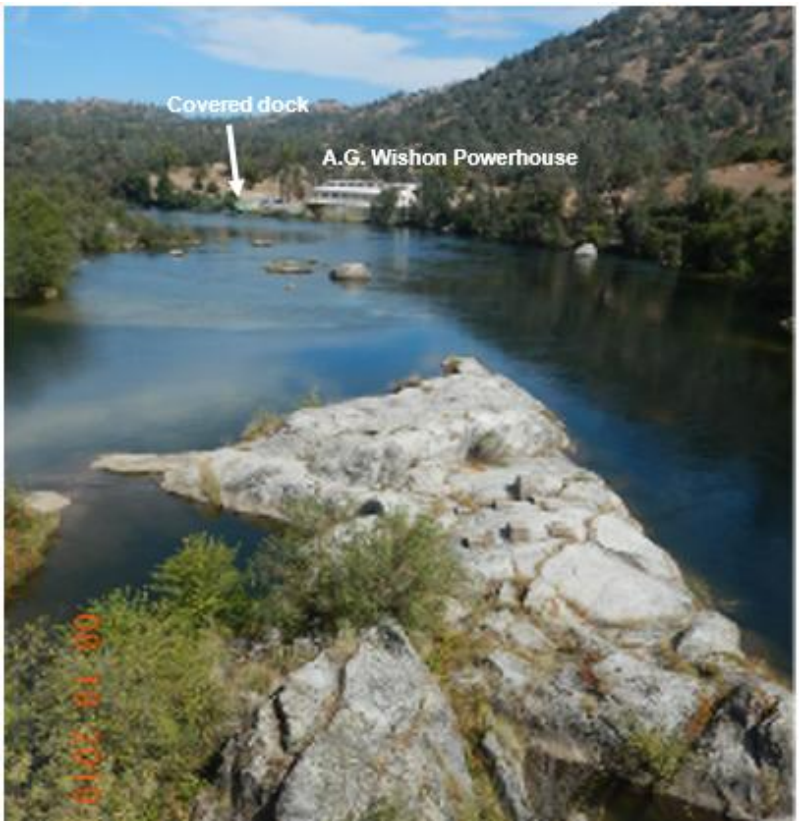


Figure 4.1-1: Key Viewing Area 1 – Powerhouse Road Bridge Crossing the San Joaquin River



Figure 4.1-2: Key Viewing Area 2 – Smalley Cove Recreation Area



Figure 4.1-3: Key Viewing Area 3 – United States Bureau of Land Management Footbridge Crossing the San Joaquin River Downstream of the Kerckhoff 1 Powerhouse



Figure 4.1-4: Key Viewing Area 4 – United States Bureau of Land Management-owned Ya-Gub-Weh-Tuh Trail Across San Joaquin River

4.1.1.1.1 Kerckhoff Dam

Kerckhoff Dam, constructed in 1920, is a concrete, constant-angle arch dam with a crest length of 570 feet and a maximum height of 114.5 feet. Fourteen radial gates control spill from the dam and are currently operated using five stationary hoists and one mobile gate hoist located on a track that spans the dam crest. A small, galvanized metal building with a shed roof serves as the gate control house and is cantilevered off its upstream side of the dam near the center of the operating platform on the dam crest. Three pipes penetrate the dam near its center. Kerckhoff Dam is only accessible by boat or helicopter.

4.1.1.1.2 Kerckhoff Reservoir

Kerckhoff Dam forms Kerckhoff Reservoir. At normal maximum water surface elevation (elevation 985.0 feet msl), the reservoir has a surface area of 175 acres, is approximately 3 miles long, and has a shoreline length of approximately 10.3 miles. The reservoir is operated near full pool with no seasonal storage; daily water level fluctuations of about five feet are common. The reservoir is accessible only by vehicle from Powerhouse Road/County Road 222. Figure 4.1-1 shows Kerckhoff Reservoir from the Powerhouse Road Bridge crossing over the SJR upstream of the reservoir. The Powerhouse Road Bridge is a publicly accessible viewpoint (KVA 1) of one covered dock within the Proposed Project. PG&E uses a covered boat dock to access the Proposed Project facilities that are on the reservoir's north shore. The terrain surrounding the reservoir is steep and heavily vegetated with riparian-mixed hardwood species dominating the upper end of the reservoir and gray pine and interior live oak species dominating the middle and lower end of the reservoir. The area is characterized as having steep terrain and heavy vegetation limits. Due to the steep slopes and abundance of dense vegetation along the shoreline, public access to the reservoir is only available at Smalley Cove Recreation Area (a Proposed Project recreation facility) (Figure 4.1-2) and along a strip of PG&E-owned land between Powerhouse Road and the Kerckhoff Reservoir shoreline. None of the primary Kerckhoff Hydroelectric Project facilities are visible from the Smalley Cove Recreation Area.

4.1.1.1.3 K1 Intake Structure, Powerhouse, Tunnel, Adits, and Surge Chamber

The K1 Intake Structure is in Kerckhoff Reservoir, near the south shore, about 200 feet upstream of Kerckhoff Dam within Kerckhoff Reservoir. The K1 Intake Structure is made from reinforced concrete, is approximately 29.5 feet long by 26 feet wide and 74.3 feet in height, and houses two steel slide gates. A trashrack on the upstream side of the intake spans the gate openings and prevents larger debris from entering the tunnel through the gates. Water passing through the gates enters the K1 Tunnel, which is approximately 16,913 feet long, as measured from the gatehouse to the surge chamber above the K1 Powerhouse. The tunnel is entirely underground and is, therefore, not visible. Three adits intersect the K1 Tunnel. The only portions of the adits that are visible are the entrances. The K1 Tunnel terminates at a surge chamber, located entirely underground. Chain-link-mesh covers the top of the surge chamber, and an 8-foot-high chain-link fence encloses it to prevent public access. The adit entrances and surge tank fencing are minor features that are generally not visible to the public at any of the three locations.

The K1 Powerhouse is a three-story concrete powerhouse that was constructed in 1920. The building is located in a narrow canyon of the SJR and is flanked by a switchyard that extends upslope from the building. The reinforced, board-formed concrete powerhouse has a low-pitched gable roof with a parapet and a generally rectangular footprint, measuring approximately 45 feet long by 99 feet wide. The powerhouse and switchyard are located within the SJR canyon and are not visible to the public, except from the bridge that crosses the SJR just downstream of the powerhouse and from the BLM-maintained trail across the river (Ya-Gub-Weh-Tuh Trail). These two views can be seen by hikers using the trail system in the BLM SJR Gorge Recreation Area.

4.1.2 Regulatory Background

The following subsections contain an overview of regulations related to aesthetics.

4.1.2.1 Federal

4.1.2.1.1 Federal Power Act

The Federal Power Act (Title 16 United States Code Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created FERC and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.1.2.1.2 United States Bureau of Land Management

Bakersfield Field Office Resource Management Plan

Portions of the Proposed Project located on BLM land are required to conform with BLM's *Bakersfield Record of Decision and Approved Field Office Resource Management Plan* (RMP) (BLM 2014). The following objective and administrative actions within the RMP address visual resources:

Objective VR-O-1. Use visual resource management (VRM) classes for all public lands within the decision area to preserve and enhance scenic quality for present and future generations.

Administrative Actions. For all surface-disturbing projects or activities, regardless of size of potential impact, incorporate visual design considerations, consistent with the Visual Resource Contrast Rating Manual H-8431-1, to meet VRM class objectives of the area.

United States Bureau of Land Management Visual Resource Management

In addition, BLM has an inventory and assessment system known as the VRM, used to manage visual resources of lands under BLM jurisdiction. The VRM system involves inventorying scenic values, establishing management objectives for those values, and evaluating proposed activities to determine whether they conform to the management objectives. The objectives range from Class I to Class IV, and portions of the Proposed Project fall under Class I, Class II, and Class III objectives (BLM 1984). Below are summaries of the three relevant BLM classifications:

Class I Objective. The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II Objective. The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III Objective. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

4.1.2.1.3 United States Forest Service

United States Forest Service Resource Management Plan

The United States Forest Service (USFS) uses the Visual Management System to apply an inventory and assessment system with objectives to National Forest System (NFS) lands. The USFS established visual quality objectives as part of its Visual Management System to describe the level of modification associated with land use activity acceptable

in a given area. The visual quality objectives range from preservation, which is applied to highly sensitive landscapes such as wilderness areas or special classified areas, to modification, which allows for land use activity that may appear dominant in relationship to the natural landscape. The NFS lands within the Proposed Project, Alternative 1, and Alternative 2 are designated under the Partial Retention objective:

Partial Retention. This provides a natural-appearing landscape where changes are evident but are subordinate to the surrounding characteristic landscape.

4.1.2.2 State

4.1.2.2.1 California Department of Transportation

The California Department of Transportation (Caltrans) manages the State Scenic Highway Program. Caltrans created the State Scenic Highway Program to promote the protection and enhancement of the natural scenic beauty of California's highways and adjacent corridors. The Sierra Gateway Highway 180 (State Route 180) is the closest officially designated scenic route to the Proposed Project and both Alternatives. State Route 168 near Clovis, a suburb of Fresno, is the closest highway to the Proposed Project and both Alternatives, and it is eligible for official designation as a State Scenic Highway. These highways are approximately 25 miles south and 6 miles south of the Proposed Project and both Alternatives, respectively.

4.1.2.3 Local

4.1.2.3.1 Fresno County General Plan

The SJR forms the boundary between Fresno and Madera counties; however, the majority of the Proposed Project and both Alternatives facilities would be in Fresno County. The Fresno County General Plan (Fresno County 2024) contains numerous goals and policies related to the protection of aesthetic/visual resources throughout the county. The Proposed Project and both Alternatives would be in the unincorporated Fresno County; therefore, the following policies and goal apply to the unincorporated areas and are aimed at protecting aesthetic/visual resources:

Policy OS-A.13. The County shall require that natural watercourses are integrated into new development in such a way that they are accessible to the public and provide a positive visual element and a buffer area between waterways and urban development to protect water quality and riparian areas.

Policy OS-F.1. The County shall encourage landowners and developers to preserve the integrity of existing terrain and natural vegetation in visually sensitive areas such as hillsides and ridges, and along important transportation corridors, consistent with fire hazard and property line clearing requirements.

GOAL OS-L. To conserve, protect, and maintain the scenic quality of land and landscape adjacent to scenic roads in Fresno County.

4.1.2.3.2 Madera County General Plan

Visually sensitive resources within Madera County include Smalley Cove Recreation Area and at Gage J-7. The Madera County General Plan (Madera County 1995) contains numerous policies related to the protection of visually sensitive resources throughout the county. The following policies apply to the unincorporated areas of Madera County and are aimed at protecting aesthetic/scenic resources:

Policy 1.H.1. The County shall require that new development in scenic rural areas is planned and designed to avoid locating structures along ridgelines, on steep slopes, or in other highly visible locations, except under the following conditions:

- Such a location is necessary to avoid hazards; or
- The proposed construction will incorporate design and screening measures to minimize the visibility of structures and graded areas

Policy 1.H.3. The County shall require that new development on hillsides employ design, construction, and maintenance techniques that achieve the following:

- Preserve and enhance the hillsides
- Maintain the character and visual quality of the hillside

Policy 1.H.4. The County shall work with federal and state agencies to conserve forest wilderness and recreation areas.

4.1.3 Analysis Methodology

4.1.3.1 Analytical Approach

Visual or aesthetic resources are generally defined as both the natural and built features of the landscape that are seen and contribute to the public's experience and appreciation of the environment. The Area of Analysis includes public viewing areas immediately adjacent to the Proposed Project, Alternative 1, and Alternative 2 components.

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.

4.1.3.2 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project and both Alternatives would have a significant impact on aesthetics if it would:

- Have a substantial adverse effect on a scenic vista (AE-1);
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway (AE-2);
- 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 a publicly accessible vantage point); in urbanized areas, conflict with applicable zoning and other regulations governing scenic quality (AE-3); or
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area (AE-4)

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

4.1.3.3 Environmental Management Measures and Monitoring Plans

The following Proposed Project monitoring plans designed to protect, maintain, or enhance resources are pertinent to aesthetics. Both plans identified below are included under the Proposed Project and both Alternatives.

4.1.3.3.1 Vegetation Management and Pest Control Plan

The Proposed Project's Vegetation Management and Pest Control Plan specifies PG&E's responsibilities for invasive weed management, pest control, vegetation and fuels management, and the protection of resources during these activities over the license term. This plan does not involve the removal of trees unless they are deemed a hazard.

4.1.3.3.2 Recreation Management Plan

The Proposed Project's Recreation Management Plan requires PG&E to consult with BLM where developments are located on BLM-managed lands and prepare a design narrative, site conceptual plan, construction plan, and additional environmental analysis, if needed.

4.1.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and

modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down-ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Proposed Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach (PBR) of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cubic feet per second (cfs) for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the PBR cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned Kerckhoff 2 (K2) Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.1.4.1 Potential Impacts Related to Scenic Vistas

Impact AE-1: Would the Project have a substantial adverse effect on a scenic vista?

4.1.4.1.1 Proposed Project

Construction and Operation

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's construction and operations activities would not obstruct or substantially affect a scenic vista in the area, and no impact would occur.

The Fresno County General Plan (Fresno County 2024) and Madera County General Plan (Madera County 1995) do not recognize any scenic vistas that would be within the viewshed of the Proposed Project. The Fresno County General Plan Final Environmental Impact Report identified the SJR and Sierra Nevada as highly valued scenic features (Fresno County 2023); however, the Proposed Project would not impede the views of the SJR or surrounding Sierra Nevada.

The Proposed Project activities that include changes in generation, routine operation, modified maintenance activities (such as the Vegetation Management and Pest Control Plan and Recreation Management Plan), FERC Proposed Project Boundary changes, and environmental management measures and monitoring plans would not involve any major physical changes to the existing visual environment or block public views within the viewshed of the Proposed Project.

The K1 Powerhouse retirement, Vista Day Use Area construction (in the vicinity of the K2 Powerhouse), reconstruction of the existing Vista Connector Trail, installation of a new flow gage, and upgrade of two manual radial gates on the dam would involve short-term construction activities, but these activities do not occur within a recognized scenic vista and therefore do not result in impacts to scenic vistas.

Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact AE-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.1.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Construction activities under Alternative 1 would not change when compared to the construction activities described as part of the Proposed Project. Operational changes under Alternative 1 would be limited ramping requirements and would not result in an effect to scenic vistas. Alternative 1 has the same analysis and impact determination as described in Section 4.1.4.1.1. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact AE-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.1.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Construction activities under Alternative 2 would not change when compared to the construction activities described as part of the Proposed Project. Operational changes under Alternative 2 would be limited to down ramping and up ramping requirements and would not result in an effect to scenic vistas. Alternative 2 has the same analysis and impact determination as described in Section 4.1.4.1.1. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact AE-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.1.4.2 Potential Impacts Related to Scenic Resources

Impact AE-2: Would the Project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

4.1.4.2.1 Proposed Project

Construction and Operation

There are no state-designated scenic highways within, or near, the Proposed Project. The closest officially designated scenic route to the Proposed Project is the Sierra Gateway Highway 180 (State Route 180), approximately 25 miles south of the Kerckhoff Dam (Caltrans 2021). State Route 168 near Clovis, a suburb of Fresno, is the closest highway to the Proposed Project and is eligible for official designation as a state scenic highway. State Route 168 generally parallels the SJR through Fresno County, but because of distance and topography, the river within the Area of Analysis is not visible

from the highway. None of the structures associated with the Proposed Project are designated historic buildings, and the Proposed Project's Vegetation Management and Pest Control Plan is designed to control invasive plant species and does not involve the removal of trees unless they are hazardous. Therefore, the Proposed Project would not substantially damage scenic resources, such as trees, rock outcroppings, or historic buildings within eligible viewsheds of State Route 180 or State Route 168. Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact AE-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.1.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Construction activities under Alternative 1 would not change when compared to the construction activities described as part of the Proposed Project. Operational changes under Alternative 1 would be limited to down ramping and up ramping requirements and would not result in an effect to scenic resources within a state scenic highway. Alternative 1 has the same analysis and impact determination as described in Section 4.1.4.2.1. Therefore, there would be **No Impact** as a result of construction or operational activities under the Alternative 1 for potential impact AE-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.1.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Construction activities under Alternative 2 would not change when compared to the construction activities described as part of the Proposed Project. Operational changes under Alternative 2 would be limited to down ramping and up ramping requirements and would not result in an effect to scenic resources within a state scenic highway. Alternative 2 has the same analysis and impact determination as described in Section 4.1.4.2.1. Therefore, there would be **No Impact** as a result of construction or operational activities under the Alternative 2 for potential impact AE-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.1.4.3 Potential Impacts Related to Visual Character or Quality of Public Views

Impact AE-3: Would the Project 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 a publicly accessible vantage point) or conflict with applicable zoning and other regulations governing scenic quality?

4.1.4.3.1 Proposed Project

Construction and Operation

The existing visual character of the area surrounding the Proposed Project includes dense forested vegetation, riverine areas, and steep and rocky shorelines. The publicly accessible vantage points for the Proposed Project are the four KVAs:

- Kerckhoff Reservoir is visible from the Powerhouse Road Bridge crossing the SJR (KVA 1; Figure 4.1-1)

- Kerckhoff Reservoir is visible from Smalley Cove Recreation Area (KVA 2; Figure 4.1-2)
- The K1 Powerhouse and Switchyard are visible from the BLM footbridge crossing the SJR just downstream of the powerhouse (KVA 3; Figure 4.1-3)
- The K1 Powerhouse and Switchyard are visible from the BLM-owned Ya-Gub-Weh-Tuh Trail across from the SJR (KVA 4; Figure 4.1-4)

The proposed Vista Day Use Area, including machinery and trucks during the construction phase, would also be visible from KVA 3 and KVA 4. Proposed Project activities related to flow operations, routine maintenance, generation, upgrades, and environmental management measures and monitoring plans within the Proposed Project boundaries would be consistent with the existing visual setting and would not change the visual character for public viewers. Portions of the Proposed Project on BLM-owned land have been and continue to be subject to BLM VRM's Class I, II, and III objectives. Increased instream flows as part of the Proposed Project in the SJR would only be visible when the base flows of the SJR are low, and the water depth and velocities from the release would diminish as base flows increase.

Additionally, the new flow velocities and water depths would be within the historical range for the SJR (historic flows in the river are provided in Section 4.11 *Hydrology and Water Quality*), and reservoir operations would remain within the normal operating range between 980.0 and 984.5 feet msl; therefore, the change in flow release would not adversely affect the existing visual character.

Construction activities associated with K1 Powerhouse retirement—including at the K1 Intake Structure, Tunnel, Switchyard, and Adits—and construction of the Vista Day Use Area, existing access road improvement, and the Vista Connector Trail (which would be in the vicinity of the K2 Powerhouse) would not be visible from public roads or the Smalley Cove Recreation Area, but they may be visible to hikers and boaters. The K1 Powerhouse and Switchyard are within the SJR canyon and are not visible from popular public areas such as the Smalley Cove Recreation Area. The K1 Powerhouse and Switchyard are visible to the public from KVA 3 and KVA 4 and boaters on SJR. KVA 3

is on the BLM footbridge crossing the SJR just downstream of the powerhouse. KVA 4 is the BLM-owned Ya-Gub-Weh-Tuh Trail opposite the SJR (Figure 4.1-4). Retirement of the K1 Powerhouse and construction of the Vista Day Use Area, existing access road improvement, and the Vista Connector Trail may involve large machinery or trucks staged outside the facilities, which may be visible from the BLM-maintained trails. Additionally, during the retirement of the K1 Powerhouse, helicopters are proposed for the construction phase, which could cause temporary visual disturbances to recreationists. The proposed Vista Day Use Area, including machinery and trucks during the construction phase, would also be visible from KVA 3 and KVA 4. These construction activities would remain within the existing facilities, and no long-term change to the visual character or alteration of public views would occur that would substantially degrade the existing visual character or quality of public views of the site and its surroundings.

Operation of the Vista Day Use Area, access road, and Vista Connector Trail would occur in a previously disturbed area and would not be visible from popular public areas such as the Smalley Cove Recreation Area or any surrounding public roads. The Vista Day Use Area would be visible from the SJR and Kerckhoff Reservoir. Like the K1 Powerhouse and Switchyard, the Vista Day Use Area, existing access road, and Vista Connector Trail would be visible to the public from KVA 3 and KVA 4 (which are BLM-maintained trails) and boaters on the SJR. The area is designated as BLM VRM Class II, with the objective of retaining the existing character of the landscape. The level of change to the characteristic of the landscape is expected to be low; management activities may be seen but are not expected to attract the attention of the casual observer and would be less than significant.

As specified in the Proposed Project's Recreation Management Plan, PG&E would plan and design these planned developments in consultation with BLM to meet regional direction, regulations, design, and other applicable standards in place at the time of design. In addition, PG&E would have an on-site meeting with BLM during initial planning and design to collaboratively evaluate details about the site design. This consultation during planning would ensure that the visual condition of the Vista Day Use

Area, access road, and Vista Connector Trail would conform to BLM's management objectives and would not substantially degrade the existing visual character or quality of public views of the site and its surroundings.

Installation of a new operational flow gage in the SJR upstream of the Kerckhoff Reservoir would not be noticeable from any public vantage points, including County Road 235. The two upgraded gates on the dam would be in the same location as the existing gates and would result in no noticeable visual change related to scenic vistas. The Proposed Project would still operate within the daily water level fluctuations of 4.5 feet (980.0 feet to 984.5 ft msl) and therefore would not impact the visual character of the impoundment compared to the baseline conditions. As such, these operational Proposed Project features would not affect the existing visual character or quality of public views of the site and its surroundings.

None of the flow measures under Proposed Project would result in a change of the physical characteristics of the PBR since flows are within the range of flows seen during baseline conditions.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under the Proposed Project for potential impact AE-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.1.4.3.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Under Alternative 1, the Proposed Project would be implemented, but PG&E's EOS Flow Recession Measure and the Subsequent Spill Ramp Down Measure would be fully replaced with alternative operational requirements to decrease flow fluctuations below

Kerckhoff Dam. The reduction of flow fluctuation below Kerckhoff Dam would provide whitewater boating opportunities. PG&E would be required to coordinate operations with SCE's upstream hydroelectric projects. Boating flows and down ramps would be based on the WY type Schedules A-D in the SCE Mammoth Pool Contract (see Table 3.4-1 in Section 3 *Alternatives Descriptions*).

Based on the modeling of Alternative 1 (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure and the Down Ramp of Spills September 1 to October 31 Measure caused the Kerckhoff Reservoir to encroach the spillway each time the operation was implemented. The Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure was shown to be successful in slowly ramping down flows within the PBR, but it also resulted in numerous small fluctuations within the Kerckhoff Reservoir. Kerckhoff Reservoir fluctuations were a result of the K2 Powerhouse cycling above and below the rough operating zone (ROZ) to ensure the reservoir remained high enough to spill the required flows. The cycling occurs every half an hour to every two hours, which could be mitigated in practice by a hydroelectric project operator during real-time conditions. If not mitigated by an operator, this increase in fluctuation has the potential to result in visual impacts along the Kerckhoff Reservoir, especially when compared to baseline conditions, which have static Kerckhoff Reservoir elevations in the modeling example. All fluctuations under the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure were contained within the operating band of 980.0 feet to 984.5 feet msl, with the majority of fluctuations seen between 982.5 feet and 983.0 feet msl. Depending on the WY, this measure is operated 5 to 21 days each year and therefore would have varying visual impacts within the Kerckhoff Reservoir.

None of the measures under Alternative 1 would result in a change of the physical characteristics of the PBR since flows are within the range of flows seen during baseline conditions.

Any anticipated changes in visual conditions from Alternative 1 would be similar to those identified under the Proposed Project and would not degrade the existing visual character or quality of public views of the site and its surroundings. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under the Alternative 1 for potential impact AE-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.1.4.3.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Construction activities under Alternative 2 would not change when compared to the construction activities described as part of the Proposed Project. Operational changes under Alternative 2 would include the Modified EOS Flow Recession, Subsequent Spill Ramp Down, Modified Spill Season Flow Measure, and Modified POM operations. The Modified EOS Flow Recession and POM Initial Release Protocol could have impacts on the visual character of the Kerckhoff Reservoir or PBR.

As shown in the alternative modeling analysis (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0) under the Modified EOS Flow Recession, the Kerckhoff Reservoir would be lowered to the crest of the spillway if the measure was implemented. However, the Kerckhoff Reservoir would still be required to stay within the operational band of elevation 980.0 feet to 984.5 feet msl, which would limit the impact to the visual characteristics of the Proposed Project.

During the POM Initial Release Protocol, the model showed issues of meeting the objective of the measure; this resulted in extreme stage increases within the PBR, ranging from 0.8 foot to 46 feet per hour. As this measure would only occur during planned outages, it would not be frequent enough to cause significant erosion to the

PBR resulting in diminished visual characteristics of the PBR. Viewers may notice rapid increases in the water depth within the PBR if present during these events. Based on the modeling, a spike in flow in the PBR often occurred around 12 p.m., when recreationalists are likely to be around the river. This drastic change in water flow would cause alarm and impact the visual characteristics of the PBR. Additionally, the model showed a swift drop in reservoir elevation to the point where the spillway loses capacity. Recovery of the reservoir occurs around 10 a.m. in the modeled analysis.

None of the measures under Alternative 2 would result in a change of the physical characteristics of the PBR since flows are well below the high flows seen during baseline conditions.

Both of these measures would create noticeable differences in the existing visual characteristics; however, neither impact is outside of the normal existing baseline conditions or occurring frequently enough to have a significant impact. As such, impacts from operations would not substantially degrade the existing visual character or quality of public views of the site and its surroundings under Alternative 2. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 2 for potential impact AE-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.1.4.4 Potential Impacts Related to Light or Glare

Impact AE-4: Would the Project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

4.1.4.4.1 Proposed Project

Construction and Operation

There are no permanent residences within the FERC Proposed Project Boundary, and the Area of Analysis sits in a rural region between Fresno and Madera counties. The closest community, Auberry, is 7.5 road miles south of the K1 Powerhouse. There are very few residences within the vicinity of the existing FERC Project Boundary. The sparse human development in the Proposed Project results in minimal sources of light. Construction equipment used for activities in the vicinity of the K1 Powerhouse to complete retirement activities, and in the vicinity of the K2 Powerhouse to construct the Vista Day Use Area, improve the access road, and refurbish the Vista Connector Trail may result in short-term glare from construction and staging equipment. The creation of short-term daytime glare from the solar reflection of glass windshields during construction would not constitute a significant source of light or glare due to the short-term nature.

PG&E proposes to install, rate calibrate, and operate a stream gage to measure flows in the SJR above the high-water mark of Kerckhoff Reservoir and downstream of SCE's Big Creek 4 Powerhouse. Gaging station construction and operation would not create a new source of substantial light or glare that would adversely affect day or nighttime views. Construction would be conducted during daylight hours, and there would be no significant light source or glare during operation.

The Proposed Project would also not involve any new security or maintenance lighting. The Vista Day Use Area would be open for day use only, and no nighttime lighting is proposed. Therefore, routine light and glare from automobile headlights at the day use area would not be expected. Glare may result from the introduction of parked cars, newly paved roads, a paved approximately 20-car parking lot, and metal signage. The K2 Powerhouse (and vicinity where the Vista Day Use Area would be constructed) is not visible from the Smalley Cove Recreation Area or any roadways. Some of these Proposed Project elements may be visible from KVA 3 and KVA 4 and from boaters along the river. However, KVA 3 does not provide a downstream view of the paved road

or parking area. KVA 4 has a view of the paved road and parking area, and this portion of trail meets the edge of the river where there is an open 180-degree view of the river and the facility across the river (Figure 4.1-4). Still, the level of potential daytime glare from the proposed facilities would not be constant throughout the day, as glare depends on weather and sun angle.

Therefore, construction activities are only scheduled to be conducted during daytime hours and would not require the use of nighttime lighting or result in nighttime glare. Additionally, helicopter use to access the site is expected to occur during two weeks of the construction period, but flights are not anticipated to occur over residences and would similarly be restricted to daytime use only.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under the Proposed Project for potential impact AE-4.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.1.4.4.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Construction activities under Alternative 1 would not change when compared to the construction activities described as part of the Proposed Project. Operational changes under Alternative 1 would be limited to down ramping and up ramping requirements and would not result in an effect related to light or glare that is different from any effects identified under the Proposed Project. Alternative 1 has the same analysis and impact determination as described in Section 4.1.4.4.1. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 1 for potential impact AE-4.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.1.4.4.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Construction activities under Alternative 2 would not change when compared to the construction activities described as part of the Proposed Project. Operational changes under Alternative 2 would be limited to down ramping and up ramping requirements and would not result in an effect related to light or glare that is different from any effects identified under the Proposed Project. Therefore, Alternative 2 has the same analysis and impact determination as described in Section 4.1.4.4.1. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 2 for potential impact AE-4.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.1.5 Literature Cited

BLM (United States Bureau of Land Management). 1984. *Manual 8400 – Visual Resource Management*. April 5. United States Department of the Interior, Bureau of Land management. Accessed: April 3, 2026. Retrieved from: https://www.blm.gov/sites/blm.gov/files/uploads/mediacenter_blmpolicymanual8400.pdf.

_____. 2014. *Bakersfield Field Office Record of Decision and Approved Resource Management Plan*. United States Department of the Interior, Bureau of Land

Management. December. Accessed: April 3, 2026. Retrieved from: https://www.govinfo.gov/content/pkg/GOVPUB-I53-PURL-gpo83734/pdf/GOVPUB-I53-PURL-gpo83734.pdf.

Caltrans (California Department of Transportation). 2021. California State Scenic Highways. Accessed: April 3, 2026. Retrieved from: https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways.

Fresno County. 2023. *Fresno County General Plan Background Report.* General Plan Review and Revision; Public Review Draft. April. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/2/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr-background-report-2023-05-10.pdf.

_____. 2024. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

Madera County. 1995. *Madera County General Plan Policy Document*. Adopted October 24. Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/40825/638615574804870000.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

PG&E (Pacific Gas and Electric Company). 2020. *Final Application for New License for the Kerckhoff Hydroelectric Project, FERC Project No. 96*. November 20.

4.2 AGRICULTURE AND FORESTRY RESOURCES

This section describes existing conditions and analyzes potential impacts on agriculture and forestry resources from implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts on agriculture and forestry resources from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.2-1).

Table 4.2-1: CEQA Checklist for Agriculture and Forestry Resources

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact AF-1: 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?	No Impact	No Impact	No Impact
Impact AF-2: Conflict with existing zoning for agricultural use, or a Williamson Act contract?	No Impact	No Impact	No Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact AF-3: 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))?	No Impact	No Impact	No Impact
Impact AF-4: Result in the loss of forest land or conversion of forest land to non-forest use?	No Impact	No Impact	No Impact
Impact AF-5: Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	No Impact	No Impact	No Impact

4.2.1 Environmental Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located in the foothills of the western slope of the Sierra Nevada on the San Joaquin River (SJR) in a sparsely populated area of Fresno and Madera counties, California. The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public lands

administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and the United States Bureau of Reclamation (Reclamation) under BLM management.

The Kerckhoff Hydroelectric Project Area is defined as all areas within the existing Federal Energy Regulatory Commission (FERC or Commission) Project Boundary. Generally, the Kerckhoff Hydroelectric Project Area is characterized by steep, mountainous terrain and foothill landscapes, with elevations ranging between 500 and 1,000 feet above mean sea level (msl). Most of the land surrounding Kerckhoff Reservoir consists of undeveloped forest and shrubland typical of the Sierra Nevada foothills, with limited agricultural activity. Land uses in the vicinity of the Kerckhoff Hydroelectric Project primarily consist of hydroelectric power generation, cattle grazing, and recreation use.

4.2.1.1 Agricultural Resources

The Kerckhoff Hydroelectric Project is not located in areas designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, nor is it situated on land enrolled in the Williamson Act Program under the California Land Conservation Act (or Williamson Act), which protects open space and agriculture resources. The Proposed FERC Project Boundary is within lands zoned as Exclusive Agricultural District (AE), Resource Conservation District (R-C), and Recreational District (RE) in Fresno County (Fresno County n.d.), and Public Open Space and Rural Mountain District in Madera County (Madera County n.d.). The zones relevant to agricultural and forestry resources are AE and R-C, both within Fresno County, which are discussed below.

Most agricultural lands within the Proposed Project are located in the southern Fresno County side of the SJR and the western side of Madera County. There are no specific Timber Districts within the Proposed FERC Project Boundary (Fresno County n.d.; Madera County n.d.).

The AE zone is intended to be an exclusive district for agriculture and those uses that are necessary and an integral part of the agricultural operation. This district is intended to protect the general welfare of the agricultural community from encroachments of non-related agricultural uses, which, by their nature, would be injurious to the physical and economic well-being of the agricultural district (Fresno County 2000).

The R-C zone is intended to provide for the conservation and protection of natural resources and natural habitat areas. Some allowable uses in R-C include growing and harvesting of timber and forest products; grazing; management for watershed, fish, and wildlife habitat; wildlife preserves; and temporary mill/chipping facilities.

4.2.1.2 Forestry Resources

Forestry resources dominate the landscape surrounding the Kerckhoff Hydroelectric Project. The USFS-SNF occupies much of the land adjacent to Kerckhoff Reservoir and the SJR, supporting mixed conifer and hardwood species typical of the southern Sierra Nevada. Vegetation includes ponderosa pine (*Pinus ponderosa*), incense cedar (*Calocedrus* spp.), and black oak woodlands interspersed with chaparral and grassland on drier slopes. These forested areas provide timber resources under United States Forest Service (USFS) management, although no commercial timber harvest occurs within the Proposed FERC Project Boundary. Forest lands are managed primarily for watershed protection, recreation, and habitat conservation rather than active timber production. Riparian corridors along the SJR and its tributaries support dense woody vegetation, contributing to habitat diversity and soil stabilization. Definitions of “forest land” and “timberlands” are found in Section 4.2.2 below.

Under the current FERC licensing agreement, PG&E is required to pay for timber that is “cut, used, or destroyed” in the construction and maintenance of projects on lands of the United States (Article 26) in accordance with the requirements of the agency of the United States having jurisdiction over said lands. Tree removal by PG&E in the USFS-SNF that is outside of PG&E’s routine maintenance activities would require a permit from USFS. Tree removal by PG&E on BLM-managed lands outside of PG&E’s routine maintenance activities would require a permit from BLM.

4.2.2 Regulatory Background

The following subsections contain an overview of regulations related to Kerckhoff Hydroelectric Project agriculture and forestry resources.

4.2.2.1 Federal

Federal regulations related to agriculture and forestry resources that are applicable to the Proposed Project are discussed below.

4.2.2.1.1 Federal Power Act

The Federal Power Act (Title 16 United States Code Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created FERC and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.2.2.1.2 United States Bureau of Land Management

United States Bureau of Land Management Forest Management Manuals

BLM's Forest Management Manuals (5000 Series) provide guidance for the maintenance, restoration, improvement, harvest, and replacement of forest vegetation and management for desired plant communities in forms that maintain genetic, structural, and successional conditions that benefit the uses of those lands in the long term (BLM 1991).

Bakersfield Field Office Resource Management Plan

Proposed Project activities that occur on public lands managed by BLM must be consistent with BLM's *Bakersfield Field Office Record of Decision and Approved Resource Management Plan* (RMP) (BLM 2014). The Bakersfield RMP identifies comprehensive management direction for all resources and uses and provides broad-scale guidance on project implementation for renewable energy, fluid mineral, livestock grazing, and recreation management. The Kerckhoff Dam, Kerckhoff 1 (K1) Powerhouse, and Kerckhoff 2 (K2) Powerhouse are located within the BLM-managed SJR Gorge Special Recreation Management Area, which is also identified as a special recreation management area in BLM's Bakersfield RMP.

Although the BLM Bakersfield RMP does not contain any objectives specific to operation and maintenance of the Proposed Project, it identifies three special recreational management zones (RMZ) within the SJR Gorge Recreation Area: Pa'san RMZ, Wuh-ki'o RMZ, and Tahoot RMZ; BLM will use the direction contained in the Bakersfield RMP for these three RMZs to guide its decisions regarding the relicensing of the Proposed Project and the development of associated license conditions. The Proposed Project facilities that are located in the SJR Gorge Recreation Area would continue to be operated and maintained in a manner consistent with the goals and objectives established for the SJR Gorge Recreation Area, regardless of the Proposed FERC Project Boundary modifications.

4.2.2.1.3 United States Forest Service

The USFS provides applicable definitions to support the CEQA analysis of agriculture and forestry resources from its Forest Inventory and Analysis (FIA) reports. The USFS defines "agricultural land" as a land-use category that includes areas used primarily for production of crops or livestock. This includes cultivated cropland, hayland, horticultural cropland, and pastureland. Agricultural land also includes land managed for forage crops, orchards, vineyards, and grazing systems. Forest land is excluded unless it is part of an agricultural operation (USFS n.d.).

The USFS defines “forest land” as a land use category consisting of areas at least 1 acre in size and 120 feet wide, with at least 10 percent tree canopy cover by live trees, or that previously had such cover, is capable of natural or artificial regeneration, and is not currently developed for non-forest use (USFS n.d.).

The USFS defines “timberlands” as comprised of unreserved forest land capable of producing 20 cubic feet per acre per year of wood from trees classified as timber species and designated as a timber forest type. Timberland excludes reserved forest land or forest land that is not managed for production of wood products through statute or administrative designation such as Wilderness Area (USFS n.d.).

Sierra National Forest Land Management Plan

The USFS uses guidance in the revised *Land Management Plan for the Sierra National Forest* (USFS 2023a), pursuant to the 2012 Forest Service Planning Rule (36 Code of Federal Regulations Part 219), for decision-making regarding the relicensing of the Proposed Project and the development of associated license conditions. The revised USFS-SNF Land Management Plan aims to help sustain forest and watershed health and productivity by addressing tree mortality, restoring forest conditions, facilitating use of fire to achieve desired conditions, and providing for sustainable recreation. According to the plan, Kerckhoff Reservoir is located in the San Joaquin Conservation Watershed, which contains much of the middle and upper SJR watershed area in the USFS-SNF (USFS 2023a).

United States Forest Service Pesticide Use Policy

To ensure the proper use of pesticides, USFS requires the review and approval of all proposals for the use and application of pesticides on National Forest System lands under a Pesticide Use Permit (USFS 2023b).

4.2.2.1.4 United States Department of Agriculture Natural Resources Conservation Service Soil Survey

The soil survey provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the United States Department of Agriculture

(USDA) Natural Resources Conservation Service, providing soil maps and data available online for more than 95 percent of the nation's counties. The soil survey can be used to determine the presence of federally designated Prime Farmland.

4.2.2.2 State

The California Public Resources Code (PRC), Government Code, California Land Conservation Act, and the Farmland Mapping and Monitoring Program (FMMP) provide applicable definitions to support the CEQA analysis of agriculture and forestry resources.

4.2.2.2.1 California Public Resources Code and Government Code

The PRC consolidates laws relating to the conservation, use, and supervision of natural resources including mines, oil and gas, and forestry. The PRC and Government Code sections that relate to the Proposed Project are included below:

- **PRC Section 12220(g):** "Forest land" is defined as 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" is defined as 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
- **Government Code Section 51104(g):** "Timberland production zone" or "TPZ" means an area that 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) of the code

- **Government Code Section 51201(c):** (a) “Agricultural land” means Prime Farmland, Farmland of Statewide Importance, or Unique Farmland, as defined by the USDA land inventory and monitoring criteria, as modified for California. (b) In those areas of the state where lands have not been surveyed for the classification specified in subdivision (a), “agricultural land” means land that meets the requirements of “prime agricultural land.”

4.2.2.2.2 California Land Conservation Act

The California Land Conservation Act of 1965, also known as the Williamson Act, allows landowners to enter into agreements with local governments to preserve agricultural land (DOC 2019a).

4.2.2.2.3 Farmland Mapping and Monitoring Program

The California Department of Conservation (DOC) FMMP provides designations for classifications of farmland throughout the state and produces maps and statistical data used for analyzing potential 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 (DOC 2019b). These are defined as follows:

- **Prime Farmland:** This is 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:** This is 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:** This is farmland of lesser quality soils used to produce 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:** This is 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:** This is 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:** This is land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 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:** This is land not included in any other category

4.2.2.2.4 California Department of Pesticide Regulation

A Pest Control Recommendation is required for all lands within California where pesticides are used.

4.2.2.3 Local

4.2.2.3.1 Fresno County General Plan

The Fresno County General Plan (Fresno County 2023, 2024) governs the land use and development in the Proposed Project. The General Plan policies (Fresno County 2024) that are applicable to agriculture include the following:

- **Policy LU-A.1 Agricultural Land Conservation:** The County shall maintain agriculturally designated areas for agriculture use and shall direct urban growth away from valuable agricultural lands to cities, unincorporated communities, and other areas planned for such development where public facilities and infrastructure are available or can be provided consistent with the adopted General or Community Plan
- **Policy LU-A.2 Agriculture-Related Uses:** The County shall allow by right in areas designated Agriculture activities related to the production of food and fiber and support uses incidental and secondary to the on-site agricultural operation

4.2.2.3.2 Madera County General Plan

The Madera County General Plan (Madera County 1995) contains policies related to the protection of agricultural and forest lands throughout the county; however, there are no relevant policies related to agricultural resources or forest resources that would apply to the Proposed Project.

As previously mentioned, the FMMP includes Farmland of Local Importance, which is land of importance to the local economy, as defined by each county's local advisory committee and adopted by its board of supervisors. Farmland of Local Importance is either currently producing or has the capability of production but does not meet the criteria of Prime, Statewide, or Unique Farmland. Authority to adopt or to recommend changes to the category of Farmland of Local Importance rests with the board of supervisors in each county (DOC 2018). Below are the definitions according to Fresno and Madera counties:

- **Fresno County:** This includes all farmable lands within Fresno County that do not meet the definitions of Prime, Statewide, or Unique. This also includes land that is or has been used for irrigated pasture, dryland farming, confined livestock and dairy, poultry facilities, aquaculture, and grazing land

- **Madera County:** This includes lands that are presently under cultivation for small grain crops but are not irrigated. It also includes lands that are currently irrigated pasture but have the potential to be cultivated for row/field crop use

4.2.3 Analysis Methodology

4.2.3.1 Analytical Approach

For this analysis, the Proposed Project was compared with applicable agricultural and forestry regulations from the Fresno County General Plan (Fresno County 2023, 2024); Fresno County Zoning Code; Madera County General Plan (Madera County 1995); Madera County Zoning Code; and Williamson Act Program requirements. This analysis determines if the Proposed Project would generate any potential significant impacts on agriculture and forestry resources. The Area of Analysis is the agricultural and forested lands that the Proposed Project would directly impact within the Proposed FERC Project Boundary (Figure 2.2-3), as well as any state or regional agricultural and forestry industries the Proposed Project would indirectly affect.

4.2.3.2 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on agriculture and forestry resources if it would do the following:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to non-agricultural use (AF-1);
- Conflict with existing zoning for agricultural use, or a Williamson Act contract (AF-2);
- 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)) (AF-3);
- Result in the loss of forest land or conversion of forest land to non-forest use (AF-4); or
- Involve other changes in the existing environment that, 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 (AF-5)

CEQA Appendix G states 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 (DOC 1997) 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.”

4.2.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam to be automated, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E’s existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down-ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach (PBR) of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cubic feet per second (cfs) for initial or subsequent spills in relation to the LTOR

down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the PBR cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient[1] storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1

[1] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.2.4.1 Potential Impacts Related to Farmland

Impact AF-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?

4.2.4.1.1 Proposed Project

Construction and Operation

Per the FMMP, the Proposed Project is entirely on land classified as grazing or un-mapped. The Proposed Project would not alter current land use. The Proposed Project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to a non-agricultural use. Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact AF-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.2.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project, discussed above in Section 4.2.4.1.1. Alternative 1 would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to a non-agricultural use. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact AF-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.2.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project, discussed above in Section 4.2.4.1.1. Alternative 2 would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to a non-agricultural use. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact AF-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.2.4.2 Potential Impacts Related to Agricultural Zoning

Impact AF-2: Would the Project conflict with existing zoning for agricultural use, or a Williamson Act contract?

4.2.4.2.1 Proposed Project

Construction and Operation

The Proposed Project is located on land districts zoned as Exclusive Agricultural (AE), Resource Conservation (RC), and Recreation (RE) in Fresno County, and Public Open Space and Rural Mountain District in Madera County, with only lands zoned as AE in Fresno County relevant to agricultural zoning or Williamson Act contracts. The

Proposed Project would not convert designated farmland to non-agricultural use nor change the zoning. Additionally, no lands within the Proposed Project are designated as a Williamson Act contract (DOC 2023). The Proposed Project would not conflict with the existing zoning for agriculture or a Williamson Act contract. Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact AF-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.2.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project, discussed above in Section 4.2.4.2.1. Alternative 1 would not convert designated farmland to non-agricultural use nor change the zoning and would not conflict with the existing zoning for agriculture or a Williamson Act contract. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact AF-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.2.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project, discussed above in Section 4.2.4.2.1. Alternative 2 would not convert designated farmland to non-agricultural use nor change the zoning and would not conflict with the existing zoning for agriculture or a Williamson Act contract. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact AF-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.2.4.3 Potential Impacts Related to Forest Land and Timberland Zoning

Impact AF-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))?

4.2.4.3.1 Proposed Project

Construction and Operation

The Proposed Project is not located on land zoned as Timberland Production and would not conflict with existing zoning for forest land or timberland. The Proposed Project would not result in the loss of forest land or conversion of forest land to non-forest use, nor would it require rezoning of forest land or timberland. Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact AF-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.2.4.3.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project, discussed above in Section 4.2.4.3.1. Alternative 1 would not result in the loss of forest land or conversion of forest land to non-forest use, nor would it require rezoning of forest land or timberland. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact potential impact AF-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.2.4.3.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project, discussed above in Section 4.2.4.3.1. Alternative 2 would not result in the loss of forest land or conversion of forest land to non-forest use, nor would it require rezoning of forest land or timberland. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact AF-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.2.4.4 Potential Impacts Related to Loss of Forest Land

Impact AF-4: Would the Project result in the loss of forest land or conversion of forest land to non-forest use?

4.2.4.4.1 Proposed Project

Construction and Operation

No forest land would be lost or converted to non-forest use as a result of construction or operation of the Proposed Project. The Vista Day Use Area would be constructed within a previously disturbed area on BLM-managed lands and the Proposed Project would not result in changes to land use designations, zoning, or forest management classifications within the Proposed FERC Project Boundary. Lands within the Proposed FERC Project Boundary would continue to be managed in accordance with existing land use designations identified in the Fresno County and Madera County general plans, the BLM Bakersfield RMP, and the USFS-SNF Land Management Plan. Routine operation and maintenance activities would continue under existing land management and permitting requirements applicable to federal and non-federal lands.

No tree removal is included as part of the Proposed Project. Tree removal is also not proposed for installation of the SJR Above Kerckhoff Reservoir Inflow Gage or for civil activities associated with the retirement of the K1 Powerhouse. Accordingly, no impacts related to tree removal are anticipated under the Proposed Project as currently defined. However, if final design refinements or construction constraints were to necessitate tree removal, appropriate avoidance and mitigation measures would be necessary. Such measures could include, but would not be limited to, minimizing the extent of vegetation

disturbance, conducting pre-construction surveys, and implementing compensatory mitigation consistent with applicable regulatory requirements.

Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact AF-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.2.4.4.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project, discussed above in Section 4.2.4.4.1. Alternative 1 would not result in the loss of forest land or conversion of forest land to non-forest use. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact AF-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.2.4.4.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project, discussed above in Section 4.2.4.4.1. Alternative 2 would not result in the loss of forest land or conversion of forest land to non-forest use. Therefore, there would be **No**

Impact as a result of construction or operational activities under Alternative 2 for potential impact AF-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.2.4.5 Potential Impacts Related to Conversion of Farmland

Impact AF-5: Would the Project involve other changes in the existing environment that, 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?

4.2.4.5.1 Proposed Project

Construction and Operation

The Proposed Project would not involve changes in the existing environment that could result in the conversion of farmland to non-agricultural use or conversion of forest land to non-forest use. The Proposed Project would not modify existing land use designations, zoning classifications, or land management objectives within the Proposed FERC Project Boundary. Agricultural and forest lands within and adjacent to the Proposed FERC Project Boundary would continue to be managed in accordance with applicable local land use plans, including the Fresno County and Madera County general plans, and land uses identified in BLM's Bakersfield RMP and USFS-SNF Land Management Plan would not change. The Proposed Project would not induce development, alter land use patterns, or create conditions that would facilitate conversion of agricultural or forest lands to other uses. Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact AF-5.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.2.4.5.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project, discussed above in Section 4.2.4.5.1. Alternative 1 would not involve changes in the existing environment that could result in the conversion of farmland to non-agricultural use or conversion of forest land to non-forest use. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact AF-5.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.2.4.5.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project, discussed above in Section 4.2.4.5.1. Alternative 2 would not involve changes in the existing environment that could result in the conversion of farmland to non-agricultural use or conversion of forest land to non-forest use. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact AF-5.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.2.5 Literature Cited

BLM (United States Bureau of Land Management). 1991. Forest Management Manuals, 5000 Series. Accessed: April 3, 2026. Retrieved from: https://www.blm.gov/policy/manuals.

_____. 2014. *Bakersfield Field Office Record of Decision and Approved Resource Management Plan*. United States Department of the Interior, Bureau of Land Management. December. Accessed: April 3, 2026. Retrieved from: https://www.govinfo.gov/content/pkg/GOVPUB-I53-PURL-gpo83734/pdf/GOVPUB-I53-PURL-gpo83734.pdf.

DOC (California Department of Conservation). 1997. Land Evaluation & Site Assessment (LESA) Model: Instruction Manual. Accessed: April 3, 2026. Retrieved from: https://www.conservation.ca.gov/dlrp/Pages/qh_lesa.aspx.

_____. 2018. Farmland of Local Importance. Accessed: April 3, 2026. Retrieved from: https://www.conservation.ca.gov/dlrp/fmmp/Documents/Farmland_of_Local_Importance_2018.pdf.

_____. 2019a. Williamson Act Program. Accessed: April 3, 2026. Retrieved from: https://www.conservation.ca.gov/dlrp/wa.

_____. 2019b. Division of Land Resource Protection. Accessed: April 3, 2026. Retrieved from: https://www.conservation.ca.gov/dlrp.

_____. 2023. California Important Farmland Finder Map. Accessed: April 3, 2026. Retrieved from: https://maps.conservation.ca.gov/DLRP/CIFF/.

Fresno County. n.d. Fresno County GIS web map viewer. Accessed: April 3, 2026. Retrieved from: https://gisportal.co.fresno.ca.us/portal/apps/webappviewer/index.html?id=b921843d343d4df998b5b3c6a301756a.

_____. 2000. Fresno County Zoning Ordinance. Section 816 “AE” Exclusive Agricultural District. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/zoning-ordinance/816-ae-exclusive-agricultural-district.pdf.

_____. 2023. *Fresno County General Plan Background Report.* General Plan Review and Revision; Public Review Draft. April. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/2/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr-background-report-2023-05-10.pdf.

_____. 2024. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

Madera County. n.d. Madera County Land Use. Accessed: October 2023. Retrieved from: https://gis.maderacounty.com/portal/apps/instant/basic/index.html?appid=df564f893e1945a88543a76040b8a297.

_____. 1995. *Madera County General Plan Policy Document*. Adopted October 24. Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/40825/638615574804870000.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

USFS (United States Forest Service). n.d. USFS. *Forest Definitions Applied in Reporting. Forest Inventory and Analysis Program.* Accessed April 3, 2026. Retrieved from. https://research.fs.usda.gov/programs/fia/forestdefinitions.

_____. 2023a. *Land Management Plan for the Sierra National Forest: Fresno, Madera, and Mariposa Counties, California*. Accessed: April 3, 2026. Retrieved from:

https://acconsensus.org/wp-content/uploads/2024/08/05-SNF_LMP_final_20230504_Web.pdf.

_____. 2023b. Pesticide Management & Coordination. Accessed: April 3, 2026. Retrieved from: https://www.fs.usda.gov/science-technology/forest-health-protection/integrated-pest-management/pesticide-management.

4.3 AIR QUALITY

This section describes existing conditions and analyzes potential impacts on air quality as a result of implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts of the Proposed Project, Alternative 1, and Alternative 2 on air quality were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.3-1).

Table 4.3-1: CEQA Checklist for Air Quality

Would the Project:	**Proposed Project**	**Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping**	**Alternative 2: Proposed Project with BLM Revised 4(e) Conditions**
Impact AQ-1: Conflict with or obstruct implementation of the applicable air quality plan?	Significant and Unavoidable	Significant and Unavoidable	Significant and Unavoidable
Impact AQ-2: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact AQ-3: Expose sensitive receptors to substantial pollutant concentrations?	No Impact	No Impact	No Impact
Impact AQ-4: Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	No Impact	No Impact	No Impact

4.3.1 Environmental Setting

4.3.1.1 Regional Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is in the foothills of the western slope of the Sierra Nevada within the San Joaquin Valley Air Basin in a sparsely populated area of Fresno and Madera counties, California. The San Joaquin Valley is bordered in the east by the Sierra Nevada (8,000 to 14,500 feet above mean sea level [msl]), in the west by the Coast Ranges (average 3,000 feet msl), and in the south by the Tehachapi Mountains (6,000 to 8,000 feet msl); these surrounding mountain ranges along with the lower valley floor create a bowl-shaped topography. A slight downward elevation gradient exists between Bakersfield, at 408 feet msl, and where the San Joaquin Valley opens at sea level to the San Francisco Bay at the Carquinez Straits. The topography of the San Joaquin Valley inhibits the transport of air pollutants out of the valley.

The San Joaquin Valley is in a Mediterranean climate zone and is influenced by a subtropical high-pressure cell most of the year, which can result in temperature

inversions. Temperature inversions are characterized by decreased vertical mixing and cause higher concentrations of air pollutants to be trapped at the surface. Pollutant concentrations are dependent on the height of the temperature inversion; temperature inversions that occur on summer days are typically 2,000 to 2,500 feet above the valley floor, while temperature inversions that occur during winter nights are typically 500 to 1,500 feet above the valley floor. Wind speed and direction are important for the mixing and transport of pollutants away from the surface. Winds in the San Joaquin Valley most frequently blow from the northwesterly direction, especially in the summer. The Coastal Range and Sierra Nevada are barriers to air movement to the west and east, respectively, and air masses are generally channeled toward the southeastern end of the valley (Valley Air District 2015).

4.3.1.2 Sensitive Receptors

Certain groups of the population have an increased sensitivity to air pollution and environmental contaminants, including children, older adults, and people with pre-existing serious health problems affected by air quality. Sensitive receptor locations include those where susceptible populations are likely to be present, such as schools, parks, playgrounds, day care facilities, nursing homes, hospitals, and residential dwelling unit(s) (Valley Air District 2015).

The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public lands administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and United States Bureau of Reclamation (Reclamation) under BLM management. The existing Federal Energy Regulatory Commission (FERC or Commission) Project Boundary includes one developed recreation facility located on the northeast end of Kerckhoff Reservoir, referred to as the Smalley Cove Recreation Area, and an adjacent dispersed day use area. Most of the lands underlying and surrounding the south half of Kerckhoff Reservoir and the area on the north side of the reservoir near Smalley Cove Recreation Area are National Forest System (NFS) lands, managed by USFS-SNF. No other facilities are located on NFS lands; BLM's San Joaquin River (SJR) Gorge Special Recreation Management Area is in the vicinity of the existing

FERC Project Boundary, straddling the SJR along Smalley Road. The Ya-Gub-Weh-Tuh Trailhead is also in close proximity of the existing FERC Project Boundary, immediately adjacent to Smalley Road. The nearest residences along Powerhouse Road are all located more than 500 feet from the existing FERC Project Boundary.

4.3.1.3 Air Pollutants of Concern

4.3.1.3.1 Criteria Pollutants

The federal Clean Air Act (CAA) requires the United States Environmental Protection Agency (USEPA) to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants. These are referred to as criteria pollutants and include particulate matter (particulate matter smaller than 10 microns [PM_{10}] and particulate matter smaller than 2.5 microns [$PM_{2.5}$]), ground-level ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead (Pb). The USEPA regulates the criteria pollutants by developing human health-based and/or environmentally based criteria for setting permissible levels (Valley Air District 2015). Ground-level O_3 is not emitted directly into the air but is created by chemical reactions between oxides of nitrogen (NO_X) and volatile organic compounds in the presence of heat and sunlight (USEPA 2025a). The USEPA has established O_3 standards based on one- and eight-hour averaging periods (USEPA 2025a).

The State of California has established air quality standards for additional pollutants not addressed by federal standards. The California Air Resources Board (CARB) has established state standards for hydrogen sulfide (H_2S), sulfates, vinyl chloride, and visibility-reducing particles.

4.3.1.3.2 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” (CARB 2025a); 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 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.

4.3.1.3.3 Odors

Odors are substances in the air that pose a nuisance to nearby land uses such as residences, schools, day care 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.

4.3.2 Regulatory Background

The following subsections contain an overview of regulations related to Kerckhoff Hydroelectric Project air quality.

4.3.2.1 Federal

4.3.2.1.1 Federal Power Act

The Federal Power Act (Title 16 United States Code Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created FERC and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.3.2.1.2 Federal Clean Air Act

Congress passed the federal CAA in 1970 and established regulations to protect human health and the environment from emissions of air pollutants. The USEPA was designated the regulatory authority to implement most of the requirements of the federal CAA. These requirements include implementing NAAQS; approving state implementation plans (SIPs); setting motor vehicle and stationary source emission standards; regulating hazardous air pollutants; issuing permits for major sources of air pollutants; and establishing acid deposition control measures, enforcement provisions, and stratospheric O_3 depletion control measures. The NAAQS were established for the six criteria air pollutants. The USEPA is required by the federal CAA to ensure the standards are based on data from the most recent five years and to revise the standards, if necessary. If areas are not meeting NAAQS, they are designated "non-attainment" and must implement additional control measures (Congressional Research Service 2022). States are responsible for developing SIPs for submittal to USEPA, which establishes procedures to attain and maintain NAAQS.

4.3.2.2 State

4.3.2.2.1 California Clean Air Act

The federal CAA delegates the regulation of air pollution control and the enforcement of 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. The CARB is responsible for ensuring implementation of the 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 NAAQS. The CAAQS also include four additional pollutants: visibility-reducing particles, sulfates, H_2S, and vinyl chloride. Similar to USEPA, CARB designates areas in California as being in attainment or non-attainment for CAAQS. The CAAQS describe adverse conditions; that is, pollution levels must be

below these standards before a basin can attain the standard. The NAAQS and CAAQS have been developed to protect human health and represent the maximum acceptable concentrations of air pollution. Table 4.3-2 summarizes CAAQS and NAAQS.

Table 4.3-2: Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS [a]	NAAQS [b]	
			Primary [c]	Secondary [d]
O_3	1-hour	0.09 ppm	—	—
O_3	8-hour	0.07 ppm	0.07 ppm	0.07 ppm
CO	1-hour	20 ppm	35 ppm	—
CO	8-hour	9.0 ppm	9 ppm	—
NO_2	1-hour	0.18 ppm	100 ppb [e]	—
NO_2	Annual arithmetic mean	0.030 ppm	0.053 ppm	—
SO_2	1-hour	0.25 ppm	75 ppb [f]	--
SO_2	3-hour	—	—	0.5 ppm
SO_2	24-hour	0.04 ppm	0.14 ppm	—
SO_2	Annual arithmetic mean	—	0.030 ppm	—
PM_{10}	24-hour	50 µg/m^3	150 µg/m^3	150 µg/m^3
PM_{10}	Annual arithmetic mean	20 µg/m^3	—	—
$PM_{2.5}$	24-hour	—	35 µg/m^3	35 µg/m^3
$PM_{2.5}$	Annual arithmetic mean	12 µg/m^3	9.0 µg/m^3	15 µg/m^3
Pb [g]	30-day average	1.5 µg/m^3	—	—
Pb [g]	Calendar quarter	—	1.5 µg/m^3	1.5 µg/m^3

Pollutant	Averaging Time	CAAQS [a]	NAAQS [b]	
			Primary [c]	Secondary [d]
Pb [g]	Rolling 3-month average	—	0.15 µg/m^3	0.15 µg/m^3
Visibility-reducing particles	8-hour	[h]	—	—
Sulfates	24-hour	25 µg/m^3	—	—
H_2S	1-hour	0.03 ppm	—	—
Vinyl chloride	24-hour	0.01 ppm	—	—

Source: CARB 2024

µg/m^3 = micrograms per cubic meter; CAAQS = California Ambient Air Quality Standards; CO = carbon monoxide; H_2S = hydrogen sulfide; NAAQS = National Ambient Air Quality Emission Standards; NO_2 = nitrogen dioxide; O_3 = ozone; Pb = lead; $PM_{2.5}$ = particulate matter smaller than 2.5 microns; PM_{10}= particulate matter smaller than 10 microns; ppm = parts per million; ppb = parts per billion; SO_2 = sulfur dioxide; — = no standard has been adopted.

[a] CAAQS for O_3, CO, SO_2 (1- and 24-hour), NO_2, PM_{10}, $PM_{2.5}$, 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 O_3, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once per year. The O_3 standard is attained when the fourth highest eight-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than 1. For $PM_{2.5}$, 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] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect public health.

[d] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse impacts of a pollutant.

[e] To attain the one-hour national standard, the three-year average of the annual 98th percentile of the one-hour daily maximum concentrations at each site must not exceed 0.100 ppm.

[f] To attain the one-hour national standard, the three-year average of the annual 99th percentile of the one-hour daily maximum concentrations at each site must not exceed 0.075 ppm.

[g] CARB has identified Pb and vinyl chloride as TACs with no threshold level of exposure for adverse health impacts determined. These actions allow the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[h] These are particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

4.3.2.2.2 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 SIP measures, which, in combination with local actions, are designed to achieve the required emission reductions to meet federal air quality standards.

4.3.2.2.3 In-Use Off-Road Diesel-Fueled Fleets Regulation

The In-Use Off-Road Diesel-Fueled Fleets Regulation (Off-Road Regulation) was adopted by CARB in 2007 and applies to owners and renters of off-road mobile equipment powered by diesel engines with 25 horsepower (hp) or greater and most two-engine vehicles (CARB 2025b). The Off-Road Regulation aims to reduce NO_X and particulate matter emissions from diesel-fueled off-road fleets operating in California by limiting unnecessary idling, requiring a disclosure of the requirements when a vehicle is sold, requiring all subject vehicles to be labeled and reported to CARB, and restricting the addition of older vehicles into fleets. The CARB approved amendments to the Off-

Road Regulation in November 2022, aimed at further reducing emissions from the off-road sector. The rulemaking became effective October 1, 2023, with requirements beginning as early as January 1, 2024 (CARB 2025b). The construction equipment included in the Proposed Project is subject to the Off-Road Regulation.

4.3.2.2.4 Portable Equipment Registration Program

The Portable Equipment Registration Program (PERP) is a voluntary statewide program that allows registered portable engines and equipment units greater than 50 hp to operate throughout the state without permits from the local air district. If an owner of a portable engine or equipment unit elects not to register the equipment under PERP, the engine or equipment unit is subject to district permitting requirements according to district regulations where the equipment will be operated. Equipment units driven by portable engines covered under PERP are used in activities that include, but are not limited to, abrasive blasting, sand and gravel screening, rock/pavement crushing, well drilling, wood chipping, and power generation (CCR 2018). The PERP program works together with the Portable Engine Airborne Toxic Control Measure, which establishes emissions requirements for portable engines to reduce exposure to diesel particulate matter and protect public health.

4.3.2.3 Local

4.3.2.3.1 San Joaquin Valley Air Pollution Control District

The Proposed Project is located in Fresno and Madera counties; both are located in the jurisdiction of the San Joaquin Valley Air Pollution Control District (Valley Air District); the Valley Air District is responsible for developing plans, implementing control measures, and enforcing federal and state air quality standards. Table 4.3-3 summarizes the Valley Air District attainment status compared to federal and state standards, as of 2025. The San Joaquin Valley is state-designated “non-attainment” for O_3 and particulate matter (PM_{10} and $PM_{2.5}$), federal-designated “non-attainment” for O_3 and $PM_{2.5}$, and “unclassified and/or in attainment” for all other criteria pollutants for NAAQS and CAAQS.

Table 4.3-3: San Joaquin Valley Air Pollution Control District Attainment Status

Pollutant	Federal Standards [a,b,c]	State Standards [d,e,f]
O_3 (1-hour)	—	Non-attainment/Severe
O_3 (8-hour)	Non-attainment/Extreme [g]	Non-attainment
PM_{10}	Attainment	Non-attainment
$PM_{2.5}$	Non-attainment	Non-attainment
CO	Attainment/Unclassified	Attainment/Unclassified
NO_2	Attainment/Unclassified	Attainment
SO_2	Attainment/Unclassified	Attainment
Pb	No Designation/Classification	Attainment
Visibility-reducing particles	—	Unclassified
Sulfates	—	Attainment
H_2S	—	Unclassified
Vinyl chloride	—	Attainment

Source: Valley Air District 2025

CO = carbon monoxide; H_2S = hydrogen sulfide; NAAQS = National Ambient Air Quality Standard; NO_2 = nitrogen dioxide; O_3 = ozone; Pb = lead; $PM_{2.5}$ = particulate matter smaller than 2.5 microns; PM_{10}= particulate matter smaller than 10 microns; SO_2 = sulfur dioxide; — = no standard has been adopted

[a] Federal Attainment Area is any area that meets the national primary or secondary attainment ambient air quality standard for a NAAQS (USEPA 2025b).

[b] Federal Non-attainment Area is any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for a NAAQS (USEPA 2025b).

[c] Federal Unclassified Area is an area that USEPA is not able to determine the status after evaluating available information (USEPA 2025c).

[d] State Attainment Area is an area where no state standard was violated in the area for a CAAQS based on three calendar years of approved data (CCR 70301, 70304).
[e] State Non-attainment Area is an area where at least one violation of a state standard for a CAAQS occurred based on three calendar years of approved data (CCR 70301, 70303).

[f] State Unclassified Area is an area for a CAAQS where the data do not support a designation of attainment or non-attainment (CCR 70305).
[g] Federal Extreme classification for O_3 indicates the design value of that area is above 0.163 ppm.

The Valley Air District has prepared *Guidance for Assessing and Mitigating Air Quality Impacts* (Guidance) as an advisory document to help address potential air quality impacts from projects within its jurisdiction and ensure consistency with CEQA requirements (Valley Air District 2015). The Guidance provides uniform procedures for assessing potential air quality impacts of proposed projects and preparing the air quality section of environmental documents. The Guidance, including the recommended thresholds of significance, was used to analyze the potential air quality impacts for the Proposed Project.

The California CAA requires air districts to develop a plan for attaining CAAQS when their areas are designated “non-attainment” for O_3, CO, SO_2, or NO_2. The Valley Air District has adopted several air quality attainment plans that identify measures needed in the San Joaquin Valley to attain NAAQS and CAAQS.

4.3.2.3.2 Fresno County General Plan

The Fresno County General Plan includes goals related to air quality and climate change in the Transportation and Circulation, Open Space and Conservation, and Health and Safety Elements (Fresno County 2024). The goals include the following:

- Improving air quality and minimize the adverse effects of air pollution in Fresno County through coordinated and efficient land use and transportation development,

by reducing vehicle miles traveled, by maximizing the efficiency of transportation facilities, and by promoting alternatives to vehicle use

- Avoiding the inappropriate location of sensitive receptors in relation to uses that include industrial and manufacturing or other uses with the potential for creating a hazardous or nuisance effect
- Implementing resilience and adaptation strategies to minimize the impacts from several potential climate hazards, including air quality

4.3.2.2.3.3 Madera County General Plan

The Air Quality Element of the Madera County General Plan describes measures and objectives focused on integrating land use, transportation, housing, and air quality plans and district and public utility programs to reduce emissions from area sources and energy consumption (Madera County 2010). The goals are aimed at designing and developing land use, transportation, and housing projects to promote efficiency, use fewer polluting modes of transportation, prevent traffic congestion, create direct pedestrian connections, and support compact development to reduce harmful pollutant emissions and to protect public health. The following specific air quality goals in the General Plan are relevant to the Proposed Project:

- **AQ Goal A1:** Achieve effective communication, cooperation, coordination, and education in developing and implementing countywide and regional programs to improve air quality and to reduce potential climate change impacts
- **AQ Goal B1:** Improve Air Quality, Land Use, and Transportation Planning Integration and reduce impacts through appropriate project location, design and application of best available technologies
- **AQ Goal C1:** Use Air Quality Assessment and Mitigation programs and resources of the Valley Air District and other agencies to minimize air pollution, related public health effects, and potential climate change impacts within the County
- **AQ Goal E1:** Minimize air emissions and potential climate change impacts related to energy consumption in Madera County

- **AQ Goal F1:** Minimize exposure of the public to hazardous air pollutant emissions, particulates, and noxious odors from freeways, major arterial roadways, and industrial, manufacturing, and processing facilities
- **AQ Goal G2:** Reduce Madera County's proportionate contribution of greenhouse gas emissions and the potential impact that may result on climate change from internal governmental operations and land use activities within its authority

4.3.3 Analysis Methodology

This analysis focuses on the potential air quality impacts from estimated construction and operation emissions associated with the Proposed Project, Alternative 1, and Alternative 2. Emissions during construction activities would be generated from fuel combustion from off-road construction equipment, on-road mobile sources delivering materials and construction workers to and from the Proposed Project Area, boat and helicopter operations, and fugitive dust from soil disturbance. The proposed emergency generator at the dam is exempt per Valley Air District Rule 6.1.2 because it will be less than 50 hp and is not included in the analysis (Valley Air District 2015). The analysis is based on the review of existing resources, technical data, and applicable laws and regulations. This air quality analysis was prepared in accordance with the requirements of CEQA to determine if the Proposed Project and both Alternatives would result in potentially significant air quality impacts from construction and operation. The Valley Air District Guidance is used as guidance for analyzing and mitigating potential air quality impacts. The Proposed Project Area for air quality impact analysis includes the area under jurisdiction of the Valley Air District.

4.3.3.1 Analytical Approach

This analysis focuses on the potential air quality impacts from construction and operation emissions from the Proposed Project, Alternative 1, and Alternative 2. The analysis also includes an evaluation of emissions associated with the change in FERC boundary; implementation of the new protection, mitigation, and enhancement (PM&E) measures and maintenance and management plans; and the reduction in energy

generation. The estimated emissions are compared to the Valley Air District established thresholds of significance for criteria pollutant emissions.

The Proposed Project includes retiring the Kerckhoff 1 (K1) Powerhouse and modifying associated facilities; constructing the Vista Day Use Area and associated trail; installing one new operational flow gage; and upgrading two manually operated radial gates on Kerckhoff Dam. Construction emissions for the Proposed Project, Alternative 1, and Alternative 2, including the Vista Day Use Area, and installation of an inflow gage above Kerckhoff Reservoir, would 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. Operation emissions for the Proposed Project, Alternative 1, and Alternative 2 would be generated during routine maintenance activities, sediment management, vegetation management, pest management, road and trail maintenance, recreation facility maintenance, power line and communication maintenance, facility painting, and other activities.

Air quality emissions from the Proposed Project, Alternative 1, and Alternative 2 operation would also occur from vehicle trips and indirectly from energy use. Although the K1 Powerhouse infrequently operated near full capacity since the Kerckhoff 2 (K2) development began operating in 1983, it has been non-operational since 2017. With the retirement of the K1 Powerhouse, the maximum diversion capacity for the Proposed Project, Alternative 1, and Alternative 2 would decrease by 1,156 cubic feet per second (cfs), thus decreasing operational needs. Under the Proposed Project and both Alternatives, up to 5,100 cfs of water would continue to be diverted from Kerckhoff Reservoir through the K2 Powerhouse to generate electricity. This hydroelectricity would not produce air pollution or toxic byproducts and could replace and offset generation from air pollutant-emitting energy sources (i.e., fossil fuel sources).

Estimated emissions from operation and most of the construction activities, including construction of the Vista Day Use Area and installation of an inflow gage, from the Proposed Project were quantified using the California Emissions Estimator Model (CalEEMod), Version 2022.1.1.29. The remaining construction emissions associated

with helicopter and boat use were calculated separately and are discussed in Section 4.3.3.2. This model uses widely accepted methodologies and data to quantify emissions estimates that include: (1) USEPA AP-42 emissions factors; (2) CARB OFFROAD2017 emissions factors for off-road equipment; and (3) EMFAC2021 (v1.0.1) emissions factors for on-road vehicles. Input data for the construction emissions include the Proposed Project-specific location information, equipment list, hours of operation, schedule, and estimated vehicle trip quantities and length (Appendix D-3 *Construction Equipment Usage and Workforce*). The timing of individual construction activities varies between the different proposed tasks but would be estimated to predominantly take place in the late summer months of August and September 2027, 2028, and 2030. The K1 Powerhouse-proposed modification/retirement actions are planned to occur between April and October 2036.

Although operational emissions are not anticipated to significantly change under the Proposed Project or Alternatives, these emissions were still calculated conservatively and included in the estimate. Input data for the operation emission estimates include regular inspection and maintenance vehicle trips and energy usage for lighting and equipment. To capture energy usage in CalEEMod, the “general heavy industry” land use type was selected, which represents a conservatively high estimate, as this land use type contains on-site energy consumption emission rates for on-site employees. As there would be no permanent on-site employees for the Proposed Project or the Alternatives, the use of this land use type would presumably result in an overestimate of operation emissions.

4.3.3.2 Helicopter and Boat Assumptions for Construction Emissions

Kerckhoff Dam is not directly accessible by road; therefore, PG&E typically accesses the dam by boat or helicopter. A boat and helicopters would be used to assist in the upgrade of two manual radial gates on the dam. The method of transportation for the concrete to the K1 tunnel plug site would include concrete trucks, helicopters, and concrete line pumps. Boats are launched from a dock on the north end of Kerckhoff Reservoir near the A.G. Wishon Powerhouse for transit to a small private dock located on the south shore of the reservoir near Kerckhoff Dam. At the dam, a series of trails

and stairways extend from the dock and the intake structures to the south abutment of the dam. Fencing between the boat dock and the intake structures and dam prevents public access from the dock to these facilities. It is assumed that no more than one boat would be used at any one time and would make five trips per day, four days per week for three months, beginning in September 2028. The boat emissions are included in Appendix D *Kerckhoff Air Emissions Modeling* and were estimated manually using emissions factors from the 2022 Port of Long Beach Air Emissions Inventory (Port of Long Beach 2023).

A helicopter would be used to assist in the upgrade of two manual radial gates on the dam and for the K1 Powerhouse proposed modification/retirement actions. PG&E uses six helicopter landing zones (HLZ) in the Kerckhoff Hydroelectric Project vicinity for operation. Four zones—HLZ at Gage J-1, HLZ at Gage J-2, HLZ at the Gage J-2 low-flow measurement site, and HLZ at Gage J-7—are used to access gaging stations. One HLZ—at Smalley Cove—is located near Smalley Cove Campground, and another HLZ is located near the K2 Powerhouse (Appendix A *Project Facilities and Maps*: Appendix A-2 *Maps, June 2023*, Map A2-2a through Map A2-2e). It is assumed that no more than one helicopter would be used at any one time and would be operated for four hours, four days per week. For the upgrade of two manual radial gates on the dam, a helicopter would be used to carry equipment for two weeks estimated to begin in September 2028. A Blackhawk helicopter would be used for two days, and a dual engine turboshaft helicopter would be used for the remainder of the task. For retirement of the K1 Powerhouse, a helicopter would be used for four weeks beginning in April 2036. A Blackhawk helicopter would be used for two days, and a dual engine turboshaft helicopter would be used for the remainder of the task. The helicopter emissions are included in Appendix D *Kerckhoff Air Emissions Modeling* and were estimated manually using emissions factors from the Swiss Federal Office of Civil Aviation (FOCA) *Guidance on Determination of Helicopter Emissions* (FOCA 2015).

4.3.3.3 Criteria for Determining Significance

The Valley Air District Guidance contains numeric air quality thresholds of significance for criteria pollutant emissions that apply to both construction and operational activities.

Thresholds of significance currently adopted by the Valley Air District for criteria pollutant emissions and their application is presented in Table 4.3-4.

Table 4.3-4: San Joaquin Valley Air Pollution Control District Air Quality Thresholds of Significance – Criteria Pollutants

Pollutant/Precursor	Construction Emissions (tons per year)	Operational Emissions from Permitted Sources (tons per year)	Operational Emissions from Non-Permitted Sources (tons per year)
CO	100	100	100
NO_X	10	10	10
Reactive organic gases	10	10	10
SO_x	27	27	27
PM_{10}	15	15	15
$PM_{2.5}$	15	15	15

Source: Valley Air District 2015

CO = carbon monoxide; NO_X = nitrogen oxide; $PM_{2.5}$ = particulate matter smaller than 2.5 microns; PM_{10}= particulate matter smaller than 10 microns; SO_X= sulfur oxide Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project, Alternative 1, or Alternative 2 would have a significant impact on air quality if they would:

- Conflict with or obstruct implementation of the applicable air quality plan (AQ-1);
- Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment under an applicable federal or state ambient air quality standard (AQ-2);
- Expose sensitive receptors to substantial pollutant concentrations (AQ-3); or

- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people (AQ-4)

4.3.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping

components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down-ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cfs for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the Project Bypass Reach cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix *G Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.3.4.1 Potential Impacts Related to Air Quality

Impact AQ-1: Would the project conflict with or obstruct implementation of the applicable air quality plan?

4.3.4.1.1 Proposed Project

Construction

The Valley Air District is tasked with implementing programs and regulations required by the federal CAA and California CAA. The Valley Air District has established thresholds of significance for criteria pollutant emissions, which are based on the Valley Air District new source review offset requirements for stationary sources. Stationary sources in the Valley Air District are subject to some of the most stringent regulatory requirements in the nation. Emission reductions achieved through implementation of the Valley Air District offset requirements are a major component of Valley Air District's air quality plans. Thus, projects with emissions below the thresholds of significance for criteria pollutants would be determined to not conflict with or obstruct implementation of Valley Air District's air quality plan.

An air quality assessment for the Proposed Project was performed in accordance with the applicable Valley Air District Guidance. As previously discussed, the estimated annual construction emissions for criteria pollutants were calculated. The maximum annual construction emissions estimates and the threshold determination for the

Proposed Project compared to the Valley Air District thresholds of significance are presented in Table 4.3-5 (Appendix D-3 *Construction Equipment Usage and Workforce*). The estimated emissions from construction activities for the Proposed Project were below the Valley Air District thresholds. There would be a temporary, localized increase in emissions, but the emissions would be low, would not conflict with implementation or achievement of a local or state air quality plan, and would have a Less Than Significant Impact.

Table 4.3-5: Proposed Project Annual Construction Emissions and San Joaquin Valley Air District Thresholds of Significance

Pollutant/Precursor	Valley Air District Thresholds (tons per year)	Proposed Project Construction Emissions (tons per year)	Above Threshold?
CO	100	0.95	No
NO_X	10	0.51	No
Reactive Organic Gases	10	0.13	No
SO_x	27	0.01	No
PM_{10}	15	0.08	No
$PM_{2.5}$	15	0.01	No

Source: Valley Air District 2015

CO = carbon monoxide; NO_X = nitrogen oxide; $PM_{2.5}$ = particulate matter smaller than 2.5 microns; PM_{10}= particulate matter smaller than 10 microns; SO_X= sulfur oxide

Construction-related emissions would occur during short-term construction periods in License Years 1, 2, 4, and 10, and equipment would not all be used simultaneously or at full load. A boat would be used for approximately three months in Year 2, and a helicopter would be used for approximately two weeks in Year 2 and one month in Year 4. The Vista Day Use Area would be constructed in License Years 4 to 6. The K1

Powerhouse-proposed modification and retirement actions are set to occur between April and October in Year 10.

Construction work requiring excavation or grading would be completed during approximately one week in Year 2 and one week in Year 4. Fugitive dust emissions could occur during any ground disturbance activities during construction of the Vista Day Use Area or retirement of the K1 Powerhouse. Fugitive dust emissions may have Potentially Significant Impact.

Under the Proposed Project, the existing FERC Project Boundary would be modified to remove lands no longer necessary for operation of the Proposed Project and both Alternatives. In doing this, the total acreage would be reduced by approximately 24 percent (PG&E 2023) (Appendix A *Project Facilities and Maps*: Appendix A-3 *Maps*, Map A3-1 and Maps A3-2a through A3-2o). The reduction in the size of the existing FERC Project Boundary and the implementation of new management plans during construction would have no effect on air quality.

Impact Analysis without Mitigation

Therefore, prior to mitigation, there would be a **Potentially Significant Impact** to implementation of an applicable air quality plan with Proposed Project construction activities under the Potential Project for potential impact AQ-1.

Impact Analysis with Mitigation

To reduce the potentially significant impact from fugitive dust emissions, Recommended Mitigation Measure AQ-1: Fugitive Dust PM10 Measures and Construction Equipment and Mitigation Measure GEO-1: Erosion and Sediment Control Plan would be implemented throughout Proposed Project construction activities. Recommended Mitigation Measure AQ-1 would minimize or avoid the emission of dust by watering the ground prior to disturbance and following disturbance, covering soil on transport vehicles, minimizing vehicle speeds on unpaved roads, and providing signage for the public to voice any complaints regarding dust emissions. Mitigation Measure GEO-1 requires the development of site-specific erosion control measures and long-term

reclamation measures for new construction project to minimize or avoid erosion and the subsequent potential emission of fugitive dust. Additional best management practices (BMPs) for fuel and equipment use to reduce potential emissions during construction activities are included in Recommended Mitigation Measure AQ-1. Therefore, there would be a **Less than Significant Impact** on air quality during construction with incorporation of Recommended Mitigation Measure AQ-1 and Mitigation Measure GEO-1.

Implementation of Recommended Mitigation Measure AQ-1 would require PG&E to develop and implement BMPs to minimize and avoid fugitive dust and air pollutant emissions during Proposed Project construction activities. Implementation of Recommended Mitigation Measure AQ-1 would reduce the potentially significant impact associated with the Proposed Project to **Less than Significant with Mitigation**.

On March 11, 2026, State Water Board staff provided Recommended Mitigation Measure AQ-1 to PG&E staff and requested that PG&E agree to implement the measure to ensure that Proposed Project impacts remain less than significant with mitigation. On March 17, 2026, PG&E responded that it does not plan to agree to mitigation measures to reduce Proposed Project impacts to a less than significant level without first reviewing the draft EIR upon its circulation. On March 19, 2026, PG&E provided comments and suggested edits to the mitigation measures shared on March 11, 2026 (personal email communication, J. Hartman and C. McCormick, March 19, 2026). Without commitment from PG&E, implementation of Recommended Mitigation Measure AQ-1 is uncertain.

Without implementation of Recommended Mitigation Measure AQ-1 or comparable action, the Proposed Project's impacts on air quality from fugitive dust emissions during construction activities are Significant and Unavoidable**.** Therefore, there would be a **Significant and Unavoidable Impact** as a result of construction activities under the Proposed Project for potential impact AQ-1.

Operation

The Proposed Project would not result in any new, permitted operational sources of air emissions. There would be emissions associated with vehicles related to operation and maintenance activities, recreation use, and energy use; however, there would not be a significant increase in vehicle trips or energy use under the Proposed Project. As a worst-case scenario, the maximum annual operation emissions are presented in Table 4.3-6, along with the thresholds of significance established by the Valley Air District. The estimated emissions from during operation for the Proposed Project were below the Valley Air District thresholds and would have a Less Than Significant Impact.

Table 4.3-6: Proposed Project Annual Operation Emissions and San Joaquin Valley Air District Thresholds of Significance

Pollutant/Precursor	Valley Air District Thresholds (tons per year)	Proposed Project Operation Emissions (tons per year)	Above Threshold?
CO	100	0.07	No
NO_X	10	0.01	No
Reactive organic gases	10	0.01	No
SO_x	27	0.01	No
PM_{10}	15	0.03	No
$PM_{2.5}$	15	0.01	No

The 24 percent reduction in the size of the existing FERC Project Boundary would result in less land requiring maintenance by PG&E and a corresponding decrease in equipment and mobile source emissions. Implementation of the new PM&E measures and maintenance and management plans and use of the Vista Day Use Area may result in additional mobile source use due to road and trail maintenance, recreation site maintenance, or recreation site use. It is unknown whether there would be an overall

decrease or increase in emissions, or if the emissions would cancel each other, due to the change in the existing FERC Project Boundary or the implementation of new plans compared to existing conditions. Regardless of the direction of the change, the resulting emissions would have a negligible effect on air quality.

Under the Proposed Project, there would be a decrease in renewable energy generation from the Kerckhoff Hydroelectric Project. The replacement for this energy is unknown but could originate from other renewable sources, which would produce no air emissions, or from fossil fuel sources, which would produce air emissions. The state of California is committed to developing renewable energy sources and incentivizes its use through the Renewable Portfolio Standard and Cap and Invest Program (CARB 2025c). Thus, it is likely that the lost energy would be replaced by renewable sources. The decrease in renewable energy production under the Proposed Project would not be anticipated to conflict with or obstruct implementation of an air quality plan. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact AQ-1.

Mitigation Measures

Recommended Mitigation Measure AQ-1: Fugitive Dust PM10 Measures and Construction Equipment

PG&E shall ensure the following during construction of the Vista Day Use Area, SJR Above Kerckhoff Reservoir Inflow Gage, retirement of the K1 Powerhouse and associated facilities, and when upgrading spill gates at Kerckhoff Dam:

- 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 two 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

PG&E shall ensure the following requirement for construction equipment involved with the Vista Day Use Area, SJR Above Kerckhoff Reservoir Inflow Gage, retirement of the K1 Powerhouse and associated facilities, and when upgrading spill gates at Kerckhoff Dam:

- 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 horsepower, registered in the PERP (www.arb.ca.gov), or permitted through the Valley Air District as a stationary source
- Electrification of equipment where feasible
- Substitution of gasoline-powered for diesel-powered equipment, where feasible
- Use of alternatively fueled construction equipment on site where feasible, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane, or biodiesel
- Use of equipment that has Caterpillar pre–chamber diesel engines where feasible
- Restriction of diesel-fueled commercial vehicles over 10,000 pounds to a 5-minute maximum idle time

Mitigation Measure GEO-1: Erosion and Sediment Control Plan

Mandatory Section 4(e) conditions issued by BLM and USFS require PG&E to develop and implement an Erosion and Sediment Control Management Plan in consultation with applicable stakeholders. The plan shall establish measures to address erosion, control sedimentation, and reclaim disturbed areas for PG&E activities that have the potential to

result in erosion on all lands within the Proposed Project Area over the term of the new license.

Consistent with mandatory Section 4(e) conditions issued by BLM and USFS, within two years of license issuance, PG&E shall develop an Erosion and Sediment Control Plan in consultation with the State Water Board, BLM, USFWS, USFS, and other interested parties, and subject to prior review and approval.

The plan shall provide direction for treating erosion, controlling sedimentation, and reclaiming disturbed sites within the Proposed Project Boundary during the term of the new license. The Erosion and Sediment Control Plan shall include the following guidelines for existing Kerckhoff Hydroelectric Project-affected areas:

- Methods for initial and periodic inventory and monitoring of the entire Proposed Project Area to identify erosion sites and sites needing reclamation caused by Proposed Project facilities and operations and assessment of site conditions for each erosion site. Periodic monitoring and inventory will include recording effectiveness of erosion and reclamation treatment measures and identification of new erosion and reclamation sites for the term of the new license
- Criteria for ranking and treating erosion and reclamation sites including a risk rating and hazard assessment for scheduling erosion treatment measures and monitoring at each site
- Erosion control and reclamation measures that incorporate current standards, follow USFS regulations and guidance (e.g. Forest Plan, Road Management Objectives, BMPs), and shall be customized to site-specific conditions
- A schedule for treatment (e.g., repair, mitigate, monitor) of erosion and reclamation sites, including a list of sites requiring immediate mitigation and schedule for their implementation
- Effectiveness monitoring of completed erosion control treatment measures after treatment to determine if further erosion control measures are needed. If erosion control measures are not effective, PG&E shall implement additional erosion control

measures approved by the State Water Board and continue monitoring until the site has stabilized

- Protocols for emergency erosion and sediment control

- At least 90 days before ground disturbance commences, PG&E shall develop site-specific temporary erosion control measures and long-term reclamation measures for each new construction or non-routine maintenance project. The temporary measures shall be designed to prevent erosion, stream sedimentation, dust, and soil mass movement during the period of ground disturbance until replaced by permanent reclamation measures within the Proposed Project Area
- The plan shall ensure compliance with the SR/SJR Basin Plan and any amendments hereto, including following water quality objectives below:

    - Turbidity:

    - Where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2
    - Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU
    - Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent
    - In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected

    - Dissolved Oxygen

    - For surface waterbodies outside the legal boundaries of the Delta, the monthly median of the mean daily DO concentration shall not fall below 85 percent of saturation in the main water mass, and the 95th percentile concentration shall not fall below 75 percent of saturation. The DO concentrations shall not be reduced below the following minimum levels at any time:

- Waters designated WARM 5.0 mg/L
- Waters designated COLD 7.0 mg/L
- Waters designated SPWN 7.0 mg/L

- Suspended Material

- Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses

- Settleable Materials

- Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses

- Beginning within the first full calendar year of the new license, PG&E shall provide an annual report of erosion control and monitoring activities of the previous year during the annual consultation meeting. The annual report shall be provided to the State Water Board, BLM, USFWS, USFS, and other interested parties. Electronic data (tabular and spatial) shall be provided along with the report. Documentation shall include a GIS database for maps keyed to a narrative description of detailed, site-specific, erosion treatment measures and sediment monitoring results

Level of Significance

Significant and Unavoidable Impact

4.3.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction activities as described in Section 4.3.4.1.1. Alternative 1 would not change any construction activities included in the Proposed Project. Under Alternative 1, construction activities

would emit the same quantity of emissions estimated for the Proposed Project and would not conflict with or obstruct implementation of an applicable air quality plan.

Impact Analysis without Mitigation

Therefore, prior to mitigation, there would be a **Potentially Significant Impact** to implementation of an applicable air quality plan with Proposed Project construction activities under Alternative 1 for potential impact AQ-1.

Impact Analysis with Mitigation

To reduce the potentially significant impact from fugitive dust emissions, Recommended Mitigation Measure AQ-1: Fugitive Dust PM10 Measures and Construction Equipment and Mitigation Measure GEO-1: Erosion and Sediment Control Plan would be implemented throughout construction activities. Recommended Mitigation Measure AQ-1 would minimize or avoid the emission of dust by watering the ground prior to disturbance and following disturbance, covering soil on transport vehicles, minimizing vehicle speeds on unpaved roads, and providing signage for the public to voice any complaints regarding dust emissions. Mitigation Measure GEO-1 requires the development of site-specific erosion control measures and long-term reclamation measures for new construction project to minimize or avoid erosion and the subsequent potential emission of fugitive dust. Additional BMPs for fuel and equipment use to reduce potential emissions during construction activities are included in Recommended Mitigation Measure AQ-1. Therefore, there would be a **Less than Significant Impact** on air quality during construction with incorporation of Recommended Mitigation Measure AQ-1 and Mitigation Measure GEO-1.

On March 11, 2026, State Water Board staff provided Recommended Mitigation Measure AQ-1 to PG&E staff and requested that PG&E agree to implement the measure to ensure that Proposed Project impacts remain less than significant with mitigation. On March 17, 2026, PG&E responded that it does not plan to agree to mitigation measures to reduce Proposed Project impacts to a less than significant level without first reviewing the draft EIR upon its circulation. On March 19, 2026, PG&E provided comments and suggested edits to the mitigation measures shared on March 11, 2026 (personal email

communication, J. Hartman and C. McCormick, March 19, 2026). Without commitment from PG&E, implementation of Recommended Mitigation Measure AQ-1 is uncertain.

Without implementation of Recommended Mitigation Measure AQ-1 or comparable action, Alternative 1's impacts on air quality from fugitive dust emissions during construction activities are Significant and Unavoidable. Therefore, there would be a **Significant and Unavoidable Impact** as a result of construction activities under Alternative 1 for potential impact AQ-1.

Operation

Under Alternative 1, there would be a reduction in flow fluctuations downstream of Kerckhoff Dam and more whitewater flow release days. Depending on the WY type during a spill year, the ramp down may provide several days of whitewater boating flows. Boating flows and down ramps would be based on the WY type Schedules A-D in the SCE Mammoth Pool Contract (see Table 3.4-1 in Section 3 *Alternatives Descriptions*). Thus, during the May 1 to August 31 time frame, there would potentially be several more available whitewater boating days available with a corresponding increase in mobile source use and associated emissions near and at the Kerckhoff Hydroelectric Project.

Nevertheless, while Alternative 1 would result in additional whitewater boating opportunities and could have a corresponding increase in mobile source activity, as discussed in Section 4.17 *Recreation*, overall recreational use within the Kerckhoff Hydroelectric Project Area is lower due to its remote location, limited access, and the requirement for expert-level boating skills in certain reaches. Given these constraints, any incremental increase in visitation would be limited in scale, and associated emissions would remain minor relative to baseline conditions. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 1 for potential impact AQ-1.

Mitigation Measures

Recommended Mitigation Measure AQ-1: Fugitive Dust PM10 Measures and Construction Equipment

Mitigation Measure GEO-1: Erosion and Sediment Control Plan

Level of Significance

Significant and Unavoidable Impact

4.3.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction activities as described in Section 4.3.4.1.1. Alternative 2 would not change any construction activities included in the Proposed Project. Under Alternative 2, construction activities would emit the same quantity of emissions estimated for the Proposed Project and would not conflict with or obstruct implementation of an applicable air quality plan.

Impact Analysis without Mitigation

Therefore, prior to mitigation, there would be a **Potentially Significant Impact** to implementation of an applicable air quality plan with Proposed Project construction activities construction activities under Alternative 2 for potential impact AQ-1.

Impact Analysis with Mitigation

To reduce the potentially significant impact from fugitive dust emissions, Recommended Mitigation Measure AQ-1: Fugitive Dust PM10 Measures and Construction Equipment and Mitigation Measure GEO-1: Erosion and Sediment Control Plan would be implemented throughout construction activities. Recommended Mitigation Measure AQ-1 would minimize or avoid the emission of dust by watering the ground prior to disturbance and following disturbance, covering soil on transport vehicles, minimizing vehicle speeds on unpaved roads, and providing signage for the public to voice any complaints regarding dust emissions. Mitigation Measure GEO-1 requires the

development of site-specific erosion control measures and long-term reclamation measures for new construction project to minimize or avoid erosion and the subsequent potential emission of fugitive dust. Additional BMPs for fuel and equipment use to reduce potential emissions during construction activities are included in Recommended Mitigation Measure AQ-1. Therefore, there would be a **Less than Significant Impact** on air quality during construction with incorporation of Recommended Mitigation Measure AQ-1 and Mitigation Measure GEO-1.

On March 11, 2026, State Water Board staff provided Recommended Mitigation Measure AQ-1 to PG&E staff and requested that PG&E agree to implement the measure to ensure that Proposed Project impacts remain less than significant with mitigation. On March 17, 2026, PG&E responded that it does not plan to agree to mitigation measures to reduce Proposed Project impacts to a less than significant level without first reviewing the draft EIR upon its circulation. On March 19, 2026, PG&E provided comments and suggested edits to the mitigation measures shared on March 11, 2026. (personal email communication, J. Hartman and C. McCormick, March 19, 2026). Without commitment from PG&E, implementation of Recommended Mitigation Measure AQ-1 is uncertain.

Without implementation of Recommended Mitigation Measure AQ-1 or comparable action, Alternative 2's impacts on air quality from fugitive dust emissions during construction activities are Significant and Unavoidable. Therefore, there would be a **Significant and Unavoidable Impact** as a result of construction activities under Alternative 2 for potential impact AQ-1.

Operation

Under Alternative 2, there would be a reduction in flow fluctuations downstream of Kerckhoff Dam and more whitewater flow release days. Depending on the WY type, there would potentially be more whitewater boating days available, with a corresponding increase in mobile source use and associated emissions near and at the Kerckhoff Hydroelectric Project. While Alternative 2 would result in additional whitewater boating opportunities and could have a corresponding increase in mobile source activity, as discussed in Section 4.17 *Recreation*, overall recreational use within the Kerckhoff

Hydroelectric Project Area is lower due to its remote location, limited access, and the requirement for expert-level boating skills in certain reaches. Given these constraints, any incremental increase in visitation would be limited in scale, and associated emissions would remain minor relative to baseline conditions. Overall, the alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 2 would not have a significant impact on implementation of an air quality plan. Therefore, there would be a **Less than Significant Impact** as a result of operational activities from Alternative 2 for potential impact AQ-1.

Mitigation Measures

Recommended Mitigation Measure AQ-1: Fugitive Dust PM10 Measures and Construction Equipment

Mitigation Measure GEO-1: Erosion and Sediment Control Plan

Level of Significance

Significant and Unavoidable Impact

4.3.4.2 Potential Impacts Related to Cumulative Air Quality

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

4.3.4.2.1 Proposed Project

Construction and Operation

By its very nature, air pollution is largely a cumulative impact. The non-attainment status of regional pollutants is a result of past and present development. Future attainment of federal and state ambient air quality standards is a function of successful implementation of the Valley Air District's attainment plans. Consequently, the Valley Air District's application of thresholds of significance for criteria pollutants is relevant to the

determination of whether a project's individual emissions would have a significant impact on air quality (Valley Air District 2015).

The San Joaquin Valley is state-designated "non-attainment" for O_3 and particulate matter (PM_{10} and $PM_{2.5}$) and federal-designated "non-attainment" for O_3 and $PM_{2.5}$ according to the CAAQS and NAAQS, respectively. Both the construction and operation emissions for reactive organic gases and NO_x are well below the Valley Air District thresholds of significance; thus, negligible concentrations of O_3 would likely be produced from emissions during construction and operation of the Proposed Project. Similarly, the emissions of PM_{10} and $PM_{2.5}$ during construction and operation are estimated to be well below the thresholds of significance. The Proposed Project would thus not result in a cumulatively considerable net increase of any criteria pollutant for which the Kerckhoff Hydroelectric Project region is in non-attainment under an applicable federal or state ambient air quality standard.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under the Proposed Project for potential impact AQ-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.3.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination for construction and operation activities as described in Section 4.3.4.2.1. Alternative 1 would not change any construction activities included in the Proposed Project or require relocation of the Proposed Project. Under Alternative 1, construction activities would emit the same quantity of emissions estimated for the Proposed Project and would not result in an increase in any criteria pollutant for which the Kerckhoff Hydroelectric Project region is

in non-attainment. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 1 for potential impact AQ-2**.**

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.3.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination for construction and operation activities as described in Section 4.3.4.2.1. Alternative 2 would not change any construction activities or require relocation of the Proposed Project. Under Alternative 2, construction activities would emit the same quantity of emissions estimated for the Proposed Project and would not result in an increase in any criteria pollutant for which the Kerckhoff Hydroelectric Project region is in non-attainment. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 2 for potential impact AQ-2**.**

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.3.4.3 Potential Impacts Related to Sensitive Receptors

Impact AQ-3: Would the project expose sensitive receptors to substantial pollutant concentrations?

4.3.4.3.1 Proposed Project

Construction and Operation

The Proposed Project includes construction activities at the Kerckhoff Dam, K1 Powerhouse, gage location, and the Vista Day Use Area. Sensitive receptor locations near the Kerckhoff Dam include the Smalley Cove Recreation Area, which is approximately 1.7 miles from the dam; the Ya-Gub-Weh-Tuh and Wuh-k'io trailheads, the SJR trail, and the SJR Gorge Special Recreation Management Area are less than one mile from the K1 Powerhouse and approximately one to two miles from the proposed location of the Vista Day Use Area. The Proposed Project is not located within 15 miles of any city, town, or local political subdivision having a population of 5,000 or more people. The nearest residences along Powerhouse Road are all located greater than 500 feet from the existing FERC Project Boundary.

As shown in Table 4.3-5 and Table 4.3-6, the estimated construction and operation emissions are well below the thresholds of significance. Furthermore, the emissions would be dispersed over several construction periods and over multiple years. There may be additional emissions associated with recreation use; however, those emission levels would not be expected to be substantially higher or lower than current conditions. Any sensitive receptors visiting the Vista Day Use Area or the SJR in the Proposed Project Area would only be potentially affected by operational emissions for short durations because the Proposed Project would not result in any new, permitted operational sources of air emissions. Additionally, modification of the existing FERC Project Boundary under the Proposed Project would not appreciably affect operational emissions. Therefore, the Proposed Project would not expose sensitive receptors to substantial pollutant concentrations. Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact AQ-3**.**

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.3.4.4.3.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination for construction and operation activities as described in Section 4.3.4.4.3.1. Alternative 1 would not change any construction activities included in the Proposed Project. Under Alternative 1, construction activities would emit the same quantity of emissions estimated for the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 1 would not expose sensitive receptors to pollutants. In addition, Alternative 1 would not require relocation of the Proposed Project to a location closer to sensitive receptors. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact AQ-3**.**

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.3.4.4.3.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination for construction and operation activities as described in Section 4.3.4.4.3.1. Alternative 2 would not change any construction activities included in the Proposed Project. Under Alternative 2,

construction activities would emit the same quantity of emissions estimated for the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 2 would not expose sensitive receptors to pollutants. In addition, Alternative 2 does not require relocation of the Proposed Project to a location closer to sensitive receptors. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact AQ-3**.**

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.3.4.4 Potential Impacts Related to Other Emissions

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

4.3.4.4.1 Proposed Project

Construction and Operation

Construction of the Proposed Project would be short term and temporary and would not require a substantial number of workers on site at any given time. The Proposed Project is not located within 15 miles of any city, town, or local political subdivision having a population of 5,000 or more people; therefore, the Proposed Project would not create emissions that could affect a substantial number of people off site. The Proposed Project is not expected to result in a substantial increase in the number of visitors to the Proposed Project Area. There is no increase in permanent employees under the Proposed Project. Therefore, a substantial number of people would not be adversely affected by other emissions (such as those leading to odors) because of construction or operation of the Proposed Project.

Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact AQ-4**.**

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.3.4.4.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination for construction and operation activities as described in Section 4.3.4.4.1. Alternative 1 would not change any construction activities included in the Proposed Project. Under Alternative 1, construction activities would emit the same quantity of emissions estimated for the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 1 would not produce other emissions (such as those leading to odors) adversely affecting a substantial number of people. In addition, Alternative 1 would not require relocation of the Proposed Project to a location closer to sensitive receptors or closer to a more populated area. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact AQ-4**.**

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.3.4.4.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination for construction and operation activities as described in Section 4.3.4.4.1. Alternative 2 would not change any construction activities included in the Proposed Project. Under Alternative 2, construction activities would emit the same quantity of emissions estimated for the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 2 would not produce other emissions (such as those leading to odors) adversely affecting a substantial number of people. In addition, Alternative 2 would not require relocation of the Proposed Project to a location closer to sensitive receptors or closer to a more populated area. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact AQ-4**.**

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.3.5 Literature Cited

CARB (California Air Resources Board). 2024. *Table of Ambient Air Quality Standards*. Accessed: April 5, 2026. Retrieved from: https://ww2.arb.ca.gov/sites/default/files/2024-08/AAQS%20Table_ADA_FINAL_07222024.pdf.

_____. 2025a. *CARB Identified Toxic Air Contaminants*. Accessed: April 5, 2026. Retrieved from: https://ww2.arb.ca.gov/resources/documents/carb-identified-toxic-air-contaminants.

_____. 2025b. *In-Use Off-Road Diesel-Fueled Fleets Regulation*. Accessed: April 5, 2026. Retrieved from: https://ww2.arb.ca.gov/our-work/programs/use-road-diesel-fueled-fleets-regulation.

____. 2025c. *California Greenhouse Gas Emissions from 2000–2023: Trends of Emissions and Other Indicators (2025 Edition)*. Accessed: April 3, 2026. Retrieved from: https://ww2.arb.ca.gov/ghg-inventory-data.

CCR (California Code of Regulations). 2018. Regulation to Establish a Statewide Portable Equipment Registration Program. Accessed: April 5, 2026. Retrieved from: https://ww2.arb.ca.gov/sites/default/files/2020-03/PERP_Reg_12.5.18R.pdf.

Congressional Research Service. 2022. *Clean Air Act: A Summary of the Act and Its Major Requirements*. Accessed: April 5, 2026. Retrieved from: https://sgp.fas.org/crs/misc/RL30853.pdf.

FOCA (Swiss Federal Office of Civil Aviation). 2015. *Guidance on the Determination of Helicopter Emissions*. Edition 2, December.

Fresno County. 2024. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

Madera County. 2010. *Madera County General Plan Air Quality Element*. Accessed April 5, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/2846/636934376261100000.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas & Electric Company, San Francisco, CA, and C. McCormick, Environmental

Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff CEQA Mitigation Measures” on March 19, 2026.

PG&E (Pacific Gas and Electric Company). 2023. *Kerckhoff Hydroelectric Project (FERC Project No. 96) Updated Exhibit G FERC Docket Number: P-96-048*. September 29.

Port of Long Beach. 2023. *Air Emission Inventory – 2022*. September. Accessed: April 5, 2026. Retrieved from: https://polb.com/environment/air/#emissions-inventory.

USEPA (United States Environmental Protection Agency). 2025a. Ground-level Ozone Basics. Accessed: April 5, 2026, 2026. Retrieved from: https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics.

_____. 2025b. Ozone Designations and Classification Information. Accessed: April 3, 2026. Retrieved from: https://www.epa.gov/green-book/ozone-designation-and-classification-information.

_____. 2025c. NAAQS Designations Process. Accessed: April 5, 2026. Retrieved from: https://www.epa.gov/criteria-air-pollutants/naaqs-designations-process.

Valley Air District (San Joaquin Valley Air Pollution Control District). 2015. *Guidance for Assessing and Mitigating Air Quality Impacts*. Accessed: April 5, 2026. Retrieved from: https://www.valleyair.org/media/g4nl3p0g/gamaqi.pdf.

_____. 2025. *San Joaquin Valley Attainment Status*. Accessed: April 5, 2026. Retrieved from: https://www.valleyair.org/air-quality-information/ambient-air-quality-standards-valley-attainmnet-status/.

4.4 BIOLOGICAL RESOURCES – AQUATICS AND FISHERIES

This section describes existing conditions and analyzes potential impacts on aquatics and fisheries biological resources from implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). All analyses are based on review of existing resources, technical data, and applicable laws and regulations. Potential impacts on aquatics and fisheries biological resources from the Proposed Project and both Alternatives were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.4-1).

Table 4.4-1: CEQA Checklist for Biological Resources – Aquatics and Fisheries

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact BIO-1: 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 California Department of Fish and Wildlife (CDFW) or	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
United States Fish and Wildlife Service (USFWS)?			
Impact BIO-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS?	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated
Impact BIO-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Impact BIO-4: 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?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact BIO-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Impact BIO-6: Conflict with the provisions of an adopted Habitat Conservation Plan; Natural Community Conservation Plan; or other approved local, regional, or state habitat conservation plan?	No Impact	No Impact	No Impact

4.4.1 Environmental Setting

This section describes the existing aquatic environment in the existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project), including riparian and wetland resources and aquatic and fisheries resources. Implementation of the Proposed Project has the potential to affect riparian and wetland habitat throughout the Proposed Project

Area,[11] as well as fish communities and other aquatic life in the Project Bypass Reach (PBR) and Kerckhoff Reservoir.[12]

Information about terrestrial biological resources is included in Section 4.5 *Biological Resources – Terrestrial*.

4.4.1.1 Physical Project Setting

The existing Kerckhoff Hydroelectric Project is located in the foothills of the western slope of the Sierra Nevada on the San Joaquin River (SJR) in a sparsely populated area of Fresno and Madera counties, California.

The Kerckhoff Hydroelectric Project Area varies in elevation from approximately 500 to 1,000 feet above mean sea level (msl) and is in the San Joaquin Hydrologic Region of Central California and the upper SJR drainage basin, which is highly developed for hydroelectric generation, flood control, and irrigation storage. As described in Section 2 *Proposed Project Description*, the Kerckhoff Hydroelectric Project primarily consists of the Kerckhoff Reservoir formed by Kerckhoff Dam, Smalley Cove Campground, the Kerckhoff 1 (K1) and Kerckhoff 2 (K2) powerhouses, two tunnels that convey water from the reservoir to the powerhouses, and appurtenant facilities and access roads. Pacific Gas and Electric Company (PG&E or Applicant) owns and operates the Kerckhoff Hydroelectric Project, which has an authorized installed capacity of 162.72 megawatts.

The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by PG&E, and on public lands administered by the United States Forest Service,

[11] The Proposed Project Area is the area contained within the Proposed FERC Project Boundary, provided in Appendix A *Project Facilities and Maps* (Appendix A-3 *Maps*; Maps A3-2a through A3-2o).

[12] For purposes of this analysis, the PBR includes the San Joaquin River (SJR) from Kerckhoff Dam downstream to the Kerckhoff 2 (K2) Powerhouse. Kerckhoff Reservoir includes the waters upstream of the Kerckhoff Dam to the end of the normal maximum water surface elevation for the reservoir where the SJR transitions from riverine to lake habitat (Appendix A *Project Facilities and Maps:* Appendix A-3 *Maps*; Map A3-2a).

Sierra National Forest (USFS-SNF); BLM; and the United States Bureau of Reclamation (Reclamation) under BLM management.

4.4.1.2 Baseline Conditions Methodology

Literature Review

The existing conditions for the Proposed Project were developed from database queries and technical studies completed for PG&E's Federal Energy Regulatory Commission (FERC or Commission) relicensing efforts and recent database queries to identify special-status species and habitats. These databases include the California Department of Fish and Wildlife (CDFW) California Natural Diversity database (CNDDB) (CDFW 2025), California Wildlife Habitat Relationship (CWHR) System database, Version 9.0 (CDFW 2017a); data system for surface water quality in California (CEDEN 2017); Classification and Assessment with Landsat of Visible Ecological Groupings (CALVEG) vegetation data (USFS 2019), USFWS Information for Planning and Consultation (IPaC) tool and critical habitat data (USFWS 2025a), National Oceanic and Atmospheric Administration (NOAA) Fisheries Essential Fish Habitat Mapper (NOAA Fisheries 2023a), and NOAA Fisheries Endangered Species Act Critical Habitat Mapper (NOAA Fisheries 2023b). The technical studies included, but were not limited to, Biological Resource Technical Reports, fisheries studies, and internal PG&E resource studies. The PG&E resource studies are summarized in the *Baseline Studies* subsection (Section 4.4.1.2.3).

Database search results for 2025 are provided as Appendix E-1 *IPaC Resources List*.

Data sources for the development of the Proposed Project's existing conditions include the following:

- *An Instream Flow Needs Study Involving Smallmouth Bass (Micropterus dolomieu) in the San Joaquin River, California* (Lambert and Handley 1980)
- *Big Creek No. 4 Water Power Project (FERC Project No. 2017), Application for New Licensee for Major Project – Existing Dam, Volume 2, Exhibit E* (SCE 1997)

- *Biological Resource Technical Reports: Upper San Joaquin Basin Storage Investigation*; Draft Riverine Fish Habitat Technical Report (Reclamation 2012)
- *Biological Resource Technical Reports: Upper San Joaquin Basin Storage Investigation*; Draft Aquatic Biological Resources Technical Report (Reclamation 2008)
- *2016 Data Collection Report, Native Aquatic Species Management Plan* (SCE 2017)
- *2017 Data Collection Report, Native Aquatic Species Management Plan* (SCE 2018a)
- *Decline of the Native Fish Fauna of the Sierra Nevada Foothills, Central California* (Moyle and Nichols 1974)
- *Distribution, Ecology, and Status of the Fishes of the San Joaquin River Drainage, California* (Brown and Moyle 1993)
- *Draft Resource Management Plan/General Plan/Environmental Impact Statement/Environmental Impact Report for Millerton Lake* (URS 2008)
- *Final Environmental Impact Statement, Kerckhoff Project No. 96* (FERC 1979)
- *Fish Health and Diversity: Justifying Flows for a California Stream* (Moyle et al. 1998)
- *Fisheries and Stream Temperature Studies of the San Joaquin River Conducted in 1977, Kerckhoff Project FERC Project No. 96* (PG&E 1978)
- *Fisheries Studies at Millerton Lake, 1979–1982* (Ecological Analysts 1982)
- *Fisheries Studies at Millerton Lake, 1984, 1985* (NES 1986a)
- *Fisheries Studies at Millerton Lake, 1986* (NES 1986b)
- *Inland Fishes of California* (Moyle 2002)
- *Interactions between an Introduced Piscivore and a Native Piscivore in a California Stream* (Gard 2004)
- *Juvenile and Adult Hardhead Thermal Tolerances and Preferences: Temperature Preference, Critical Thermal Limits, Active and Resting Metabolism, and Blood-Oxygen Equilibria* (Thompson et al. 2012)
- *Lethal Temperatures in Ammocoetes of Four Species of Lampreys* (Potter and Beamish 1975)

- *List of Californian Macroinvertebrate Taxa and Standard Taxonomic Effort* (CDFG 2003)
- *Millerton Lake Spring 2013 General Fish Survey and Slot Limit Evaluation* (CDFW 2017b)
- Museum records within one mile of the Proposed Project from the University of California at Berkeley, Museum of Vertebrate Zoology and the California Academy of Sciences (California Academy of Sciences 2017; Museum of Vertebrate Zoology 2017)
- Observations on Nest Characteristics, Spawning Habitat, and Spawning Behavior of Pacific and Western Brook Lamprey in a Washington Stream (Stone 2006)
- *Ramp-down and Stranding Study in the Horseshoe Bend Reach below Dam 7* (SCE 2018b)
- *Revised Exhibit S, Fish and Wildlife, FERC Project No. 96. Kerckhoff Project* (PG&E 1984)
- *San Joaquin River Transport Time from Kerckhoff Powerhouse to the Proposed Kerckhoff 2 Powerhouse Site* (Landis and Lambert 1979)
- *Study of American Shad at Millerton Lake, 1987, 1988, 1989, and 1990* (NES 1988, 1989, 1990a, 1990b)
- *Technical and Scientific Support-Land and Environmental Management: Crane Valley Project Hardhead Pool Characterization* (PG&E 2011)
- *Temperature Criteria for Freshwater Fish: Protocol and Procedures* (Brungs and Jones 1977)
- *Temperature Requirements of Pacific Coastal Fishes* (Moyle and Knight 1984)
- *Upper Thermal Limits of Freshwater Mussels (Bivalvia, Unionidae) in Ramped Temperature Exposures* (Martin 2016)

Definitions

- FERC Project Boundary: the geographic boundary of facilities/lands covered by the FERC license
- Study Area: the footprint used for baseline studies and impact analysis (may include buffers)

Special-Status Aquatic Species

For the purposes of this document, a special-status aquatic species is defined as any aquatic species that is granted status by a federal, state, or local agency:

- Federally listed aquatic species granted status by the USFWS or NOAA Fisheries under the Endangered Species Act (ESA) as federal threatened (FT), federal endangered (FE), federal proposed threatened (FPT), federal proposed endangered (FPE), federal candidate (FC), or listed species proposed for delisting
- California-listed aquatic species granted status by the CDFW under the California Endangered Species Act (CESA) including state threatened (ST), state endangered (SE), state candidate threatened (CT), state candidate endangered (CE), California fully protected (CFP), and California species of special concern (SSC)
- BLM Sensitive (BLMS) species in the Bakersfield Field Office
- United States Forest Service (USFS) Sensitive (FSS) species in the USFS-SNF

Baseline Studies

In support of the Final License Application (FLA), PG&E completed field surveys for aquatics and fisheries biological resources in September 2018 and April through October 2019 (PG&E 2020a, 2023). These studies included the following:

- Channel Form and Fluvial Processes (Study GEO 1) (PG&E 2019a)
- Supplemental Channel Form and Fluvial Processes (Study GEO 1-S) (PG&E 2020b)
- Project-related Sediment Management in Kerckhoff Reservoir (Study GEO 2) (PG&E 2019b)
- Operations Simulation Model (Study HYD 1) (PG&E 2020c)
- Riparian and Wetland Resources (Study BOT 2) (PG&E 2020d)
- Hydrology With and Without the Project (Study HYD 2) (PG&E 2020e)
- Plant Communities, Special-status Plants, and Invasive Weeds (Study BOT 1) (PG&E 2020f)
- Rare Aquatic Species (Study AQ 6) (PG&E 2020g)
- Aquatic Habitat Mapping (Study AQ 1) (PG&E 2020h)
- Mussels and Aquatic Molluscs (Study AQ 3) (PG&E 2020i)

- Western Pond Turtles (Study AQ 5) (PG&E 2020j)
- Water Temperature in Kerckhoff Reservoir and PBR (Study WQ 1) (PG&E 2020k)
- Water Quality Sampling in PBR and Kerckhoff Reservoir (Study WQ 2) (PG&E 2020l)
- Fish Populations (Study AQ 2) (PG&E 2020m)
- Benthic Macroinvertebrates (Study AQ 7) (PG&E 2020n)
- Entrainment (Study AQ 4) (PG&E 2020o)
- Technical Memorandum, Kerckhoff Hydroelectric Project Stage-Discharge Investigation (PG&E 2021)

Detailed changes to the existing FERC Project Boundary and associated maps are included in Appendix A-3 *Maps*.

Study Boundaries

The study areas, described below, for the Proposed Project were defined by PG&E in consultation with relicensing participants to include locations within the existing FERC Project Boundary with characteristics representative of the various resource and wildlife habitats identified for analysis. These surveys predated the proposed protection, mitigation, and enhancement (PM&E) measures of the Vista Day Use Area and new upstream gaging in Kerckhoff Reservoir near Big Creek 4. Therefore, the study areas did not include those portions of the Proposed Project.

Study Areas

***Riparian and Wetland Resources Study Area*:** The Riparian and Wetland Resources Study Area includes the following:

- The PBR, which includes the SJR between Kerckhoff Dam and the K2 Powerhouse discharge structure, approximately 9.8 miles downstream from the dam
- A 50-foot buffer around all areas within the existing FERC Project Boundary and adjacent to Kerckhoff Hydroelectric Project facilities
- A 50-foot buffer on existing hydroelectric facility roads and gated roads shared with the BLM and USFS (i.e., 25 feet on either side from the road edge)

- A 10-foot buffer on existing hydroelectric facility trails (i.e., 5 feet on either side of the trail edge)

***Aquatic Resources Study Area*:** The Aquatic Resources Study Area includes Kerckhoff Reservoir and the PBR.

Riparian and Wetland Communities

As detailed in the Riparian and Wetland Resources Technical Study Report for the Kerckhoff Hydroelectric Project, riparian and wetland vegetation within the Riparian and Wetland Resources Study Area was mapped at a landscape level using aerial photographs and low-altitude helicopter survey (conducted at an altitude of several hundred feet above ground elevation). The helicopter survey was supplemented with ground-truthing conducted as part of the Plant Communities, Special-Status Plants, and Invasive Weeds Technical Study (PG&E 2022).

Aquatic Resources

As detailed in the Aquatic Habitat Mapping Technical Study Report, initial stream habitat classification was based on a combination low-level helicopter surveys, high-resolution digital orthophotography, LiDAR, aerial observations, and bathymetry. These data were collected primarily for the Channel Form and Fluvial Processes and Project-Related Sediment Management Practices in Kerckhoff Reservoir Technical Studies. Habitat characterization was subsequently verified during ground-truth surveys (PG&E 2022). Riparian vegetation along the shoreline of Kerckhoff Reservoir was characterized during the Riparian and Wetland Resources and Plant Communities, Special-Status Plants, and Invasive Weeds Technical Studies. Limnological conditions, including physical properties and water temperatures used to characterize aquatic habitat, were also provided by the Water Temperature and Water Quality Sampling Technical Studies (PG&E 2022).

4.4.1.3 Riparian and Wetland Resources

Riparian and Wetland Communities

Riparian and wetland communities are shown on Appendix E-2 *Figures* (Figure E2-1 through Figure E2-2) and summarized in Table 4.4-2. The characteristics of these communities, including sub-association, density, and distribution, are further detailed in Appendix E-2 *Figures* (Figure E2-3 through Figure E2-5). In addition, 39 small-scale habitat features (e.g., springs/seeps, small streams, other unique plant communities) were recorded during the field surveys. The majority (25 of 39) of these features were classified as intermittent drainages. Seven perennial drainages and three ephemeral swales/depressions were also recorded. Of the 39 features, 33 were naturally occurring drainages, and 26 were conveyed through a culvert or bridge. Many of the features (21 out of 39) supported wetland vegetation or small seeps. In Appendix E-2 *Figures*, Figure E2-6 through Figure E2-20 show the location of each of these features.

Table 4.4-2: Summary of Riparian and Wetland Communities within the Riparian and Wetland Resources Study Area

Land Cover Classifications	Acres
Perennial Lake or Pond	135.5
Riparian Mixed Hardwood	24.9
Wet Meadows	11.4
River/Stream	10.3

Source: USFS 2019

Riparian and Wetland Vegetation around Kerckhoff Reservoir

Riparian communities are primarily established along the shoreline and islands along the northern one-third, upstream portion of Kerckhoff Reservoir. The riparian vegetation consists of wide corridors of white alder (*Alnus rhombifolia*) and Oregon ash (*Fraxinus latifolia*) trees with co-dominant willow shrubs (*Salix* spp.) or Fremont cottonwood (*Populus fremontii*) along the shoreline in some areas (Appendix E-2 *Figures*, Figure E2-3 and Figure E2-4). Because of the steep shoreline, riparian vegetation is sparse

along roughly 70 percent of the shoreline in the southern, downstream portion of the reservoir, except in a few locations near the dam and intake structures. Approximately 95.4 percent of the riparian communities established along the reservoir shoreline were dominated by mature trees and shrubs and lacked younger age classes (PG&E 2020a).

Water surface elevations also influence riparian and wetland distribution around the Kerckhoff Reservoir. Kerckhoff Reservoir water surface elevations normal operating range is from 980.0 and 984.5 feet msl throughout the year during the period of record (water years [WYs] 1984 to 2017; however, see Section 4.11 *Hydrology and Water Quality* for a review of WYs 2018 to 2023), except during reservoir drawdowns for maintenance in October or November. Kerckhoff Hydroelectric Project operation results in some changes in water surface elevations, primarily in the upstream portion of the reservoir near Smalley Cove and Fish Creek and the margins of the bars. In Appendix E-2 *Figures*, Figure E2-5 shows the riparian and wetland vegetation in relation to the extent of inundation at the highest monthly average, monthly average, and lowest monthly average. White alder, willows, and Oregon ash are established in the areas that experience the greatest change in inundation extent in relation to reservoir water surface elevations, indicating that these species are well adapted to surviving in dynamic flow environments (PG&E 2022).

Riparian and Wetland Resources Associated with the Project Bypass Reach

Riparian vegetation is sparse and channel margins are unvegetated along the majority of the PBR (71 percent; 13.57 miles). A patchwork of discontinuous and continuous narrow riparian corridor comprises the remaining 29 percent (5.40 miles) of the PBR, occurring between river miles (RM) 292.4 and 286.9 where depositional features are present. A few patches of wide riparian corridor are also present along this segment of the PBR. Riparian vegetation generally occurs at or near tributary confluences where smaller substrate sizes are deposited on the lateral bars. Colluvial material collected along the base of the hillslopes also supports pockets of riparian vegetation along the PBR. Little riparian vegetation occurs in the bedrock-controlled segment downstream of RM 286.9. The distribution of the riparian vegetation along the PBR is shown in Appendix E-2 *Figures*, Figure E2-3 and Figure E2-4.

The riparian communities along the PBR were primarily composed of native species and consisted of a mix of young and mature white alder trees and willow shrubs, including arroyo willow (*Salix lasiolepis*) and red willow (*Salix laevigata*), with a few scattered Fremont cottonwood and Oregon ash trees. High flows during wetter years scour vegetation and move sediment throughout the PBR, limiting the development of old riparian forests along the river margins. The combination of young and mature trees and shrubs indicates that conditions have been suitable for establishment and maintenance of riparian vegetation in recent years under baseline Kerckhoff Hydroelectric Project operations (PG&E 2022).

Aquatic Habitat Resources of Kerckhoff Reservoir and the Project Bypass Reach

The following sections summarize existing aquatic habitat resource conditions under baseline operations, which is Kerckhoff Hydroelectric Project operations and physical conditions as of May 2023 as described in the Aquatic Habitat Mapping Technical Study (PG&E 2022).

Bathymetry

Shallow-water habitats are important for juvenile fish and other aquatic life. The amount of such habitat is limited in the reservoir, especially in its downstream portions. Kerckhoff Reservoir is relatively steep-sided, reflecting its original topography as an entrenched river.

Habitat areas for nearshore species and availability of shallow habitats were calculated for depths of 3 feet or less, 6 feet or less, 9 feet or less, and 12 feet or less for the normal operating range of reservoir elevations (984.5 feet msl to 980.0 feet msl). In Appendix E-2 *Figures*, Figure E-21 through Figure E-24 present these shallow-water habitat intervals from the normal maximum water surface elevation habitat. In these maps, the reservoir has been divided into five segments along the longitude of the reservoir: the upper reservoir, middle reservoir, lower reservoir, dam area, and Smalley Cove. At 984.5 feet msl, the upper and middle portions of the reservoir are relatively shallow and contain large areas of shallow-water habitat compared to the remainder of the reservoir, with a small shallow area at Smalley Cove and relatively little shallow-

water habitat in the lower reservoir and in the dam area (Table 4.4-3; PG&E 2022). During baseline reservoir operation, water surface levels can be lowered from the normal maximum water surface elevation of 984.5 feet msl to 980.0 feet msl, resulting in declines in available shallow-water habitat, as indicated in Table 4.4-3 (PG&E 2022).

Table 4.4-3: Surface Area Acreage of Shallow-Water Habitat in Kerckhoff Reservoir at Maximum Operating Level (984.5 feet msl) and Minimum Operating Level (980 feet msl)

Elevation (feet msl)	Acreage of Shallow-Water Habitat (Open Water <12 feet in depth)	
	984.50	980.00
Upper reservoir	65.86	48.89
Middle reservoir	49.45	38.86
Lower reservoir	20.75	19.79
Dam area	6.69	6.41
Smalley Cove	5.88	2.03

Sediment

Sediment samples were taken at 15 locations distributed throughout the Kerckhoff Reservoir by PG&E in 2019 (Study GEO 2; PG&E 2019b). Substrate along the longitudinal axis of the reservoir was dominated by medium and fine sands. Steeper shoreline areas of the reservoir include exposed bedrock at the shoreline. Bedrock outcrops and some boulders were visible in some locations in the upstream area of the reservoir, where the slopes were less steep (PG&E 2022).

Aquatic Vegetation

Riparian vegetation along the shoreline of Kerckhoff Reservoir is characterized in Section 4.4.1.3. Submerged aquatic vegetation (SAV) was found to be present in Kerckhoff Reservoir. The densest area of SAV was located in Smalley Cove and

covered a substantial portion of the cove, with the northwestern portion of Smalley Cove classified as a wet meadow near the confluence of Fish Creek. The SAV sampled from Smalley Cove included several species of pond weeds (*Potamogeton* sp.), parrot's feather (*Myriophyllum aquaticum*), and filamentous algae. Smaller patches of SAV were also identified in the nearshore, shallow water of the upper reservoir and in few shallow nearshore locations in the lower reservoir (PG&E 2022).

Cover and Mesohabitats

The primary cover for fish and invertebrates available in the reservoir is deep water. Riparian trees and hardwoods provide limited nearshore cover along the periphery of the reservoir. In some instances, shrubs provide local cover, as do infrequently encountered snags or pieces of large wood. The SAV generally provides patchy cover in limited shallow areas found primarily in the upper and middle reservoir segments. However, in Smalley Cove where SAV is plentiful, this vegetation appears to be used by several fish species, including largemouth bass (*Micropterus salmoides*) (PG&E 2022).

Mesohabitats represent the commonly identified local conditions that aquatic organisms use for shelter, feeding, spawning, rearing, or other activities. At a general level of characterization, these include pools, runs, and riffles. Aquatic mesohabitat types in the PBR were identified using classification approaches (the methods of Hawkins et al. 1993 and McCain et al. 1990) for the Sierra Nevada. The PBR was characterized as 77.2 percent slow-water habitat and 22.8 percent fast-water habitat. Slow-water habitats mainly consisted of scour pools, and fast-water habitats included riffles, cascades, and rapids. Boulder and bedrock were the dominant substrates in slow-water and fast-water habitats.

Hydrology and Water Quality

A detailed review of baseline hydrology and water quality for the Kerckhoff Hydroelectric Project is provided in Section 4.11 *Hydrology and Water Quality*. The Kerckhoff Hydroelectric Project currently provides minimum instream flows (MIFs) to the SJR to protect American shad (*Alosa sapidissima*) and flows to maintain water temperatures for the protection of smallmouth bass (*Micropterus dolomieu*). More specifically, the

Kerckhoff Hydroelectric Project provides a minimum flow of 25 cfs downstream during normal years and a minimum flow of 15 cfs during dry years, with additional releases as determined necessary in consultation with the CDFW to (1) maintain stream temperatures at or below 27 degrees Celsius (°C) upstream of K2 Powerhouse, and (2) flush sediments that may accumulate in the streambed below Kerckhoff Dam.

Based on an agreement between the CDFW and PG&E,[13] up to a total of 50 cubic feet per second (cfs) may be released downstream of Kerckhoff Dam, to hold stream temperatures at or below 80.6 degrees Fahrenheit (°F) (27 degrees Celsius [°C]) between Kerckhoff Dam and the K2 Powerhouse. The additional releases would be made when the water temperature exceeds 80.6°F (27°C) for a minimum of four hours per day for five consecutive days.

American shad spawning flow releases are provided through either the K1 Powerhouse or the K2 Powerhouse from May 15 through June 30, with the requirement based on Millerton Lake water surface elevation. These release requirements are summarized as follows:

- When Millerton Lake water surface elevation is greater than or equal to 545 feet msl:
  - 1,200 cfs from the K2 Powerhouse from 10 p.m. to 2 a.m.
  - 775 cfs from the K2 Powerhouse or 400 cfs from the K1 Powerhouse during the remaining hours
- When Millerton Lake water surface elevation is less than 545 feet msl:
  - 775 cfs from the K2 Powerhouse from 10 p.m. to 2 a.m.

[13] The 1980 Fishery Agreement between the Applicant and CDFW (formerly CDFG) required four years of preoperational studies of striped bass (*Morone saxatilis*) and American shad (*Alosa sapidissima*) to identify the requirements that trigger spawning and the frequency, duration, and location of spawning. Additionally, the 1980 Fishery Agreement included instream flow release and water temperature requirements.

- 400 cfs from the K2 or K1 Powerhouse during the remaining hours

Historically, American shad spawning flows were released from the K1 Powerhouse or the K2 Powerhouse; however, in recent years, the K1 Powerhouse has not been operated, so American shad spawning flows are released from the K2 Powerhouse. In addition, the current license requires PG&E to operate the Kerckhoff Hydroelectric Project facility so that peak flows are not exceeded during flood periods. More specifically, "the [Applicant] shall operate the project during flood periods in a manner that will not cause peak river flows below Kerckhoff Dam and powerhouse to exceed the peak flows that would have occurred in the absence of the project (Appendix C *License Articles and Orders*: Table C-1)."

Water Temperature

Water temperatures can affect the suitability of habitat for fish and other aquatic species. The magnitude, duration, and spatial distribution of water temperatures vary with season, meteorology, elevation, and distance downstream from dams and reservoirs. Differences in water temperature may affect the distribution of fish and aquatic life along the SJR.

As described above in the *Hydrology and Water Quality* subsection, summer water temperatures in the PBR are managed by releases from the reservoir to support smallmouth bass under the 1980 Fishery Agreement with the CDFW. That agreement requires maintenance of stream temperatures at or below 27°C. Baseline water temperature monitoring data at Gage J-7 near the K1 Powerhouse indicate that weekly average water temperatures did not exceed 27°C, and rarely exceeded 26°C during baseline operations (PG&E 2022).

The water temperature regime in the reservoir is largely driven by operations. Due to the relatively small storage capacity of Kerckhoff Reservoir in conjunction with the relatively higher capacities of the K1 and K2 powerhouses, the residence time for water in the reservoir is short, resulting in substantial vertical mixing and a lack of stratification in the water column (PG&E 2020a). Water column temperature profiling in 2019 at three locations in the reservoir showed that temperatures varied little across depth profiles

and increased through the summer, with mean temperatures at all sites and depths (0 to 15 meters, or 0 to 49.2 feet) between 17 and 18°C at their warmest in September. Similar trends in water temperature were observed during studies by PG&E in 1976 and 1977 (PG&E 2020a). These conditions fall well within the range of suitable temperatures for the fish community present in Kerckhoff Reservoir.

4.4.1.4 Aquatic Species and Populations

Fish

The distribution and status of fish species reported in the Proposed Project Area are provided in Table 4.4-4, with 10 species of fish detected during PG&E's 2019 sampling within Proposed Project waterbodies, which include Hardhead, Sacramento pikeminnow (*Ptychocheilus grandis*), Sacramento sucker (*Catostomus occidentalis*), three-spined stickleback (*Gasterosteus aculeatus*), sculpin (*Cottus* sp.), largemouth bass (*Micropterus salmoides*), and spotted bass (*Micropterus punctulatus*) in Kerckhoff Reservoir and Hardhead, Sacramento pikeminnow, Sacramento sucker, prickly sculpin (*Cottus asper*), smallmouth bass, spotted bass, green sunfish (*Lepomis cyanellus*), and western mosquitofish (*Gambusia affinis*) in the PBR. Two additional species have been documented in the Proposed Project waterbodies by CDFW: American shad occur seasonally near the K2 Tailrace, and a Kern brook lamprey (*Lampetra hubbsi*) ammocoete was collected upstream of the K2 Tailrace (PG&E 2020a).

One native species that is absent from Proposed Project waters is rainbow trout (*Oncorhynchus mykiss*). Rainbow trout are not present in Kerckhoff Reservoir or the PBR, based on data PG&E have compiled and collected. No rainbow trout were collected during the 2019 studies in the PBR (Study AQ 2; PG&E 2020m), and none were observed during studies conducted in 1977 (PG&E 1978). This suggests that rainbow trout have been absent for the past 40 years. Smallmouth bass, which are abundant in the PBR, both predate on and compete with rainbow trout. The dominance of pool habitats in the PBR with high clarity create favorable conditions for the already established smallmouth bass. Smallmouth bass are sight predators and would prey on

both native minnows and trout if present. In addition, physical conditions in the PBR are not favorable to the presence of rainbow trout.[14]

Two CDFW species of special concern and USFS sensitive fish species occur within the existing FERC Project Boundary. Hardhead are present in Kerckhoff Reservoir, tributaries to Kerckhoff Reservoir, the SJR upstream of Kerckhoff Reservoir, and the PBR. Kern brook lamprey ammocoetes[15] have been documented upstream of the K2 Tailrace in the PBR.

Hardhead are primarily found in relatively undisturbed larger streams in low to mid-elevations and mid-elevation reservoirs associated with hydroelectric generation. They prefer clear and deep pools and runs with mixed boulder, gravel, and sand substrate and occupy areas with low velocities (0.7 to 1.3 feet per second). They typically reside in streams with summer temperatures that exceed 20°C. Adult hardhead may avoid water temperatures over 26°C but will tolerate water temperatures of 29.7°C or warmer,

[14] Physical habitat conditions in the PBR consist primarily of pool habitats with warm summer conditions, which are much more suitable for smallmouth bass and other centrarchids than rainbow trout. In rivers, rainbow trout are generally associated with areas of swift water, such as pocket water and riffles that deliver drifting insects for feeding. The trout may use boulders or other large objects for velocity cover when not actively feeding. Pocket water habitats and other habitats with suitable velocities are sparse in the PBR, which is composed of 77 percent pools. Trout also require gravel to build redds (nests) in areas of sufficient flow velocities for spawning. Deposits of gravel in riffles or shallow runs are uncommon in the PBR, as are areas that would have suitable depths and velocities for spawning. The combination of suitable depths, velocities, and substrate for rainbow trout spawning is rare. While water temperatures immediately downstream of Kerckhoff Dam are usually suitable for trout throughout the summer (Section 4.11), no trout were found there in 1977 or during more recent surveys (Section 4.4.1.4). In the lower portion of the PBR, water temperatures are not suitable for rainbow trout for much of the summer.

[15] An ammocoete is the larval stage of lampreys.

if acclimated. The MWAT was determined to be 27°C for juveniles and 25.2°C for adults. Hardhead may spawn from mid-March through August, but peak spawning upstream of the Proposed Project in the Horseshoe Bend Reach of the SJR is variable and can occur as late as July (PG&E 2017a). Fry and young-of-the-year (YOY) fish use the shallowest habitat near stream margins and use deeper water as they age (PG&E 2022).

Kern brook lamprey is endemic to the east side of the San Joaquin Valley, and they principally inhabit silty backwaters of rivers in the Sierra Nevada foothills ranging from elevations of 98 to 1,073 feet msl. Ammocoetes (larvae) are usually found in shallow pools and along the edges of runs where flows are slight; they favor substrates with a mixture of sand and mud at depths of 12 and 43 inches. Kern brook lamprey undergo metamorphosis in the fall and spawn in the spring, dying after spawning. Temperature tolerances for this species are unknown, but spawning temperatures for the related western brook lamprey (*L. richardsoni*) are between 7.7 and 20°C and 9.4 and 16°C in Cedar Creek, Washington (PG&E 2022).

Table 4.4-4: Fish Species Occurring in the Project Bypass Reach or Kerckhoff Reservoir

Common Name (*Scientific Name*)	**Status**	**Habitat Associations**	**Temporal Distribution**	**Physical Distribution**
Hardhead (*Mylopharodon conocephalus*)	Native, FSS/SSC	**Known to occur in PBR and Kerckhoff Reservoir**. Primarily found in relatively undisturbed larger streams in low to mid-elevations and mid-elevation reservoirs associated with hydroelectric generation (Moyle 2002). Prefer clear and deep pools and runs with mixed boulder, gravel, and sand substrate and occupy areas with low velocities (0.7 to 1.3 feet/second). They typically reside in streams with summer temperatures that exceed 20°C (Moyle 2002). Adult hardhead may avoid water temperatures over 26°C but will tolerate water temperatures of 29.7°C or warmer, if acclimated. MWAT was determined to be 27.0°C for juveniles and 25.2°C for adults (Thompson et al. 2012). Hardhead may spawn from mid-March through August, but peak spawning upstream of the Proposed Project in the Horseshoe Bend Reach of the SJR is variable and can	Year-long	Millerton Lake, PBR, Kerckhoff Reservoir, tributaries to Kerckhoff Reservoir, and SJR upstream of Kerckhoff Reservoir

Common Name (*Scientific Name*)	**Status**	**Habitat Associations**	**Temporal Distribution**	**Physical Distribution**
		occur as late as July (PG&E 2017a). Fry and YOY fish use the shallowest habitat near stream margins and use deeper water as they age.		
Sacramento pikeminnow (*Ptychocheilus grandis*)	Native	**Known to occur in PBR and Kerckhoff Reservoir**. Inhabit clear streams at low to mid-elevations with other native fish, especially Sacramento sucker. Generally live in waters with summer temperatures between 18 and 26°C. However, in a well-oxygenated environment, Sacramento pikeminnow could survive water temperatures to 35°C (Cech et al. 1990). Primarily spawn in March and April but may spawn in May or later depending on location and conditions. Fry and juveniles occupy shallow, low-velocity areas and will occupy deeper habitats as they age. Adults primarily occupy deep pool habitat and are considered top predators of these habitats.	Year-long	Millerton Lake, PBR, Kerckhoff Reservoir, tributaries to Kerckhoff Reservoir, and SJR upstream of Kerckhoff Reservoir

Common Name (*Scientific Name*)	**Status**	**Habitat Associations**	**Temporal Distribution**	**Physical Distribution**
Sacramento sucker (*Catostomus occidentalis*)	Native	**Known to occur in PBR and Kerckhoff Reservoir**. Occupy a wide variety of habitats, including clear, cool streams to warm reservoirs. Preferred temperatures may be from 20 to 25°C for optimal growth and were found to inhabit temperatures of 26°C and 28°C in field studies (Cech et al. 1990). Species spawns primarily in March and April but may spawn as early as mid-February and as late as mid-June. Fry and YOY fish use the shallowest habitat near stream margins and use deeper water as they age.	Year-long	Millerton Lake, PBR, Kerckhoff Reservoir, tributaries to Kerckhoff Reservoir, and SJR upstream of Kerckhoff Reservoir
Three-spined stickleback (*Gasterosteus aculeatus*)	Native	**Known to occur in Kerckhoff Reservoir**. Widely distributed and largely anadromous in coastal watersheds but have established non-anadromous populations inland (Moyle 2002). They inhabit clear, shallow, low-velocity areas with emergent vegetation with finer substrates. Three-spined stickleback eat small organisms off the substrate or within emergent vegetation. They spawn primarily from May through	Year-long	Kerckhoff Reservoir

Common Name (*Scientific Name*)	**Status**	**Habitat Associations**	**Temporal Distribution**	**Physical Distribution**
		July depending on locale but may spawn as early as April (Moyle 2002).		
Prickly sculpin (*Cottus asper*)	Native	**Known to occur in PBR and Kerckhoff Reservoir**. Widely distributed in coastal and Central Valley streams and reservoirs throughout California (Moyle 2002). They are tolerant of a wide variety of salinities, temperatures, turbidities, and other water quality conditions. In the Sierra Nevada foothills, species inhabits cool and clear streams with mixed rubble to gravel substrate. They hide under substrate during the day and forage along the bottom at night feeding primarily on BMI. Species may spawn from mid-February to mid-July but typically spawn from March to June (Moyle 2002).	Year-long	Millerton Lake, PBR, Kerckhoff Reservoir, tributaries to Kerckhoff Reservoir, and SJR upstream of Kerckhoff Reservoir
Largemouth bass	Introduced	**Known to occur in Kerckhoff Reservoir**. Inhabit large reservoirs, ponds, and backwaters in large rivers (Moyle 2002). This is a hardy species that can	Year-long	Millerton Lake, Kerckhoff Reservoir

Common Name (*Scientific Name*)	**Status**	**Habitat Associations**	**Temporal Distribution**	**Physical Distribution**
(*Micropterus salmoides*)		withstand water temperatures as warm as 37°C and dissolved oxygen levels as low as 1 milligram/liter. Summer temperature preferences for juvenile and adult largemouth bass range from 24 to 34°C (Nevada Department of Wildlife 2016a). Largemouth bass typically spawn for the first time at 2 or 3 years old. Spawning may commence as early as March at approximately 15 to 16°C and extend through June to about 24°C. Juveniles will school in shallow, vegetated areas and feed on zooplankton and small invertebrates.		
Spotted bass (*Micropterus punctulatus*)	Introduced	**Known to occur in PBR and Kerckhoff Reservoir**. In streams, spotted bass are pool dwellers that prefer clear, low-gradient sections of rivers and avoid riffles and backwater areas with aquatic plants (Moyle 2002). Summer temperature preferences for juvenile and adult spotted bass range from 28 to 30°C (Nevada Department of Wildlife 2016b). YOY eat zooplankton	Year-long	Millerton Lake, PBR, Kerckhoff Reservoir, tributaries to Kerckhoff Reservoir, and SJR

Common Name (*Scientific Name*)	**Status**	**Habitat Associations**	**Temporal Distribution**	**Physical Distribution**
		and insects and switch to larger prey as they grow, which includes larger insects, crustaceans, and smaller fish. Adults feed primarily on crayfish and secondarily on other fish, including other spotted bass. Spotted bass spawn primarily from early May to early July but may spawn as early as April and as late as early August (Moyle 2002).		upstream of Kerckhoff Reservoir
Smallmouth bass (*Micropterus dolomieu*)	Introduced	**Known to occur in PBR**. Widely distributed in larger Central Valley streams and reservoirs (Moyle 2002). Species prefers well-oxygenated, clear lakes and streams with moderate gradients, as well as rocky bottomed streams with a mix of pool, riffle, and run habitats where they can use rocky shelves for cover. Summer temperature preferences for juvenile and adult smallmouth bass range from 18.0 to 29.5°C (Nevada Department of Wildlife 2016c). MWAT for good smallmouth bass growth has been identified as 29°C (Brungs and Jones 1977). YOY feed primarily on	Year-long	Millerton Lake, PBR

Common Name (*Scientific Name*)	**Status**	**Habitat Associations**	**Temporal Distribution**	**Physical Distribution**
		insects until they reach 39 to 59 inches, and they transition to crustaceans and smaller fish. Adults are frequently cannibalistic and consume a wide variety of prey including fish, crayfish, amphibians, and small mammals. Smallmouth bass spawn primarily in May and June but may spawn as early as April and as late as early July (Moyle 2002).		
Green sunfish (*Lepomis cyanellus*)	Introduced	**Known to occur in PBR**. A warm-water species that inhabit lakes, ponds, and streams. In lakes, they inhabit shallow, weedy areas that exclude larger fish or less tolerant species (Moyle 2002). Green sunfish frequently shoal in shallow water as YOY. They are a small, slow-growing species that typically reach maturity at the beginning of their third year (Moyle 2002). As adults, they are an aggressive, territorial predator. Peak spawning for green sunfish occurs in May and June but may extend into early August.	Year-long	Millerton Lake, PBR, and SJR upstream of Kerckhoff Reservoir

Common Name (*Scientific Name*)	**Status**	**Habitat Associations**	**Temporal Distribution**	**Physical Distribution**
Western mosquitofish (*Gambusia affinis*)	Introduced	**Known to occur in PBR**. A small (less than 2.4 inches) species that is widely distributed throughout California for mosquito abatement (Moyle 2002). They tolerate a wide range of environmental conditions, which includes temperature, oxygen, turbidity, and salinity. Western mosquitofish can persist in temperatures from 10 to 35°C, but optimal growth occurs at temperatures between 25°C and 30°C. This species prefers shallow, often stagnant, waters devoid of predators. They are opportunistic diurnal omnivores that exhibit rapid growth rates and explosive breeding when prey is abundant. Western mosquitofish may breed from late March into early December (Moyle 2002).	Year-long	Millerton Lake, PBR
American shad (*Alosa sapidissima*)	Introduced	**Known to occur in PBR**. A large, self-sustaining population is established in Millerton Lake (PG&E 1978; FERC 1979) and is the only known self-maintaining landlocked population. American shad	Year-long	Millerton Lake, PBR

Common Name (*Scientific Name*)	**Status**	**Habitat Associations**	**Temporal Distribution**	**Physical Distribution**
		reach sexual maturity in Millerton Lake at 3 to 4 years of age (NES 1986a). Spawning begins in May and generally peaks from mid-June through mid-July when temperatures are between 11.1 and 17.2°C (Moyle 2002). Species spawns primarily at night, between the hours of 9 p.m. and 7 a.m., with peak activity between 11 p.m. and 4 p.m. near the surface over deep shoreline eddies (NES 1986a). The eggs are slightly heavier than fresh water, so flow velocities of about 1 to 2 feet per second are required to keep the eggs suspended as they are transported downstream. Dissolved oxygen levels of at least 5 milligrams/liter are required for egg survival. The eggs hatch in approximately 8 to 12 days at 11.1 to 15°C, 6 to 8 days at 17.2°C, and 3 days at 23.9°C (Moyle 2002).		
Threadfin shad (*Dorosoma petenense*)	Introduced	**Known to occur in PBR**. Threadfin shad generally occupy the open waters of lakes, and best growth and survival occur in waters in which summer water	Year-long	Millerton Lake, PBR

Common Name (*Scientific Name*)	**Status**	**Habitat Associations**	**Temporal Distribution**	**Physical Distribution**
		temperatures exceed 22 to 24°C and that do not become colder than 7 to 9°C. Threadfin shad cannot withstand water temperatures cooler than 4°C (Moyle 2002). They spawn between April and August with peak spawning occurring in June and July.		
Kern brook lamprey (*Lampetra hubbsi*)	Native, FSS/SSC	**Known to occur in PBR**. Species is endemic to the east side of the San Joaquin Valley (Moyle 2002), and they principally inhabit silty backwaters of rivers in the Sierra Nevada foothills ranging from elevations of 98 to 1,073 feet msl. Ammocoetes (larvae) are usually found in shallow pools and along the edges of runs where flows are slight; they favor substrates with a mixture of sand and mud at depths of 12 and 43 inches. Kern brook lamprey undergo metamorphosis in the fall and spawn in the spring, dying after spawning (Moyle 2002). Temperature tolerances for this species are unknown, but spawning temperatures for the related western brook lamprey (*L. richardsoni*) are between	Year-long	Millerton Lake, PBR

Common Name (*Scientific Name*)	**Status**	**Habitat Associations**	**Temporal Distribution**	**Physical Distribution**
		7.7 and 20°C and 9.4 and 16°C in Cedar Creek, Washington (Stone et al. 2002; Stone 2006).		

°C = degrees Celsius; BMI = benthic macroinvertebrate; MWAT = maximum weekly average temperature; YOY = young-of-the-year

USFS Status:

FSS = U.S. Forest Service sensitive

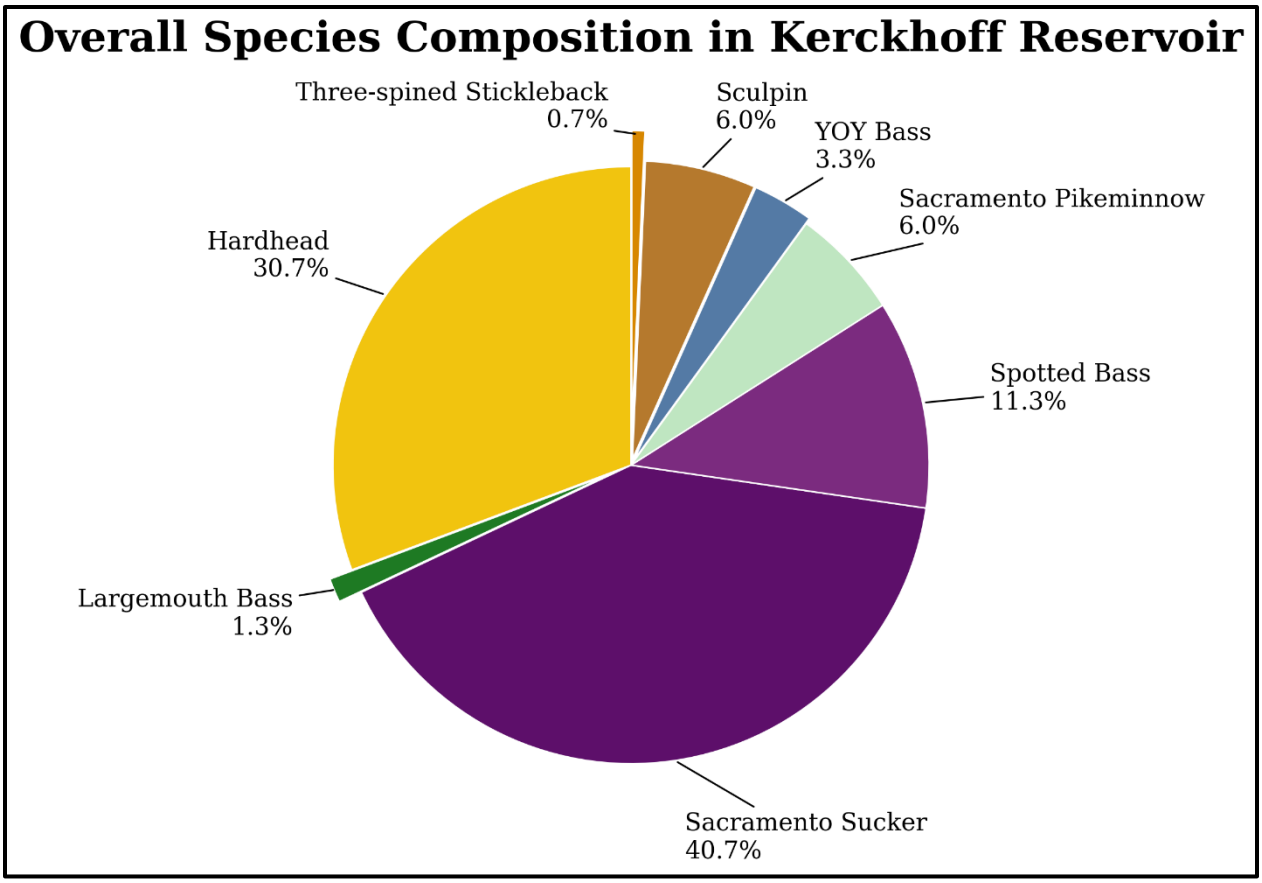
State Status:

SSC = species of special concern

Kerckhoff Reservoir Fish Populations

The Kerckhoff Reservoir fish community is typical of reservoirs at similar elevations in the Sierra Nevada. The fish community historically included rainbow and brown trout, hardhead, Sacramento pikeminnow, Sacramento sucker, prickly sculpin, three-spined stickleback, smallmouth bass, largemouth bass, green sunfish, and striped bass (FERC 1979).

During PG&E's 2019 AQ 2 study, PG&E collected seven species using boat electrofishing, variable mesh gill nets, and minnow traps (PG&E 2020m). Kerckhoff Reservoir fish population sampling locations by sampling method are provided in Study AQ 2 (PG&E 2020m). The combined results for all sampling methods are provided in Figure 4.4-1. Sampling locations are provided on Figure 4.4-2. Sacramento sucker was the most abundant fish captured from all gear types combined (40.7 percent of catch), followed by hardhead (30.7 percent), spotted bass (11.3 percent), Sacramento pikeminnow (6.0 percent), sculpin (6.0 percent), YOY bass (likely largemouth bass; 3.3 percent), largemouth bass (1.3 percent), and three-spined stickleback (0.7 percent).



YOY = young-of-the-year

Figure 4.4-1: Overall Species Composition from all Gear Types in Kerckhoff Reservoir, 2019

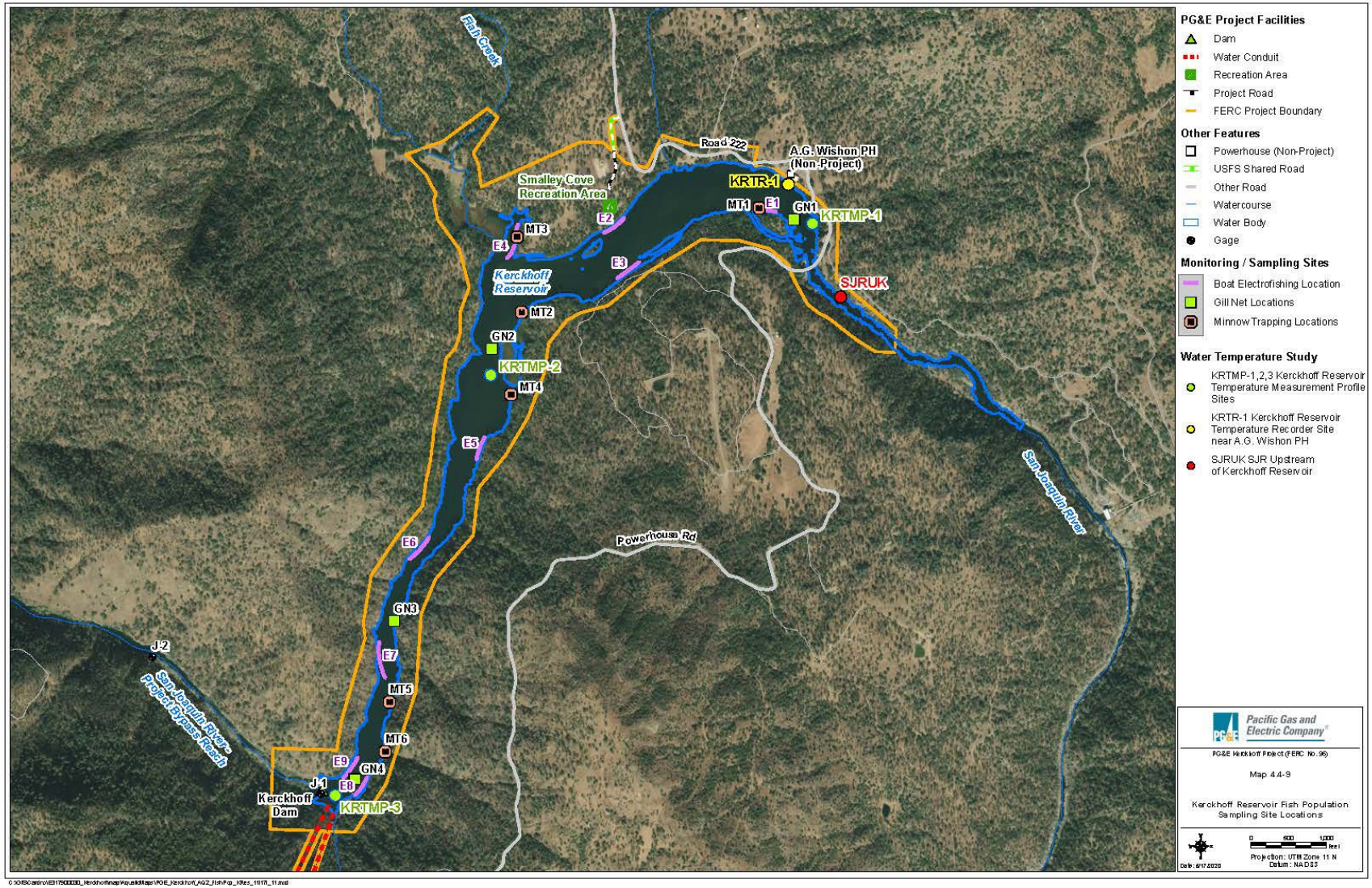


Figure 4.4-2: Kerckhoff Reservoir Fish Population Sampling Site Locations

Project Bypass Reach Fish Populations

Fish species encountered in the PBR during recent studies are provided in Table 4.4-4, and fish collected during the 2019 relicensing sampling are provided in Table 4.4-5. Additionally, Kern brook lamprey was detected by environmental DNA (Study AQ 6; PG&E 2020g) and later sampled by CDFW (personal communication, E. Guzman and G. Morimoto, February 26, 2020). Reclamation studies (2008) indicated that ammocoetes (larvae), possibly Kern brook lamprey, were collected in the SJR between Kerckhoff Dam and Millerton Lake from 1979 through 1982 (Wang 1986).

Table 4.4-5: Fish Species Collected in Project Bypass Reach, 2019

Family	**Common Name** ***(Scientific Name)***
Catostomidae (suckers)	Sacramento sucker (*Catostomus occidentalis*)
Centrarchidae (sunfish)	Spotted bass (*Micropterus punctulatus*)
	Smallmouth bass (*Micropterus dolomieu*)
	Bluegill (*Lepomis macrochirus*)
	Green sunfish (*Lepomis cyanellus)*
Cyprinidae (minnows)	Hardhead (*Mylopharodon conocephalus)*
	Sacramento pikeminnow (*Ptychocheilus grandis)*
Poeciliidae (livebearers)	Western mosquitofish (*Gambusia affinis*)
Cottoidae (sculpins)	Prickly sculpin (*Cottus asper*)

The construction of Friant Dam in 1941, and prior to that the operation of Sack Dam in the SJR downstream, blocked the passage of anadromous fish to the SJR Gorge, and anadromous fish (other than American shad) are no longer found there (SCE 2004). Introduction of non-native species, in addition to the presence of Friant Dam, Millerton Lake, and other alterations to the SJR, have changed the fish community composition and relative abundances of native species.

Non-native fish species dominated the catch in the PBR (Figure 4.4-3). Sacramento sucker was the most abundant of the native species present but had more than two age classes present only in the upstream portion of the PBR just below Kerckhoff Dam, which may be a product of cooler water coming from Kerckhoff Dam resulting in better habitat, entrainment of these fish from the reservoir where robust populations exist, or both.

For the 2019 fish surveys conducted by PG&E along the PBR, fish composition results combining backpack electrofishing and snorkel counts from each study site were overlaid on an aerial photograph for geographical reference (Figure 4.4-3). The trends in fish community composition from upstream to downstream indicate that native species represent a larger proportion of the fish community close to Kerckhoff Dam and a smaller percentage at the downstream sites. However, native fish persist through all four sites. Spotted bass represent the largest percentage of the community at Site 1 near the dam, represent a smaller percentage at Site 2, and are absent downstream at Sites 3 and 4. Smallmouth bass represent a small percentage of the fish community at Site 1, more than half of the fish community at Site 2, and most of the fish community at the downstream Sites 3 and 4. At Site 1 near Kerckhoff Dam, spotted bass dominated deep pool habitat, while Sacramento sucker dominated shallow habitats. At Site 2, smallmouth bass dominated deeper pool habitats, while spotted bass dominated shallow habitat. At Sites 3 and 4, smallmouth bass dominated deeper pool habitat and was the only species captured in shallow habitats.

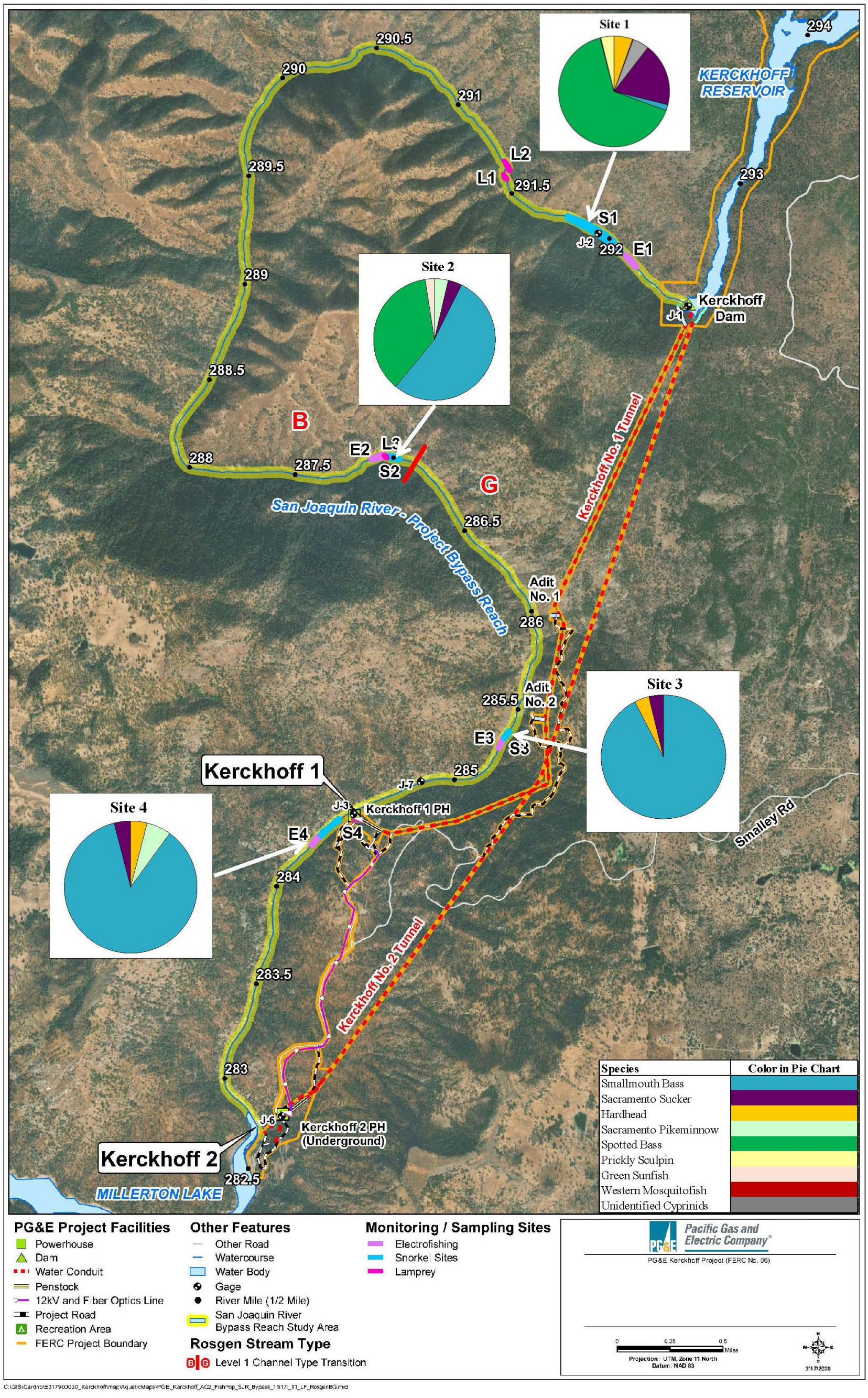


Figure 4.4-3: Project Bypass Reach Species Composition by Sampling Site, including Backpack Electrofishing and Snorkel Observations, 2019

Fish Passage

Fish passage under existing conditions throughout the PBR and Kerckhoff Reservoir was evaluated as part of Study AQ 1 (PG&E 2020h). Potential passage barriers (e.g., isolated pools or discontinuities in flow) based on rainbow trout barrier characteristics (Bjornn and Reiser 1991; Flosi et al. 2009; Thompson 1972) were evaluated from aerial imagery and helicopter observations. A potential barrier to passage in the PBR was identified during habitat mapping in a 45-foot-long cascade (Habitat Unit 62; Study AQ 1, PG&E 2020h) near RM 287 in the segment upstream of the K1 Powerhouse. The flow at which the potential barrier was identified was 45 cfs (PG&E 2022). Under higher flows, it is unlikely that this barrier persists.

There are no fish passage barriers between Millerton Lake and the PBR. Friant Dam blocks passage of anadromous fish from the SJR to Millerton Lake and the PBR. Kerckhoff Dam blocks upstream passage from the PBR to Kerckhoff Reservoir (PG&E 2022).

Tributary Spawning Access

The principal tributary to Kerckhoff Reservoir is the SJR upstream of the reservoir. There is no barrier to fish movement from the reservoir to the SJR upstream of the reservoir. Fish Creek enters Kerckhoff Reservoir through Smalley Cove. Access is available to Fish Creek; however, summer low flows in Fish Creek may impede movements to and from the creek during summer and fall. Several intermittent water courses enter the upper area of Kerckhoff Reservoir, including a spill channel from Corrine Lake (part of PG&E's Crane Valley Project, FERC No. 1354) (PG&E 2022).

Fish Stocking and Introductions

Kerckhoff Reservoir

The CDFW stocked Kerckhoff Reservoir during the 1950s to establish populations of game fish species, which included rainbow trout, smallmouth bass, largemouth bass, brown trout, and sunfish (*Lepomis* sp.), but creel censuses revealed poor angler harvest returns, and stocking was discontinued (FERC 1979). Additionally, a parasitic copepod,

Salmincola edwardsii, was found in some rainbow trout in the upper SJR drainage, and planting in Kerckhoff Reservoir potentially could have provided a link to introduce the parasite to lower portions of the watershed (FERC 1979). Other fish species introduced to upstream waters, such as spotted bass, are also found in the reservoir.

Project Bypass Reach

Supplemental stocking has not occurred in the PBR (FERC 1979).

Millerton Lake

A successful sports fishery was established when the lake was opened to the public in 1945 for largemouth bass and bluegill, but this was followed by a period of fish population decline (FERC 1979). The CDFW initiated a fish stocking program in the early 1950s to establish game fish and enhance angling opportunities (URS 2008). Striped bass were first stocked in Millerton Lake from 1955 to 1957, followed by threadfin shad as striped bass forage fish. Periodic stocking by CDFW maintained the striped bass fishery through 1992. American shad were incidentally introduced in Millerton Lake with striped bass from 1955 to 1957 and may have been mixed with striped bass during stocking in 1965, 1972, and 1973 (FERC 1979). The use of baitfish by anglers and illegal fish planting has introduced additional non-native species into the lake.

American Shad Spawning Flows

Currently, PG&E provides supplementary flows to support non-native American shad spawning. CDFW has regarded the population in Millerton Lake as an under-utilized fishery (FERC 1979; PG&E 2023). These flows are based on numerous supporting studies summarized in the Proposed Project Pre-Application Document (PG&E 2017a), including FERC (1979), Landis and Lambert (1979), Ecological Analysts (1982), and National Environmental Services, Inc (NES 1990b). The CDFW and PG&E initiated studies in 1977 to evaluate the potential impacts of modified flows associated with the then proposed operation of the K2 Powerhouse, as American shad depend on turbulent flowing water for keeping eggs in suspension during and following spawning (PG&E

1978; FERC 1979). Then, PG&E and NES conducted several years of studies after K2 Powerhouse generation began to determine operational methods to support shad spawning, as required by the 1980 Fishery Agreement and 1984 Revised Exhibit S issued by FERC in consultation with the CDFW, BLM, and USFWS (NES 1990b). Spawning success was best during drier years, with water temperatures of 11 to 17.2°C and flows of about 1 to 2 feet per second (Ecological Analysts 1982; NES 1990b).

As a result of these studies, minimum flow release requirements from the K1 and K2 powerhouses were required by FERC to support American shad spawning. Flows to provide suitable velocities for spawning and egg suspension are required from May 15 to June 30. The requirements under the existing license state that when water surface elevation on Millerton Lake is below 545 feet, PG&E must release 775 cfs from the K2 Powerhouse from 10 p.m. to 2 a.m., and 400 cfs during the remaining hours from either the K1 or K2 Powerhouse. When Millerton Lake level is at or above 545 feet water surface elevation, PG&E must release 1,200 cfs from the K2 Powerhouse between 10 p.m. and 2 a.m., and in the remaining hours, either 775 cfs from the K2 Powerhouse or 400 cfs from the K1 Powerhouse. Historically, American shad spawning flows have been released from either the K1 or K2 Powerhouse, but in recent years, the K1 Powerhouse has not been operated, so all American shad spawning flows are currently released from the K2 Powerhouse.

Aquatic Reptiles and Amphibians

Four special-status amphibians and one special-status aquatic reptile have the potential to occur within the existing FERC Project Boundary. These species are listed in Table 4.4-6, along with information on each species' regulatory status, habitat associations, and temporal distribution (seasonal presence).

Although suitable habitat is present for foothill yellow-legged frog (*Rana boylii*, south Sierra Distinct Population Segment [DPS], federally and state endangered), this species has not been detected during historic surveys within and in the vicinity of the Kerckhoff Hydroelectric Project, nor was the species identified during eDNA testing completed in

2019 (PG&E 2022). The existing FERC Project Boundary falls outside proposed critical habitat for this species.

According to the USFWS Environmental Conservation Online System (USFWS 2025b), the Western spadefoot (*Spea hammondii*) has the potential to occur within the existing FERC Project Boundary, though it has not been documented. The Western spadefoot uses primarily upland habitat and relies on vernal pools for reproduction, which are not present within the existing FERC Project Boundary. This species was not targeted for sampling during efforts to document other amphibian species. There is no designated critical habitat for this species.

Suitable breeding habitat for California tiger salamander (*Ambystoma californiense*, central California DPS, federally and state threatened) is not present within the existing FERC Project Boundary, although they could use the habitat present for dispersal. This species was not detected during aquatic larval surveys conducted in 2008 and 2011 (PG&E 2022). The existing FERC Project Boundary falls outside the final critical habitat for this species.

Suitable habitat for California red-legged frog (*Rana draytonii*, federally threatened) occurs within the low-gradient section of Fish Creek near Smalley Cove. However, the presence of bullfrogs and centrarchids likely inhibits suitability due to increased predation. The existing FERC Project Boundary falls outside the final critical habitat for this species.

The Northwestern pond turtle (*Actinemys marmorata*, proposed federally threatened) occurs in Kerckhoff Reservoir and within the PBR (PG&E 2022). Two adult males were trapped in Kerckhoff Reservoir, and 35 individual turtles were identified in the PBR during targeted surveys in 2019. Of the 35 individual turtles, there were 16 adult/sub-adult females, 15 adult/sub-adult males, and 4 juveniles of unknown sex. All captured individuals were in good condition.

Table 4.4-6: Aquatic Reptile and Amphibian Species Occurring or Potentially Occurring in the Proposed Project Area

Common Name (*Scientific Name*)	Status	Habitat and Life History	Temporal Distribution	Potential to Occur
Amphibians				
California tiger salamander – Central California DPS (*Ambystoma californiense*)	FT, ST	Lives in vacant or mammal-occupied burrows throughout most of the year; in grassland, savanna, or open woodland habitats. Needs underground refuges, especially ground squirrel burrows, and vernal pools or other seasonal water sources for breeding.	Year-long	**Potential to occur (during dispersal only).** Suitable vernal pool habitat for this species is present within 1 mile of the Proposed Project Area at Kennedy Table and Squaw Leap. Upland dispersal habitat is present within the Proposed Project. Wetlands are present within the Proposed Project, but no seasonal wetland habitats typically associated with this species occur within this area. This species was not detected in the Proposed Project during aquatic larval surveys conducted in 2008 and 2011 (Reclamation 2014) but was not targeted during 2019 studies. Critical habitat for this species is present downstream of Millerton Lake.
Western Spadefoot – Northern DPS (*Spea hammondii*)	FPT, BLMS, SSC	Spends most of its life in underground burrows, entering water only to breed. Aestivates through most of the year; will emerge from burrows after rains in October to May. It is primarily nocturnal and breeds in vernal pools or other temporary water bodies.	Year-long	**Not likely to occur.** Suitable vernal pool habitat for this species is present within 1 mile of the Proposed Project Area at Kennedy Table and Squaw Leap, but adults are known to burrow close to vernal pool areas. No previous surveys targeted this species, and they would be difficult to observe outside of larval stages in vernal pools given their life history.

Common Name (*Scientific Name*)	Status	Habitat and Life History	Temporal Distribution	Potential to Occur
Foothill yellow-legged frog – Southern Sierra DPS (*Rana boylii)*	FE, SE, BLMS, FSS	Stream-breeding species associated with flowing water and riparian areas, including permanent or intermittent streams in coast ranges and Sierra foothills. Migration occurs along branched stream networks, and various life stages use a wide range of channel types, from ephemeral drainages to large mainstem rivers. Breeding takes place in flowing aquatic habitat with at least some cobble-sized substrate to provide refuge for egg masses and tadpoles. Once temperatures rise above 10 to 12°C (Seltenrich and Pool 2002), foothill yellow-legged frogs begin reproduction, but eggs and rearing tadpoles are susceptible to scour of egg masses, displacement of tadpoles, and stranding of egg masses and tadpoles due to flow fluctuations. Tadpoles rear in and near spawning areas and require algae or diatoms as a food source. Post-metamorphic frogs require areas to bask adjacent to cobble or boulder escape cover.	Year-long	**Not likely to occur.** Focused surveys were conducted in the PBR in 2007, but the species was not found (Reclamation 2008). The species also was not found during focused surveys in the Horseshoe Bend Reach in 2008 (personal email communication, P. Strand and W. Lifton, March 23, 2006) and protocol-level surveys in 2012 (SCE 2013). Altered hydrology and presence of non-native predators like bullfrogs and centrarchid fish likely prohibit use by foothill yellow-legged frogs. The species was not found in Kerckhoff Reservoir, Smalley Cove, Fish Creek, or the PBR during environmental DNA surveys in 2018 (PG&E 2022). The nearest known population currently resides upstream of SCE's Big Creek No. 3 Powerhouse in Jose Creek, but it is over 15 miles away and upstream of SCE's Dam 7 and Redinger Lake (SCE 2008a, 2008b).

Common Name (*Scientific Name*)	Status	Habitat and Life History	Temporal Distribution	Potential to Occur
California red-legged frog (*Rana draytonii)*	FT, SSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Associated with permanent water but may use intermittent waters for breeding. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	Year-long	**Potential to occur.** Habitat assessment conducted in Fish Creek and Kerckhoff Reservoir. Habitat in low-gradient section of Fish Creek assessed as potentially suitable, but presence of bullfrogs and centrarchids likely prohibits use by California red-legged frog. Was not targeted during 2019 studies.
Aquatic Reptiles				
Northwestern pond turtle (formerly western pond turtle) (*Actinemys marmorata)*	FPT, BLMS, FSS, SSC	Inhabits permanent or semi-permanent, slow-moving fresh or brackish water (including ponds, streams, rivers, lakes, marshes, sloughs, and agricultural canals), with available basking sites and adjacent open habitats or forest for nesting. Females may travel up to 0.5 mile away to a suitable nesting site to deposit eggs. Breeding takes place underwater during summer months. Species hatches in the spring and must migrate to suitable shallow aquatic habitat with thick emergent and/or aquatic vegetation.	Year-long	**Present.** This species is known to occupy the watershed both upstream and downstream of the Proposed Project, and individuals have been recorded in Kerckhoff Reservoir (Reclamation 2008; PG&E 2017b; SCE 2017, 2018a). The species was found in Kerckhoff Reservoir (2 trapped) and the PBR (35 trapped) in 2019 trapping study (Study AQ 5, PG&E 2018a).

Federal Status:

FE = federal endangered, FT = federal threatened, FPT = federal proposed threatened

USFS Status:

FSS = U.S. Forest Service sensitive

BLM Status:

BLMS = BLM Sensitive

State Status:

SE = state endangered, ST = state threatened, SSC = species of special concern

Benthic Macroinvertebrates

Benthic macroinvertebrate (BMI) species occupy different microhabitats (e.g., the surface of stones or deeper within the substrate) and have different habits (e.g., some cling to the substrate, and others actively swim among the substrate). Characteristics of microhabitats, such as water flow and velocity, affect which macroinvertebrates are better adapted to the conditions present, and thus the BMI community composition. BMI community composition is often used as a proxy for water quality, habitat condition, and overall stream health.

The BMI sampling was conducted in Kerckhoff Reservoir in 2012 and PBR in 2019. In the reservoir, the *Ephemeroptera* (mayflies), *Plecoptera* (stoneflies), and *Trichoptera* (collectively, EPT) index was calculated at 17, which is considered a good to fair rating. In the PBR, standard BMI metrics (e.g., richness, relative abundance, diversity, and composition), the Index of Biotic Integrity (IBI), and the California Stream Condition Index (CSCI) were used to determine overall stream health. Undisturbed reference sites have median IBI scores in the 70 to 80 range (Rehn 2008). The IBI scores at the PBR ranged from 12 to 25, with scores greatest near Kerckhoff Dam and lowest at the downstream sites. Lower IBI scores are believed to be suggestive of site impairment. The CSCI scores range from greater than or equal to 0.92 (“Likely Intact”) to less than or equal to 0.62 (“Very Likely Altered”), with intermediate categories of “Possibly Altered” (0.77–0.91) and “Likely Altered” (0.63–0.76). Scores in the PBR ranged from 0.68 to 0.76, placing all sampled sites within the “Likely Altered” category. These metrics suggest significant disturbance at each of the sites, with disturbance increasing downstream (PG&E 2022). The relative lack of riparian vegetation, the dominance of pool habitat, and the entrenched nature of the river channel likely influenced the BMI community composition and scores. Overall, the BMI community in the PBR is consistent with disturbed habitats (PG&E 2022).

Crustaceans

A query of the CNDDB (CDFW 2025) and IPaC (USFWS 2025a) databases identified three federally listed vernal pool species with the potential to occur within the FERC

Project Boundary including the vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), and conservancy fairy shrimp (*Branchinecta conservatio*). None of these species, nor their preferred habitat (vernal pools), have been documented within the existing FERC Project Boundary, though no targeted surveys have been conducted. The existing FERC Project Boundary falls outside final critical habitat for each of these species.

Aquatic Molluscs

Aquatic molluscs were surveyed in 2019 for Study AQ 3 (PG&E 2020i) to characterize the distribution, species composition, and relative abundance of native freshwater mussels and to document the potential presence of invasive aquatic molluscs. Sampling sites in the PBR were co-located with the Fish Population Study AQ 2 (PG&E 2020m), previously located mussel beds, and in Kerckhoff Reservoir, known locations and harvesting sites provided through consultation with California Native American Tribes.

No federal or state-listed molluscs were detected in Study AQ 3. However, the western pearlshell mussel (*Margaritifera falcata*), a California ranked S1S2 species in the CNDDB (CDFW 2025) and an important mussel species for local Native American Tribes, was documented in the PBR within the existing FERC Project Boundary (see *Technical Study Report (TSR-19), Mussels and Aquatic Molluscs (AQ 3),* PG&E 2020b). Tribal members report that this species previously existed in the area now occupied by the reservoir but has been extirpated following the building of Kerckhoff Dam (North Fork Mono Tribe 2024). The western pearlshell mussel is further discussed in Section 4.6 *Cultural Resources* and/or Section 4.19 *Tribal Cultural Resources.*

Invasive Molluscs

No Watch List invasive mussels or snails were found during the surveys, including Quagga or zebra (Dreissenid) mussels or New Zealand mud snails (PG&E 2020i).

4.4.2 Regulatory Background

The following sections contain an overview of regulations related to aquatic and fisheries biological resources.

4.4.2.1 Federal

Federal Power Act

The Federal Power Act (Title 16 United States Code [USC] Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created FERC and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (18 Code of Federal Regulations [CFR] Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

Specific to aquatic resources, 18 CFR Section 5.26 describes the Section 10(j) process of the Federal Power Act, which requires FERC to analyze “all terms and conditions timely recommended by fish and wildlife agencies pursuant to the Fish and Wildlife Coordination Act for the protection, mitigation of damages to, and enhancement of fish and wildlife (including related spawning grounds and habitat) affected by the development, operation, and management of the project.”

Endangered Species Act of 1973

The ESA (16 USC Sections 1531 et seq.) is intended to provide a means to conserve the ecosystems upon which listed endangered and threatened species depend and to provide programs for the conservation of those species, thus preventing extinction of listed plants and wildlife. Under Section 9(a)(1)(B) of the ESA, it is unlawful to “take” any listed species. “Take” is defined under the ESA as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.”

For projects that are authorized, funded, or carried out by the federal government (projects with a “federal nexus”) and may affect a federally listed threatened or endangered species, the federal approving agency is required to consult with USFWS (terrestrial species, nonoceanic fish) and/or the National Marine Fisheries Service (NMFS) (marine species), as applicable, under Section 7 of the ESA to ensure the

action is not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of critical habitat. Such consultation may result in a Biological Opinion.

Sections 4(a)(3) and (b)(2) require the designation of critical habitat for endangered or threatened species. Critical habitat is defined under the ESA as: (1) areas within the geographic range of a species that are occupied by individuals of that species and contain the physical and/or biological features essential to the conservation of the species, thus warranting special management consideration or protection; and (2) areas outside of the geographic range of a species at the time of listing, but that are considered essential to the conservation of the species.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 U.S.C. 661–666e) requires USFWS and/or NOAA Fisheries to review proposed federal actions affecting streams or other waters and to provide recommendations to minimize impacts on fish and wildlife. State wildlife agencies (e.g., CDFW) also consult on any federal action involving the control or modification of surface waters. Accordingly, any project with a federal nexus must undergo review by federal and state wildlife trust agencies. Under Section 10(j) of the Federal Power Act, FERC must obtain fish and wildlife agency recommendations consistent with the Fish and Wildlife Coordination Act.

Clean Water Act

The discharge of pollutants into Waters of the United States, including discharge of sediment to surface water, is regulated by the Clean Water Act (CWA). Additional discussion of CWA requirements appears in Section 4.4.2.2.

Clean Water Act Section 404

Section 404 of the CWA (33 USC Section 1344) establishes a program to regulate the discharge of dredged or fill material into Waters of the United States. 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 by the United States Army Corps of Engineers (USACE) before dredged or fill material may be discharged into Waters of the United States.

Wild and Scenic Rivers

The National Park Service has compiled and maintains a Nationwide Rivers Inventory, a register of river segments that potentially qualify as national wild, scenic, or recreational river areas. The Nationwide Rivers Inventory is a listing of more than 3,200 free-flowing river segments in the United States that are believed to possess one or more outstandingly remarkable natural or cultural values judged to be at least regionally significant. Under a 1979 Presidential directive and related Council on Environmental Quality Procedures, all federal agencies must seek to avoid or mitigate actions that would adversely affect Nationwide Rivers Inventory segments (National Park Service 2023).

United States Bureau of Land Management Bakersfield Field Office Resource Management Plan

The *Bakersfield Field Office Record of Decision and Approved Resource Management Plan* (RMP) (BLM 2014) is considered relevant because the Proposed Project is located within the SJR Gorge Recreation Area. This plan provides direction for the management and protection of natural resources on public lands administered by BLM. Relevant management goals for aquatic biological resources are provided below.

BR-G-1: Contribute to maintaining the biotic diversity within the Planning Area. Ensure public lands provide for a diversity of native species, ecosystems, and ecosystem processes.

BR-G-2: Promote the recovery of state and federally listed species. Promote conservation of other plant and animal species to prevent future listings.

BR-G-3: Promote the success of recovery plans, conservation plans, wildlife management plans, vegetation and weed management plans, and other regional conservation strategies.

Relevant objectives for suitable Wild and Scenic River segments are provided below.

- **Objective [WSR-O-1]:** Determine suitable river segments for inclusion in the National Wild and Scenic Rivers System. Manage those suitable river segments so to maintain their free-flowing nature, water quality, outstandingly remarkable values, and tentative classification, pending congressional action; or
- **Objective [WSR-D-2]:** Establish a corridor extending 0.25 mile from each edge suitable river segment, in which the following interim protective management guidelines would apply:

  - (a) Approve no actions altering the free-flowing nature of the suitable segment through impoundments, diversions, channeling, or riprapping
  - (b) Approve no actions that would measurably diminish the stream segment's identified outstandingly remarkable value(s)
  - (c) Approve no actions that would modify the setting or level of development of the suitable river segment to a degree that would change its identified classification for the duration of the RMP

Relevant management goals for hydrology and water quality management are provided in Section 4.11 *Hydrology and Water Quality*.

Land Management Plan for the United States Forest Service Sierra National Forest

The USFS uses the direction in the revised *Land Management Plan for the Sierra National Forest* (USFS 2023), pursuant to the 2012 Forest Service Planning Rule (36 CFR Part 219), to guide its decisions regarding the relicensing of the Proposed Project and the development of associated license conditions. The newest plan presents the current forest plan management direction based on modifications to the original and revised forest plans. It provides general direction for achieving forest-wide desired conditions and management directions to meet those conditions. It also identifies two broad desired condition categories, Ecological Sustainability and Diversity of Plant and Animal Communities, with specific desired resource conditions discussed further within the plan for each.

Desired conditions, standards, and guidelines related to aquatic and fisheries biological resources and relevant to the Proposed Project are summarized below. Hydrology and water quality-related practices under this plan are stated in Section 4.11 *Hydrology and Water Quality*, and standards and guidelines related to terrestrial biological resources are stated in Section 4.5 *Biological Resources – Terrestrial*.

- Ensure adequate quality, quantity, and timing of water flows support beneficial uses and ecological structure and functions, including aquatic species diversity and riparian vegetation
- Maintain or improve watershed functions, such as maintaining long-term soil productivity and aquifer recharge by maintaining lateral connectivity between streams and their associated floodplains
- Maintain or improve riparian and wetland habitat function

4.4.2.2 State

California Endangered Species Act

The CESA is administered by CDFW and prohibits the "take" of plant and animal species identified as either threatened or endangered in the State of California by the Fish and Game Commission (Fish and Game Code Section 2050 to 2097). Under CESA, "take" is defined as "hunt, pursue, catch, capture, or kill." Sections 2091 and 2081 of CESA allow CDFW to authorize exceptions to the prohibition of "take" of state-listed threatened or endangered plant and animal species for purposes such as public and private development.

State Water Resources Control Board and Regional Water Quality Control Boards

Porter-Cologne Water Quality Control Act

California's primary statute governing water quality and water pollution issues for both surface waters and groundwater is the Porter-Cologne Water Quality Control Act (Porter-Cologne Act; California Water Code Section 13000 et seq.). The Porter-Cologne Act grants the California State Water Resources Control Board (State Water Board) and each of the nine Regional Water Quality Control Boards (Regional Water Board)

authority to protect water quality and is the primary means for implementation of California's responsibilities under the CWA. This act grants the State Water Board and Regional Water Boards 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.

Basin Plan

The State of California has responsibility for maintaining water quality standards as stipulated in the federal CWA of 1970. Federal water quality standards required by the CWA are implemented under the authority of the State Water Board and Central Valley Regional Water Quality Control Board (Central Valley Regional Water Board). As stated above, the Regional Water Board basin plans provide standards through (1) designating existing and potential beneficial uses, (2) meeting water quality objectives to protect those beneficial uses, and (3) implementing programs designed to achieve those objectives. State law defines beneficial uses of California's waters that may be protected against quality degradation to include, and not be limited to, "domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves" (Water Code Section 13050(f)). Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning. The Central Valley Regional Water Board's 2019 Basin Plan sets forth water quality standards for the Sacramento River and SJR basins (Central Valley Regional Water Board 2019).

Water Quality Control Plan for the Sacramento River and San Joaquin River Basins

The Regional Water Boards have primary responsibility for the coordination and control of water quality in California. The Porter-Cologne Act grants authority to the Regional Water Boards to implement and enforce water quality laws, regulations, policies, and plans to protect the groundwater and surface waters of the state. The preparation and adoption of water quality control plans (basin plans) is required by the California Water

Code (Section 13240) and supported by the federal CWA. Nine water quality control plans, which apply to different areas of California, formally designate existing and potentially beneficial uses and water quality objectives. The water quality control plan applicable to the Proposed Project is the Central Valley Regional Water Board's Water Quality Control Plan for the Sacramento River and SJR Basins and is referred to as "the SR/SJR Basin Plan" (Central Valley Regional Water Board 2019).

The SR/SJR Basin Plan identifies beneficial uses that apply to the surface waters in the SJR watershed from the source to Millerton Lake (Hydro Unit 540), which include municipal and domestic supply, irrigation, stock watering, power, contact and non-contact recreation, canoeing and rafting, other non-contact recreation, cold and warm freshwater habitat, and wildlife habitat (Central Valley Regional Water Board 2019).

Clean Water Act Section 401

Section 401 of the CWA (33 USC Section 1341) requires applicants for federal licenses or permits that may result in a discharge into navigable waters to provide the federal licensing or permitting agency with a certification from the applicable state agency that the activity to be licensed or permitted will comply with state water quality laws (33 USC Section 1341(a)(1),(d)). 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. 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.

Clean Water Act Section 402

Under CWA Section 402, the National Pollutant Discharge Elimination System (NPDES) controls water pollution by regulating point sources of pollution to Waters of the United

States. The State Water Board administers the NPDES permit program in California. Projects that disturb 1 or more acres of soil are required to obtain coverage under the state NPDES General Permit for Discharges of Storm Water Associated with Construction Activity. A Storm Water Pollution Prevention Plan (SWPPP) must be developed and implemented for each project covered by the general permit. The SWPPP must include best management practices (BMPs) that are designed to reduce potential impacts on surface water quality during project construction and operation.

California Fish and Game Code

Fully Protected Species

The classification of "fully protected" was implemented in California in the 1960s to protect rare or threatened species (many of which are now listed under CESA). The California Fish and Game Code includes protections for "fully protected birds" (Section 3511), "fully protected mammals" (Section 4700), "fully protected reptiles and amphibians" (Section 5050), and "fully protected fish" (Section 5515). No California fully protected species are known to occur within the Proposed Project Boundary.

Final Hatchery and Stocking Program Environmental Impact Report / Environmental Impact Statement

The fundamental objectives of CDFW's Fish Hatchery and Stocking Program are to continue the rearing and stocking of fish from hatchery facilities for the recreational use of anglers; for mitigation of habitat loss attributable to dam construction and blocked access to upstream spawning areas; for mitigation of fish losses caused by operation of the state-operated Sacramento-SJR Delta pumps; and for conservation and species restoration.

The CDFW stocked Kerckhoff Reservoir during the 1950s to establish populations of game fish species, which included rainbow trout, brown trout, smallmouth and largemouth bass, and sunfish, but stocking was discontinued (FERC 1979).

Aquatic Invasive Species Management Plan

The California Aquatic Invasive Species Management Plan (CDFW 2008) proposes management actions for addressing aquatic invasive species (AIS) threats in California. It focuses on non-native algae, crabs, clams, fish, plants, and other species that invade California's creeks, wetlands, rivers, bays, and coastal waters. The plan's overall goal is to identify the steps to take to minimize the harmful ecological, economic, and human health impacts of AIS in California. The eight objectives in the plan are to: (1) improve coordination and collaboration among the people, agencies, and activities involved with AIS; (2) minimize and prevent the introduction and spread of AIS into and throughout the waters of California; (3) develop and maintain programs that ensure the early detection of new AIS and the monitoring of existing AIS; (4) establish and manage systems for rapid response and eradication; (5) control the spread of AIS and minimize their impacts on native habitats and species; (6) increase education and outreach efforts to ensure awareness of AIS threats and management priorities throughout California; (7) increase research about the baseline biology of AIS, the ecological and economic impacts of invasions, and control options to improve management; and (8) ensure state laws and regulations promote the prevention and management of AIS introductions.

California Water Plan 2018 Update 2023

The California Water Plan has been updated every five years by the California Department of Water Resources (CDWR) since 1957. It provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California's water future. It presents data and information about California's water resources including water supply evaluations and assessments of agricultural, urban, and environmental water uses to quantify the gap between water supplies and uses. The California Water Plan also identifies and evaluates existing and proposed statewide demand management and water supply augmentation programs and projects to address the state's water needs. The most recent plan, *California Water Plan 2018 Update 2023,* provides recommended actions, funding scenarios, and an investment strategy to bolster efforts by water and resource managers, planners, and decision-

makers to overcome California's most pressing water challenges (CDWR 2023). It reaffirms the state government's unique role and commitment to sustainable, equitable, long-term water resource management; it also introduces implementation tools to inform sound decision-making. The plan's broad and diverse portfolio of recommended actions addresses California's critical, systemic, and institutional challenges.

4.4.2.3 Local Agencies

Madera County General Plan

The Madera County General Plan (Madera County 1995) is relevant because a portion of the Proposed Project is located in part within Madera County. The plan includes information regarding land uses in the vicinity of the Proposed Project and management goals and policies relevant to the Proposed Project Area.

County natural resource goals and policies include conserving and enhancing the quality and diversity of forest resources; protecting and enhancing the natural qualities of Madera County's streams, creeks, and groundwater; protecting wetland communities and related riparian areas; and protecting, restoring, and enhancing habitats that support fish and wildlife species so as to maintain populations at viable levels. Relevant Madera County management goals for aquatic biological resources are provided below:

Goal 5.D: To protect wetland communities and related riparian areas throughout Madera County as valuable resources.

- **Policy 5.D.1.** The County shall comply with the wetlands policies of the USACE, the USFWS, and the CDFW. Coordination with these agencies at all levels of project review shall continue to ensure that appropriate mitigation measures and the concerns of these agencies are adequately addressed
- **Policy 5.D.7.** The County shall support the management of wetland and riparian plant communities for passive recreation, groundwater recharge, nutrient catchment, and wildlife habitats. Such communities shall be restored, where possible

Goal 5.E: To protect, restore, and enhance habitats that support fish and wildlife species so as to maintain populations at viable levels.

- **Policy 5.E.5.** The County shall support the maintenance of suitable habitats for all indigenous species of wildlife through maintenance of habitat diversity
- **Policy 5.E.7.** The County shall support the preservation or reestablishment of fisheries in the rivers and streams within the county, whenever possible
- **Policy 5.E.8.** The County shall ensure close monitoring of pesticide use in areas adjacent to habitats of special-status plants and animals

Fresno County General Plan

The Fresno County General Plan (Fresno County 2024) is relevant because the Proposed Project is located in part within Fresno County. The plan includes information regarding land uses in the vicinity of the Proposed Project and management goals and policies relevant to the Proposed Project Area. Relevant Fresno County management goals for aquatic biological resources are provided below:

Goal OS-A: To protect and enhance the water quality and quantity in Fresno County's streams, creeks, and groundwater basins.

Goal OS-D: To conserve the function and values of wetland communities and related riparian areas throughout Fresno County while allowing compatible uses where appropriate. Protection of these resource functions will positively affect aesthetics, water quality, floodplain management, ecological function, and recreation/tourism.

- **Policy OS-D.1.** The County shall support the "no-net-loss" wetlands policies of the USACE, USFWS, and CDFW. Coordination with these agencies at all levels of project review shall continue to ensure that appropriate mitigation measures and the concerns of these agencies are adequately addressed
- **Policy OS-D.5.** The County shall strive to identify and conserve remaining upland habitat areas adjacent to wetland and riparian areas that are critical to the feeding, hibernation, or nesting of wildlife species associated with these wetland and riparian areas

- **Policy OS-D.7.** The County shall support the management of wetland and riparian plant communities for passive recreation, groundwater recharge, nutrient storage, and wildlife habitats
- **Policy OS-E.4.** The County shall encourage private landowners to adopt sound wildlife habitat management practices, as recommended by CDFW officials and USFWS
- **Policy OS-E.13.** The County should protect to the maximum extent practicable wetlands, riparian habitat, and meadows since they are recognized as essential habitats for birds and wildlife
- **Policy OS-E.16.** Areas that have unusually high value for fish and wildlife propagation should be preserved in a natural state to the maximum possible extent

Goal OS-E: To help protect, restore, and enhance habitats in Fresno County that support fish and wildlife species so that populations are maintained at viable levels.

Goal OS-F: To preserve and protect the valuable vegetation resources of Fresno County.

4.4.3 Analysis Methodology

4.4.3.1 Analytical Approach

Analysis of the Proposed Project's potential impacts on aquatics and fisheries biological resources is based on the review of the Proposed Project design, as well as studies and technical reports prepared by PG&E in support of the FLA and Second Supplemental Information Filing (PG&E 2022). New construction, proposed environmental management measures and monitoring plans for the protection of aquatic and fisheries resources, and changes in operation activities under the Proposed Project are evaluated. Potential Proposed Project construction and operation impacts are analyzed in the context of direct or indirect impacts. Direct impacts are those on the physical environment that are immediately related to the Proposed Project and occur at the same time and place as the Proposed Project (e.g., vegetation removal and grading associated with construction and operation). Indirect impacts are those that occur later in time or farther removed in distance than direct impacts (e.g., long-term changes in

water quality and off-site impacts from noise, dust, lighting). Additionally, potential impacts are discussed in relation to their duration, being temporary, long term, or permanent.

Under the Proposed Project, PG&E would continue to conduct routine maintenance activities at the Kerckhoff Hydroelectric Project facilities, which would not result in impacts different to the current baseline condition. The Area of Analysis for aquatic and fisheries resources encompasses all waters, adjacent riparian and wetland habitat, and upland habitat with the potential to be used by aquatic species included in this resource area that fall within the Proposed Project Area.

4.4.3.2 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on aquatics and fisheries biological resources if it would:

- 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 (BIO-1);
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFW or USFWS (BIO-2);
- Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means (BIO-3);
- 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 (BIO-4);
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (BIO-5); 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 (BIO-6)

4.4.3.3 Environmental Management Measures and Monitoring Plans

The Proposed Project's environmental management measures and monitoring plans include measures intended to protect aquatics and fisheries resources and comply with the regulatory framework detailed in Section 4.4.2 *Regulatory Background*. These environmental management measures and monitoring plans are summarized below and considered in this impact analysis. These plans have been summarized here to provide context to the following impact analysis that will evaluate actions taken during operation to fulfill these plans in the context of CEQA.

Operational Modifications

American Shad Spawning Season Flow Release Regime

Operation of the Kerckhoff Hydroelectric Project includes spawning flow requirements to protect American shad, which is considered a recreationally important species. The existing FERC license contains a requirement to provide American shad spawning flows (400 cfs) from either the K1 Powerhouse or K2 Powerhouse between May 15 and June 30. However, the retirement of the K1 Powerhouse results in a need to revise the original requirement.

Under the Proposed Project's American Shad Spawning Season Flow Release Regime, these releases may be made at the K2 Tailrace or may be released at Kerckhoff Dam. When spill flows at the dam are greater than or equal to 400 cfs, no additional releases to the PBR are required at the dam. Normally, American shad spawning flows would be provided through the K2 Powerhouse when Kerckhoff Dam is not spilling. If the releases are made at the K2 Tailrace, no additional flow beyond MIF requirements would be released in the PBR during this period. However, additional releases at Kerckhoff Dam to the PBR would be required when inflow to Kerckhoff Reservoir is too low to operate

the K2 Powerhouse. In that case, releases made at the dam would increase flow in the PBR.

Water Temperature Measure

The Proposed Project's Water Temperature Measure requires that, from May 1 through October 31, the Applicant will release a maximum flow up to, but not exceeding, 50 cfs to the PBR below Kerckhoff Dam to (1) maintain a MWAT of less than or equal to 25°C, and (2) ensure that the daily maximum water temperature remains less than or equal to 30°C, as measured at Gage J-7.

Flow Management Measures

End-of-Spill Flow Recession and Whitewater Flow Releases Measure

The EOS Flow Recession will be scheduled to occur between May 1 and August 31 of each year in conjunction with and immediately following the whitewater boating flow releases to the SJR below Kerckhoff Dam. The EOS Flow Recession will be scheduled annually by PG&E for the forecasted final flow recession from spill after flow is forecasted to decrease below 2,500 cfs. In non-spill years, the EOS Flow Recession will be scheduled based on the forecast of water availability. PG&E shall provide notification 10 days in advance of the planned EOS Flow Recession (as required under the Whitewater Notification and Access Measure). PG&E shall release water from Kerckhoff Dam to provide the whitewater boating flows, consisting of 2 days (9:00 a.m. to 6 p.m.) of whitewater boating flows with target flows of 2,500–2,000 cfs on the first day and 2,000–1,600 cfs on the second day, followed by a ramp down to minimum inflow (MIF).

- Day 1 (9 a.m.) 2,500–2,000 cfs for minimum 9 hours
- Day 1 (6 p.m.) 2,000–1,600 cfs for minimum 24 hours
- Day 2 (6 p.m.) 1,600–1,200 cfs for minimum 10 hours
- Day 3 (4 a.m.) 1,200–800 cfs for minimum 5 hours
- Day 3 (9 a.m.) 800–600 cfs for minimum 5 hours
- Day 3 (2 p.m.) 600–400 cfs for minimum 5 hours

- Day 3 (7 p.m.) 400–200 cfs for minimum 5 hours
- Day 4 (12 a.m.) 200 cfs–MIF

Subsequent Spill Ramp Down Measure

PG&E's proposed Subsequent Spill Ramp Down Measure would be implemented each year from the conclusion of the EOS Flow Recession through October 31 in all WY types, except during K2 Powerhouse outages. PG&E states the measure is designed to reduce potential stranding for spills resulting from unexpected high flows originating upstream of the Proposed Project that may occur following the EOS Flow Recession. After the conclusion of the EOS Flow Recession, for daily average[16] flows exceeding 500 cfs, PG&E shall ramp down the declining limb of spills when daily average flow at PG&Es Gage J-2 declines below 1,600 cfs as follows:

Step Schedule:

- Step 1: Maintain hourly average flow within a range of 1,600–1,200 cfs for 2 hours
- Step 2: Reduce the hourly average flow within a range of 1,200–800 cfs for 2 hours
- Step 3: Reduce the hourly average flow within a range of 800–600 cfs for 2 hours
- Step 4: Reduce the flow within a range of 600–400 cfs for 2 hours
- Step 5: Reduce the hourly average flow within a range of 400–200 cfs for 2 hours
- Step 6: Reduce the hourly average flow within a range of 200 cfs to MIF, or as close as feasible based on inflow to Kerckhoff Reservoir

Spill Season Flow Measure

The Spill Season Flow Measure manages spill recessions from March 1 through August 31 when the Kerckhoff Hydroelectric Project is in operation and not including K2 Powerhouse outages. The measure is designed to provide the public with visual cues of water conditions when there is spill from Kerckhoff Dam. When spill flows measured at Gage J-2 are 500 cfs or more for at least 5 hours and the EOS Flow Recession

[16] Daily average flow calculated from midnight-to-midnight.

Measure or the Subsequent Spill Ramp Down do not apply subject to sufficient water availability,[17] the Applicant shall release flows below Kerckhoff Dam as follows:

Step Schedule:

- Step 1: Maintain a 500-cfs target hourly average flow (flow within a range of 600–400 cfs) for a minimum of 5 hours
- Step 2: After a minimum of 5 hours of releasing a target hourly average flow of 500 cfs (flow within a range of 600–400 cfs), reduce the flow to a target hourly average flow of 300 cfs (flow withing a range of 400-200 cfs) for a minimum of 5 hours
- Step 3: After a minimum of 5 hours of releasing the 300-cfs target hourly average flow (flow within a range of 400-200 cfs), reduce flow to the target hourly average flow range of 200 cfs

PG&E's Spill Season Flow Measure includes the following compliance caveats:

- If flow drops below a target flow range during a release under this measure, return the flow to that target flow range as soon as practical and continue the measure until complete
- If average flow exceeds the flow range identified in the schedule, flow shall be returned, as soon as practical, to the original flow range for the step that was being implemented for at least the step duration specified in the schedule, then the ramp down will resume according to the schedule. If inflows continue to exceed the target flow resulting in a pause of the ramp down for more than 10 hours, the ramp down may be terminated and restarted if the triggering conditions are met subsequently

This measure is not included under Alternative 1.

[17] Sufficient water availability is dependent on combined accessible volume of water from inflow, storage within the normal operating range, or current powerhouse diversions

Planned Outage Measure

PG&E would implement the Planned Outage Measure (POM) year-round when K2 Powerhouse is required to be taken offline and when flows below Kerckhoff Dam are expected to exceed an daily average of 500 cfs as measured at Gage J-2. PG&E would post signage at least one week prior to releases associated with planned outages and implementation of the three planned outage protocols that affect flow during the outage, based on calendar date. The three protocols—POM Ramp Up, POM Ramp Down, and POM Winter Ramp Down—would tend to reduce flow fluctuations during the outage, and flows below Kerckhoff Dam would be stepped down to MIF following the outage as follows:

- **Initial Release Protocol** –PG&E would release the initial spill associated with an outage of the K2 Powerhouse prior to 3:30 a.m., subject to sufficient water availability. If the release is not practical at this time, roving Kerckhoff Hydroelectric Project PG&E staff would alert people of the impending high flows in the areas of the trail to the BLM footbridge near the K1 Powerhouse and the trailhead to BLM's River Access Trail during daylight hours
- **POM Ramp Up Protocol:** During planned outages of the K2 Powerhouse occurring from March 1 to October 31, this protocol would provide a two-step ramp up of flow to provide recreationalists visual cues as to water conditions downstream of Kerckhoff Dam
- **POM Ramp Down Protocol:** During planned outages from end of spill to October 31, following conclusion of flow releases below Kerckhoff Dam greater than an hourly average of 500 cfs, flows would be ramped down to benefit aquatic biota
- **POM Winter Ramp Down Protocol:** During planned outages from November 1 to February 28/29, following conclusion of flow releases below Kerckhoff Dam greater than an hourly average of 500 cfs, flows would be decreased to an hourly average target flow of 500 cfs for at least five hours, subject to water availability, to deter people from entering the river during intermittent periods of low flow and to benefit aquatic biota. When water availability would be insufficient to sustain a 500-cfs release, the flow below Kerckhoff Dam would ramp down to MIF in 5-hour steps

Aquatic Resources Plan

This adaptive management plan sets out a program for monitoring pearlshell mussel abundance and fish community composition in the PBR relative to changes in water temperature due to Proposed Project operations. If deleterious changes in fish or mussel communities or habitat are observed, changes in operation may be implemented in consultation with the resource agencies. Implementation of this plan is intended, provided MIFs, to manage water temperatures within the ranges necessary for fish and aquatic communities to maintain growth, reproduction, and larval development seen at current baseline conditions.

Vegetation Management and Pest Control Plan

The Proposed Project's Vegetation Management and Pest Control Plan requires the following PM&E measures to avoid potential impacts on non-target aquatic resources from the use of pesticides.

- Only pesticides approved by the United States Environmental Protection Agency (USEPA), California Department of Pesticide Regulation (CDPR), and the applicable landowner (e.g., the USFS or BLM) are used
- Only aquatic-safe pesticide formulations are used within 50 feet of aquatic habitats
- Other pesticides may be evaluated and considered for future applications in consultation with the USFS and BLM, as appropriate. A risk assessment and environmental analysis would be conducted before such pesticides are proposed to be used

Project Road and Trail Maintenance Plan

The Project Road and Trail Maintenance Plan includes maintenance of roads and trails for safety; minimization of erosion and sedimentation along the Proposed Project roads and trails to protect aquatic biological resources and other resources during maintenance activities; protection of water quality during road/trail maintenance; and compliance with consultation, permitting, and reporting requirements during non-routine road/trail maintenance. The PM&E measures of the plan include regular inspection,

routine maintenance, non-routine maintenance, consultation with agencies, and reporting.

4.4.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, EOS Flow Recession Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and POM, which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a

series of down-ramping operations with specific WY and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the PBR of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cfs for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the PBR cannot exceed a maximum of 1 foot per hour (or

less) at Gage J-2 between MIF and 4,000 cfs, provided there is sufficient[18] storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability.

[18] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The State Water Board evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.4.4.1 Potential Impacts Related to Special-Status Species or Their Habitats

Impact BIO-1: Would the 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 California Department of Fish and Wildlife or United States Fish and Wildlife Service?

Proposed Project

Special-Status Species and Habitats in the Proposed Project Area

Special-Status Fish Species

Focused surveys and a review of existing information indicate that no fish species listed under the ESA or CESA occur or have the potential to occur within the Area of Analysis. However, two native fish species with special status in California have been identified in the Area of Analysis: hardhead and Kern brook lamprey (see Section 4.4.1.4).

Aquatic Reptile and Amphibian Species

As discussed in Section 4.4.1.4, Table 4.4-6, and the CNDDB results in Appendix E-1 *IPaC Resources List*, the study area has the potential to support California tiger salamanders (central California DPS, FT, ST, CFP) and the California red-legged frog (FT, FSS, SSC), though neither species have been documented in the Area of Analysis, and no records of these species were identified in CNDDB for the Aquatic Resources Study Area (Appendix E-1 *IPaC Resources List*). However, no focused studies for these species were performed, so their presence within the Area of Analysis is unknown, though they are considered to have the potential to occur.

The foothill yellow-legged frog (south Sierra DPS; FE, SE, FSS) has suitable habitat within the Area of Analysis. However, focused surveys did not identify this species within the Aquatic Resources Study Area (PG&E 2018b). Therefore, this species is considered unlikely to occur within the Area of Analysis.

Focused studies for northwestern pond turtles (federally proposed threatened, FSS, SSC, BLMS) identified this species in Kerckhoff Reservoir and the PBR (PG&E 2018a).

Benthic Macroinvertebrates

No special-status BMIs have been identified within the Area of Analysis.

Aquatic Molluscs

The western pearlshell mussel, a CNDDB S1S2 special-status species (CDFW 2025), and five native aquatic snail species were documented in the Proposed Project Area during 2019 surveys (PG&E 2020i). The western pearlshell is also a species of cultural importance for local Native American Tribes, as further discussed in Section 4.6 *Cultural Resources* and/or Section 4.19 *Tribal Cultural Resources.*

Construction

Kerckhoff 1 Retirement and Modification Activities

Under the Proposed Project, the K1 Powerhouse would be retired, and associated facilities would be modified. The K1 generating units are currently non-operational, so

any potential impacts would occur from modifications of the current infrastructure to future uses or full retirement. All activities associated with the retirement of K1 Powerhouse would not require in-water work, Therefore, no direct or indirect impacts to special-status species or their habitats are anticipated.

Gate Upgrades

The upgrade of the two gates on Kerckhoff Dam consists of upgraded control and supervisory control and data acquisition (SCADA), which is a computer-based system for gathering and analyzing real-time data to monitor and control equipment. No impacts to special-status aquatic species or their habitat are anticipated.

Inflow Gage

The SJR Above Kerckhoff Reservoir Inflow Gage Measure would require PG&E to install, calibrate, and operate a stream gage in the SJR upstream of Kerckhoff Reservoir and downstream of the Big Creek 4 Powerhouse within four years of license issuance. Installation of the flow gage would require limited in-water work that could temporarily disturb the stream bed and increase sediment levels. PG&E has not developed specific details in regard to the construction of the inflow gage and BMPs for this work would be developed post-license.

Direct permanent loss of suitable habitat for special-status species would be limited to the impact area of the inflow gage, which would be negligible when compared to the overall river's available habitat, but it would have the potential to result in a permanent loss to waters of the United States, which could result in a potentially significant impact. The flow gage installation has potential to directly impact two special-status aquatic species known to occur in the Proposed Project Area: hardhead and northwestern pond turtle. Although these species are mobile and would likely leave when crew entered the work area, it is possible for these species to be harmed if present during flow gage installation. Short-term indirect impacts from flow gage installation could include impacts on water quality and aquatic habitats (including sediment, riparian, and water habitats), which have the potential to significantly impact special-status species and their habitats.

Vista Day Use Area

As depicted in Appendix E-2 *Figures*, Figure E2-25, construction of the Vista Day Use Area would occur approximately 400 feet or more away from the adjacent San Joaquin River channel; therefore, no potential direct impact to aquatic habitat is anticipated. Potential indirect impact on aquatic resources, such as loss of over-water shading due to vegetation removal, is also not anticipated due to the distance from the river and the gradual elevation change at the Vista Day Use Area proposed location. Additionally, the Vista Day Use Area would be constructed in a disturbed area that does not support suitable upland habitat for northwestern pond turtle aestivation or hibernation.

Construction Impact Determination for Special-Status Species or Their Habitats

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** as a result of construction activities under the Proposed Project for potential impact BIO-1, primarily due to direct and indirect impacts associated with the construction of the inflow gage.

Impact Analysis with Mitigation

To reduce the potentially significant impact, Mitigation Measures BIO-1 and BIO-3 would require pre-construction surveys for sensitive species (specifically, the northwestern pond turtle), stop work protocols, the restoration of land impacted by construction of the inflow gage to baseline conditions, and compensation for any permanent loss of waters of the United States. Therefore, there would be a **Less than Significant Impact with Mitigation Incorporated** on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.

Operation

Under the Proposed Project, Kerckhoff Reservoir would continue to be operated as a forebay, maintaining water elevations and storage volumes within the normal operating range of the reservoir. This operational storage is limited to water surface elevations between 980.0 and 984.5 feet msl, which corresponds to operational limitations of the

K2 Powerhouse and reservoir spill height (984.5 feet msl). Compared to pre-LTOR inflow conditions, monthly average water surface elevations would be 0.5 to 0.6 foot less in July through February, excluding October (1.5 feet lower). In the spring, the monthly average water surface elevations would be less than 0.3 foot lower (PG&E 2023).

Based on the Proposed Project operations model that includes SCE's LTOR flows for the Big Creek No. 4 Hydroelectric Project, storage and water surface elevations in Kerckhoff Reservoir would be similar under the Proposed Project compared to baseline conditions, with 11 of 12 months seeing 7 inches or less in water surface elevation change. Components of the Proposed Project that would affect reservoir storage and reservoir water surface elevations during implementation would be the following:

- The EOS Flow Recession Measure would result in reduced reservoir elevations during release of whitewater flows, and decreased elevations may extend into the associated ramp down
- During the implementation of the Subsequent Spill Ramp Down Measure, reservoir elevations may be lowered by approximately 0.2 foot
- The implementation of the Spill Season Flow Measure, as modeled, would generally result in reservoir water surface elevation decreases of 0 to over 0.5 foot, depending upon reservoir inflow and the duration of the Spill Season Flow Measure (PG&E 2022)

Proposed Project modeling of the implementation of the POM protocols indicates potential impacts on reservoir water surface elevations (PG&E 2022). The ramp up and ramp down protocols have storage requirements that would affect reservoir elevations during planned outages. However, reservoir fluctuations would generally stay with the normal operating range of 980 to 984.5 feet msl, similar to baseline conditions.

Much of the remaining flow variability downstream of Kerckhoff Dam is a function of variable inflows resulting from storm and spring runoff that cause spills in SCE projects upstream of Kerckhoff Reservoir and variation in generation at SCE's Big Creek No. 4 Powerhouse. Inflows to Kerckhoff Reservoir under the Proposed Project in late spring /

early summer would include flows released by SCE below Dam 7 at Redinger Lake to the SJR to implement its LTOR flows for the Big Creek No. 4 Hydroelectric Project, which is located upstream of the Kerckhoff Hydroelectric Project facility (see Section 4.11 *Hydrology and Water Quality*). Additional inflows also include Willow Creek, other releases from Dam 7 at Redinger Lake, and PG&E's A.G. Wishon Powerhouse flows. With potential additional flows from Big Creek No. 4 Powerhouse, there may be increased inflow to Kerckhoff Reservoir. Because the K2 Powerhouse capacity is greater than that of both SCE's Big Creek No. 4 Powerhouse and PG&E's A.G. Wishon Powerhouse combined, flow fluctuations in the PBR occur during periods when upstream flows from SCE's Dam 7 and discharge from the other sources exceed the Kerckhoff Hydroelectric Project facility diversion capacity and the reservoir is at full capacity. Under those circumstances, the Kerckhoff Hydroelectric Project facility is essentially run-of-the-river (i.e., water is not held within Kerckhoff Reservoir and instead is allowed to flow as the river would without the dam retaining water), and any flow fluctuation in the PBR would be the result of changes in Kerckhoff Reservoir inflow.

In addition to addressing potential impacts resulting from the changes in flow management described above, the impact analysis below also addresses potential impacts resulting from the newly constructed day use area and implementation of the environmental management measures.

Vista Day Use Area

As indicated in Section 4.17 *Recreation*, the overall recreation use levels in the Proposed Project are not expected to increase substantially, although the location of recreation use near the K2 Powerhouse and the SJR may shift to the Vista Day Use Area and the river area that is accessible from BLM's SJR Trail (PG&E 2023). The shift of users away from the river could reduce short-term displacement of special-status aquatic species using the SJR near K2 Powerhouse.

American Shad Spawning Season Flow Release Regime

To satisfy the required American shad spawning flow releases, there is potential for some of the required flow to be released from Kerckhoff Dam if the reservoir water

surface elevation is too low to operate the K2 Powerhouse. Under this circumstance, flow in the PBR would increase to convey this water downstream. More than 77 percent of the habitat in the PBR consists of pools, which are relatively unresponsive to changes in flow. Pools contain slow-moving water that primarily responds to increased flow by increasing in depth, not wetted width or velocity. Therefore, aquatic habitat available in the PBR remains relatively unchanged except for a potential temporary increase in the vertical extent of habitat. This temporary increase in pool depth may provide more refuge locations for larval or juvenile fishes. Therefore, impacts from the American Shad Spawning Season Flow Release Regime Measure on Kern brook lamprey, hardhead, and northwestern pond turtle and their habitat would be negligible.

Water Temperature Measure

Implementation of the Proposed Project's Water Temperature Measure would have a potentially beneficial impact on native fish and other aquatic life by maintaining the PBR water temperatures at or below a maximum weekly average water temperature (MWAT) of 25°C. This measure was developed to benefit hardhead, and consequently other native species, by maintaining cooler stream temperatures when compared to existing operations (27°C or less). Implementation of the Water Temperature Measure would have a positive impact on special-status species.

Flow Management Measures

Under the Proposed Project, the EOS Flow Recession Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and POM would be implemented. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project. Impacts from these measures would be seen in either the Kerckhoff Reservoir or the PBR, as analyzed below.

Kerckhoff Reservoir

Implementation of the Proposed Project's flow management measures would reduce average water elevation in Kerckhoff Reservoir when compared to existing operations by relatively small increments (less than 7 inches July through February, except for October, and less than or equal to 4 inches during the spring). The reduction in

reservoir elevations during flow releases would temporarily reduce the amount of aquatic habitat available in the Kerckhoff Reservoir. However, the reductions would be of short duration and within the normal range of operating elevations. Therefore, any potential impacts on aquatic organisms in Kerckhoff Reservoir, including special-status species, would be negligible.

Project Bypass Reach

Implementation of the Proposed Project's flow management measures like the Subsequent Spill Ramp Down Measure would reduce and stabilize flows in the PBR relative to baseline operations, which do not include stepped ramp ups and ramp downs (PG&E 2023). See Appendix E-2 *Figures*, Figure E2-26, for a graphical representation of one example of the difference in flow patterns anticipated within the PBR for the Proposed Project relative to baseline operations. More gradual reductions in stage relative to baseline operations would provide increased time for aquatic organisms to leave areas of potential stranding (beaching or trapping), with the potential for fewer mortalities of aquatic organisms, including special-status species. This measure would have a potential minor beneficial impact on aquatic organisms, including special-status species, along the PBR.

Management Plans

Under baseline operations, high levels of recurrent recreation day use along the Kerckhoff Reservoir shoreline occurs along the northern shoreline between the Powerhouse Road Bridge and Smalley Cove Recreation Area that can degrade aquatic habitat and prevent use by aquatic species.

Under the Proposed Project, PG&E would minimize the potential for the loss or degradation of environmental resources, including aquatic habitat, along the Kerckhoff Reservoir shoreline by implementing measures in the Recreation Management Plan to manage dispersed recreation in this area, including providing a defined area for launching trailered watercraft, installing barriers to control vehicles, installing signs displaying rules and regulations applicable to the area, and regularly patrolling the area to ensure compliant use. Therefore, implementation of the Proposed Project would

enhance aquatic habitat for aquatic species, including special-status species, in the areas potentially affected by recurrent dispersed recreation use along the Kerckhoff Reservoir shoreline.

Routine maintenance activities are not anticipated to change under the Proposed Project. Herbicide application methods described in the Vegetation Management and Pest Control Plan would further minimize any potential for impacts on special-status aquatic species. Only aquatic-safe herbicides would be allowed within 50 feet of aquatic habitats to prevent runoff or drift of chemicals into the watershed. Applications would be infrequent (typically several times per year) and include vegetation within defined areas around existing hydroelectric facilities and select invasive weed populations within the Proposed FERC Project Boundary. Herbicides would be applied under the supervision of a certified Pest Control Advisor (PCA) in accordance with a Pest Control Recommendation (PCR) or Pest Use Proposal (PUP).

Non-routine maintenance activities that would result in ground disturbance and would have potential to impact special-status species or their habitat would require the following:

- Consultation with BLM or USFS, as appropriate, based on the type of maintenance and the urgency of the required repairs prior to implementing non-routine maintenance along a Proposed Project road or trail on their land to:
  - Review and comment on the proposed non-routine maintenance activity; and
  - Identify and implement appropriate BMPs and avoidance and minimization measures that may be necessary to protect environmental and cultural resources, including riparian vegetation and wetland habitat
- Obtaining all necessary permits and approvals prior to implementing a non-routine maintenance project along a Proposed Project road or trail. If required, all measures and conditions established by resource agencies in these permits and agreements would be implemented as part of major road maintenance

- Identifying necessary permits, as appropriate, in consultation with the resource agencies, with considerations to the type of work to be completed and the location of the work

Implementation of the Vegetation Management and Pest Control Plan would minimize the potential for degradation of riparian vegetation and wetland habitat by employing measures to reduce the spread or introduction of invasive weeds:

- Applicant would wash heavy equipment previously used on non-paved surfaces, outside the watershed, with power or high-pressure washers to remove soil, seeds, vegetation, or other seed-bearing material before using for Proposed Project operation and maintenance activities
- When work is planned in a defined part of the Proposed FERC Project Boundary with known invasive weed infestations, the “clean” parts of the work zone would be worked first, as practical
- To the maximum extent feasible, equipment would remain on established roads
- Applicant would use certified weed-free hay, mulch, or straw for erosion control; if certified weed-free straw is not available, the Applicant would use certified weed-free rice straw
- Applicant will conduct floristic surveys every five years and monitor treated targeted invasive weed populations annually. As part of agency consultation, the results of the invasive weed monitoring will be discussed, and specific invasive weed populations that are at high risk of spread within the Proposed FERC Project Boundary will be identified, and the following measures will apply:
  - Applicant will mark or flag entry points to the high-risk population(s)
  - Upon exiting the high-risk population areas, workers will use leaf-blowers, or other methods as needed, to remove soil, seeds, and parts of plants off heavy equipment so that they are not transported from the infested area

The Proposed Project would provide protection of riparian vegetation and wetland habitat through the implementation of BMPs and avoidance and protection measures

during maintenance, and measures to prevent the spread or introduction of invasive weeds. Potential impacts would be less than significant.

FERC Boundary Modifications

All land that is encompassed by the Proposed FERC Project Boundary would be under FERC jurisdiction and, therefore, subject to the terms and conditions specified in the license, including those designated to protect environmental resources contained in the new license. The FERC Project Boundary modifications ensure that only lands necessary for the operation of the Proposed Project are included within the Proposed FERC Project Boundary. Therefore, the Proposed FERC Project Boundary modifications would have a potential beneficial impact relative to existing conditions by ensuring all land necessary for operation is included in the Proposed FERC Project Boundary, as required, and environmental resources, including aquatic habitat and the species that they support, are protected.

Operations Impact Determination for Special-Status Species or Their Habitats

Therefore, there would be a **Less Than Significant Impact** as a result of operational activities under the Proposed Project for potential impact BIO-1.

Mitigation Measures

Mitigation Measure BIO-1: Conduct a Preconstruction Survey for Northwestern Pond Turtle at the New San Joaquin River Gage

To avoid potential injury or mortality of northwestern pond turtles, PG&E shall ensure that the following steps are taken:

- Prior to beginning construction or staging at the SJR Above Kerckhoff Reservoir Inflow Gage, a qualified biologist (i.e., a biologist familiar with the habitat requirements and biology of northwestern pond turtle) shall conduct a preconstruction survey for turtle nests or hibernating turtles. If suitable habitat is encountered that has the potential to be disturbed as determined by the qualified

biologist, then the suitable habitat shall be flagged prior to construction. The qualified biologist shall periodically inspect the flagged area, and make repairs as needed

- If a northwestern pond turtle is encountered in the work area, work in the immediate area shall stop and the turtle shall be allowed to leave the area on its own. The qualified biologist shall be contacted immediately, and the biological monitor (or other Kerckhoff Hydroelectric Project personnel) shall continuously monitor the individual's movements during the working time period until it is safely out of the work area or has been relocated by the qualified biologist at least 500 feet away from the proposed disturbance area to a location with similar habitat that is outside the influence of inflow gage construction. The qualified biologist shall report any northwestern pond turtles observations in the work area to the State Water Board, CDFW, and USFWS within 48 to 72 hours or 24 hours if turtles are relocated
- Construction activities shall not resume until the turtle(s) have moved by its/their own volition or been relocated by the qualified biologist at least 500 feet away from the proposed disturbance area to a location with similar habitat that is outside the influence of inflow gage construction. If a turtle nest is found, construction activities shall not take place within 100 feet of the nest until the turtles have hatched and the juvenile turtles have moved or been relocated at least 500 feet from construction activities

Mitigation Measure BIO-3: Compensate for the Temporary and Permanent Losses of Waters of the United States/Waters of the State

- To compensate for temporary impacts on waters of the United States and waters of the state for the SJR Above Kerckhoff Reservoir Inflow Gage, all temporary fill shall be removed and the Kerckhoff Reservoir bed and creek bed shall be restored to pre-Proposed Project contours and conditions within 30 days following completion of construction activities
- If construction of the SJR Above Kerckhoff Reservoir Inflow Gage results in permanent loss of waters of the United States and waters of the state, PG&E shall pay into the National Fish and Wildlife Foundation Sacramento District In-lieu Fee Program to ensure no net loss of wetland functions and values. The compensation

ratio shall be a minimum of 1:1 (one acre of habitat credit for every one acre of impact). The actual mitigation ratio and associated credit acreage may be modified based on CWA Section 404 and Section 401 permitting, which shall dictate the ultimate compensation for permanent impacts on waters of the United States and waters of the state

Level of Significance

Less than Significant Impact with Mitigation Incorporated

Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction impacts as the Proposed Project, discussed in Section 4.4.4.1.1. Therefore, there would be a **Potentially Significant Impact** as a result of construction activities under Alternative 1 for potential impact BIO-1.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** to special-status species or their habitats with Alternative 1 construction activities.

Impact Analysis with Mitigation

To reduce the potentially significant impact, Mitigation Measures BIO-1 and BIO-3 would require pre-construction surveys for sensitive species (specifically, the northwestern pond turtle), stop work protocols, the restoration of land impacted by construction of the inflow gage to baseline conditions, and compensation for any permanent loss of waters of the United States. Therefore, there would be a **Less than Significant Impact with Mitigation Incorporated** on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.

Operation

Under Alternative 1, the Proposed Project would be implemented, but PG&E's EOS Flow Recession Measure and the Subsequent Spill Ramp Down Measure would be fully replaced with alternative operational requirements to decrease flow fluctuations below Kerckhoff Dam. Alternative 1 would also replace the down ramping components of the Proposed Project's Spill Season Flow Measure and the ramp up components of the Proposed Project's Spill Season Flow Measure and POM.

The reduction of flow fluctuation below Kerckhoff Dam would provide whitewater boating opportunities. Boating flows and ramp downs would be based on the WY type Schedules A-D in the SCE Mammoth Pool Contract (see Table 3.4-1 in Section 3 *Alternatives Descriptions*).

Spill Year Schedule Boating Flows and Down Ramping of Spill Flows

Under the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure, PG&E would ramp down flows between May 1 through August 31 in the PBR after SCE has identified when down ramping of spill flows at Big Creek 4's Dam No. 7 will start. Standard down ramping for end of spills are determined by the WY Schedules, A, B (low storage), B (high storage), C, or D.

Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), each schedule was successfully implemented and provided the desired boating flows and days. However, while the model showed this measure was technically successful 100 percent of the time, the measure in practice would be infeasible. As shown in the model, the reservoir elevation drops very close to the K2 Powerhouses minimum operating reservoir elevation. As the reservoir approaches the K2 Powerhouses minimum operating reservoir elevation, the K2 Powerhouse cycles above and below the ROZ in an attempt to keep the reservoir high enough to stay above the minimum operating elevation for the K2 Powerhouse. The K2 Powerhouse cycling frequency is anywhere from half an hour to two hours, which represents an unrealistic operating scenario. Based on the documented operational constraints, any operation that requires K2 to dwell in the ROZ is considered infeasible

due to excessive cavitation and vibration impacts and the associated maintenance and outage consequences. That means operating strategies that would require repeated short interval oscillations across the ROZ are not considered feasible, because they can increase cycling wear and raise reliability/maintenance risk even if each individual crossing is brief (personal email communication, J. Hartman and C. McCormick, March 5, 2026).

As for operational impacts, the releases to accommodate whitewater boating were designed to more closely mimic the system's natural hydrograph, with the intention of reducing the potential for stranding of aquatic organisms or damage to their habitats via excessive erosion or deposition of sediment. The PBR supports a limited amount of gentle sloping habitat (less than 4 percent slope) where stranding could occur. Furthermore, these releases would result in changes to the reservoir's surface elevation relative to the Proposed Project, but all fluctuations would be contained within the baseline normal operating range of 980.0 feet to 984.5 feet msl, with the majority of fluctuations between 982.5 feet and 983.0 feet msl. Impacts to special-status species and their habitats from this measure are expected to be minimal and would not jeopardize the persistence of any affected species.

Although the modeling described above showed this component of Alternative 1 to be infeasible, implementing the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure would result in **Less than Significant Impact** compared with baseline for potential impact BIO-1. Ultimately, as described in the modeling report (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), implementation of the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure was deemed as infeasible as a result of over-cycling of the powerhouse through the ROZ and the necessity for rapid operational changes that may not be foreseeable to a reservoir operator not aware of upstream non-Proposed Project operations.

Non-Spill Year Boating Flows and Down Ramping

The boating flows and down ramping schedule is attempted every weekend from May 15 to June 15 of non-spill years. The modeled Non-Spill Year Boating Flows and Ramp Down Measure success was primarily dependent on the volume of inflows coming into Kerckhoff Reservoir during the weekends. Based on the past data in the model, this measure was only successful in providing boating flows 28.6 percent of the time. The measure was only feasible when natural flows were high enough to support 2 days of 2,500 cfs to 1,600 cfs.

Implementation of the Non-Spill Year Boating Flows Measure could result in changes to Kerckhoff Reservoir water surface elevation relative to the Proposed Project. However, any fluctuations would remain within the current normal operating range of 980.0 feet to 984.5 feet msl under implementation of this measure. Down ramping following the release of boating flows are designed to reduce the potential for stranding of aquatic organisms and would occur in a manner more consistent with the natural hydrograph in river systems draining the western slope of the Sierra Nevada. Therefore, there would be a **Less than Significant Impact** as a result of operations specific to Non-Spill Year Boating Flows under Alternative 1 for potential impact BIO-1.

Stranding Protection Down Ramp Measure

The Stranding Protection Down Ramping Measure covers initial and subsequent spills between May 1 and August 31. In other words, the ramp down schedules (AB, BC, D) are reserved for the large spill events in each spill season, while all others are handled by the Stranding Protection Down Ramping Measure. Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), the Stranding Protection Down Ramping ramp down better matches the inflow reductions over the same period, the pool elevation drops are minimal. and avoid the K2 Powerhouse over-cycling most of the time. The K2 Powerhouses minimum operating reservoir elevation was encroached 37.5 percent of the time and only induced K2 Powerhouse over-cycling 12.5 percent of the time.

Implementation of the Stranding Protection Down Ramp Measure could result in changes to Kerckhoff Reservoir water surface elevation relative to the Proposed Project. However, any fluctuations would remain within the normal operating range of 980.0 feet to 984.5 feet msl under implementation of this measure. By implementing down ramping in a manner more consistent with the natural hydrograph in river systems draining the western slope of the Sierra Nevada, and minimizing fluctuations to water surface elevation in the reservoir such that they remain within the normal operating range, there would be a **Less than Significant Impact** as a result of operations specific to the Stranding Protection Down Ramp Measure under Alternative 1 for potential impact BIO-1.

September – October Down Ramp Measure

During the September – October Ramp Down Measure, a ramp down is triggered during declining limb of spills once the average daily flow declines below 1,600 cfs. Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), this measure was successfully implemented 100 percent of the time but did encroach on the K2 Powerhouses minimum operating reservoir elevation every time. This is due to the low inflows typically seen during the September and October months at the Kerckhoff Project. However, no powerhouse cycling was seen in the model and therefore this measure is considered feasible.

Implementation of the September – October Down Ramp Measure could result in changes to Kerckhoff Reservoir water surface elevation relative to the Proposed Project. However, any fluctuations would remain within the normal operating range of 980.0 feet to 984.5 feet msl under implementation of this measure. By implementing down ramping in a manner more consistent with the natural hydrograph in river systems draining the western slope of the Sierra Nevada, and minimizing fluctuations to water surface elevation in the reservoir such that they remain within the normal operating range, there would be a **Less than Significant Impact** as a result of operations specific to the September – October Down Ramp Measure under Alternative 1 for potential impact BIO-1.

Alternative 1 Ramp Up Measure

The Alternative 1 Ramp Up Measure imposes a limit on the rate increase of stage as measured at Gage J-2, for spill events starting between MIF and 4,000 cfs, regardless of time of year, provided there is sufficient storage and powerhouse capacity to meet this requirement. To model this measure, the alternatives modeling report (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0) analyzed if a one foot per hour ramp rate in general would be feasible, subject to sufficient storage and powerhouse capacity regardless of the inflow recorded at the gage above of the reservoir. Based on the modeling, this measure was successful 97.6 percent of the time and caused no encroachment toward Kerckhoff's minimum operating elevation or K2 Powerhouse over-cycling. The success of the application of this measure depends heavily on advanced notification of the magnitude and timing of forecasted inflows from upstream projects, as well as the skill of the operator to predict the time, in advance of an increase in inflows, at which initiation of the ramp up protocol should begin. It would be better for the operator to initiate the protocol earlier than later, as an earlier start would allow the operator to back off spill if the reservoir were draining too fast and still maintain a rate of stage increase at Gage J-2 of less than one foot per hour. A late start would require the operator to spill more than the protocol allows to prevent the reservoir from rising above guide curve.

Implementation of this measure would provide conditions that more closely follow the natural hydrograph, ultimately reducing the potential for involuntary downstream redistribution of aquatic species and scour or erosion of their habitats. Therefore, there would be a **Less than Significant Impact** as a result of operations specific to the Alternative 1 Ramp Up Measure for potential impact BIO-1.

Operations Impact Determination for Special-Status Species or Their Habitats

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 1 for potential impact BIO-1.

Mitigation Measures

Mitigation Measure BIO-1: Conduct a Preconstruction Survey for Northwestern Pond Turtle at the New San Joaquin River Gage

Mitigation Measure BIO-3: Compensate for the Temporary and Permanent Losses of Waters of the United States/Waters of the State

Level of Significance

Less than Significant Impact with Mitigation Incorporated

Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction impacts for potential impact BIO-1 as the Proposed Project, discussed in Section 4.4.4.1.1.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** to special-status species or their habitats with Alternative 2 construction activities for potential impact BIO-1.

Impact Analysis with Mitigation

To reduce the potentially significant impact, Mitigation Measures BIO-1 and BIO-3 would require pre-construction surveys for sensitive species (specifically, the northwestern pond turtle), the restoration of land impacted by construction of the inflow gage to baseline conditions, and compensation for any permanent loss of waters of the United States. Therefore, there would be a **Less than Significant Impact with Mitigation Incorporated** on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.

Operation

Alternative 2 is similar to the Proposed Project Flow Measures, with the only difference being seen in AA WYs. Under each of the flow measures, either an increase in time spent at a down-ramping flow step is implemented, or an entirely new, higher flow step is established, with each change resulting in more water being released into the PBR (see details in Section 3.4.3 *Alternative 2*).

The modeling report (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0) indicated that the POM Initial Release Protocol under Alternative 2, which is also included in the Proposed Project, but with slightly different implementation requirements, could result in spikes in flow in the PBR if inflows are not consistent from 3:30 a.m., when the protocol would begin, subject to water availability. More specifically, there are spikes in flow in the PBR if the protocol is implemented and then inflows recede causing the spill to stop, followed by a large increase in inflows which forces the hydroelectric project back into spill. Increased water velocity, a potential impact of high rates of stage increase, has the potential to displace aquatic species and transport sediment, potentially affecting riparian habitat. However, this measure would only occur during the scheduled planned outages, which are often planned for in October, and is subject to water availability. Species and their habitats along the west slope of the Sierra Nevada are accustomed to seasonal and interannual variability in flows, and this mid- to late fall timeframe aligns with some of the first precipitation events of the season (Booth et al. 2006), which are more likely to fall as rain (as opposed to snow, which would not result in increased runoff) at higher elevations due to above-freezing temperatures (Dettinger 2005). Additionally, the first rainstorms of the season can experience limited ground saturation resulting in higher runoff and subsequent flood-like conditions (Shaw et al. 2010), especially in physically constrained channels like the PBR.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 2 for potential impact BIO-1.

Mitigation Measures

Mitigation Measure BIO-1: Conduct a Preconstruction Survey for Northwestern Pond Turtle at the New San Joaquin River Gage

Mitigation Measure BIO-3: Compensate for the Temporary and Permanent Losses of Waters of the United States/Waters of the State

Level of Significance

Less than Significant Impact with Mitigation Incorporated

4.4.4.2 Potential Impacts Related to Riparian Habitat

Impact BIO-2: Would the 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 California Department of Fish and Wildlife or United States Fish and Wildlife Service?

Proposed Project

Construction

Under the Proposed Project, PG&E would retire the K1 Powerhouse, construct the Vista Day Use Area, install a new flow gage upstream of Kerckhoff Reservoir (SJR Above Kerckhoff Reservoir Inflow Gage Measure), and upgrade the Kerckhoff Dam radial gates. Scattered riparian vegetation (alders with Fremont cottonwood) was mapped upstream of the dam and scattered or narrow alder and willow corridors were mapped downstream from the dam. As discussed in Section 4.4.4.1 *Potential Impacts Related to Special-Status Species or Their Habitats*, gate upgrades consist of work on control components and would not impact riparian habitat.

Vista Day Use Area

The Vista Day Use Area would be located in a previously disturbed area. The vegetation community mapped in the vicinity of the day use area and access road was primarily annual grasses and forbs, shown in Appendix E-2 *Figures*, Figure E2-25. As

outlined in the Recreation Management Plan, as part of the planning for the Vista Day Use Area, the Applicant would prepare a design narrative, site conceptual plan, and an environmental analysis for resources not assessed as part of the license application, including special-status plants. A construction plan would be prepared prior to construction of the new recreation day use area. The construction plan would include a description of the measures to avoid potential impacts on sensitive resources, including riparian resources if found, and identification of permitting and other regulatory requirements needed prior to construction.

Inflow Gage

Construction associated with the new inflow gage has the potential to affect riparian habitat. While it is currently unclear what the exact size of the construction footprint would be, it is assumed that both the direct loss of habitat from the installation of permanent structures as well as the temporary loss of habitat due to construction activities in the area (e.g., hauling of equipment, increased foot traffic, equipment staging) would result in potentially significant impacts to riparian habitat. The specific plans for construction would require approval via the regulatory permitting processes described in Section 4.4.4.1.

Kerckhoff 1 Retirement and Modification Activities

Under the Proposed Project, the K1 Powerhouse and associated facilities would be retired as described in Section 4.4.4.1. Retirement would include permanent closure of K1 Penstock No. 1 and K1 Penstock No. 3, and the main shutoff and bypass valves would be sealed upstream of the K1 Headworks. One small-scale habitat feature (HAB 20) and another small drainage just north of HAB 20, which are located downslope of the K1 Headworks and support riparian vegetation, may potentially be affected by the proposed retirement (refer to Appendix E-2 *Figures*, Figure E2-16, for the specific location of these features, labeled as HAB 20 and drainage channel on the map). HAB 20 is a small intermittent drainage that likely flows during the wet season in most years. However, flow within the drainage is augmented with water released from the K1 Surge Chamber/Headworks and by water leakage from both the K1 Tunnel upstream of the

penstock shutoff valves and from the drain associated with the No. 2 penstock bypass valve. Based on field surveys conducted in June 2019 (PG&E 2022), the wetted vegetated portion of this drainage is about 100 feet in length. The drainage supports a few riparian and wetland vegetation species, such as sedges (*Cyperus* sp.), as well as grasses and various upland species, such as yerba santa (*Eriodictyon californicum*). Flow within the second small drainage is augmented with leakage from the K1 Sandtrap Valve. The valve is part of the K1 Headworks and is used to drain the tunnel. Based on observations made in late summer 2022, the drainage appears to receive augmented flow year-round. This drainage supports a narrow riparian corridor composed of mature woody riparian vegetation. The surrounding habitat for both drainages is oak and pine woodland. Therefore, the changes associated with the retirement of these facilities may result in reduced water flow into both drainages and, subsequently, could result in a shift in the vegetation species composition. However, because the habitat features are located within steep drainages, under natural conditions, these drainages likely receive sufficient surface flow during the wet season in most years and during rain events to maintain some amount of riparian and wetland vegetation without the contributions from K1 facilities leakage. In addition, several additional water sources are in proximity to these two drainages, including the SJR; HAB 21 (a natural intermittent stream, wetland, and seep); and an intermittent stream that is tributary to the SJR north of HAB 20. HAB 21 and the intermittent stream north of HAB 20 would not be affected by the changes in operation and would continue to provide a water source over the term of the license (refer to Appendix E-2 *Figures*, Figure E2-6 through Figure E-20, for the specific locations of these features).

Potential indirect impacts to water quality from ground disturbance in areas hosting riparian, seep, and stream habitat are regulated as part of the process described in Section 4.4.4.1 (via compliance with CWA Sections 401 and 402, as applicable). The Proposed Project includes a variety of riparian, seep, and small stream habitat avoidance and minimization measures as outlined in their Vegetation Management and Pest Control Plan, Recreation and Management Plan, and Road and Trail Management Plan. These measures include but are not limited to the following:

- Regular inspections and repair of existing facilities, such as repairing roadways, which may include fresh application of road surface stabilizers (porous aggregate)
- Clearing and maintaining existing erosion control structures such as water bars and ditches
- An integrated pest management approach that maximizes the use of physical control when feasible, limits areas in which pesticide is used, limits the duration of pesticide, uses target-specific application methods and compounds, and uses only aquatic-safe herbicides within 50 feet of aquatic habitats to prevent runoff or drift of chemicals into the watershed infrequent applications (typically two times per year)
- Ongoing invasive weed management benefits riparian, seep, and stream habitat when those species are competing with or degrading that habitat

Construction Impact Determination for Riparian Habitat

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** as a result of construction activities under the Proposed Project for potential impact BIO-2, primarily due to direct and indirect impacts associated with the construction of the inflow gage.

Impact Analysis with Mitigation

To reduce the potentially significant impact, Mitigation Measure BIO-3 would require the restoration of land impacted by construction of the inflow gage to baseline conditions and compensation for any permanent loss of waters of the United States. Therefore, there would be a **Less than Significant Impact with Mitigation Incorporated** on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS.

Operation

Maintenance

Ongoing maintenance and repairs could result in temporary impacts to riparian habitat or small-scale habitat features (e.g., springs/seeps and small stream) in the case of

culvert or drainage replacement or repairs; however, as discussed in Section 4.4.4.1, any non-routine heavy maintenance activities resulting in modification of stream or lake habitat would require permitting and would be subject to an independent environmental review in support of that process, if warranted.

Flow Management Measures

Under the Proposed Project, the EOS Flow Recession Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and POM would be implemented. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project. Impacts from these measures would be seen in either the Kerckhoff Reservoir or the PBR, as analyzed below.

Project Bypass Reach

The geomorphologic characteristics of the watershed and the hydrologic regime largely control riparian vegetation patterns (e.g., distribution, abundance, community composition, and age class structure) in the PBR. Within the PBR, the distribution and abundance of riparian vegetation are limited by the highly entrenched channel with narrow valley bottoms with limited floodplain development and few alluvial deposits, steep side slopes, and prevalence of bedrock and coarse substrate along the majority of the river (PG&E 2022). In segments of the PBR where the valley bottom broadens, riparian vegetation is established on channel bars and adjacent to the channel. The results of the geomorphic and riparian studies indicate the current flow regime maintains sediment/channel conditions in the PBR (e.g., no berm or new bank development was observed) (PG&E 2022).

Riparian vegetation patterns also reflect the hydrology regime, which influences recruitment and establishment of riparian vegetation. Flows can affect the formation and destruction of geomorphic landforms (e.g., bars) that support riparian vegetation, the quantity and quality of substrate for supporting riparian vegetation (e.g., sites suitable for riparian vegetation establishment), transport of seeds and stems, and viability of riparian vegetation once established. Flow attributes that are important for maintaining the distribution and structural and compositional complexity of riparian species include

(1) inter-annual variability; (2) hydrograph shape; (3) the frequency of high magnitude scouring or "re-setting" flows; and (4) the frequency, magnitude, timing, and recession rates of seed setting flows (recruitment flows). Flow attributes during ecologically sensitive periods for riparian species (e.g., seed release, initial establishment, growing season) are particularly important for maintaining riparian vegetation. Riparian vegetation often establishes in elevation zones where water is available during the drier months and the plants are not too close to the channel and susceptible to damage by high flows. In the PBR, the steep side slopes limit the area adjacent to the channel where riparian vegetation can reach summer water levels and not be frequently scoured by winter and spring flows. The riparian community along the PBR is currently composed of native riparian species with a diverse age class assemblage, indicating that flow conditions have been suitable for successful establishment in recent years.

The Proposed Project includes additional flow releases to maintain temperature criteria, updated flow operation (see the EOS Flow Recession Measure, the Subsequent Spill Ramp Down Measure, the Spill Season Flow Measure, and the POM in Section 2.4.2.1 *Proposed Project Environmental Management Measures*), whitewater boating flows, and a proposed revision to the American shad spawning season flow release locations. Provided below is an analysis of potential impacts of this action on riparian vegetation in the PBR. Modeled daily flow data generated using the operations simulation model for the Proposed Project (compared to baseline operations) were used to evaluate flows in the PBR.

The annual flow patterns and magnitudes, frequency, and timing of spill flows, as well as intra-annual variability, would be similar under existing conditions and the Proposed Project. Under the Proposed Project, average monthly flows would be slightly higher in the spring and/or summer (depending on the WY type) in all WY types, with the most difference occurring in drier years, primarily due to the implementation of the Proposed Project's Flow Management Measures. In addition, the Proposed Project's Water Temperature Measure would increase instream flows to maintain water temperatures to support the native fish population when the defined water temperature criteria are exceeded. The water temperature releases during these hot, dry periods would provide

additional soil moisture that would benefit the riparian vegetation. In above normal and wet WYs, implementation of the Proposed Project's Spill Season Flow Measure would also increase flows compared to existing conditions by sustaining an approximately 500-cfs flow during spill periods with fluctuating flows to deter people from entering the water in the PBR. Increased flows at the end-of-spill and later in the summer from implementation of the Proposed Project's Spill Season Flow Measure and the EOS Flow Recession Measure would provide additional moisture to riparian vegetation along the PBR. Under the Proposed Project's Planned Outage Ramp Up, flows may also be increased (up to 500 cfs) during times of the annual outage as defined in the Proposed Project's POM. The planned outages typically occur in late fall and winter when riparian vegetation is dormant. As a result, these higher flows would have minimal potential impact on riparian vegetation.

Inter-annual flow patterns would be similar under the Proposed Project and baseline operations, with higher flow events in wetter years and low flows in the drier years. The annual hydrograph pattern would also be similar under both the Proposed Project and baseline operations. In wetter years, spills would occur in the spring, consistent with the timing of seed release for native riparian vegetation species.

Under the Proposed Project, the frequency of the higher magnitude and infrequent flow events that can scour banks, bars, and some existing vegetation (e.g., flows that occur once every five years and less frequently—about 8,500 cfs and greater) would be similar to existing conditions (PG&E 2023). Additional analysis is included in provided in Section 4.11 *Hydrology and Water Quality*.

Kerckhoff Reservoir Shoreline

PG&E's Operations Simulation Model modeled daily flow data for baseline operations and the Proposed Project were estimated and used to evaluate potential impacts of changes in operation on riparian vegetation and wetland habitat on Kerckhoff Reservoir water surface elevations.

As described above in Section 4.4.4.1, monthly average water surface elevations would be less than 0.3 feet lower under the Proposed Project than under the existing

conditions but would still fall within the normal operating range. The greatest change in inundation occurs at the upper end of Kerckhoff Reservoir where the dominant species are well adapted to surviving in dynamic flow environments (white alder, willows, Oregon ash, and freshwater emergent wetlands). Under the Proposed Project, flows expected to promote successful riparian vegetation establishment would be similar to baseline operations.

Management Plans

The potential direct loss or degradation of riparian vegetation during the Proposed Project maintenance is discussed in Section 4.4.4.1 due to potential impacts on special-status aquatic species within these riparian and wetland habitats.

As indicated, routine maintenance activities are not anticipated to change under the Proposed Project. However, implementation of the proposed management plan includes implementation of avoidance and minimization measures expected to benefit riparian habitat.

Additionally, PG&E would minimize the potential for the loss or degradation of environmental resources, including riparian vegetation, along the Kerckhoff Reservoir shoreline from concentrated visitor use by implementing measures in the Proposed Project's Recreation Management Plan to manage dispersed recreation in this area, including providing a defined area for launching trailered watercraft, installing barriers to control vehicles, installing signs displaying rules and regulations applicable to the area, regularly patrolling the area to ensure compliant use, and creating and maintaining three suitable areas where recreation boat-in access would be provided for day use. Therefore, the Proposed Project would enhance riparian vegetation in the areas potentially affected by recurrent dispersed recreation use along the Kerckhoff Reservoir shoreline.

Overall, implementation of the Proposed Project would have a beneficial potential impact on the overall riparian vegetation and wetland habitat of the Kerckhoff Reservoir shoreline.

FERC Boundary Modifications

All land that is encompassed by the Proposed FERC Project Boundary would be under FERC jurisdiction and, therefore, subject to the terms and conditions specified in the license, including those designated to protect environmental resources contained in the new license. The FERC Project Boundary modifications ensure that only lands necessary for the operation of the Proposed Project are included within the Proposed FERC Project Boundary. The Proposed FERC Project Boundary modifications would have a potential beneficial impact relative to existing conditions by ensuring all land necessary for operation is included in the Proposed FERC Project Boundary, as required, and environmental resources, including riparian vegetation and wetland habitat, are protected.

Operations Impact Determination for Riparian Habitat

Therefore, there would be a **Less Than Significant Impact** as a result of operational activities under the Proposed Project for potential impact BIO-2.

Significance Determination Summary for Riparian Habitat Before Mitigation

Therefore, there would be a **Potential Significant Impact** to riparian habitat as described under potential impact BIO-2 with Proposed Project construction activities.

Significance Determination Summary for Riparian Habitat After Mitigation

To reduce the potentially significant impact under potential impact BIO-2, Mitigation Measure BIO-3 would require the restoration of the reservoir bed and creek bed to pre-Proposed Project contours impacted by construction of the inflow gage to baseline conditions for any temporary impacts to waters of the United States and compensation for any permanent loss of waters of the United States. Therefore, there would be a **Less than Significant Impact with Mitigation Incorporated** on any riparian habitat or other sensitive natural community under the Proposed Project as described in potential impact BIO-2.

Mitigation Measures

Mitigation Measure BIO-3: Compensate for the Temporary and Permanent Losses of Waters of the United States/Waters of the State

Level of Significance

Less than Significant Impact with Mitigation Incorporated

Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction impacts as the Proposed Project, discussed in Section 4.4.4.2.1.

Construction Impact Determination for Riparian Habitat

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** as a result of construction activities under Alternative 1 for potential impact BIO-2, primarily due to direct and indirect impacts associated with the construction of the inflow gage.

Impact Analysis with Mitigation

To reduce the potentially significant impact, Mitigation Measure BIO-3 would require the restoration of land impacted by construction of the inflow gage to baseline conditions for temporary impacts to waters of the United States and compensation for any permanent loss of waters of the United States. Therefore, there would be a **Less than Significant Impact with Mitigation Incorporated** on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS.

Operation

Spill Year Schedule Boating Flows and Down Ramping of Spill Flows

Under the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure, PG&E would ramp down flows between May 1 through August 31 in the PBR after SCE has identified when down ramping of spill flows at Big Creek 4's Dam No. 7 will start. Standard down ramping for end of spills are determined by the WY Schedules, A, B (low storage), B (high storage), C, or D.

Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), each schedule was successfully implemented and provided the desired boating flows and days. However, while the model showed this measure was technically successful 100 percent of the time, the measure in practice would be infeasible. As shown in the model, the reservoir elevation drops very close to the K2 Powerhouses minimum operating reservoir elevation. As the reservoir approaches the K2 Powerhouses minimum operating reservoir elevation, the K2 Powerhouse cycles above and below the ROZ in an attempt to keep the reservoir high enough to stay above the minimum operating elevation for the K2 Powerhouse. The K2 Powerhouse cycling frequency is anywhere from half an hour to two hours, which represents an unrealistic operating scenario. Based on the documented operational constraints, any operation that requires K2 to dwell in the ROZ is considered infeasible due to excessive cavitation and vibration impacts and the associated maintenance and outage consequences. That means operating strategies that would require repeated short interval oscillations across the ROZ are not considered feasible, because they can increase cycling wear and raise reliability/maintenance risk even if each individual crossing is brief (personal email communication, J. Hartman and C. McCormick, March 5, 2026).

As for operational impacts, the releases to accommodate whitewater boating were designed to more closely mimic the system's natural hydrograph. Compared to baseline conditions, the reduced rate of fluctuation in flows in the PBR could have a positive impact on riparian habitat by reducing the potential for scour of suitable habitat and

established stands of riparian flora. Furthermore, these releases would result in changes to the reservoir's surface elevation relative to the Proposed Project, but all fluctuations would be contained within the normal operating range of 980.0 feet to 984.5 feet msl, with the majority of fluctuations between 982.5 feet and 983.0 feet msl. Impacts to riparian habitats from this measure are expected to be minimal.

Although the modeling described above showed this component of Alternative 1 to be infeasible, implementing the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure under Alternative 1 would result in a **Less than Significant Impact** compared with baseline for potential impact BIO-2. Ultimately, as described in the modeling report (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), implementation of the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure was deemed as infeasible as a result of over cycling of the powerhouse through the ROZ and the necessity for rapid operational changes that may not be foreseeable to a reservoir operator not aware of upstream non-Proposed Project operations.

Non-Spill Year Boating Flows and Down Ramping

The boating flows and down ramping schedule is attempted every weekend from May 15 to June 15 of non-spill years. The modeled Non-Spill Year Boating Flows and Ramp Down Measure success of was primarily dependent on the volume of inflows coming into Kerckhoff Reservoir during the weekends. Based on the past data in the model, this measure was only successful in providing boating flows 28.6 percent of the time. The measure was only feasible when natural flows were high enough to support 2 days of 2,500 cfs to 1,600 cfs.

Implementation of the Non-Spill Year Boating Flows Measure could result in changes to Kerckhoff Reservoir water surface elevation relative to the Proposed Project. However, any fluctuations would remain within the normal operating range of 980.0 feet to 984.5 feet msl under implementation of this measure. Therefore, there would be a **Less than Significant Impact** as a result of operations specific to Non-Spill Year Boating Flows under Alternative 1 for potential impact BIO-2.

Stranding Protection Down Ramp Measure

The Stranding Protection Down Ramping Measure covers initial and subsequent spills between May 1 and August 31. In other words, the ramp down schedules (AB, BC, D) are reserved for the large spill events in each spill season, while all others are handled by the Stranding Protection Down Ramping Measure. Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), the Stranding Protection Down Ramping ramp down better matches the inflow reductions over the same period, the pool elevation drops are minimal. and avoid the K2 Powerhouse over-cycling most of the time. The K2 Powerhouses minimum operating reservoir elevation was encroached 37.5 percent of the time and only induced K2 Powerhouse over-cycling 12.5 percent of the time.

Implementation of the Stranding Protection Down Ramp Measure could result in changes to Kerckhoff Reservoir water surface elevation relative to the Proposed Project. However, any fluctuations would remain within the normal operating range of 980.0 feet to 984.5 feet msl under implementation of this measure. By implementing down ramping in a manner more consistent with the natural hydrograph in river systems draining the western slope of the Sierra Nevada, and minimizing fluctuations to water surface elevation in the reservoir such that they remain within the normal operating range, there would be a **Less than Significant Impact** as a result of operations specific to the Stranding Protection Down Ramping Measure under Alternative 1 for potential impact BIO-2.

September – October Down Ramp Measure

During the September – October Ramp Down Measure, a ramp down is triggered during declining limb of spills once the average daily flow declines below 1,600 cfs. Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), this measure was successfully implemented 100 percent of the time but did encroach on the K2 Powerhouses minimum operating reservoir elevation every time. This is due to the low inflows typically seen during the

September and October months at the Kerckhoff Project. However, no powerhouse cycling was seen in the model and therefore this measure is considered feasible.

Implementation of the September – October Down Ramp Measure could result in changes to Kerckhoff Reservoir water surface elevation relative to the Proposed Project. However, any fluctuations would remain within the normal operating range of 980.0 feet to 984.5 feet msl under implementation of this measure. By implementing down ramping in a manner more consistent with the natural hydrograph in river systems draining the western slope of the Sierra Nevada and minimizing fluctuations to water surface elevation in the reservoir such that they remain within the normal operating range, there would be a **Less than Significant Impact** as a result of operations specific to the September – October Down Ramp Measure under Alternative 1 for potential impact BIO-2.

Alternative 1 Ramp Up Measure

The Alternative 1 Ramp Up Measure imposes a limit on the rate increase of stage as measured at Gage J-2, for spill events starting between MIF and 4,000 cfs, regardless of time of year provided there is sufficient storage and powerhouse capacity to meet this requirement. To model this measure, the alternatives modeling report (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0) analyzed if a 1 foot per hour ramp rate in general would be feasible, subject to sufficient storage and powerhouse capacity regardless of the inflow recorded at the gage above of the reservoir. Based on the modeling, this measure was successful 97.6 percent of the time and caused no encroachment toward Kerckhoff's minimum operating elevation or K2 Powerhouse over-cycling. The success of the application of this measure depends heavily on advanced notification of the magnitude and timing of forecasted inflows from upstream projects, as well as the skill of the operator to predict the time, in advance of an increase in inflows, at which initiation of the ramp up protocol should begin. It would be better for the operator to initiate the protocol earlier than later, as an earlier start would allow the operator to back off spill if the reservoir were draining too fast and still maintain a rate of stage increase at Gage J-2 of less than one foot per hour. A late start

would require the operator to spill more than the protocol allows to prevent the reservoir from rising above guide curve.

Implementation of this measure would provide conditions that more closely follow the natural hydrograph, ultimately reducing the potential for scour or erosion of riparian habitats. Therefore, there would be a **Less than Significant Impact** as a result of operations specific to the Alternative 1 Ramp Up Measure for potential impact BIO-2.

Significance Determination Summary for Riparian Habitat

Therefore, there would be a **Less than Significant Impact with Mitigation Incorporated** to riparian habitat as a result of Alternative 1 construction and operational activities as described under potential impact BIO-2.

Mitigation Measures

Mitigation Measure BIO-3: Compensate for the Temporary and Permanent Losses of Waters of the United States/Waters of the State

Level of Significance

Less than Significant Impact with Mitigation Incorporated

Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction impacts as the Proposed Project, discussed in Section 4.4.4.2.1.

Construction Impact Determination for Riparian Habitat

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** as a result of construction activities under Alternative 2 for potential impact BIO-2, primarily due to direct and indirect impacts associated with the construction of the inflow gage.

Impact Analysis with Mitigation

To reduce the potentially significant impact, Mitigation Measure BIO-3 would require the restoration of land impacted by construction of the inflow gage to baseline conditions and compensation for any permanent loss of waters of the United States. Therefore, there would be a **Less than Significant Impact with Mitigation Incorporated** on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS.

Operation

Alternative 2 is similar to the Proposed Project Flow Measures, with the only difference being seen in AA WY under each of the flow measures, either an increase in time spent at a down-ramping flow step is implemented, or an entirely new, higher flow step is established, with each change resulting in more water being released into the PBR (see details in Section 3.4.4 *Alternative 2*).

Based on the modeling report (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0) the POM Initial Release Protocol could result in spikes in flow in the PBR if the protocol is implemented and then inflows recede, causing the spill to stop, followed by a large increase in inflows, which forces the Proposed Project back into spill. Increased water velocity, a potential impact of high rates of stage increase, has the potential to scour or deposit sediment, potentially affecting riparian habitat. However, this measure would only occur during the scheduled planned outages, which are often planned for in October. Riparian habitats along the west slope of the Sierra Nevada are accustomed to seasonal and interannual variability in flows, and this mid- to late fall timeframe aligns with some of the first precipitation events of the season (Booth et al. 2006), which are more likely to fall as rain (as opposed to snow, which would not result in increased runoff) at higher elevations due to above-freezing temperatures (Dettinger 2005). Additionally, the first rainstorms of the season can experience limited ground saturation resulting in higher runoff and subsequent flood-like conditions (Shaw et al. 2010), especially in physically constrained channels like the PBR. While the high flow events in the PBR may have short-term

negative impacts on riparian habitat, these impacts are anticipated to be similar to what is experienced under baseline conditions.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 2 for potential impact BIO-2.

Significance Determination Summary for Riparian Habitat

Therefore, there would be a **Less than Significant Impact with Mitigation Incorporated** to riparian habitat as a result of Alternative 2 construction and operational activities as described in potential impact BIO-2.

Mitigation Measures

Mitigation Measure BIO-3: Compensate for the Temporary and Permanent Losses of Waters of the United States/Waters of the State

Level of Significance

Less than Significant Impact with Mitigation Incorporated

4.4.4.3 Potential Impacts Related to Wetlands

Impact BIO-3: Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Proposed Project

Construction

There are no state or federally protected wetlands, as shown in Figure E2-1 and Figure E2-5 in Appendix E-2 *Figures*, and those mapped by the National Wetlands Inventory (USFWS 2026), within the footprint of proposed construction activities. Indirect impacts from the discharge of fill from the construction of the inflow gage are expected to be negligible given the likely limited size of the proposed construction area and the

distance between the proposed construction site and the nearest mapped wetlands. More than 0.5 miles separate the construction site from the nearest wetland, and most of this distance is within the Kerckhoff Reservoir, where low water velocities would result in the settling out of any discharged fill soon after reaching the reservoir. Still, Mitigation Measure BIO-3 was developed to reduce any impacts to local waters and require compensation for any losses attributable to construction associated with the inflow gage.

Wetland areas are distinguished from the *Alnus rhombifolia*, *Fraxinus latifolia*, *Salix exigua*, *Salix lasiolepis*, and *Populus fremontii* communities mapped in Figure E2-5 that are being considered as riparian habitat, for which the analysis can be found in Section 4.4.4.2 *Potential Impacts Related to Riparian Habitat*.

Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact BIO-3.

Operations

As detailed in Sections 4.4.3 and 4.4.4.1, the Proposed Project would result in changes in hydrologic regimes relative to baseline operations due to American Shad Spawning Season Flow Release Measure and Flow Management Measures.

The only mapped wetland habitats in the Proposed Project Area with the potential to be affected by operations are generally focused along the northwest shoreline of Kerckhoff Reservoir (Figure E2-5, Appendix E-2; USFWS 2026). Changes in reservoir elevations and resulting inundation (or lack of inundation) of these habitats are the primary consideration for any potential impacts. Under the Proposed Project, PG&E would operate the reservoir within the historical operating range. Monthly average water surface elevations would change by 0.6 foot or less in all months but October, during which water surface elevation would be 1.5 feet lower than Kerckhoff Hydroelectric Project operations. The greatest change in inundation occurs at the upper end of Kerckhoff Reservoir. White alder, willows, Oregon ash, and herbaceous wetlands established in this area are well adapted to surviving in dynamic flow environments. Additionally, the reservoir drawdowns during flow releases are of relatively short

duration. Based on the anticipated consistency of reservoir elevations between the Proposed Project and baseline conditions, no changes in the extent or characteristics of existing wetlands are anticipated.

Ongoing maintenance and repairs could also result in temporary discharge of fill or stormwater pollution entering wetlands in the case of culvert or drainage replacement or repairs; however, as discussed in Section 4.4.4.1, any non-routine heavy maintenance activities requiring discharge of fill to federally or state-regulated wetlands would require permitting and would be subject to an independent environmental review in support of that process, if warranted. Additionally, as indicated in Section 4.4.4.2 for the installation of the new flow gage and construction of the Vista Day Use Area, the Proposed Project's management plans include a variety of wetland avoidance and minimization measures that further protect wetland resources.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact BIO-3.

Significance Determination Summary for Wetlands

Therefore, there would be a **Less than Significant Impact** to wetlands with Proposed Project construction and operational activities as described under potential impact BIO-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction impacts as the Proposed Project, discussed in Section 4.4.4.3.1. Therefore, there would be a

Less than Significant Impact as a result of construction activities under Alternative 1 for potential impact BIO-3.

Operation

Spill Year Schedule Boating Flows and Down Ramping of Spill Flows

Under the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure, PG&E would ramp down flows between May 1 through August 31 in the PBR after SCE has identified when down ramping of spill flows at Big Creek 4's Dam No. 7 will start. Standard down ramping for end of spills are determined by the WY Schedules, A, B (low storage), B (high storage), C, or D.

Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), each schedule was successfully implemented and provided the desired boating flows and days. However, while the model showed this measure was technically successful 100 percent of the time, the measure in practice would be infeasible. As shown in the model, the reservoir elevation drops very close to the K2 Powerhouses minimum operating reservoir elevation. As the reservoir approaches the K2 Powerhouses minimum operating reservoir elevation, the K2 Powerhouse cycles above and below the ROZ in an attempt to keep the reservoir high enough to stay above the minimum operating elevation for the K2 Powerhouse. The K2 Powerhouse cycling frequency is anywhere from half an hour to two hours, which represents an unrealistic operating scenario. Based on the documented operational constraints, any operation that requires K2 to dwell in the ROZ is considered infeasible due to excessive cavitation and vibration impacts and the associated maintenance and outage consequences. That means operating strategies that would require repeated short interval oscillations across the ROZ are not considered feasible, because they can increase cycling wear and raise reliability/maintenance risk even if each individual crossing is brief (personal email communication, J. Hartman and C. McCormick, March 5, 2026).

As for operational impacts, the releases to accommodate whitewater boating would result in changes to the reservoir's surface elevation relative to the Proposed Project,

but all fluctuations would be contained within the baseline normal operating range of 980.0 feet to 984.5 feet msl, with the majority of fluctuations between 982.5 feet and 983.0 feet msl. Impacts to wetland habitats from this measure are expected to be minimal.

Although the modeling described above showed this component of Alternative 1 to be infeasible, implementing the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure would result in a **Less than Significant Impact** compared with baseline for potential impact BIO-3. Ultimately, as described in the modeling report (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), implementation of the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure was deemed as infeasible as a result of over-cycling of the powerhouse through the ROZ and the necessity for rapid operational changes that may not be foreseeable to a reservoir operator not aware of upstream non-Proposed Project operations.

Non-Spill Year Boating Flows and Down Ramping

The boating flows and down ramping schedule is attempted every weekend from May 15 to June 15 of non-spill years. The modeled Non-Spill Year Boating Flows and Down Ramping Measure success of was primarily dependent on the volume of inflows coming into Kerckhoff Reservoir during the weekends. Based on the past data in the model, this measure was only successful in providing boating flows 28.6 percent of the time. The measure was only feasible when natural flows were high enough to support 2 days of 2,500 cfs to 1,600 cfs.

Implementation of the Non-Spill Year Boating Flows Measure could result in changes to Kerckhoff Reservoir water surface elevation relative to the Proposed Project. However, any fluctuations would remain within the normal operating range of 980.0 feet to 984.5 feet msl under implementation of this measure. Therefore, there would be a **Less than Significant Impact** as a result of operations specific to the Non-Spill Year Boating Flows Measure under Alternative 1 for potential impact BIO-3.

Stranding Protection Down Ramp Measure

The Stranding Protection Down Ramping Measure covers initial and subsequent spills between May 1 and August 31. In other words, the ramp down schedules (AB, BC, D) are reserved for the large spill events in each spill season, while all others are handled by the Stranding Protection Down Ramping Measure. Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), the Stranding Protection Down Ramping ramp down better matches the inflow reductions over the same period, the pool elevation drops are minimal. and avoid the K2 Powerhouse over-cycling most of the time. The K2 Powerhouses minimum operating reservoir elevation was encroached 37.5 percent of the time and only induced K2 Powerhouse over-cycling 12.5 percent of the time.

Implementation of the Stranding Protection Down Ramping Measure could result in changes to Kerckhoff Reservoir water surface elevation relative to the Proposed Project. However, any fluctuations would remain within the normal operating range of 980.0 feet to 984.5 feet msl under implementation of this measure. Therefore, there would be a **Less than Significant Impact** as a result of operations specific to the Stranding Protection Down Ramping Measure under Alternative 1 for potential impact BIO-3.

September – October Down Ramp Measure

During the September – October Down Ramp Measure, a ramp down is triggered during declining limb of spills once the average daily flow declines below 1,600 cfs. Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), this measure was successfully implemented 100 percent of the time but did encroach on the K2 Powerhouses minimum operating reservoir elevation every time. This is due to the low inflows typically seen during the September and October months at the Kerckhoff Project. However, no powerhouse cycling was seen in the model and therefore this measure is considered feasible.

Implementation of the September – October Down Ramp Measure could result in changes to Kerckhoff Reservoir water surface elevation relative to the Proposed

Project. However, any fluctuations would remain within the normal operating range of 980.0 feet to 984.5 feet msl under implementation of this measure. Therefore, there would be a **Less than Significant Impact** as a result of operations specific to the September – October Down Ramp Measure under Alternative 1 for potential impact BIO-3.

Alternative 1 Ramp Up Measure

The Alternative 1 Ramp Up Measure imposes a limit on the rate increase of stage as measured at Gage J-2, for spill events starting between MIF and 4,000 cfs, regardless of time of year, provided there is sufficient storage and powerhouse capacity to meet this requirement. To model this measure, the alternatives modeling report (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0) analyzed if a 1 foot per hour ramp rate in general would be feasible, subject to sufficient storage and powerhouse capacity regardless of the inflow recorded at the gage above of the reservoir. Based on the modeling, this measure was successful 97.6 percent of the time and caused no encroachment toward Kerckhoff's minimum operating elevation or K2 Powerhouse over-cycling. The success of the application of this measure depends heavily on advanced notification of the magnitude and timing of forecasted inflows from upstream projects, as well as the skill of the operator to predict the time, in advance of an increase in inflows, at which initiation of the ramp up protocol should begin. It would be better for the operator to initiate the protocol earlier than later, as an earlier start would allow the operator to back off spill if the reservoir were draining too fast and still maintain a rate of stage increase at Gage J-2 of less than one foot per hour. A late start would require the operator to spill more than the protocol allows to prevent the reservoir from rising above guide curve.

Implementation of this measure could result in changes to Kerckhoff Reservoir water surface elevation relative to the Proposed Project. However, any fluctuations would remain within the normal operating range of 980.0 feet to 984.5 feet msl. Therefore, there would be a **Less than Significant Impact** as a result of operations specific to the Alternative 1 Ramp Up Measure under Alternative 1 for potential impact BIO-3.

Significance Determination Summary for Wetland Habitat

Changes to reservoir surface elevation under Alternative 1 are not expected to vary substantially from baseline conditions, resulting in minimal impact to wetland habitats relative to baseline conditions. Therefore, there would be a **Less than Significant Impact** to wetlands with Alternative 1 construction and operational activities.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction impacts as the Proposed Project, discussed in Section 4.4.4.3.1. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 2 for potential impact BIO-3.

Operation

Alternative 2 is similar to the Proposed Project Flow Measures, with the only difference being seen in AA WYs. Under each of the flow measures, either an increase in time spent at a down-ramping flow step is implemented, or an entirely new, higher flow step is established, with each change resulting in more water being released into the PBR (see details in Section 3.4.4 *Alternative 2*).

The model of operations under the proposed alternatives (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0) showed that changes in flow from Kerckhoff Dam and in some circumstances, powerhouse cycling, may result in differences to the water surface elevation in Kerckhoff Reservoir relative to the Proposed Project. However, changes to reservoir surface elevation under Alternative 2

are not expected to vary substantially from baseline conditions, resulting in minimal impact to wetland habitats relative to baseline conditions.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 2 for potential impact BIO-3.

Significance Determination Summary for Wetlands

Changes to reservoir surface elevation under Alternative 2 are not expected to vary substantially from baseline conditions, resulting in minimal impact to wetlands relative to baseline conditions. Therefore, there would be a **Less Than Significant Impact** to wetlands as a result of construction and operational activities under Alternative 2 for protentional impact BIO-3.

Mitigation Measures

No Mitigation Required.

Level of Significance

Less than Significant Impact

4.4.4.4 Potential Impacts Related to Fish Passage or Wildlife Migration

Impact BIO-4: Would the project 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?

Potential impacts on movement or migration of terrestrial wildlife species are discussed in Section 4.5 *Biological Resources – Terrestrial*.

Proposed Project

Construction and Operation

Under current conditions, there is no upstream fish passage at Kerckhoff Dam.

As discussed in Section 4.4.4.1, installation of the new flow gage within the SJR upstream of Kerckhoff Reservoir and downstream of SCE's Big Creek No. 4 Powerhouse could require a temporary surface diversion to provide a dry work area. A diversion structure would temporarily narrow the channel and increase flow velocities at the flow gage installation location. This could result in a short-term disruption of fish movements; however, with a channel width of over 100 feet upstream of Kerckhoff Reservoir, installation of the 3- to 4-foot-wide gage would neither substantially nor permanently alter fish passage. Additionally, with the implementation of Mitigation Measure WQ-2 that requires development of a plan with best management procedures for installation of the new stream gage, impacts to migration would be less than significant.

Therefore, there would be a **Less than Significant Impact** as a result of construction and operational activities under the Proposed Project for potential impact BIO-4.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project discussed above in Section 4.4.4.4.1.

Therefore, there would be a **Less than Significant Impact** as a result of construction and operational activities under Alternative 1 for potential impact BIO-4.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project discussed above in Section 4.4.4.4.1.

Therefore, there would be a **Less than Significant Impact** as a result of construction and operational activities under Alternative 2 for potential impact BIO-4.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.4.4.5 Potential Impacts Related to Local Policies or Ordinances

Impact BIO-5: Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Proposed Project

Neither Madera County nor Fresno County have any natural resource ordinances that pertain to the Proposed Project. Proposed Project elements that affect aquatic resources on county lands include the Flow Management Measures and Management Plans. Relevant local agency management goals for aquatic biological resources are listed in Section 4.4.2.3 *Local Agencies*.

Construction and Operation

The Proposed Project would improve hydrologic and temperature conditions for native fish communities in the PBR of the SJR while maintaining wetland and riparian

communities and within the Project Area. The Proposed Project would not conflict with the Fresno County General Plan or the Madera County General Plan policies.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under the Proposed Project for potential impact BIO-5.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project discussed above in Section 4.4.4.5.1.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 1 for potential impact BIO-5.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project discussed above in Section 4.4.4.5.1.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 2 for potential impact BIO-5.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.4.4.6 Potential Impacts Related to Conservation Plans

Impact BIO-6: Would the Project conflict with the provisions of an adopted Habitat Conservation Plan; Natural Community Conservation Plan; or other approved local, regional, or state habitat conservation plan?

Proposed Project

Construction and Operation

The Proposed Project does not fall within an adopted Habitat Conservation Plan; Natural Community Conservation Plan; or other approved local, regional, or state habitat conservation plan.

Therefore, there would be **No Impact** as a result of construction and operational activities under the Proposed Project for potential impact BIO-6.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project discussed above in Section 4.4.4.6.1.

Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 1 for potential impact BIO-6.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project discussed above in Section 4.4.4.6.1.

Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 2 for potential impact BIO-6.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.4.5 Literature Cited

BLM (United States Bureau of Land Management). 2014. *Bakersfield Field Office Record of Decision and Approved Resource Management Plan*. United States

Department of the Interior, Bureau of Land Management. December. Accessed April 5, 2026. Retrieved from: https://www.govinfo.gov/content/pkg/GOVPUB-I53-PURL-gpo83734/pdf/GOVPUB-I53-PURL-gpo83734.pdf.

Bjornn, T.C., and D.W. Reiser. 1991. "Habitat Requirements of Salmonids in Streams." *American Fisheries Society Special Publication*, Vol. 19: 83–138.

Booth, E.G., J.F. Mount, and J.H. Viers. 2006. Hydrologic Variability of the Consumes River Floodplain. San Francisco Estuary and Watershed Science 4(2): Article 2.

Brown, L.R., and P.B. Moyle. 1993. "Distribution, ecology, and status of the fishes of the San Joaquin River drainage, California." California Fish and Game, Vol. 79: 96–114.

Brungs, W.A., and B.R. Jones. 1977. *Temperature Criteria for Freshwater Fish: Protocol and Procedures.* EPA-600/3-77-061. Ecological Research Series. Environmental Research Laboratory, Office of Research and Development, United States Environmental Protection Agency.

California Academy of Sciences. 2017. Institute for Biodiversity Science & Sustainability. San Francisco, CA. Accessed: April 5, 2026. Retrieved from: https://www.calacademy.org/scientists.

CDFG (California Department of Fish and Game). 2003. List of Californian Macroinvertebrate Taxa and Standard Taxonomic Effort.

CDFW (California Department of Fish and Wildlife). 2008. *California Aquatic Invasive Species Management Plan.* Sacramento, CA.

_____. 2017a. California Wildlife Habitat Relationships [online database]. Version 9.0. Accessed: April 5, 2026. Retrieved from: https://wildlife.ca.gov/Data/CWHR.

_____. 2017b. *Millerton Lake Spring 2013 General Fish Survey and Slot Limit Evaluation*. Inland Fisheries Division Lake & Reservoir Management & Research Fisheries Branch.

_____. 2025. CNDDB-tracked Elements by Quad [ds2853]. Accessed: April 5, 2026. Retrieved from: https://apps.wildlife.ca.gov/bios6/?bookmark=327.

CDWR (California Department of Water Resources). 2023. *California Water Plan Update 2023*. Accessed: April 5, 2026. Retrieved from: https://water.ca.gov/-

/media/DWR-Website/Web-Pages/Programs/California-Water-Plan/Docs/Update2023/Final/California-Water-Plan-Update-2023.pdf.

Cech, J.J., S.J. Mitchell, D.T. Castleberry, and M. McEnroe. 1990. "Distribution of California stream fishes: Influence of environmental temperature and hypoxia." *Environmental Biology of Fishes*, Vol. 29: 95–105.

CEDEN (California Environmental Data Exchange Network). 2017. Data system for surface water quality in California. Accessed: April 5, 2026. Retrieved from: http://ceden.waterboards.ca.gov/.

Central Valley Regional Water Board (Central Valley Regional Water Quality Control Board). 2019. *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region*. Fifth Edition, Revised February 2019 (with Approved Amendments). The Sacramento River Basin and San Joaquin River Basin. Accessed: April 3, 2026. Retrieved from: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201902.pdf.

Dettinger, M.D. 2005. A long-term (~50-yr) historical perspective on flood-generating winter storms in the American River basin. 2005 California Extreme Precipitation Symposium:62-73.

Ecological Analysts. 1982. *Fisheries studies at Millerton Lake, 1979–1982*. Prepared for Pacific Gas and Electric Company. Department of Engineering Research, San Ramon, CA. 82 pp.

FERC (Federal Energy Regulatory Commission). 1979. *Final Environmental Impact Statement, Kerckhoff Project No. 96.* February. Office of Electric Power Regulation.

_____. 1993. Order establishing permanent flow release regime for the Kerckhoff Hydroelectric Project (FERC Project No. 96). April. Federal Energy Regulatory Commission, Office of Hydropower Licensing, Washington D.C.

Flosi, G., S. Downie, J. Hopelain, M. Bird, R. Coey, and B. Collins. 2009. *California salmonid stream habitat restoration manual, Part IX*. Third edition. California Department of Fish and Game.

Fresno County. 2024. *Fresno County General Plan Policy Document.* Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

Gard, M. 2004. "Interactions between an introduced piscivore and a native piscivore in a California stream." *Environmental Biology of Fishes*, Vol. 71, No. 3: 287–295.

Hawkins, C.P., J.L. Kershner, P.A. Bisson, M.D. Bryant, L.M. Decker, S.V. Gregory, D.A. McCullough, C.K. Overton, G.H. Reeves, R.J. Steedman, and M.K. Young. 1993. "A Hierarchical Approach to Classifying Stream Habitat Features." *Fisheries*, Vol. 18, No. 6:3–12.

Lambert, T.R, and J.M. Handley. 1980. *An instream flow needs study involving smallmouth bass (Micropterus dolomieu) in the San Joaquin River, California*.

Landis, H.R., and T.R. Lambert. 1979. *San Joaquin River transport time from Kerckhoff Powerhouse to the proposed Kerckhoff 2 Powerhouse site*. Pacific Gas and Electric Company, Department of Engineering Research Report 025.91-79.1. 9 pp.

Madera County. 1995. *Madera County General Plan Policy Document*. Adopted October 24. Accessed: April 3, 2026. Retrieved from:https://www.maderacounty.com/home/showpublisheddocument/40825/638615574804870000.

Martin, K.R.C. 2016. *Upper Thermal Limits of Freshwater Mussels (Bivalvia, Unionoida) In Ramped Temperature Exposures*. Missouri State University Graduate Thesis. Accessed: April 5, 2026. Retrieved from: https://bearworks.missouristate.edu/theses/2969.

McCain, M.D., D. Fuller, L. Decker, and K. Overton. 1990. *Stream habitat classification and inventory procedures for northern California*. FHR Currents: R-5's fish habitat relationships, Technical Bulletin No. 1. U.S. Department of Agriculture, Forest Service, Pacific Southwest Region, Arcata, CA.

Moyle, P.B. 2002. *Inland Fishes of California: Revised and Expanded*. University of California Press.

Moyle, P.B., and N.K. Knight. 1984. *Temperature requirements of Pacific coastal fishes*. University of California, Berkeley: University of California Water Resources Center. Accessed: April 5, 2026. Retrieved from https://escholarship.org/uc/item/7qg862b1.

Moyle, P.B., M.P. Marchetti, J. Baldrige, and T.L. Taylor. 1998. "Fish Health and Diversity: Justifying Flows for a California Stream." *Fisheries*, Vol. 23, No. 7:6–15.

Moyle, P.B., and R.D. Nichols. 1974. "Decline of the Native Fish Fauna of the Sierra Nevada Foothills, Central California." *The American Midland Naturalist*, Vol. 92, No. 1: 72–83.

Museum of Vertebrate Zoology. 2017. Amphibians & Reptiles Collection. University of California, Berkeley. Berkeley, CA. Accessed: March 2026. Retrieved from: http://arctos.database.museum/mvz_herp.

NES (National Environmental Services, Inc.). 1986a. *Fisheries studies at Millerton Lake, 1984, 1985.* Prepared by National Environmental Services, Inc. for Pacific Gas and Electric Company Department of Engineering Research, San Ramon, CA.

_____. 1986b. *Fisheries studies at Millerton Lake, 1986.* Prepared for Pacific Gas and Electric Company, Department of Engineering Research, San Ramon, CA.

_____. 1988. *Study of American shad at Millerton Lake, 1987.* Prepared for Pacific Gas and Electric Company, Department of Engineering Research, San Ramon, CA.

_____. 1989. *Study of American shad at Millerton Lake, 1988.* Prepared for Pacific Gas and Electric Company, Department of Engineering Research, San Ramon, CA.

_____. 1990a. *Study of American shad at Millerton Lake, 1989*. Prepared for Pacific Gas and Electric Company, Department of Engineering Research, San Ramon, CA.

_____. 1990b. *Study of American shad at Millerton Lake, 1990*. Prepared for Pacific Gas and Electric Company, Department of Engineering Research, San Ramon, CA.

Nevada Department of Wildlife. 2016a. *Largemouth bass (Micropterus salmoides) thermal tolerance analyses – juvenile and adult summer*. Draft. January.

_____. 2016b. *Spotted bass (Micropterus punctulatus) thermal tolerance analyses – Juvenile and adult summer*. Draft. March.

_____. 2016c. *Smallmouth bass (Micropterus punctulatus) thermal tolerance analyses – juvenile and adult summer*. Draft. January.

National Park Service. 2023. Nationwide Rivers Inventory. Accessed: March 31, 2026. Retrieved from: https://www.rivers.gov/nri

NOAA Fisheries. 2023a. Essential Fish Habitat Mapper. Accessed: April 5, 2026. Retrieved from: https://www.habitat.noaa.gov/apps/efhmapper/?page=page_4.

_____. 2023b. ESA Critical Habitat Mapper. Accessed: April 5, 2026. Retrieved from: https://noaa.maps.arcgis.com/apps/webappviewer/index.html?id=68d8df16b39c48fe9f60640692d0e318.

North Fork Mono Tribe. 2024. North Fork Mono Tribe Motion to Intervene (FERC Project No. 96). Letter to FERC, May 5. Accession Number 20240517-0001.

Personal Email Communication from P. Strand, USFS, to W. Lifton, ENTRIX, Inc. March 23, 2006.

Personal Communication between E. Guzman, Biologist, CDFW, and G. Morimoto, Pacific Gas and Electric Company, San Francisco, CA, February 26, 2020.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Ramping Follow-Up,” on March 5, 2026.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

PG&E (Pacific Gas and Electric Company). 1978. *Fisheries and Stream Temperature Studies of the San Joaquin River Conducted in 1977*, Kerckhoff Project FERC Project No. 96.

_____. 1984. *Revised Exhibit S, fish and wildlife. FERC Project No. 96. Kerckhoff Project*. May 21. 88 pp.

_____. 2011. *Technical and scientific support-land and environmental management: Crane Valley Project hardhead pool characterization. Internal Memorandum*. January 31. 14 pp.

_____. 2017a. *Pre-Application Document (PAD), Kerckhoff Hydroelectric Project, FERC Project No. 96*. San Francisco, CA. November.

_____. 2017b. *2016 Annual Noxious Weed Control Monitoring Report*. Final. Addressing Article 409, 4(e) Conditions 18 and 48. Crane Valley Hydroelectric Project FERC No. 1354. February.

_____. 2018a. *PG&E Revised Study Plan: Western Pond Turtle (AQ 5).* Kerckhoff Hydroelectric Project, FERC Project No. 96.

_____. 2018b. *PG&E Revised Study Plan: Rare Aquatic Species (Study AQ 6).* Kerckhoff Hydroelectric Project, FERC Project No. 96.

_____. 2019a. *Technical Study Report 01: Channel Form and Fluvial Processes (Study GEO 1)*. Kerckhoff Hydroelectric Project, FERC Project No. 96. California. May 2019.

_____. 2019b. *Technical Study Report 02: Project-Related Sediment Management Practices in Kerckhoff Reservoir (Study GEO 2).* Kerckhoff Hydroelectric Project, FERC Project No. 96. July 2019.

_____. 2020a. *Final Application for New License for the Kerckhoff Hydroelectric Project, FERC No. 96*. November 20.

_____. 2020b. *Technical Study Report (TSR-19): Mussels and Aquatic Molluscs (AQ 3),* Kerckhoff Hydroelectric Project, FERC No. 96. May 14.

_____. 2020b. *Technical Study Report 01a: Supplemental Channel Form and Fluvial Processes (Study GEO 1-S).* Kerckhoff Hydroelectric Project, FERC Project No. 96. April.

_____. 2020c. *Technical Study Report 07: Operations Simulation Model (Study HYD 1).* Kerckhoff Hydroelectric Project, FERC Project No. 96.

_____. 2020d. *Technical Study Report 06: Riparian and Wetland Resources (Study BOT 2).* Kerckhoff Hydroelectric Project, FERC Project No. 96.

_____. 2020e. *Technical Study Report 09: Hydrology With and Without the Project (Study HYD-2).* Kerckhoff Hydroelectric Project, FERC Project No. 96.

_____. 2020f. *Technical Study Report 11: Plant Communities, Special-status Plants, and Invasive Weeds (Study BOT 1).* Kerckhoff Hydroelectric Project, FERC Project No. 96. April.

_____. 2020g. *Technical Study Report 15: Rare Aquatic Species (Study AQ 6).* Kerckhoff Hydroelectric Project, FERC Project No. 96. May.

_____. 2020h. *Technical Study Report 18: Aquatic Habitat Mapping (Study AQ 1).* Kerckhoff Hydroelectric Project, FERC Project No. 96. April.

_____. 2020i. *Technical Study Report 19: Mussels and Aquatic Molluscs (Study AQ 3).* Kerckhoff Hydroelectric Project, FERC Project No. 96. May.

_____. 2020j. *Technical Study Report 20: Western Pond Turtles (Study AQ 5).* Kerckhoff Hydroelectric Project, FERC Project No. 96. May.

_____. 2020k. *Technical Study Report 22: Water Temperature in the Project Bypass Reach and Kerckhoff Reservoir (Study WQ 1).* Kerckhoff Hydroelectric Project FERC, Project No. 96.

_____. 2020l. *Technical Study Report 21: Water Quality Sampling in the Project Bypass Reach and Kerckhoff Reservoir (Study WQ 2).* Kerckhoff Hydroelectric Project, FERC Project No. 96.

_____. 2020m. *Technical Study Report 24: Fish Populations (Study AQ 2).* Kerckhoff Hydroelectric Project, FERC Project No. 96. May.

_____. 2020n. *Technical Study Report 27: Benthic Macroinvertebrates (Study AQ 7).* Kerckhoff Hydroelectric Project, FERC Project No. 96. May.

_____. 2020o. *Technical Study Report 03: Entrainment, Phase 1 (Study AQ 4).* Kerckhoff Hydroelectric Project, FERC Project No. 96. June.

_____. 2021. *Technical Memorandum: Kerckhoff Hydroelectric Project Stage-Discharge Investigation.* Prepared by M. Katzel and W. Lifton, Cardno, Sacramento, CA. Prepared for L. Whitman, Pacific Gas and Electric Company. September 13.

_____. 2022. *Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. May 26.

_____. 2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

Potter, I.C., and F.W.H. Beamish. 1975. "Lethal Temperatures in Ammocoetes of Four Species of Lampreys." *Acta Zoologica*, Vol. 56, No. 1: 85–91.

Reclamation (United States Bureau of Reclamation). 2008. *Biological Resource Technical Reports: Upper San Joaquin Basin Storage Investigation*; Draft Aquatic Biological Resources Technical Report.

_____. 2012. *Biological Resource Technical Reports: Upper San Joaquin Basin Storage Investigation*; Draft Riverine Fish Habitat Technical Report. Pacific Region.

_____. 2014. *Upper San Joaquin River Basin Storage Investigation, Draft Environmental Impact Statement*. United States Department of the Interior, Bureau of Reclamation, Mid-Pacific Region. Accessed: April 5, 2026. Retrieved from: https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=821.

Rehn, A.C. 2008. Benthic macroinvertebrates as indicators of biological condition below hydropower dams on west slope Sierra Nevada streams, California, USA. *River Research and Applications* 25:208-228.

SCE (Southern California Edison Company). 1997. *Big Creek No. 4 Water Power Project (FERC Project No. 2017), Application for New Licensee for Major Project – Existing Dam*, Volume 2, Exhibit E. Rosemead, CA.

_____. 2004. *Combined aquatics working group CAWG 13-anadromous fish*. Southern California Edison Company, Big Creek, CA.

_____. 2008a. *Final Native Aquatic Species Management Plan (NASMP)*. Southern California Edison Company, Big Creek, CA. July.

_____. 2008b. *Native Aquatic Species Progress Repo*rt. Southern California Edison Company, Big Creek, CA.

_____. 2013. *2012 Data Collection and Baseline Report, Native Aquatic Species Management Plan (NASMP).* Southern California Edison Company, Big Creek, CA.

_____. 2017. *2016 Data Collection Report, Native Aquatic Species Management Plan (NASMP)*. Southern California Edison Company, Big Creek, CA.

_____. 2018a. *2017 Data Collection Report, Native Aquatic Species Management Plan (NASMP)*. Southern California Edison Company, Big Creek, CA.

_____. 2018b. *Ramp-down and stranding study in the Horseshoe Bend Reach below Dam 7.* Southern California Edison Company, Big Creek, CA.

Seltenrich and Pool. 2002. *A Standardized Approach for Habitat Assessments and Visual Encounter Surveys for the Foothill Yellow-Legged Frog (Rana boylii).* Pacific Gas and Electric Company, San Francisco, CA.

Shaw, E.M., K. Beven, N.A. Chappell, and R. Lamb. 2010. *Hydrology in Practice*. Fourth edition. CRC Press.

Stone, J. 2006. Observations on Nest Characteristics, Spawning Habitat, and Spawning Behavior of Pacific and Western Brook Lamprey in a Washington Stream. *Northwestern Naturalist*, Vol. 87, No. 3: 225–232.

Stone, J., J. Pirtle, and S. Barndt. 2002. *Evaluate habitat use and population dynamics of lamprey in Cedar Creek.* BPA Contract #200001400: Annual Report for 2001.

Thompson, K. 1972. Determining stream flows for fish life. In: *Proceedings, instream flow requirements workshop*. Pacific Northwest River Basin Committee, Vancouver, WA.

Thompson, L.C., N.A. Fangue, J.J. Cech, D.E. Cocherell, and R.C. Kaufman. 2012. Juvenile and adult hardhead thermal tolerances and preferences: Temperature preference, critical thermal limits, active and resting metabolism, and blood-oxygen equilibria. Center for Aquatic Biology and Aquaculture Technical Report, University of California, Davis.

URS. 2008. Draft Resource Management Plan / General Plan / Environmental Impact Statement / Environmental Impact Report for Millerton Lake. Prepared by URS Corporation. Prepared for U.S. Department of the Interior, Bureau of Reclamation. June.

USFS (United States Forest Service). 2019. *Classification and Assessment with Landsat of Visible Ecological Groupings (CALVEG)*. Accessed: April 17, 2019. Retrieved from: https://data.fs.usda.gov/geodata/edw/datasets.php.

_____. 2023. *Land Management Plan for the Sierra National Forest: Fresno, Madera, and Mariposa Counties, California*. Accessed: April 3, 2026. Retrieved from: https://acconsensus.org/wp-content/uploads/2024/08/05-SNF_LMP_final_20230504_Web.pdf.

USFWS (United States Fish and Wildlife Service). 2025a. *Information for Planning and Consultation (IPaC)*. United States Department of the Interior, Fish and Wildlife Service, Washington, D.C. Accessed: April 5, 2026. Retrieved from: https://ipac.ecosphere.fws.gov/

_____. 2025b. Environmental Conservation Online System. Accessed April 5, 2026. Retrieved from: https://ecos.fws.gov/ecp/.

_____. 2026. *National Wetlands Inventory (NWI)*. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Accessed: April 5, 2026. Retrieved from: https://www.fws.gov/program/national-wetlands-inventory.

Wang, J.C.S. 1986. F*ishes of the Sacramento-San Joaquin Estuary and Adjacent Waters, California: A Guide to the Early Life Histories.* Interagency Ecological Program Technical Report No. 9. United States Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Byron, CA.

4.5 BIOLOGICAL RESOURCES – TERRESTRIAL

This section describes existing conditions and analyzes potential impacts on terrestrial biological resources as a result of implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on the review of existing resources, technical data, and applicable laws and regulations. The potential impacts on terrestrial biological resources from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.5-1).

Table 4.5-1: CEQA Checklist for Biological Resources – Terrestrial

Would the Project:	**Proposed Project**	**Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping**	**Alternative 2: Proposed Project with BLM Revised 4(e) Conditions**
Impact BIO-1: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife (CDFW) or United States Fish and Wildlife Service (USFWS)?	Significant and Unavoidable	Significant and Unavoidable	Significant and Unavoidable

Would the Project:	**Proposed Project**	**Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping**	**Alternative 2: Proposed Project with BLM Revised 4(e) Conditions**
Impact BIO-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Impact BIO-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Impact BIO-4: 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?	No Impact	No Impact	No Impact
Impact BIO-5: Conflict with any local policies or ordinances protecting biological resources, such	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
as a tree preservation policy or ordinance?			
Impact BIO-6: Conflict with the provisions of an adopted Habitat Conservation Plan; Natural Community Conservation Plan; or other approved local, regional, or state habitat conservation plan?	No Impact	No Impact	No Impact

4.5.1 Environmental Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located on private lands, some of which are owned by PG&E, and on public lands administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and the United States Bureau of Reclamation (Reclamation) under BLM management.

This section describes terrestrial biological resources in the Proposed Project Vicinity, including identification of vegetation alliances, special-status plants, invasive weeds, wildlife habitats, special-status wildlife, and game species. Information about riparian and wetland habitats and special-status aquatic species is included in Section 4.4 *Biological Resources – Aquatics and Fisheries*.

4.5.1.1 Physical Project Setting

The Kerckhoff Hydroelectric Project is in the foothills of the western slope of the Sierra Nevada between 500 and 1,000 feet in elevation on the San Joaquin River (SJR) in a sparsely populated area of Fresno and Madera counties, California. The Kerckhoff

Hydroelectric Project Area is in the San Joaquin Hydrologic Region of Central California and in the upper SJR drainage basin, which is highly developed for hydroelectric generation, flood control, and irrigation storage. As described in Section 2 *Proposed Project Description*, the Kerckhoff Hydroelectric Project primarily consists of the Kerckhoff Reservoir formed by Kerckhoff Dam, Smalley Cove Campground, the Kerckhoff 1 (K1) and Kerckhoff 2 (K2) powerhouses, two tunnels that convey water from the reservoir to the powerhouses, and appurtenant facilities and access roads. PG&E owns and operates the Kerckhoff Hydroelectric Project, which has an authorized installed capacity of 162.72 megawatts.

4.5.1.2 Baseline Conditions Methodology

4.5.1.2.1 Literature Review

The existing terrestrial biological resource conditions for the Proposed Project are based on the following database queries and technical studies completed for PG&E's Federal Energy Regulatory Commission (FERC or Commission) relicensing efforts:

- *Technical Study Report 11* for the Kerckhoff Hydroelectric Project, Plant Communities, Special-status Plants, and Invasive Weeds (Study BOT 1) (PG&E 2022)
- *Technical Study Report 13* for the Kerckhoff Hydroelectric Project, Special-status Wildlife Species (Study WILD 1) (PG&E 2022)
- *Technical Study Report 13a* for the Kerckhoff Hydroelectric Project, Special-status Wildlife Species (Study WILD 1-S) Supplemental Report (PG&E 2020c)
- California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB) (CDFW 2023)
- California Native Plant Society (CNPS) Rare Plant Inventory (CNPS 2026a)
- United States Fish and Wildlife Service (USFWS) Critical Habitat (USFWS 2023)
- USFWS Information for Planning and Consultation (IPaC) tool and critical habitat data (USFWS 2026; FERC 2025)
- USFWS National Wetland Inventory (USFWS 2026)
- USGS National Hydrology Dataset (USGS 2023)

- Classification and Assessment with Landsat of Visible Ecological Groupings (CALVEG) vegetation data (USFS 2019)

Updated database search results are provided as Appendix E *Biological Resources – Terrestrial Data*: Appendix E-1 *IPaC Resources List*. Several new special-status species appeared in the updated record search compared to those identified in PG&E's Final License Application (FLA) (PG&E 2022) and were added to Appendix E-1 (FERC 2025).

4.5.1.2.2 Definitions

- FERC Project Boundary: the geographic boundary of facilities/lands covered by the FERC license
- Study Area: the footprint used for baseline studies and impact analysis (may include buffers)

Special-Status Wildlife

For the purposes of this document, a special-status wildlife species is defined as any animal species that is granted status by a federal, state, or local agency and includes the following:

- Federally listed species granted status by the USFWS under the Endangered Species Act (ESA) include threatened (FT), endangered (FE), proposed threatened, proposed endangered, candidate (FC), or listed species proposed for delisting. Bald and golden eagles are also federally protected under the Bald and Golden Eagle Protection Act (BGEPA)
- California-listed wildlife species granted status by the CDFW under the California Endangered Species Act (CESA) include state threatened (ST), state endangered (SE), state candidate threatened, state candidate endangered, California fully protected (CFP), and California species of special concern (CSC)
- The list of wildlife species for BLM includes species that are not federally listed under the ESA but are designated by the BLM State Director for special management consideration; only BLM sensitive (BLMS) species are included

- The list of wildlife species for USFS includes species that are not federally listed under the ESA but are considered USFS sensitive (FSS) in the USFS-SNF
- Migratory birds protected under the Migratory Bird Treaty Act

Special-Status Plants

For the purposes of this document, special-status plants (including mosses) are defined as any plant granted protection by a federal, state, or local agency, as follows:

- Federally listed plant species granted status by the USFWS under the ESA include FT, FE, proposed threatened, proposed endangered, FC, or listed species proposed for delisting
- California-listed plant species granted status by the CDFW under the CESA include ST, SE, and state rare (SR)
- Under CEQA, special-status plants are also defined as those species identified by the CNPS California Rare Plant Rank (CRPR) rating system:
  - 1A (Plants presumed extirpated in California and either rare or extinct elsewhere)
  - 1B (Plants rare, threatened, or endangered in California and elsewhere)
  - 2A (Plants presumed extirpated in California but common elsewhere)
  - 2B (Plants rare, threatened, or endangered in California but common elsewhere)
  - 3 (Review List: plants about which more information is needed)
  - 4 (Watch List: plants of limited distribution)
- The BLM list of sensitive plant species are species designated by the BLM State Director for special management consideration. In California, this includes all plants that are listed as FC, ST, SE, and SR; all plants that have a CRPR of 1B; and any other plants that the BLM State Director has determined to warrant status
- The most recent USFS list of sensitive plant species for Region 5 was provided in April 2019 (USFS 2019b)
- Per CDFW guidance, Rare Natural Communities are defined as vegetation types assigned a ranking of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable) by CDFW's Vegetation Classification and Mapping Program using NatureServe's Heritage Methodology (CDFW 2023)

4.5.1.2.3 Baseline Conditions Studies

Study Boundaries

The Study Area for field surveys completed by PG&E did not include the proposed Vista Day Use Area or new flow gage location. In support of the FLA, PG&E completed field surveys for terrestrial biological resources in April, May, June, and December 2019. The study areas for the Proposed Project were defined by PG&E in consultation with relicensing participants to include locations within the existing Kerckhoff Hydroelectric Project Boundary (existing FERC Project Boundary) with characteristics representative of the various wildlife habitats identified for analysis. These surveys predated the proposed protection, mitigation, and enhancement (PM&E) measures of the Vista Day Use Area and new upstream gaging in Kerckhoff Reservoir near Big Creek 4. Therefore, the study areas did not include those portions of the Proposed Project. Detailed changes to the existing FERC Project Boundary and associated maps are included in Appendix A *Project Facilities and Maps*: Appendix A-3 *Maps*.

Botanical Study Area

The Study Area for all botanical resources included the following:

- A 50-foot buffer around all areas within the existing FERC Project Boundary except for the K1 and K2 Tunnels, Adits 1 and 2, and the facilities described below
- A 50-foot buffer on Proposed Project roads and gated roads shared with BLM and USFS (i.e., 25 feet on either side from the road edge)
- A 10-foot buffer on Proposed Project trails (i.e., 5 feet on either side from the trail edge)

The Botanical Study Areas are depicted on Figures E2-6 through E2-20 provided in Appendix E *Biological Resources Terrestrial Data*: Appendix E-2 *Figures*.

General Wildlife Study Area

The Study Area for wildlife habitats and special-status wildlife species (excluding bald eagle [*Haliaeetus leucocephalus*] and bats) included areas within the existing FERC

Project Boundary (including a 0.5-mile buffer) and areas within 0.5 mile of Kerckhoff Hydroelectric Project facilities currently outside of the existing FERC Project Boundary.

Bald Eagle Study Area

The Study Area for bald eagle includes Kerckhoff Reservoir, the Project Bypass Reach (PBR) (9.8 miles), and the short reach immediately below the K2 Powerhouse to Millerton Lake, including a 0.25-mile buffer on either side of these reaches.

Bat Study Area

The Study Area for special-status bats included the Kerckhoff Hydroelectric Project facilities.

Vegetation Mapping

As detailed in the *Plant Communities, Special-Status Plants, and Invasive Weeds Technical Study Report* for the Kerckhoff Hydroelectric Project (BOT 1), PG&E developed preliminary maps of vegetation alliances within the Proposed Project Vicinity based on the CALVEG dataset (USFS 2019a; PG&E 2022). Subsequently, aerial photographs were reviewed to identify areas where the CALVEG data did not appear to correspond to the aerial imagery, and ground verification of those areas was conducted in April, May, and June 2019.

Ground verification was completed concurrently with surveys for special-status botanical and invasive weed species. Locations and attributes of small-scale habitat features (e.g., springs/seeps, small streams, and other unique plant communities) were also recorded concurrently (PG&E 2022).

Database search results are provided as Appendix E-1 *IPaC Resources List*.

Special-Status Wildlife and Their Habitats

PG&E's study approach for identifying special-status wildlife occurrences and habitats in the Study Area included the following:

- Developing preliminary tables of special-status wildlife species known to occur or potentially occurring in the Study Area based on literature review and consultation
- Documenting the distribution of California Wildlife Habitat Relationship (CWHR) habitats in the Study Area using a CALVEG-CWHR crosswalk developed for California by the USFS and CDFW (USFS 2009)
- Conducting field surveys and compiling other incidental wildlife data
- Developing final tables and maps of special-status wildlife species known to occur or potentially occurring in the Study Area using CDFW's CWHR database (CDFW 2019). The CWHR database uses a predictive model to determine the likelihood of the occurrence of animal species in any given geographical location based on ecological data included in the model, such as the life history and known distribution of an animal, existing vegetation, percent canopy cover, presence of water, and a number of other elements including landscape features

Surveys were conducted on foot in May 2019 between approximately 8:00 a.m. and 2:00 p.m. Areas that were inaccessible on foot were surveyed with binoculars. Species were recorded as present if they were observed; species-specific vocalizations were heard; or diagnostic field signs were found (e.g., scat, tracks, pellets). Depending on the survey area and terrain, survey methods included zigzag or linear transects. Zigzag transects were used in larger habitat areas (e.g., mixed conifer forest), while linear transects were used in narrow habitats (e.g., riparian).

Special-Status Plant Species

Surveys for special-status plant species conducted by PG&E followed current procedures outlined in *Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018; CDFG 2009). Surveyors also referenced *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 2000).

Based on the blooming periods for special-status plants known or with potential to occur within the Study Area, field surveys were conducted April 29 through May 7 and June 18 through June 26, 2019. The timing of surveys was verified based on reference

population monitoring, which occurred on the first day of each survey period prior to initiating field surveys. Surveys were completed in all accessible areas within the Study Area.

Invasive Plant Species

Surveys for invasive weeds were conducted concurrently with special-status plant species and followed the same general protocol in regard to survey timing and methods. For the purposes of this document, priority invasive weeds were defined from the following sources:

- Species listed in the California Invasive Plant Council (Cal-IPC) inventory as high or moderate (Cal-IPC 2019)
- Species listed with a pest ranking by the California Department of Food and Agriculture as A or B under CCR Title 3 Section 4500 (CDFA 2016, 2019)
- Species identified by BLM as invasive (BLM 2019)
- Species identified by the USFS as priority in the USFS-SNF (USFS 2019b). No new special-status species appeared in the updated record search as compared to those identified in PG&E's FLA

4.5.1.3 Vegetation Communities

Fourteen CALVEG vegetation alliances are present within the Botanical Study Area. Table 4.5-2 provides a complete list of these vegetation alliances and their respective acreage. Figures in Appendix F *Biological Resources – Aquatics and Fisheries Data* illustrate the distribution of the CALVEG vegetation alliances present within the Botanical Study Area.

Table 4.5-2: Vegetation Alliances and Habitat Types Within the Botanical Study Area

CALVEG Vegetation Alliance		Acres	Corresponding CWHR Vegetation Alliance / Habitat Types	Corresponding Sensitive Manual of California Vegetation Alliance(s) with State Rank (S1 to S3)[a]
Upland Communities				
Gray Pine		61.4	Blue Oak-Foothill Pine	None
Interior Mixed Hardwood		80.7	Montane Hardwood	California Bay Forest and Woodland Alliance (S3)
Interior Live Oak		120.8	Blue Oak Woodland	None
Blue Oak		48.8	Blue Oak Woodland	None
California Buckeye		5.2	Blue Oak Woodland/Montane Hardwood	California Buckeye Groves (S3)
Valley Oak		7.6	Valley Oak Woodland	Valley Oak Forest and Woodland (S3)
Annual Grasses and Forbs		43.4	Annual Grassland	None

CALVEG Vegetation Alliance		**Acres**	**Corresponding CWHR Vegetation Alliance / Habitat Types**	**Corresponding Sensitive Manual of California Vegetation Alliance(s) with State Rank (S1 to S3)[a]**
Riparian/Wetland Communities				
Perennial Lake or Pond		135.5	Lacustrine	None
Riparian Mixed Hardwood		24.9	Montane Riparian	Button Willow Thickets (S2) Oregon Ash Groves (S3) Deer Grass Beds (S2) Fremont Cottonwood Forest and Woodland (S3) Valley Oak Forest and Woodland (S3) Red Willow Thickets (S3)
Wet Meadows		11.4	Fresh Emergent Wetland	Common Monkeyflower Seep (S3)
River/Stream		10.3	Riverine	None

CALVEG Vegetation Alliance		**Acres**	**Corresponding CWHR Vegetation Alliance / Habitat Types**	**Corresponding Sensitive Manual of California Vegetation Alliance(s) with State Rank (S1 to S3)[a]**
Non-Vegetated or Developed Habitats				
Urban/Developed (General)		16.3	Barren	None
Barren		3.9	Barren	None
Urban-Related Bare Soil		1.2	Barren	None

Sources: PG&E 2022

CALVEG = Classification and Assessment with Landsat of Visible Ecological Groupings; CWHR = California Wildlife Habitat Relationship

[a] Alliance State Ranks:

S1: Vegetation is critically imperiled in the state because of extreme rarity (often five or fewer populations or because of factor(s) such as very steep declines making it especially vulnerable to extirpation from the state).

S2: Vegetation is imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state.

S3: Vegetation is vulnerable in the state due to a restricted range, relative few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state.

4.5.1.3.1 Small-Scale Features

Seventy-four small-scale habitat features are present within the Botanical Study Area, including 9 perennial streams, 25 intermittent streams, 16 wetlands, 12 seeps, and 12

depressions/swales. Section 4.4 *Biological Resources – Aquatics and Fisheries* provides the description and location of these small-scale habitat features that may provide aquatic habitat.

4.5.1.4 Special-Status Plants

The desktop review conducted for this analysis generated a list of 45 special-status plants, 8 bryophytes, and 1 lichen species for evaluation of potential to occur within the Botanical Study Area. A complete listing of the species evaluated, the status of each species, a summary of life history requirements, and information on their potential presence in the Study Area is provided as Appendix E-3 *Tables*. Of the 45 special-status botanical species, only 1 species had been reported as historically occurring within the Botanical Study Area, the tree anemone (*Carpenteria californica,* ST), though it was not observed during plant surveys. Two special-status vascular plant species—Kings river monkeyflower (*Erythranthe acutidens*; CRPR 3) and Hall's wyethia (*Wyethia elata*; CRPR 4.3)—were detected during surveys on May 2, June 18, and June 26, 2019; and May 1, 2, 5 and 7; and June 18 and 23-26, 2019, respectively. No special-status bryophyte or lichen species were observed during botanical surveys conducted within the Botanical Study Area. Seventeen additional species that are ranked as SR, FSS, BLMS, and/or CRPR Ranks of 1 through 4 were determined to have high or moderate potential to occur in the Botanical Study Area, including 16 plant and 4 bryophyte species. Species identified as having potential to occur within the Botanical Study Area are provided in Table 4.5-3.

Table 4.5-3: Special-Status Plant Species with Potential to Occur in the Botanical Study Area

Common Name (*Scientific Name*)	Status[a] (Federal/State/BLM/ USFS/CRPR)	Habitat
Known to Occur		
Vascular Plants		
Hall's wyethia (*Wyethia elata*)	– / – / – / – / 4.3	Cismontane woodland and lower montane coniferous forest
Kings river monkeyflower (*Erythranthe acutidens*)	– / – / – / – / 3	Cismontane woodland and lower montane coniferous forest
Tree anemone (*Carpenteria californica*)	– / ST / BLMS / FSS / 1B.2	Chaparral, cismontane woodland, usually granitic; foothill chaparral, foothill woodland, lower ponderosa pine forest; prefers draws and moist areas but also found on drier slopes
Potential to Occur		
Vascular Plants		
Ewan's larkspur (*Delphinium hansenii* ssp. *ewanianum*)	– / – / – / – / 4.2	Cismontane woodland and valley and foothill grassland; rocky
Farnsworth's jewel flower (*Streptanthus farnsworthianus*)	– / – / – / – / 4.3	Cismontane woodland

Common Name (*Scientific Name*)	**Status[a] (Federal/State/BLM/ USFS/CRPR)**	**Habitat**
Hartweg's golden sunburst (*Pseudobahia bahiifolia*)	FE / SE / – / – / 1B.1	Cismontane woodland and valley and foothill grassland; clay soils
Madera leptosiphon (*Leptosiphon serrulatus*)	– / – / – / FSS / 1B.2	Openings in woodland, chaparral; dry slopes in cismontane oak woodland and lower montane coniferous forest; usually in decomposed granite, one instance on serpentine
Michael's rein orchid (*Piperia michaelii*)	– / – / – / – / 4.2	Chaparral, cismontane woodland, and lower montane coniferous forest
Orange lupine (*Lupinus citrinus* var. *citrinus*)	– / – / BLMS / FSS / 1B.2	Chaparral, cismontane woodland, and lower montane coniferous forest; granitic soils
Oval-leaved viburnum (*Viburnum ellipticum*)	– / – / – / – / 2B.3	Chaparral, cismontane woodland, and lower montane coniferous forest
Sierra Nevada monkeyflower (*Erythranthe sierrae*)	– / – / – / – / 4.2	Cismontane woodlands and lower montane coniferous forest (openings); vernally wet depressions, swales, streambanks, meadows, and seeps (dry); granitic, sandy, or gravelly soils

Common Name (*Scientific Name*)	**Status[a] (Federal/State/BLM/ USFS/CRPR)**	**Habitat**
Slender-stalked monkeyflower (*Erythranthe gracilipes*)	– / – / BLMS / FSS / 1B.2	Chaparral, cismontane woodland, lower montane (ponderosa pine) coniferous forest; disturbed or burned areas and/or decomposed granite; rock outcrops and associated gravelly and sandy areas
Small-flowered monkeyflower (*Erythranthe inconspicua*)	– / – / – / – / 4.3	Chaparral, cismontane woodland, and lower montane coniferous forest; mesic
Streambank springbeauty (*Claytonia parviflora* ssp. *grandiflora*)	– / – / – / – / 4.2	Cismontane woodland; rocky (mesic)
Tracy's eriastrum (*Eriastrum tracyi*)	– / SR / – / FSS / 3.2	Open areas on shale or alluvium in chaparral, cismontane woodland, and valley and foothill grassland
Yosemite evening primrose (*Camissonia sierrae* ssp. *sierrae*)	– / – / – / FSS / 4.3	Cismontane woodland and lower montane coniferous forest
Bryophytes		
Brassy bryum (*Bryum chryseum*)	– / – / – / – / 4.3	Cismontane woodland, valley and foothill grassland, openings in chaparral habitats

Common Name (*Scientific Name*)	**Status[a] (Federal/State/BLM/ USFS/CRPR)**	**Habitat**
Elongate copper moss (*Mielichhoferia elongate*)	– / – / – / FSS / 4.3	Seasonally moist sites on metamorphic, sedimentary, limestone, and serpentine rock outcrops; often containing heavy metals
Shevock's copper moss (*Mielichhoferia shevockii*)	– / – / – / FSS / 1B.2	Metamorphic rocks, often along roads; also in woodlands on gravelly soil among rocks containing heavy metals; often found with elongate copper moss
Wine-colored tufa moss (*Plagiobryoides vinosula*)	– / – / – / – / 4.2	Cismontane woodland

Source: PG&E 2022

[a] Federal Status: FE = federal endangered; FT = federal threatened

State Status: SE = state endangered; ST = state threatened; SR = state rare

USFS Status: FSS = USFS sensitive

BLM Status: BLMS = United States Bureau of Land Management sensitive

CRPR Ratings: CRPR 1B = Plants rare, threatened, or endangered in California and 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 of limited distribution

Threat Ranks:

1 = Seriously threatened in California (over 80 percent of occurrences threatened/high degree and immediacy of threat)

2 = Moderately threatened in California (20–80 percent of occurrences threatened/moderate degree and immediacy of threat)

3 = Not very threatened in California (<20 percent of occurrences threatened/low degree and immediacy of threat or no current threats known)

4.5.1.4.1 Special-Status Botanical Species Present on Site

Federally and State-Listed Species

There is no federally designated critical habitat for botanical species within the Botanical Study Area. As a reminder, the Study Area for all botanical resources included: (1) a 50-foot buffer around all areas within the existing FERC Project Boundary except for the K1 and K2 Tunnels, Adits 1 and 2, and the facilities described below; (2) a 50-foot buffer on Proposed Project roads and gated roads shared with BLM and USFS (i.e., 25 feet on either side from the road edge); and (3) a 10-foot buffer on Proposed Project trails (i.e., 5 feet on either side from the trail edge).The nearest critical habitat is located approximately one mile northwest of K2 Powerhouse.

Tree anemone was recorded in the Proposed Project Vicinity (approximately one mile southeast of Adit 1) and reported to occur in the Botanical Study Area; however, it was not detected during the PG&E special-status plant surveys in 2019 (PG&E 2022).

Other Special-Status Species

No bryophytes, lichens, or vascular plants considered sensitive by the USFS or BLM or ranked as CRPR 1 or 2 were observed in the Botanical Study Area.

Kings River Monkeyflower (CRPR 3)

This species is found in cismontane woodland and lower montane coniferous forest. Suitable habitat is present in the Botanical Study Area, and CNPS mapped several historical occurrences in the immediate vicinity of the Study Area (near Smalley Road/New Auberry and near Tollhouse/Black Mountain) (CNPS 2026a). This species was observed during the PG&E special-status plant surveys. Six populations of this species were observed in the vicinity of the Kerckhoff Dam/intake area and the J-2 Stream Gage access trail (Appendix E-2 *Figures*, Figure E2-6 through Figure E2-20**Error! Reference source not found.Error! Reference source not found.**). Kings River monkeyflower is well documented in Tulare, Fresno, Madera, Mariposa, and Calaveras counties, and the Botanical Study Area is located within the center of the

known range for the species (California Consortium of Herbaria Portal 2025). Therefore, this species' survival and reproduction in the wild are not in immediate jeopardy, nor is the species likely to become endangered within the foreseeable future throughout all or a significant portion of its range (CEQA Guidelines Section 15380). As a result, this species is not further addressed in this document.

Hall's Wyethia (CRPR 4.3)

Hall's wyethia can be found in cismontane woodland and lower montane coniferous forest. While the Botanical Study Area is just outside of the elevation range for the species, there are several recorded occurrences in the vicinity of the Botanical Study Area and suitable habitat (cismontane woodland) is present in the Botanical Study Area. This species was observed during the PG&E special-status plant surveys. Twenty-seven populations were mapped along Kerckhoff Reservoir and south to Kerckhoff Dam/intake area and J-2 Stream Gage access trail (**Error! Reference source not found.**Appendix E-2 *Figures*, Figure E2-6 through Figure E2-20). Hall's wyethia is well documented in Tuolumne, Fresno, Madera, Mariposa, and Mono counties (California Consortium of Herbaria Portal 2025). Therefore, this species' survival and reproduction in the wild are not in immediate jeopardy, nor is the species likely to become endangered within the foreseeable future throughout all or a significant portion of its range (CEQA Guidelines Section 15380). As a result, this species is not further addressed in this document.

4.5.1.5 Invasive Weeds

For the purposes of this document, priority invasive weeds were defined from the following sources:

- Species listed in the California Invasive Plant Council (Cal-IPC) inventory as high or moderate (Cal-IPC 2019)
- Species listed with a pest ranking by the California Department of Food and Agriculture as A or B under CCR Title 3 Section 4500 (CDFA 2016, 2019)
- Species identified by BLM as invasive (BLM 2019)
- Species identified by the USFS as priority in the USFS-SNF (USFS 2019b)

Twenty-two invasive weed species were identified in the Botanical Study Area during PG&E botanical surveys. Of these, eight species are widespread throughout the Botanical Study Area, often occurring as common associates of grassland and woodland habitats. These ubiquitous species, which were mapped at the landscape level, include the slender oat (*Avena barbata*), wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), Italian thistle (*Carduus pycnocephalus*), tocalote (*Centaurea melitensis*), Italian ryegrass (*Festuca perennis*), seaside barley (*Hordeum marinum*), and wall barley (*Hordeum murinum*).Table 4.5-4 presents a summary of the ubiquitous invasive weed species, the general facilities where they were located, and a description of general cover.

Table 4.5-4: Summary of Ubiquitous Invasive Weed Populations Documented in the Study Area

Existing Hydroelectric Facility (General Location)	**Ubiquitous Invasive Weed Species and Estimated Cover**						
	Slender Oat (*Avena barbata*) / Wild Oat (*Avena fatua*) [a]	**Ripgut Brome (*Bromus diandrus*)**	**Italian Thistle (*Carduus pycnocephalus*)**	**Tocalote (*Centaurea melitensis*)**	**Italian Ryegrass (*Festuca perennis*)**	**Seaside Barley (*Hordeum marinum*)**	**Wall Barley (Hordeum murinum)**
Powerhouse Road (Road 235) north to Smalley Cove	MOD	MOD	LOW	P	—	—	LOW
Kerckhoff Reservoir (southeast shoreline)	LOW	LOW	P	—	LOW	—	—
Smalley Cove Recreation Area	MOD	LOW/ MOD	LOW	LOW	LOW	LOW	LOW
Kerckhoff Reservoir (northwest shoreline)	LOW	LOW/ MOD	P	P	LOW	P	P
Kerckhoff Dam (intake area)	LOW	MOD	LOW	—	LOW	—	—

Existing Hydroelectric Facility (General Location)	**Ubiquitous Invasive Weed Species and Estimated Cover**						
Gage J-2, HLZ at J-2, and Trail to J-2	LOW	LOW/ MOD	LOW	—	P	—	P
Access Roads 1 and 2	LOW/ MOD	LOW/ MOD	LOW	P/LOW	LOW	—	LOW
Gage J-7, HLZ at J-7, and Trail from J-7 HLZ to SJR	LOW	LOW	P	LOW	—	—	—
K1 Powerhouse, switchyard, surge chamber, headworks; laydown storage area near K1 Powerhouse; warehouse near K1 Powerhouse; and Access Roads 2, 4, 5, 6C, 6, and 7	LOW/ MOD	MOD	LOW	LOW	MOD	—	—
Access Road 6, BLM shared	LOW	MOD	LOW	P	MOD	—	LOW

Existing Hydroelectric Facility (General Location)	**Ubiquitous Invasive Weed Species and Estimated Cover**						
(BLM visitors center to trailhead parking lot)							
Access Road 6, BLM shared (trailhead parking lot to K2 Switchyard)	LOW/ MOD	LOW	LOW	P	LOW/ MOD	—	LOW
Access Road 8	MOD	LOW	LOW	LOW	LOW	—	LOW
K2 Powerhouse, discharge tunnel, switchyard, and end of Access Road 6A	LOW	LOW/ MOD	LOW	LOW/ MOD	P	—	—

HLZ = helicopter landing zone

P = present (only observed very infrequently and at very low cover <1 percent)

HIGH = high cover (>25 percent)

MOD = moderate cover (6–25 percent)

LOW = low cover (<5 percent)

[a] Slender oat (*Avena barbata*) and wild oat (*Avena fatua*) cannot be distinguished without close inspection of individual plants and are grouped together in this table. Fourteen additional species occurred as discrete populations including yellow starthistle (*Centaurea solstitialis*), bull thistle (*Cirsium vulgare*), fig (*Ficus carica*), common velvet grass (*Holcus*

lanatus), Klamath weed (*Hypericum perforatum*), hyssop loosestrife (*Lythrum hyssopifolia*), Bermuda buttercup (*Oxalis pes-caprae*), Himalayan blackberry (*Rubus armeniacus*), Russian thistle (*Salsola tragus*), milk thistle (*Silybum marianum*), Spanish broom (*Spartium junceum*), puncture vine (*Tribulus terrestris*), woolly mullein (*Verbascum thapsus*), and greater periwinkle (*Vinca major*). Appendix E-1 *IPaC Resources List*, Figure E2-6 through Figure E2-20, depict the location of these discrete populations in the Botanical Study Area.

4.5.1.6 Wildlife Resources

4.5.1.6.1 Special-Status Wildlife

This section describes special-status wildlife that occur or may potentially occur in the Wildlife Study Area. The Study Area for wildlife habitats and special-status wildlife species (excluding bald eagle and bats) included areas within the existing FERC Project Boundary (including a 0.5-mile buffer) and areas within 0.5 miles of Kerckhoff Hydroelectric Project facilities currently outside of the existing FERC Project Boundary. The Study Area for bald eagle includes Kerckhoff Reservoir, the PBR (9.8 miles) and the short reach immediately below the K2 Powerhouse to Millerton Lake, including a 0.25-mile buffer on either side of these reaches. The Study Area for special-status bats included Kerckhoff Hydroelectric Project facilities.

This section addresses only special-status terrestrial wildlife species. Section 4.4 presents information about aquatic species, including fish, amphibians, and aquatic reptiles.

Eight special-status wildlife species were observed in the Wildlife Study Area as described in Section 4.5.1.2.3 during PG&E wildlife reconnaissance surveys conducted in May 2019, bat surveys conducted in May and December 2019, and bald eagle helicopter surveys conducted in June 2019 or observed incidentally during other PG&E studies (PG&E 2022). Nineteen additional special-status wildlife species have been recorded in the Wildlife Study Area historically or may potentially occur in the Wildlife Study Area based on the presence of suitable habitat (Table 4.5-5). A comprehensive list of special-status species evaluated for their potential to occur in the Wildlife Study Area, including the status of each species, a summary of life history requirements, and information on their presence in the Wildlife Study Area, is provided as Appendix E-3 *Tables*.

There is no federally designated critical habitat for FE or FT terrestrial wildlife species within the Wildlife Study Area. The nearest such critical habitat is located approximately one mile northwest of the K2 Powerhouse.

Table 4.5-5: Special-Status Wildlife Species with Potential to Occur in the Wildlife Study Area

Common Name (*Scientific Name*)	**Status (Federal/State/BLM/USFS)**	**Habitat**
Known to Occur		
Birds		
Bald eagle (*Haliaeetus leucocephalus*)	Bald and Golden Eagle, Protection Act / SE, CFP (nesting and wintering) / BLMS / FSS	This species is a year-round resident in ice-free regions of California. Foraging areas include regulated and unregulated rivers, reservoirs, lakes, estuaries, and coastal marine ecosystems. Breeding bald eagles require relatively large bodies of water, including reservoirs containing a large standing population of suitable-sized fish. Nests are usually located within one mile of foraging habitat. This species is known to occur. Suitable foraging and nesting habitat is present within the Wildlife Study Area. This species was observed nesting on Kerckhoff Reservoir during bald eagle nesting surveys conducted in 2019. Wintering subadults were also observed in the PBR and south of the K2 Powerhouse at the upper end of Millerton Lake. Additionally, this species was also observed roosting on Kerckhoff Reservoir during wildlife reconnaissance surveys conducted in 2019, as well as at Kerckhoff Reservoir and near the K2 Powerhouse during other technical studies.

Common Name (*Scientific Name*)	**Status (Federal/State/BLM/USFS)**	**Habitat**
California spotted owl (*Strix occidentalis occidentalis*)	Proposed FT CSC / BLMS / FSS	In the Sierra Nevada, this species typically nests in old growth or mature, multilayered, dense, mixed-conifer forests. It forages in multilayered mixed conifer, redwood, Douglas fir, and oak woodland habitats, from sea level to elevations of approximately 7,600 feet, with the majority (86%) occurring from 3,000 to 7,000 feet. Foraging habitat is similar to nesting habitat, but owls may also forage in more open canopy. This species is known to occur. A single individual responded to calls during two nocturnal surveys conducted near Kerckhoff Dam within the Wildlife Study Area (Reclamation 2014). However, nesting habitat is marginal in the Wildlife Study Area. This species was not observed during surveys conducted in support of relicensing.
Golden eagle (*Aquila chrysaetos*)	Bald and Golden Eagle Protection Act / CFP / BLMS	This species forages in grasslands and early successional stages of forest and shrub habitats at elevations up to 11,500 feet msl. It nests on secluded cliffs with overhanging ledges or large trees in open areas with unobstructed views. This species is known to occur. Suitable nesting and foraging habitat is present within the Wildlife Study Area. Two individuals were observed incidentally in the PBR

Common Name (*Scientific Name*)	**Status (Federal/State/BLM/USFS)**	**Habitat**
		during bald eagle helicopter surveys conducted in June 2019. The species is also known to nest southwest of the Wildlife Study Area on the cliffs above Millerton Lake (Reclamation 2014).
Yellow warbler (*Setophaga petechia*)	CSC	This species breeds in riparian woodlands from coastal and desert lowlands at elevations up to 8,000 feet msl in the Sierra Nevada. It also breeds in montane chaparral, open ponderosa pine, and mixed conifer habitats with substantial amounts of brush. This species is known to occur. Suitable habitat for this species is present within the Wildlife Study Area. Singing males were observed during wildlife reconnaissance surveys conducted in May 2019 at three locations: • One individual was observed adjacent to the Fiber Optics and 12 kV pole line between K1 Switchyard and K2 Switchyard, near the Ya-Gub-Weh-Tuh Trailhead parking lot; • Five individuals were observed on the eastern shore of Smalley Cove, adjacent to Smalley Cove Campground; and • One individual was observed on the SJR, just above the inlet into Kerckhoff Reservoir. Other records of this species are also known within the Proposed Project Vicinity (Reclamation 2014).

Common Name (*Scientific Name*)	**Status (Federal/State/BLM/USFS)**	**Habitat**
Mammals		
Fringed myotis (*Myotis thysanodes*)	BLMS / FSS	Optimal habitats for this species are pinyon-juniper, valley foothill hardwood, and hardwood-conifer, generally at elevation of 4,000 to 7,000 feet msl. This species roosts in caves, mines, buildings, and crevices. Separate day and night roosts may be used. The species uses open habitats, early successional stages, streams, lakes, and ponds as foraging areas. It is a migratory species, making relatively short, local movements to suitable hibernacula. **This species is known to occur.** Suitable foraging and roosting habitat is present within the Wildlife Study Area. This species was detected during bat surveys conducted for relicensing studies in 2019.
Long-eared myotis (*Myotis evotis*)	BLMS	This species is found predominantly in coniferous forests, typically only at higher elevations in southern areas (between 7,000 and 8,500 feet msl). They roost in tree cavities and beneath exfoliating bark in both living trees and dead snags. This species is known to occur.

Common Name (*Scientific Name*)	**Status (Federal/State/BLM/USFS)**	**Habitat**
		Suitable foraging and roosting habitat is present within the Wildlife Study Area. This species was detected during bat surveys conducted for relicensing studies in 2019.
Pallid bat (*Antrozous pallidus*)	CSC / BLMS / FSS	This species occurs in grasslands, shrublands, woodlands, and forests from sea level to 10,000 feet msl. It typically roosts in caves, crevices, or mines and requires open habitat for foraging. This species is known to occur. Suitable roosting and foraging habitat is present within the Wildlife Study Area. This species was observed during bat surveys conducted for relicensing studies in 2019. Maternal roosts are present south of the Wildlife Study Area on the cliffs above Millerton Lake (Reclamation 2014).
Townsend's big-eared bat (*Corynorhinus townsendii*)	CSC / BLMS / FSS	This species is found in all but alpine and subalpine habitats; it is most abundant in mesic habitats up to 6,000 feet msl. It requires caves, mines, tunnels, buildings, or other human-made structures for roosting and is extremely sensitive to disturbance and may abandon a roost if disturbed. This species is known to occur.

Common Name (*Scientific Name*)	**Status (Federal/State/BLM/USFS)**	**Habitat**
		Suitable foraging habitat is present within the Wildlife Study Area, though recent surveys at several Kerckhoff facilities indicated that no potential roosting habitat appears to be present at those existing features (PG&E 2022). This species was detected during bat surveys conducted for relicensing studies in 2019. It was detected in the Millerton Lake Cave System in the vicinity of the Wildlife Study Area approximately 0.8 mile north of Big Sandy Creek (Reclamation 2014).
Western mastiff bat (*Eumops perotis californicus*)	CSC / BLMS	This species is found in a variety of habitats including desert scrub, chaparral, oak woodland, ponderosa pine, meadows, and mixed conifer forests up to 4,600 feet above msl in elevation. Its distribution is likely limited by availability of significant rock features offering suitable roosting habitat. This species is known to occur. Suitable foraging and roosting habitat for this species is present within the Wildlife Study Area. This species was heard foraging above Kerckhoff Reservoir in 2015 (PG&E 2022). This species is known to roost southwest of the Wildlife Study Area on the cliffs above Millerton Lake (Reclamation 2014). This species was not observed during surveys conducted in support of relicensing.

Common Name (*Scientific Name*)	**Status (Federal/State/BLM/USFS)**	**Habitat**
Yuma myotis (*Myotis yumanensis*)	BLMS	Occasionally roosting in mines or caves, these bats are most often found in buildings or bridges. Bachelors also sometimes roost in abandoned cliff swallow nests, but tree cavities are probably the original sites for most nursery roosts. These bats typically forage over water in forested areas. **This species was detected during bat surveys.** Suitable foraging and roosting habitat is present within the Wildlife Study Area. This species was detected during bat surveys conducted for relicensing studies in 2019.
May Potentially Occur		
Reptiles		
California legless lizard (*Anniella pulchra*)	CSC	This species occurs in moist warm loose soil with plant cover. Moisture is essential. It occurs in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks. This species often can be found under surface objects such as rocks, boards, driftwood, leaf litter, and logs. Elevation range is from sea level to 5,900 feet msl.

Common Name (*Scientific Name*)	**Status (Federal/State/BLM/USFS)**	**Habitat**
California mountain kingsnake (*Lampropeltis zonata*)	BLMS	The species is found in diverse habitats including coniferous forest, oak-pine woodlands, riparian woodland, chaparral, manzanita, and coastal sage scrub. Wooded areas near a stream with rock outcrops, talus, or rotting logs that are exposed to the sun are good places to find this snake. Elevation range is from 1,500 to 8,000 feet msl.
Coast horned lizard (*Phrynosoma blainvillii*)	CSC / BLMS	This species occurs in valley foothill hardwood, conifer, and riparian habitats, as well as in pine-cypress, juniper, and annual grassland habitats. The elevational range extends up to 4,000 feet msl in the Sierra Nevada foothills and up to 6,000 feet msl in the mountains of southern California.
Birds		
American peregrine falcon (*Falco peregrinus anatum*)	CFP (nesting)	This species is a very uncommon breeding resident and uncommon as a migrant. It breeds in woodlands, forests, coastal habitats, and riparian areas near wetlands, lakes, rivers, or other water on high cliffs, banks, dunes, or mounds. Active nesting sites are known along the coast, in the Sierra Nevada, and in the mountains of northern California. This species migrate along the coast and the western Sierra Nevada in spring and fall.

Common Name (*Scientific Name*)	**Status (Federal/State/BLM/USFS)**	**Habitat**
Grasshopper sparrow (*Ammodramus savannarum*)	CSC	This species inhabits moderately open grasslands, grassland-shrub areas, and ruderal areas with patchy bare ground. It is an uncommon and local summer resident and breeder in the foothills and lowlands west of the Cascade-Sierra Nevada crest. This species occurs in dry, dense grasslands, especially those with a variety of grasses and tall forbs and scattered shrubs for singing perches.
Loggerhead shrike (*Lanius ludovicianus*)	CSC	This species is usually found in open areas with few trees, such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, and saline and freshwater emergent wetlands.
Northern harrier (*Circus cyaneus*)	CSC	This species occurs in a variety of habitats at elevations up to 10,000 feet msl. It forages in open areas such as meadows, wetlands, and grasslands. Its breeding habitat is up to 5,700 feet msl in the Sierra Nevada, in areas with shrubby vegetation near foraging habitat.
Purple martin (*Progne subis*)	CSC	This species is an uncommon, local summer resident in wooded, low-elevation habitats. It is found in valley foothill, montane hardwood, montane hardwood-conifer, and riparian habitats. The species nests in tall, old trees near an open body of water and occasionally in residential areas.

Common Name (*Scientific Name*)	**Status (Federal/State/BLM/USFS)**	**Habitat**
Short-eared owl (*Asio flammeus*)	CSC	This species prefers open areas with few trees, such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, saline and fresh emergent wetlands. It needs elevated sites for perching and dense vegetation for roosting.
White-tailed kite (*Elanus leucurus*)	CFP (nesting) / BLMS	This species prefers coastal and lowland valleys. It is often associated with farmlands, meadows with emergent vegetation, and grasslands.
Mammals		
American badger (*Taxidea taxus*)	CSC	This species occurs throughout most of the state in areas with dry, friable soils. It is most abundant in drier open stages of most shrub, forest, and herbaceous habitats up to elevations of 12,000 feet msl.
Ringtail (*Bassariscus astutus*)	CFP	This species is found in most forest and shrub habitats in close association with rocky and/or riparian areas, usually not more than 0.6 mile from water. It dens in hollow trees, snags, or other cavities.
San Joaquin pocket mouse (*Perognathus inornatus*)	BLMS	This species occurs in dry, open grasslands with fine-textured soils in the Central and Salinas Valleys from elevations of 1,000 to 2,000 feet msl.

Common Name (*Scientific Name*)	**Status (Federal/State/BLM/USFS)**	**Habitat**
Spotted bat (*Euderma maculatum*)	CSC / BLMS	This species ranges from arid deserts and grasslands through mixed conifer forests up to elevations of 10,600 feet msl in southern California. It prefers sites with adequate roosting habitat, such as cliffs, and is often limited by the availability of cliff habitat. Feeds over water and along marshes.
Western red bat (*Lasiurus blossevillii*)	CSC	This species roosts in forests and woodlands from sea level up through mixed mesic conifer forests in coastal ranges and the Sierra Nevada. It forages in a variety of habitats including croplands, grasslands, shrublands, and open woodlands and forests. The species prefers solitary roosts in trees and occasionally shrubs.
Western small-footed bat (*Myotis ciliolabrum*)	BLMS	This species is found in a wide variety of habitats, primarily in relatively arid wooded and brushy uplands near water. Elevation range is from sea level to 8,900 feet msl.
Insects		
Monarch butterfly (*Danaus plexippus*)	FC	This species relies on milkweed plants for reproduction and feeds from a variety of flowering plants. California Monarchs primarily overwinter along the coast, where they roost in eucalyptus, Monterey pines, and Monterey cypress trees.

Source: PG&E 2022
kV = kilovolt; msl = mean sea level

Federal Status: FC = federal candidate; FE = federal endangered; FT = federal threatened

State Status: SE = state endangered; ST = state threatened

USFS Status: FSS = USFS-SNF sensitive

BLM Status: BLMS = BLM sensitive

CFP = California fully protected; CSC = California species of special concern

Federally or State-Listed Species

Bald Eagle

The Study Area for bald eagle includes Kerckhoff Reservoir, the PBR (9.8 miles) and the short reach immediately below the K2 Powerhouse to Millerton Lake, including a 0.25-mile buffer on either side of these reaches. Bald eagles are state listed as endangered, protected under the BGEPA, and identified as CFP, BLMS, and FSS. Bald eagles are known to nest and forage in the FERC Project Boundary. Two subadults were observed during Study WILD 1 bald eagle wintering surveys—one roosting in a foothill pine outside the Wildlife Study Area and one flying over the SJR southwest of Kerckhoff Dam. A bald eagle territory was documented on the east side of Kerckhoff Reservoir during nesting surveys. An adult bald eagle was observed incubating a newly identified nest within the territory in March 2019; the nest was empty on the subsequent visits in May and June, but the adults continued to occupy the territory. In 2020, this nest was used again by the bald eagles and produced one young. The territory also includes two roost trees and an alternate nest (PG&E 2022).

Monarch Butterfly

The monarch butterfly (*Danaus plexippus*) is likely to occur given the ubiquity of its main larval food source, milkweed (*Asclepias* spp.), and its dispersal abilities (CNPS 2026b).

Other Special-Status Species

Special-Status Reptile Species

Three terrestrial reptiles may potentially occur in the Wildlife Study Area: northern California legless lizard (*Anniella pulchra* [CSC]), coast horned lizard (*Phrynosoma blainvillii* [BLMS, CSC]), and California mountain kingsnake (*Lampropeltis zonata* [BLMS]). Table 4.5-5 includes a summary of habitat requirements for each of these species.

Special-Status Bird Species

Golden Eagle

Although the golden eagle (*Aquila chrysaetos*) is not state or federally listed, it is protected under the BGEPA and identified as BLMS and CFP. The golden eagle is known to occur in the Wildlife Study Area. Two adult golden eagles were observed in the PBR during bald eagle surveys conducted in support of relicensing efforts.

Other Raptors

One additional special-status raptor species, the California spotted owl (*Strix occidentalis occidentalis* [Proposed FT, BLMS, FSS, CSC]), was previously recorded within the Wildlife Study Area. A single individual responded to calls during two nocturnal surveys conducted near Kerckhoff Dam within the Wildlife Study Area (Reclamation 2014). However, nesting habitat within the Wildlife Study Area is marginal, and the species was not observed during spring surveys conducted in support of relicensing. Four other special-status raptor species may potentially occur in the Wildlife Study Area, including three diurnal raptors—northern harrier (*Circus cyaneus* [CSC]), white-tailed kite (*Elanus leucurus* [BLMS, CFP]), and American peregrine falcon (*Falco peregrinus anatum* [CFP])—and one additional owl species—short-eared owl (*Asio flammeus* [CSC]). Table 4.5-5 includes a summary of each species' status and habitat requirements.

Other Birds

One special-status songbird, the yellow warbler (*Setophaga petechia* [CSC]), is known to occur in the Wildlife Study Area. Adult males were observed in the following locations: one individual adjacent to the fiber optics and 12-kV pole line between the K2 Switchyard and the non-Kerckhoff Hydroelectric Project substation near the K1 Headworks, five individuals near Smalley Cove Recreation Area, and one individual along the SJR near the inlet to Kerckhoff Reservoir.

Three additional non-raptorial special-status bird species may potentially occur in the Wildlife Study Area, including the grasshopper sparrow (*Ammodramus savannarum*

[CSC]), loggerhead shrike (*Lanius ludovicianus* [CSC]), and purple martin (*Progne subis* [CSC]). Table 4.5-5 includes a summary of each species' status and habitat requirements.

Special-Status Mammal Species

Bats

The Study Area for special-status bats included Kerckhoff Hydroelectric Project facilities. Prior to conducting surveys for special-status mammal species, PG&E performed a desktop review and completed field evaluations of the structural suitability of existing hydroelectric facilities for habitat suitability. Existing hydroelectric facilities represent suitable habitat for day- and/or night-roosting bats. Two active day roosts and seven active night roosts were documented on or in existing hydroelectric facilities. Table 4.5-6 provides a detailed list of existing hydroelectric facilities that may potentially support bat roosts, as well as the location of day and night roosts documented during field surveys (PG&E 2022).

The K1 Powerhouse and the wood storage building on the slope above the intake structures represented suitable habitat for maternal roosts (i.e., possess appropriate structural and thermal qualities to support multiple bats and their young). However, no maternity colonies were observed during the field inspections of existing hydroelectric facilities. The only evidence of reproductive behavior was a pregnant California myotis (*Myotis californicus*), a common bat species, observed in the wood storage building on the slope above the intake structures. However, this individual was not associated with other pregnant females that would indicate a maternity colony (PG&E 2022).

Table 4.5-6: Summary of Bat Roost Survey Results

Kerckhoff Hydroelectric Facility	Suitability by Roost Type				Roosting/Special-Status Species Observed?
	Maternity	Day	Night	Not Suitable	
Kerckhoff Dam	—	—	X	—	**Yes**: special-status bat species were observed at night roost, on sides of Kerckhoff Dam. Potential special-status species observed included either Townsend's big-eared bat (*Corynorhinus townsendii*) or Yuma myotisa (*Myotis yumanensis*).
K1 Intake Structure	—	X	X	—	No
K2 Intake Structure	—	—	X	—	No
North Adit to K1 Tunnel (instream flow release)	—	X	X	—	**Yes:** A night roost was observed in North Adit to K1 Tunnel; however, only two to three pieces of guano were documented, indicating very minimal use. The species is unknown.
Wood Storage Building on Slope above Intake Structures	X	X	X	—	**Yes:** A day roost was detected on the exterior of a wood storage facility. An individual (either Yuma myotis or western small-footed bat [*Myotis ciliolabrum*]) was visually observed. Potential pallid bat (*Antrozous pallidus*), long-eared myotis (*Myotis evotis*), and fringed myotis (*Myotis thysanodes*) were observed.

Kerckhoff Hydroelectric Facility	**Suitability by Roost Type**				**Roosting/Special-Status Species Observed?**
					Multiple individuals of California myotis (*Myotis californicus*) were visually observed, including a pregnant individual.
Metal Storage Building between Boat Dock and K2 Intake Structures	—	—	—	X	No
Gage J-2– SJR below Kerckhoff Dam	—	—	X	—	**Yes:** A night roost was observed in Gage J-2–SJR; however, only two pieces of guano were documented, indicating very minimal use. The bat species is unknown.
Gage J-1– Kerckhoff Reservoir	—	—	—	X	No
Smalley Cove Campground (Smalley Cove Recreation Area)	—	X	X	—	**Yes:** A potential pallid bat was observed on the exterior of a campground bathroom face.
Adit 1 to K1 Tunnel	—	X	X	—	No
Adit 2 to K1 Tunnel	—	X	X	—	No

Kerckhoff Hydroelectric Facility	**Suitability by Roost Type**				**Roosting/Special-Status Species Observed?**
K1 Powerhouse (above ground)	X	X	X	—	**Yes:** A night roost was detected in the interior of K1 Powerhouse building. These were potentially pallid bat or Yuma myotis.
K1 Switchyard (small building inside switchyard)	—	—	—	X	No
Communication Building near K1 Powerhouse	—	—	X	—	**Yes:** A night roost was detected on the exterior of the Communication Building (incidental use). The species is unknown.
K1 Headworks	—	X	X	—	No
Control House near K1 Powerhouse	—	—	—	X	No
Warehouse near K1 Powerhouse	—	X	X	—	**Yes:** A potential day/night roost was detected in the interior of warehouse facility. The species is unknown.
J-7 Temperature Monitor	—	—	—	X	No
K2 Penstock Construction Access Tunnel (plugged)	—	X	X	—	**Yes:** May 2019: A day roost was initially identified at entrance of tunnel.

Kerckhoff Hydroelectric Facility	**Suitability by Roost Type**				**Roosting/Special-Status Species Observed?**
					December 2019: Migratory roosting and night roosting was observed. The species is unknown.
K2 Powerhouse (underground)	—	—	—	X	No
K2 Switchyard Communication Building	—	—	—	X	No
Portal Door and Access Tunnel to K2 Powerhouse	—	—	X	—	No

Notes: Shaded cells are subject to acoustic monitoring.

Surveyors detected five special-status bat species during subsequent acoustic surveys conducted for PG&E at locations where signs of bat habitation was observed. These include the following:

- Pallid bat (*Antrozous pallidus* [BLMS, FSS, CSC])
- Townsend's big-eared bat (*Corynorhinus townsendii* [BLMS, FSS, CSC])
- Long-eared myotis (*Myotis evotis* [BLMS])
- Fringed myotis (*Myotis thysanodes* [BLMS, FSS])
- Yuma myotis (*Myotis yumanensis* [BLMS]) (PG&E 2022)

Four additional special-status bats may potentially roost in the Bat Study Area, including western mastiff bat (*Eumops perotis californicus* [BLMS, CSC]), spotted bat (*Euderma maculatum* [BLMS, CSC]), western red bat (*Lasiurus blossevillii* [CSC]), and western small-footed bat (*Myotis ciliolabrum* [BLMS]). Western mastiff bats were observed foraging over Kerckhoff Reservoir during other studies in the area (PG&E 2022).

Other Mammals

Three other special-status mammals may potentially occur in the Wildlife Study Area, including two mesocarnivores—the ringtail (*Bassariscus astutus* [CFP]) and American badger (*Taxidea taxus* [CSC])—and the San Joaquin pocket mouse (*Perognathus inornatus* [BLMS]). Table 4.5-5 includes a summary of each species' status and habitat requirements.

4.5.2 Regulatory Background

The following subsections contain an overview of regulations related to terrestrial biological resources.

4.5.2.1 Federal

4.5.2.1.1 Federal Power Act

The Federal Power Act (16 USC Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the

development of hydroelectric power projects. The Federal Power Act created FERC and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (18 CFR Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.5.2.1.2 Endangered Species Act of 1973

The ESA, codified at Title 16 of the United States Code (16 USC Sections 1531 et seq.), was enacted to conserve ecosystems upon which FE and FT species depend and to implement programs for the conservation of those species, thereby preventing their extinction.

Under Section 9(a)(1)(B) of ESA, it is unlawful to “take” any listed species. The term “take” is defined as: “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.”

For projects that are authorized, funded, or carried out by a federal agency (i.e., projects with a federal nexus) and that may affect a FT or FE species, the approving federal agency must consult with USFWS or NOAA Fisheries under Section 7 of the ESA. The purpose of this consultation is to ensure that the proposed action is not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of designated critical habitat. Formal consultation may result in the issuance of a Biological Opinion.

Sections 4(a)(3) and (b)(2) of the ESA require the designation of critical habitat for endangered or threatened species. Critical habitat is defined as:

(1) Areas within the geographic range of a species that are occupied by individuals of that species and contain the physical and/or biological features essential to the conservation of the species, thus warranting special management consideration or protection; and

(2) Areas outside of the geographic range of a species at the time of listing, but that are considered essential to the conservation of the species

4.5.2.1.3 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act mandates that the USFWS, NOAA Fisheries, and state wildlife trust agencies consult on any federal action involving the control or modification of surface waters. As such, any project involving a federal nexus, such as a permit with the United States Army Corps of Engineers (USACE), must also be reviewed by state and federal wildlife trust agencies (e.g., the CDFW).

4.5.2.1.4 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC 703–712), as amended, implemented the 1916 Convention between the United States and Canada for the protection of migratory birds and established federal responsibilities for the protection of migratory birds, their eggs, and nests. Later amendments incorporated treaties with Mexico, Russia, and Japan. The MBTA prohibits the take, possession, buying, selling, purchasing, or bartering of any migratory bird, including feathers or other parts, nests, eggs, or products, without prior authorization by the USFWS (50 CFR 21).

4.5.2.1.5 Bald and Golden Eagle Protection Act

The BGEPA (16 USC 668-668d) prohibits anyone, without a permit issued by the Secretary of the Interior, from “taking” bald or golden eagles, including their parts (including feathers), nests or eggs. The act defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.” Regulations further define “disturb” 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 CFR 22.6).

4.5.2.1.6 United States Bureau of Land Management Bakersfield Field Office Resource Management Plan

Portions of the Proposed Project fall within the BLM *Bakersfield Field Office Record of Decision and Approved Resource Management Plan* (RMP) (BLM 2014), which provides management and protection of natural resources on public lands administered by the BLM within the Bakersfield planning area. The Proposed FERC Project Boundary is not located within BLM-designated Area of Critical Environmental Concern, Wilderness Area, Wilderness Study Area, Outstanding National Area, Wildlife Management Area, or National Conservation Land. However, approximately eight miles of the PBR is designated by the BLM as suitable Wild and Scenic River. Additionally, between the dam and Millerton Lake, many of the existing Kerckhoff Hydroelectric Project facilities are located within the Wu Ki'Oh, Pa' San, and Tahoot Recreation Management Zones of the SJR Gorge Special Recreation Management Area. These lands are managed to maintain their unique recreation setting characteristics and recreational opportunities including the opportunity for community residents and visitors to engage in a remote isolated recreational experience; day-use activities like fishing, kayaking and gold-panning; and participate in interpretive programs and educational opportunities; while protecting critical resources (BLM 2014). Planning objectives from the Bakersfield RMP related to recreational management are provided in Section 4.17 *Recreation*. Relevant terrestrial biological resources goals (BR-G) are provided below:

- **BR-G-1:** Contribute to maintaining the biotic diversity within the Planning Area. Ensure public lands provide for a diversity of native species, ecosystems, and ecosystem processes
- **BR-G-2:** Promote the recovery of state and federally listed species. Promote conservation of other plant and animal species to prevent future listings
- **BR-G-3:** Promote the success of recovery plans, conservation plans, wildlife management plans, vegetation and weed management plans, and other regional conservation strategies

4.5.2.1.7 Land Management Plan for the United States Forest Service Sierra National Forest

Every national forest the USFS manages is required to have a land management plan (forest plan) that is consistent with the National Forest Management Act of 1976 (16 USC 1604) and other laws. Portions of the Proposed Project fall within USFS-SNF Land Management Plan planning area (USFS 2023a). That plan provides direction for the management and protection of natural resources on public lands administered by the National Forest System (NFS) within the USFS-SNF planning area. The Proposed Project is located within a NFS-designated Sustainable Recreation Management Area. The Proposed Project Area is not designated by the NFS as National Conserved Land, Wildlife Management Area, Designated Wilderness Area, Watershed Conservation Area, or Special Interest Area. No portions of the SJR within the Proposed Project boundary are identified as suitable Wild and Scenic River by USFS. The SJR and Kerckhoff Reservoir, where they fall within NFS lands, are identified as Riparian Conservation Areas. Relevant planning objectives from the USFS-SNF Land Management Plan related to recreation are provided in Section 4.17 *Recreation*. Standards and guidelines that are relevant to the Proposed Project and related to terrestrial biological resources are provided below.

Forestwide Components for Terrestrial Ecosystems

- Retain live conifer trees greater than 30 inches in diameter except in the case of imminent threat to life and property
- Vegetation treatments facilitate increasing heterogeneity at all scales, from tree clumps to large landscapes. Several treatment strategies can be employed: using landscape topography (slope, aspect, and slope position) to vary stand densities; promoting tree clumps and gaps within a stand; increasing the proportion of large to small trees; retaining important habitat structures such as large trees, snags, and trees with broken tops; and increasing diversity by promoting hardwoods, pines, and native plant species
- To retain essential habitat elements required for nesting, roosting, and denning by wildlife including fisher, California spotted owl, cavity-nesting birds, and tree-dwelling

bats and other small mammals, mechanical vegetation treatments within forested habitats should maintain and promote large and structurally complex trees, snags, and downed logs distributed widely on the landscape and consistent with forest type desired conditions, especially where they occur in clumps and along forest edges

- Mechanical vegetation treatments and salvage operations should retain all large hardwoods greater than 12 inches in diameter (8 inches for blue oak), except where they pose a threat to human life or property or as needed for operability
- Design vegetation treatments to maintain or enhance special habitat features. Vegetation management projects on lands outside of wilderness should include measures to minimize the risk of introducing non-native invasive species into wilderness
- Focus treatment efforts on high-priority invasive species and infestations while developing management goals for lower-priority species and infestations. Prioritize areas such as wilderness, research natural areas, botanical areas, wild and scenic areas, and aquatic and riparian areas to maintain the integrity of native species and ecosystems. Prepare control and prevention plans for high-priority invasive species, which promote early detection of new populations and rapid management response as an effective approach to minimize spread

Forestwide Components for Animal and Plant Species

- Design features, mitigation, and project timing considerations should be incorporated into projects that may affect habitat for at-risk species where they occur to minimize potential impacts to ecological conditions that provide for the persistence of at-risk species
- Known nest, roost, rest, or den trees used by at-risk species, including surrounding trees that provide beneficial thermal or predatory protection, should not be purposefully removed, except for the reasonably unavoidable removal of hazard trees and as required to meet other state or federal regulatory requirements
- To minimize disturbance to deer breeding and fawning, vegetation treatments should include minimization actions developed in coordination with the CDFW in key summer range areas from May 15 through July 15, and during rutting season in key

winter range areas from November 15 through January 1 (refer to most current CDFW deer range maps)

- Follow best available guidance for National White-nose Syndrome (WNS) Decontamination Protocols to minimize the spread of the fungus known to cause WNS, for activities and authorizations with potential to enter subterranean or cave-like habitats
- Preferentially retain groups and clumps of large trees, snags and downed logs along forest edges to provide habitat and roost sites for wildlife species, such as small mammals, cavity-nesting birds, and tree-dwelling bats
- Projects should be designed to minimize invasive species spread by incorporating prevention and control measures into ongoing management or maintenance activities that involve ground disturbance, terrestrial or aquatic habitat alteration, or the possibility of spreading invasive species. When feasible, projects should include measures to use invasive species-free gravel, fill, and topsoil, and include follow-up inspections as needed and specified in regional or national strategies
- Where pesticide applications are proposed within 500 feet of known occupied sites for at-risk amphibian species, design applications to avoid potential adverse impacts on individuals and their habitats

United States Forest Pesticide Use Policy

To ensure the proper use of pesticides, the USFS requires the review and approval of all proposals for the use and application of pesticides on NFS lands under a Pesticide Use Permit (PUP) (USFS 2023b).

4.5.2.2 State

4.5.2.2.1 California Endangered Species Act

The CESA is administered by the CDFW and prohibits the “take” of plant and animal species identified as either ST or SE in the State of California by the Fish and Game Commission (Fish and Game Code Section 2050–2097). “Take” is defined as hunt, pursue, catch, capture, or kill. Sections 2091 and 2081 of the CESA allow the CDFW to

authorize exceptions to the prohibition of "take" of ST or SE plant and animal species for purposes such as public and private development.

4.5.2.2.2 Fish and Game Code of California

Native Plant Protection Act (Sections 1900–1913 of the Fish and Game Code)

The CDFW is responsible for implementing the Native Plant Protection Act, which allows the California Fish and Game Commission to designate endangered and rare plant species.

Birds of Prey and Native Nesting Birds (Section 3503)

Section 3503 of the Fish and Game Code serves as California's state regulation prohibiting the take of nesting birds or their eggs. Subsection 3503.5 specifically prohibits the take, possession, or destruction of any birds in the orders Falconiformes or Strigiformes (collectively, "raptors") and their eggs or nests. Non-native species are not afforded protection under the Fish and Game Code.

Fully Protected Species

The classification of "fully protected" (CFP) was implemented in California in the 1960s to protect rare or threatened species (many of which are now listed under CESA). The Fish and Game Code includes protections for "fully protected birds" (Section 3511), "fully protected mammals" (Section 4700), "fully protected reptiles and amphibians" (Section 5050), and "fully protected fish" (Section 5515).

4.5.2.2.3 California State Wildlife Action Plan

In 2000, Congress enacted the State Wildlife Grants Program to support state programs that broadly benefit wildlife and habitats but particularly "species of greatest conservation need." As a requirement for receiving funding under this program, state wildlife agencies submitted a Wildlife Action Plan (comprehensive wildlife conservation strategy) to USFWS in 2005. In partnership with the Wildlife Health Center, University of California, Davis, CDFW directed the development of California's Wildlife Action Plan.

To meet requirements of the grant program, CDFW released the first comprehensive plan update in 2015 (CDFW 2015). The revised plan includes updated statewide and regional conservation strategies based on current stressors and circumstances.

4.5.2.3 Local

4.5.2.3.1 Madera County General Plan

The Madera County General Plan (Madera County 1995) applies to the Proposed Project because it is located within Madera County. The plan includes information regarding land uses in the Proposed Project Vicinity and management goals and policies relevant within the Proposed FERC Project Boundary. The Madera County General Plan provides an overall framework for development of the county and protection of its natural and cultural resources. The plan addresses seven topics, organized into elements, as follows: land use, circulation (transportation), housing, conservation, open space, noise, and safety. The plan includes specific programs for implementing the policies described in each element.

Natural resource goals and policies in the Madera County General Plan (specifically Part II Goals, Policies, and Implementation Programs, Section 5 *Agricultural and Natural Resources*) relevant to the Proposed Project include the following:

- Goal 5.E: To protect, restore, and enhance habitats that support fish and wildlife species so as to maintain populations at viable levels
  - Policy 5.E.1: The County shall identify and protect critical nesting and foraging areas, important spawning grounds, migratory routes, waterfowl resting areas, oak woodlands, wildlife movement corridors, and other unique wildlife habitats critical to protecting and sustaining wildlife populations
  - Policy 5.E.2: The County shall require development in areas known to have particular value for wildlife to be carefully planned and, where possible, located so that the reasonable value of the habitat for wildlife is maintained

- Policy 5.E.3: The County shall encourage private landowners to adopt sound wildlife habitat management practices, as recommended by CDFW officials and the USFWS
- Policy 5.E.4: The County shall support preservation of the habitats of rare, threatened, endangered, and/or other special-status species. The County shall consider developing a formal habitat conservation plan in consultation with federal and state agencies, as well as other resource conservation organizations. Such a plan would provide a mechanism for the acquisition and management of lands supported by threatened and endangered species
- Policy 5.E.5: The County shall support the maintenance of suitable habitats for all indigenous species of wildlife through maintenance of habitat diversity
- Policy 5.E.6: The County shall ensure the conservation of sufficiently large, continuous expanses of native vegetation to provide suitable habitat for maintaining abundant and diverse wildlife, if this preservation does not threaten the economic well-being of the county
- Policy 5.E.8: The County shall ensure close monitoring of pesticide use in areas adjacent to habitats of special-status plants and animals
- Policy 5.E.10: Prior to approval of discretionary development permits involving parcels within a significant ecological resource area, the County shall require, as part of the environmental review process, a biotic resources evaluation of the sites by a qualified biologist. The evaluation shall be based upon field reconnaissance performed at the appropriate time of year to determine the presence or absence of rare, threatened, or endangered species of plants or animals. Such evaluation will consider the potential for significant impact on these resources and will either identify feasible measures to mitigate such potential impacts or indicate why mitigation is not feasible
- Policy 5.E.11: The County shall provide for a minimum 200-foot wildlife corridor along the SJR between Friant Dam and the Highway 145 crossing, consistent with the SJR Parkway Plan. The County shall require a buffer with a minimum width of 150 feet between existing or planned urban or suburban uses. Exceptions may be necessary where the minimum width is infeasible due to

topography or other physical constraints. In these instances, an offsetting expansion on the opposite side of the river should be provided

- Goal 5.F: To preserve and protect the valuable vegetation resources of Madera County
  - Policy 5.F.1. The County shall encourage landowners and developers to preserve the integrity of existing terrain and natural vegetation in visually sensitive areas such as hillsides, ridges, and along important transportation corridors
  - Policy 5.F.2. The County shall require developers to use native and compatible non-native species, especially drought-resistant species, to the extent possible in fulfilling landscaping requirements imposed as conditions of discretionary permit approval or for project mitigation
  - Policy 5.F.3. The County shall support the preservation of outstanding areas of natural vegetation, including, but not limited to, oak woodlands, riparian areas, and vernal pools
  - Policy 5.F.4. The County shall ensure that landmark trees are preserved and protected
  - Policy 5.F.6. The County shall require that new development preserve natural woodlands to the maximum extent possible
  - Policy 5.F.7. The County shall require that development on hillsides be limited to maintain valuable natural vegetation, especially forests and open grasslands, and to control erosion

- Policy Goal 5.H: To preserve and enhance open space lands to maintain the natural resources of the county
  - Policy 5.H.1. The County shall support the preservation and enhancement of natural landforms, natural vegetation, and natural resources as open space. To the extent feasible, the County shall permanently protect as open space areas of natural resource value, including wetlands preserves, riparian corridors, woodlands, and floodplains

- Policy 5.H.2. The County shall require that new development be designed and constructed to preserve the following types of areas and features as open space to the maximum extent feasible: a. High erosion hazard areas; b. Scenic and trail corridors; c. Streams and streamside vegetation; d. Wetlands; e. Other significant stands of vegetation; f. Wildlife corridors; and g. Any areas of special ecological significance
- Policy 5.H.3. The County shall support the maintenance of open space and natural areas that are interconnected and of sufficient size to protect biodiversity, accommodate wildlife movement, and sustain ecosystems
- Policy 5.H.4. Recognizing the importance of both public and privately owned open space, the County shall encourage both private and public ownership and maintenance of open space
- Policy 5.H.5. The County shall require that significant natural, open space, and cultural resources be identified in advance of development and incorporated into site-specific development project design

4.5.2.3.2 Fresno County General Plan

The Fresno County General Plan (Fresno County 2024) applies to the Proposed Project because it is located within Fresno County. The plan includes information regarding land uses in the Proposed Project Vicinity and management goals and policies relevant to the Proposed Project Area. Natural resource goals outlined in the Fresno County General Plan that are relevant to the Proposed Project include the following:

- Goal OS-E: To help protect, restore, and enhance habitats in Fresno County that support fish and wildlife species so that populations are maintained at viable levels
- Goal OS-F: To preserve and protect the valuable vegetation resources of Fresno County

4.5.3 Analysis Methodology

4.5.3.1 Analytical Approach

The analysis of the Proposed Project's potential impacts on terrestrial biological resources is based on the review of the Proposed Project design and technical study reports included in PG&E's FLA. These reports document existing terrestrial biological resources within the Proposed Project Area.

Ongoing operation activities conducted under the existing FERC license that will continue unchanged are not evaluated, except where they may contribute to cumulative impacts. The analysis focuses on the following:

- New construction activities
- Proposed environmental management measures and monitoring plans
- Changes in operational activities from existing conditions under the Proposed Project

Impacts are assessed in terms of direct or indirect effects:

- Direct impacts occur immediately and at same location as the Proposed Project (e.g., vegetation removal and grading during construction and maintenance activities)
- Indirect impacts occur later in time or at a greater distance (e.g., long-term changes in water quality, off-site impacts from noise, dust, or lighting)

For this analysis, indirect impacts from construction activities are considered short term (temporary), while direct impacts from construction and both direct and indirect impacts from operation are considered long term (permanent).

The Area of Analysis for plant and wildlife resources are described in Section 4.5.1.2.3 *Baseline Studies, Study Boundaries,* and generally encompass the FERC Project Boundary and Kerckhoff Hydroelectric Project facilities, along with an appropriate buffer (generally 0.5 mile for wildlife, 50 feet for plants). Proposed Project facilities that were not included in the Area of Analysis included K1 and K2 Tunnels and Adits 1 and 2.

4.5.3.2 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on terrestrial biological resources if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as candidate, sensitive, or special-status in local or regional plans, policies, or regulations, or by CDFW or USFWS (BIO-1);
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS (BIO-2);
- Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means (BIO-3);
- 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 (BIO-4);
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinances (BIO-5); and
- Conflict with the provisions of an adopted Habitat Conservation Plan; Natural Community Conservation Plan; or other approved local, regional, or state habitat conservation plan (BIO-6)

4.5.3.2.1 Proposed Project Components Assessed

The following components are evaluated for potential effects on terrestrial biological resources:

- FERC Project Boundary modifications
- Retirement of the K1 Powerhouse and associated facilities
- Modified and Proposed Project operational measures, including:
  - Upgrades to the Kerckhoff Dam radial gates for Flow Management Measures

  - Installation of a new flow gage in the SJR
  - Trail assessment and improvements for whitewater boating access to the SJR at the J-2 Stream Gage

- Management Measures and Maintenance Plans, including:

  - Recreation Management Plan:

    - Construction of Vista Day Use Area and associated trail improvements
    - Paving of gravel road between Access Road 6A and the day use area
    - Provision of dispersed day use areas and boat-in shoreline access points

  - Vegetation Management and Pest Control Plan
  - Wildlife Management Plan
  - Project Road and Trail Maintenance Plan
  - Proposed Project Modified Flow Measures

Other components of the Proposed Project are addressed in Section 4.4 *Biological Resources – Aquatics and Fisheries* or other relevant Environmental Impact Report sections (e.g., Section 4.6 *Cultural Resources*, Section 4.17 *Recreation*).

4.5.3.3 Environmental Management Measures and Monitoring Plans

The Proposed Project includes the following plans to protect terrestrial biological resources and comply regulatory requirements detailed in Section 4.5.2 *Regulatory Background:*

- Vegetation Management and Pest Control Plan:
  Provides PM&E measures during vegetation and pest management, including the use of pesticides
- Wildlife Management Plan:
  Includes PM&E measures to minimize potential impacts on bald eagle, golden eagle, nesting birds, and special-status bats during operation, maintenance, and construction
- Recreation Management Plan:

Implements best management practices (BMPs) to avoid and minimize impacts on terrestrial biological resources through drainage and water quality management, vegetation management, and visitor access control

4.5.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating

Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down-ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Proposed Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the PBR of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cfs for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the PBR cannot exceed a maximum of 1 foot per hour (or

less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient[19] storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability.

[19] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.5.4.1 Potential Impacts Related to Special-Status Species and Their Habitats

Impact BIO-1: Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or United States Fish and Wildlife Service?

4.5.4.1.1 Proposed Project

Special-Status Species and Habitats in the Proposed Project Area

Special-Status Plants

Focused surveys within the Proposed FERC Project Boundary did not identify ESA- or CESA-listed plants; however, historic records of tree anemone (CESA-threatened) exist, and the unsurveyed areas around the Vista Day Use Area and new flow gage could potentially support listed species.

No CEQA-defined rare species have been identified as having potential to occur within the Proposed FERC Project Boundary.

Special-Status Wildlife

Focused surveys resulted in no observations of FE, FT, or FC wildlife species. However, a review of existing information indicated that one species recently proposed for listing, the monarch butterfly, has the potential to occur within the Proposed FERC Project Boundary (FERC 2025). The monarch's host plant, which includes multiple milkweed species, could occur in upland habitat around Proposed Project features like the Vista Day Use Area, where routine maintenance has the potential to impact both the insect and its host plant.

Special-Status Reptiles

Three terrestrial reptiles may potentially occur in the Proposed FERC Project Boundary:

- Northern California legless lizard (CSC)

- Coast horned lizard (BLMS, CSC)
- California mountain kingsnake (BLMS)

Special-Status Avian Species

One SE species, the bald eagle, is known to nest and winter within the Proposed FERC Project Boundary. Nesting was documented at the same foothill pine nest location on the eastern shoreline of Kerckhoff Reservoir in 2019 and 2020. A new bald eagle territory was identified in March 2019 on USFS land on the Fresno County side of the Kerckhoff Reservoir shoreline, approximately 0.4 mile southwest of Smalley Cove Recreation Area. This territory includes both a primary and an alternate nest. Bald eagles were also observed foraging in the PBR.

Special-Status Bats

Five special-status bat species are known to occur within the Proposed FERC Project Boundary, and four additional species may potentially occur. Relicensing surveys documented two-day roosts and seven-night roosts on or within existing hydroelectric facilities, though no maternity roosts were observed.[20] Several facilities provide suitable habitat for day and/or night roosts (i.e., possess suitable structural and thermal qualities). Although most of the species known to occur within the Proposed FERC Project Boundary prefer mines, crevices, or structures for roosting, the long-legged myotis roosts in tree cavities, and new roosts may be established over a new license term.

Proposed Project Protection, Mitigation, and Enhancement Measures

Under the Proposed Project, PG&E would implement PM&Es, including the Vegetation Management and Pest Control Plan (PG&E 2023), which provides:

[20] The only evidence of reproductive behavior was a pregnant California myotis (*Myotis californicus*), a common bat species, observed in the wood storage building on the slope above the intake structures. However, this individual was not associated with other pregnant females that would indicate a maternity colony (PG&E 2022).

- Habitat enhancement for special-status botanical species through targeted treatment of invasive weed populations, reducing competition and displacement by invasive species
- Regular floristic surveys, with results used to guide consultation with USFS and BLM to identify invasive weed species or populations for treatment, determine appropriate methods, and establish annual monitoring activities
- Ongoing monitoring of treated invasive weed populations to evaluate treatment effectiveness ensure long-term habitat protection

Additionally, site-specific avoidance measures would be incorporated into construction plans, such as:

- Scheduling work outside blooming periods
- Flagging and avoiding plant populations
- Conducting floristic surveys every five years

As outlined in the Recreation Management Plan, PG&E would prepare, and subsequently submit for FERC approval, a design narrative, site conceptual plan, and an environmental analysis for resources not assessed as part of the license application, including special-status plants. The construction plan would also include the following:

- A description of avoidance measures required to protect sensitive resources, including special-status plants if found
- Identification of permitting and other regulatory requirements needed prior to construction

Site-specific measures to avoid potential impacts on any identified special-status botanical populations may include, but are not limited to the following:

- Implementing work outside the blooming period of the special-status plant species
- Floristic surveys every five years starting in Year 1 of the license
- Flagging and avoiding the plant populations

Herbicides would be applied under the supervision of a licensed Pest Control Advisor (PCA) in accordance with:

- A Pest Control Recommendation (PCR) on all lands in California
- A Pest Use Proposal (PUP) on NFS lands[21]

Only herbicides approved by the United States Environmental Protection Agency (USEPA) and California Department of Pesticide Regulation (CDPR) would be used. Selected herbicides would be target-specific whenever feasible and applied directly to minimize overspray and avoid adjacent habitat that could support special-status species.

Construction

Elements of the Proposed Project construction, including construction of the Vista Day Use Area, installation of a new flow gage upstream of Kerckhoff Reservoir, retirement of the K1 Powerhouse, and providing dispersed day-use areas and boat-in shoreline access points, could result in significant and unavoidable impacts on special-status species or their habitats over the term of the license if species are present. Individual actions under the Proposed Project are discussed below, and species categories are broken out where necessary to discuss specific species-level impacts.

K1 Powerhouse

Under the Proposed Project, the K1 Powerhouse would be retired, and associated facilities would be modified. The K1 generating units are currently non-operational, so any potential impacts would occur from modifications of the current infrastructure to future uses or full retirement. All activities associated with the retirement of K1 Powerhouse would occur with minimal or no ground disturbance. However, bats have been documented as utilizing the K1 Powerhouse facilities, and as such, potential

[21] A PCR is required by the CDPR for all lands within California. A PUP is required on all USFS-SNF lands per USFS's Pest Use Policy.

impacts from the retirement of the K1 Powerhouse under the Proposed Project are discussed below:

Special-Status Bats

The K1 Powerhouse and a nearby wood storage structure were identified as suitable maternity habitat (i.e., possess suitable structural and thermal qualities). While no maternity roosts were observed in the K1 Powerhouse structure, some evidence of night roosting (i.e., a small amount of guano, species unknown) was noted in the interior of the facility. Under the Proposed Project, K1 Powerhouse and associated facilities would be retired and sealed, meaning it would no longer be used to generate power and would be repurposed to provide operational support. The process of lining the turbine pits, closing the turbine shutoff valve, plugging the tailrace, and sealing penetrations for electrical connections could potentially disturb special-status bat maternity roosts, if present, or alter interior structures that may be used by roosting bats. However, the wood storage structure would remain, preserving some potential habitat. Still, the decommissioning of the K1 Powerhouse is anticipated to result in Significant and Unavoidable impacts to special-status bats.

Inflow Gage Above Kerckhoff Reservoir

One new flow gage would be installed as part of the Proposed Project, located upstream of Kerckhoff Reservoir and downstream of SCE's Big Creek No. 4 Powerhouse, within the waters of the SJR. The gage would be supported by one to four poles and a gage house with a maximum footprint of 12 square feet. Direct permanent loss of suitable habitat for special-status species would be limited to approximately 12 square feet, which is negligible when compared to the overall available habitat.

Special-Status Plants

As discussed in Section 4.5.1.2, the proposed location for the new flow gage was not included in the Botanical Study Area and, therefore, were not surveyed as part of PG&E's FERC license application. Although focused surveys within other areas of the Proposed FERC Project Boundary did not identify ESA- or CESA-listed plants, historic

records of tree anemone (CESA-threatened) exist, and this species could be located within the unsurveyed areas around the new flow gage.

Vegetation Management and Pest Control Plan would require floristic surveys prior to construction of these new facilities and features. Survey results would be documented in written reports and provided to appropriate resource agencies (USFWS, USFS, BLM, and CDFW) and members of the Cultural Resource Working Group for review and comment. Therefore, less than significant impacts would be anticipated for special-status plants as a result of gage installation.

Special-Status Wildlife

Ground disturbance resulting from installation of the new flow gage would be minimal; therefore, less than significant impacts would be anticipated for special-status wildlife species as a result of gage installation.

Special-Status Reptiles

Terrestrial reptiles could be affected directly during ground disturbance for installation of the new flow gage. However, this site is not expected to support special-status terrestrial reptiles due to lack of suitable habitat (see Table 4.5-5 for habitat details). Therefore, less than significant impacts would be anticipated for special-status terrestrial reptiles as a result of gage installation. Aquatic reptiles are discussed in Section 4.4 4.4 *Biological Resource – Aquatics and Fisheries*.

Special-Status Avian Species

No tree trimming or tree removal would be required for installation of the flow gage (12-square-foot footprint); therefore, no impacts to special-status avian species would be anticipated.

Special-Status Bats

No tree trimming or tree removal would be required for installation of the flow gage (12-square-foot footprint), and ample roosting habitat would remain at the landscape scale; therefore, no impacts to special-status bats would be anticipated.

J-2 Stream Gage Access Trail Improvements

Under the Proposed Project's Whitewater Notification and Access Measure, PG&E would conduct a trail assessment to develop a plan for improving trail conditions along the J-2 Stream Gage access trail for whitewater boating access. Improvement may include:

- Widening to a maximum of three feet
- Vegetation clearing
- Avoiding surface disturbance in rocky outcrops or erodible soils

PG&E would assess potential impacts on terrestrial biological resources in collaboration with BLM to ensure the improvements would not significantly adversely affect terrestrial resources. Following a field assessment under the Whitewater Notification and Access Measure, PG&E would develop a J-2 Stream Gage Access Trail Plan that presents the trail alignment and specific trail improvement measures as determined by the field assessment and BLM recommendations. FERC approval would be required prior to implementation of trail improvement activities. If improvements are implemented, tree removal may be necessary to increase trail width for safe access. The total number of trees removed is expected to be small and would not substantially affect nesting bird habitat at the landscape scale. If any resources are found to be significantly adversely affected, that section of the trail would be excluded from improvements.

Additionally, tree trimming and removal for trail widening (up to three feet)[22] would be minimal, and ample roosting habitat would remain at the landscape scale. As noted above, PG&E would prepare a J-2 Stream Gage Access Trail Plan for BLM review and comment and obtain FERC approval. Habitat assessments and pre-construction surveys by a qualified biologist would be conducted where suitable roost habitat exists. If bats are detected, work would be delayed until roosts are vacated, consistent with the Wildlife Management Plan. Therefore, less than significant impacts to special-status

[22] The width of the trail to Gage J-2 would only increase by one foot.

terrestrial species would be expected due to J-2 Stream Gage Access Trail Improvements.

Vista Day Use Area

Special-Status Plants

As discussed in Section 4.5.1.2, the proposed location for the Vista Day Use Area was not included in the Botanical Study Area and, therefore, was not surveyed as part of PG&E's FERC license application. Although focused surveys within other areas of the Proposed FERC Project Boundary did not identify ESA- or CESA-listed plants, historic records of tree anemone (CESA-threatened) exist, and this species could be located within unsurveyed areas proposed for construction. If avoidance is not feasible and a federally or state-listed botanical species is present, construction of the Vista Day Use Area, including trail reconstruction could result in a potentially significant impact on special-status botanical species.

Vegetation Management and Pest Control Plan would require floristic surveys prior to construction of these new facilities and features. Survey results would be documented in written reports and provided to appropriate resource agencies (USFWS, USFS, BLM, and CDFW) and members of the Cultural Resource Working Group for review and comment.

Additional measures outlined in the Vegetation Management and Pest Control Plan and the Project Road and Trail Management Plan would serve to further limit potential impacts to special-status botanical species. These include the following:

1. Managing drainage with erosion control features (culverts, drains, ditches, and water bars)
2. Vegetation management and weed removal
3. Debris removal
4. Installing access control features (posts, rails, gates, and barrier rock)

By implementing the proposed PM&Es, impacts would be reduced to less than significant.

Special-Status Wildlife

The proposed Vista Day Use Area would be constructed at a previously disturbed area near the K2 Powerhouse. Wildlife habitat mapped in the vicinity of the proposed Vista Day Use Area and associated access road is primarily Annual Grasses, and the existing trail to be refurbished is located within Blue Oak Woodland, as shown on Figure F-2 in Appendix F *Biological Resources – Aquatics and Fisheries Data*.

Wildlife habitat(s) surrounding the proposed reconstructed trail and the new flow gage was not surveyed as part of the license application. However, based on CDFW vegetation mapping data (Vegetation – Southern Sierra Nevada Foothills [ds3073]), habitat at the new flow gage location (Interior live oak–shreve oak woodland and forest [*Quercus wislizeni – Quercus parvula* (tree)] Forest and Woodland Alliance), is similar to that within the Botanical Study Area.

Focused surveys resulted in no observations of FE, FT, or FC wildlife species. However, a review of existing information indicated that one species recently proposed for listing, the monarch butterfly, has the potential to occur within the Proposed FERC Project Boundary (FERC 2025). The monarch's host plant, which includes multiple milkweed species, could occur in upland habitat around Proposed Project features like the Vista Day Use Area, where construction and routine maintenance has the potential to impact both the insect and its host plant. Impacts to monarch's host plants would be minimized through the Proposed Project's Vegetation Management and Pest Control Plan, which would require floristic surveys prior to construction of these new facilities and features. Survey results would be documented in written reports and provided to appropriate resource agencies (USFWS, USFS, BLM, and CDFW) and members of the Cultural Resource Working Group for review and comment. By implementing the proposed PM&Es, impacts would be reduced to less than significant.

Special-Status Reptiles

Terrestrial reptiles could be affected directly during ground disturbance for construction of Vista Day Use Area (approximately 2.72 acres). However, this site is not expected to support terrestrial special-status reptiles due to lack of suitable habitat (see Table 4.5-5 for habitat details). Therefore, less than significant impacts would be anticipated for special-status terrestrial reptiles. Aquatic reptiles are discussed in Section 4.4 4.4 *Biological Resource – Aquatics and Fisheries*.

Special-Status Avian Species

Potential disturbance of any special-status or migratory bird species for the proposed Vista Day Use Area would be avoided through implementation of the following PM&Es included in the Wildlife Management Plan:

- Protection of Nesting Golden Eagles during Non-Routine Heavy Maintenance or Construction
- Protection of Nesting Birds during Vegetation Removal
- Power Pole Replacements

Therefore, less than significant impacts would be anticipated for special-status avian species.

Special-Status Bats

Construction of the Vista Day Use Area and associated access road would occur in previously disturbed areas and is unlikely to affect roosting habitat. The trail segment proposed for reconstruction at the day use area, the new flow gage, and the trail to Gage J-2 proposed for improvements pursuant to the Whitewater Notification and Access Measure are located within wooded habitat that may support tree-roosting bats. Tree trimming and removal for trail widening (up to 3 feet)[23] or installation of the flow gage (12-square-foot footprint) would be minimal, and ample roosting habitat would remain at the landscape scale. Prior to implementing trail improvements, PG&E would

[23] The width of the trail to Gage J-2 would only increase by one foot.

prepare a J-2 Stream Gage Access Trail Plan for BLM review and comment and obtain FERC approval. Habitat assessments and pre-construction surveys by a qualified biologist would be conducted where suitable roost habitat exists. If bats are detected, work would be delayed until roosts are vacated, consistent with the Wildlife Management Plan.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** from construction activities to roosting bats during K1 Powerhouse retirement and modification activities under the Proposed Project for potential impact BIO-1.

Impact Analysis with Mitigation

To reduce the potentially significant impacts to special-status bats from Proposed Project construction associated with the K1 Powerhouse decommissioning, Recommended Mitigation Measure BIO-2: Roosting Bats could be adopted. This measure would require construction activities to occur outside of bat maternity season if feasible, require pre-construction surveys for special-status bats or their habitat by a qualified biologist if work does occur during the maternity season, and the implementation of appropriate avoidance and minimization measures if special-status bats or active roosts are identified within the construction area. Therefore, if the Recommended Mitigation Measure BIO-2 were implemented, there would be a Less Than Significant Impact on any species identified as a candidate, sensitive, or special-status in local or regional plans, policies, or regulations, or by CDFW or USFWS with incorporation of Recommended Mitigation Measure BIO-2.

On March 11, 2026, State Water Board staff provided Recommended Mitigation Measure WQ-5 to PG&E staff and requested that PG&E agree to implement the measure to ensure that Proposed Project impacts remain less than significant with mitigation. On March 17, 2026, PG&E responded that it does not plan to agree to mitigation measures to reduce Proposed Project impacts to a less than significant level without first reviewing the draft EIR upon its circulation. On March 19, 2026, PG&E provided comments and suggested edits to the mitigation measures shared on March

11, 2026 (personal email communication, J. Hartman and C. McCormick, March 19, 2026). Without commitment from PG&E, implementation of Recommended Mitigation Measure WQ-5 is uncertain.

Without implementation of Recommended Mitigation Measure BIO-2 or comparable action, the Proposed Project's impacts to special-status roosting bats are **Significant and Unavoidable**.

Operation

Elements of the Proposed Project, including Proposed FERC Project Boundary modifications, routine vegetation management and herbicide use, maintenance or repair of existing hydroelectric facility roads or trails, and non-routine heavy-maintenance activities, could result in potentially significant impacts on special-status species or their habitats over the term of the license if species are present. Individual actions under the Proposed Project are discussed below, and species categories are broken out where necessary to discuss specific species-level impacts.

General O&M Activities

Special-Status Avian Species

Routine hydroelectric facility maintenance, reservoir-based recreation, and non-routine heavy maintenance and construction has the potential to disturb nesting affect bald eagles depending on timing, proximity, and specific activity types. The USFWS National Bald Eagle Management Guidelines (USFWS 2007) provide recommended activity buffers near nests during the typical nesting season (January through July):

- Tree removal or construction-type activities: 660 feet (or closer only where eagles have demonstrated tolerance to similar activity)
- Motorized or non-motorized watercraft: 330 feet, except where eagles have demonstrated tolerance
- Helicopter operations: Avoid flights within 1,000 feet of the nest, except where eagles have demonstrated tolerance

Disturbance of Bald Eagle Nests from Routine Proposed Project Maintenance

Ongoing routine facility maintenance occurs along the upper portion of Kerckhoff Reservoir, near the existing bald eagle nest is location, including:

- Maintenance of the Smalley Cove Recreation Area: Routine maintenance activities at the Smalley Cove Recreation Area include minor repairs, painting, and replacing minor parts and structural components to keep fixed assets in a safe and acceptable condition. Heavy maintenance generally includes paving or hardening surfaces and replacing water or other utility systems and site amenities, such as tables, grills, and signs
- Helicopter patrols: PG&E conducts periodic helicopter patrols. The flight path for the patrols varies but occasionally requires flying along the length of Kerckhoff Reservoir

Evidence summarized by USFWS (2007) indicated bald eagles are less likely to be disturbed by ongoing activities that pre-date successful nesting activity in a given area. No changes to routine maintenance activities are proposed. Existing and new avoidance measures described in the Proposed Project's Wildlife Management Plan (PG&E 2023) would continue to be implemented, including:

- No repeated helicopter fly-bys or hovering within 1,000 feet of an active bald eagle nest during the limited operating period for the nesting season (January 1 to July 31)
- Annual monitoring of the existing bald eagle nest and any new nests identified over the license term, with ongoing collaboration among CDFW, USFWS, USFS, and BLM as appropriate
- Non-routine maintenance activities, including hazard tree removal, and construction in areas with suitable bald eagle nesting habitat would be scheduled between August 1 and December 31 to avoid the bald eagle nesting season (January 1–July 31)
- If work during this period is unavoidable, a qualified biologist would conduct a pre-activity survey for active bald eagle nests within 0.25 mile of the proposed activity no more than 14 days prior to commencement. If an active nest is identified, work would be postponed until the young have fledged or the nesting attempt has failed, as

confirmed by the biologist, and appropriate resource agencies (USFWS, CDFW) would be notified

Disturbance of Bald Eagle Nests from Reservoir-Based Recreation

Kerckhoff Reservoir is open for year-round recreation. Commonly used watercraft include personal watercraft, non-motorized boats (e.g., kayaks and canoes), and small trailered or hand-launched watercraft. Several studies have shown that eagles can tolerate or become habituated to predictable, non-threatening human activity and nearby developments with consistent characteristics and activity levels (e.g., powerhouses and highways) (Fraser et al. 1985; Guinn 2013; Wood et al. 1989). Under the Proposed Project, PG&E may create and maintain up to three boat-in access areas along the shore of Kerckhoff Reservoir if suitable areas are identified. As discussed in Section 4.17, day use within the Proposed FERC Project Boundary may modestly increase relative to existing conditions; but the recreational increase is not expected to be substantial enough to adversely affect bald eagle nesting.

Disturbance of Bald Eagle Nests from Implementing Non-Routine Heavy Maintenance and Construction

New or intermittent activities, such as non-routine heavy maintenance and construction activities, could potentially disturb nesting eagles, either at the existing nest or at new nests identified over the term of the license. Such activities often include ground disturbance, are implemented for several days, and require heavy equipment.

The proposed boat-in access and dispersed day-use areas are currently greater than 0.25 mile (greater than 1,320 feet) from the existing bald eagle nest. Construction of these sites using hand-operated equipment is not expected to affect bald eagles at the existing nest. However, if new nests are established near the northwest portion of Kerckhoff Reservoir, creation of these improvements could have the potential to disturb those nests.

Kerckhoff Dam radial gates upgrades of installation of the new inflow gage are not expected to affect bald eagles due to distance: the existing nest is more than 1.3 miles

upstream of the dam and approximately 1.3 miles from the new gage location. Helicopter use needed to transport equipment and personnel to work areas could potentially disturb nesting bald eagles if repeated helicopter fly-bys or hovering occur within 1,000 feet of an active nest.

To minimize potential impacts during non-routine heavy maintenance and construction activities in areas with suitable bald eagle nesting habitat, PG&E would implement the following additional measures described in the Wildlife Management Plan:

- Siting restrictions: New recreation areas or boating access points would not be located within 660 feet of known bald eagle nests. Buffer sizes may be increased based on site-specific conditions, including observations of the pair's sensitivity to human activity, proximity to existing human activity or development (e.g., roads, structures), current site conditions (e.g., screening vegetation, terrain), and the type and intensity of Proposed Project activities
- Timing and pre-activity surveys: Non-routine heavy maintenance activities and construction would be scheduled outside the bald eagle nesting period whenever feasible. If work during nesting season is unavoidable, PG&E would conduct pre-activity surveys to determine the presence/nesting status and impose no-work buffers consistent with the USFWS National Bald Eagle Management Guidelines (2007). Where eagles establish new nests in secluded areas removed from existing permanent human activity (e.g., undisturbed forest tracts), a 0.25-mile (1,280-foot) buffer would be implemented
- Work restrictions: Excepting emergencies, no activities would be allowed within buffers until a qualified biologist confirms that young have fledged and are no longer occupying the nest, or that the nesting attempt has failed
- Avian-safe infrastructure: Future power pole replacements on Proposed Project distribution lines would be constructed to be avian safe, consistent with the current version of PG&E's Raptor-Safe Construction and Wildlife Protection

Other Special-Status Avian Species

Golden eagles and yellow warblers are known to occur in the Proposed FERC Project Boundary. Although, no known golden eagle nests occur within the Proposed FERC Project Boundary, new nests could be established during the license term. Non-routine heavy maintenance or construction within 0.25 mile of an active nest could cause disturbance. The nesting season for yellow warbler is April 15 to August 31 and lies within the general nesting bird range.

PG&E would implement measures contained in the Wildlife Management Plan to minimize the potential impacts on golden eagle nests during non-routine heavy maintenance and construction activities required in areas with suitable golden eagle nesting habitat. These measures include:

- Schedule activities outside the golden eagle nesting period (February 1 to July 31)
- If work within this period is unavoidable, conduct pre-activity surveys to determine the presence/nesting status of any golden eagle nests and impose 0.25-mile no-work buffers around the nests (see Wildlife Management Plan for details)

Measures implemented under the Proposed Project to protect these species would also protect other special-status bird species that may occur over the term of a new license.

In summary, with implementation of PM&Es, including buffer-based avoidance, seasonal timing, pre-activity surveys, work restrictions until fledging or failure, helicopter protocols, avian-safe construction, and annual monitoring with five-year evaluations and adaptive management, potential impacts are reduced. Reservoir operations remain within historical ranges; prey resources are maintained; and site-specific measures ensure activities avoid or minimize disturbance to known and future nests.

Special-Status Bat Species

Disturbance to Roosting Bats

Hazard tree removal and non-routine heavy maintenance and construction activities may also potentially disturb or disrupt special-status bat maternity or day roosts, if

present. However, activities under the Proposed Project would be similar to that under the existing conditions. Of those activities, hazard tree removal would have the most potential to impact tree roosting bats. However, removals only occur on an as-needed basis (typically annually) and within a 200-foot maximum buffer along approximately 5.5 miles of existing roads and hydroelectric facilities, including Smalley Cove Recreation Area and Kerckhoff Dam. Based on a review of PG&E data on hazard tree removal in the Proposed Project Area from 2018 to 2023, tree removal averaged only 22.5 trees per year (personal email communication, L. Quick and J. Hartman, October 24, 2023). The surrounding woodland provides ample alternative roosting trees.

Furthermore, special-status bats typically select the largest available trees and snags for roosting and are known to switch between roosts on a regular basis. Based on PG&E's 2018–2019 hazard tree removal data, most removed trees or snags were relatively small (less than 24-inches diameter at breast height [DBH]; Baker et al. 2008; Weller and Zaber 2001). This, combined with the surrounding woodland and bats' roost-switching behavior, suggests minimal impact. Lastly, vegetation management crews would receive training on bat habitat, and for non-routine maintenance activities, PG&E would implement the following measures:

- If non-routine heavy maintenance activities are proposed at facilities suitable to support roosting bats (Table 4.5-6) during the bat maternity season (mid-April through September), a qualified biologist would review the activity for the potential to disturb roosting bats
- If determined necessary, the biologist would conduct a pre-activity survey for special-status roosting bats prior to commencement of the activity to determine whether bats are present
- If a bat roost is present, PG&E would implement appropriate avoidance and minimization measures (including delaying work during the bat maternity season), developed by a qualified biologist based on site-specific conditions such as roost location, bat species present, and nature of the activity proposed

Consumption of Contaminated Prey

Bats primarily meet their nutrition and water needs through insect prey, though some bats drink from open water sources such as lakes and ponds. Herbicide use under the Proposed Project could pose acute or chronic risks if bats consume contaminated insects. PG&E applies herbicides in combination with manual vegetation management to reduce fire hazards and control invasive weed populations, maintaining bare ground conditions around facilities. Vegetation management is limited to narrow buffers, varying from 10 feet in width along trails and up to 100 feet in width around powerhouses, switchyards, and ancillary support facilities. Herbicide use under the Proposed Project would be similar to that under the existing conditions.

The potential for bats to ingest contaminated prey is generally low because most bat species forage on aerial insects that disperse widely, reducing repeated exposure. The exception is the pallid bat, which gleans insects from the ground and could encounter treated areas. A risk assessment modeled acute exposure scenarios pertinent to bats (consumption of contaminated insects by a small mammal) for all herbicides proposed under the Proposed Project (no modeling for chronic scenarios is available). Glyphosate was the only herbicide with a hazard quotient (HQ) above 1, indicating potential risk, though not necessarily adverse effects. Glyphosate has low acute and chronic toxicity to mammals, does not bioaccumulate, and exhibits minimal secondary-poisoning potential, especially given its estimated half-life of 7 to 10 weeks (USEPA 2019; PG&E 2023). Considering pallid bat's foraging behavior, low likelihood of contacting treated foliage, and USEPA findings that mammalian exposures under labeled application rates remain well below toxicological thresholds, glyphosate use is expected to pose a low toxicological risk to pallid bats.

Environmental management measures identified in the Vegetation Management and Pest Control Plan further minimize the potential for secondary impacts on bats resulting from use of herbicides. These measures include:

- Use of aquatic-safe herbicides within 50 feet of aquatic habitats to prevent runoff or drift of chemicals into the watershed

- Infrequent applications (typically twice per year) targeted to defined areas
- Compliance with the Statewide National Pollutant Discharge Elimination System Permit for Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications (Aquatic Weed Control General Permit), which describes BMPs to protect water quality during aquatic weed management

Infection and Mortality from White-Nose Syndrome

The fungus *Pseudogymnoascus destructans* (Pd), which causes white-nose syndrome (WNS) in bats, is presumed to be widespread in California. Pd thrives in cool environments (typically 39°F to 59°F, up to 68°F) (Langwig et al. 2015). In North America, bats hibernating in caves and mines may become infected when their body temperatures decrease during winter torpor into the range permissive for growth of Pd. WNS has caused severe population declines in eastern North America (WNS Response Team 2018).

Entry of contaminated personnel or equipment into adits or tunnels could introduce Pd to bat populations in the Proposed Project Area. However, the risk is low for existing hydroelectric structures, and retirement activities further reduce potential exposure:

- North Adit: Cool, shaded, and potentially suitable for Pd growth, but bat use is minimal based on 2019 PG&E bat roosting surveys likely due to humid conditions and standing water. The North Adit is gated, limiting public access
- K1 Tunnel: Would be plugged and retired under the Proposed Project, eliminating potential bat habitat and reducing WNS risk over the license term. Retirement would seal penetrations and prevent water flow, removing conditions that could support Pd growth or bat use
- Adits 1 and 2: Receive ultraviolet (UV) exposure throughout, limiting Pd growth or persistence (Palmer et al. 2018). Bat use is also minimal. During the Study WILD-1 surveys, one piece of old guano was observed. No other bat sign was observed in Adit 1 or Adit 2. Habitat suitability of Adits 1 and 2 is reduced because of the

presence of standing water. Adit 1 and Adit 2 would be abandoned in place and gated for public safety and environmental protection, further risk

- K2 Penstock Construction Access Tunnel: Receives UV exposure limiting the potential for Pd to grow or persist (Palmer et al. 2018). Based on the substantial bat guano and urine deposits observed, it appears to be used as a migratory stopover roost by Mexican free-tailed bats (*Tadarida brasiliensis*) and as a night roost by other bat species. This creates some potential for Pd-infected bats to transmit the fungus to other bats, though structural conditions limit Pd persistence

Under the Proposed Project's Wildlife Management Plan, PG&E would implement measures to minimize WNS risk:

1. Follow CDFW reporting procedures for sick or dead bats
2. Include Pd ecology, training on reporting procedures if sick or dead bats are found, and training on decontamination procedures
3. Post signs at the entrance to Proposed Project adits and tunnels alerting the public to stay away from the adits
4. Avoid visiting multiple adits/tunnels on the same day
5. Decontaminate footwear, clothing, and equipment after contact with soils or guano in the K2 Penstock Construction Access Tunnel using bleach spray or a similar disinfectant product described in the National WNS Decontamination Protocol (WNS Response Team 2018)

Rodenticide and Herbicide Use

Under the Proposed Project, PG&E would continue to administer herbicide and pesticides to control vegetation and vertebrate pests. While these activities are necessary for facility safety and vegetation management, they have the potential to affect special-status species, including yellow warblers, golden eagle, and other migratory birds, primarily through contamination of food sources or secondary poisoning.

Potential impacts to species are as follows:

- Herbicides and songbirds: Herbicide use could potentially impact yellow warblers and other songbirds if insects, fruits, or seeds become contaminated. However, a risk assessment (PG&E 2022) modeled herbicide effects on wildlife across multiple exposure scenarios and concluded that herbicide applications under the Proposed Project pose a low toxicological risk to songbirds
- Herbicides and raptors: Herbicides could also affect golden eagles and other predatory birds if small mammals ingest contaminated vegetation. The same risk assessment found that herbicides proposed for use have a low toxicological risk to raptors (PG&E 2022)
- Rodenticides and raptors: Use of rodenticides on the exterior of facilities could potentially result in secondary poisoning if raptors consumed contaminated rodents or carcasses. Rodenticides are applied only as necessary near dams, powerhouses, and other facilities to protect human health and ensure safe operations of these facilities

Application Methods and Controls

Potential impacts on songbirds from the use of herbicides would be further minimized through implementation of the Proposed Project's Vegetation Management and Pest Control Plan, with measures or methods including:

- Herbicides:
  - Applied primarily by localized, on-foot methods
  - Use of aquatic-safe, USEPA- and CDPR-approved pesticides only
  - Applications typically occur once per year and within defined areas using hand application or low-boom methods along existing hydroelectric facility roads, avoiding direct spray of chemicals on rodent prey sources
- Rodenticides:
  - Only first-generation anti-coagulant rodenticides (FGARs), such as diphacinone, would be used. No second-generation anti-coagulant rodenticides (SGARs), which pose higher toxicity, persistent risk, and bioaccumulative would be used

- FGARs have been shown to present low risk of secondary poisoning compared to SGARs (CDPR 2018)
- Methods used on the exterior of facilities include ground squirrel bait stations, direct burrow baiting, carbon dioxide gas, burrow blocking (i.e., use of sand slurry to fill burrows), and other non-rodenticide traps (i.e., snap traps, glue traps)
- All rodenticides would continue to be applied by a licensed qualified applicator with appropriate categories for structural applications, and prescribed by a licensed PCA according with label requirements and project constraints

The potential for the ongoing use of pesticides to affect special-status birds over the term of the license is considered negligible under the Proposed Project based on:

1. Herbicide applications consistent with the Vegetation Management and Pest Control Plan
2. Rodenticides not used inside facilities and applied only under strict controls
3. Use of herbicides and rodenticides with inherently low toxicity to non-target wildlife, under PCA supervision and in accordance with a PCR or PUP
4. Regular inspection of baited burrows and traps to ensure effectiveness and discontinue treatment when appropriate

Project Boundary Modifications

Special-Status Plants

Reducing the acreage of the existing FERC Project Boundary would decrease the amount of potentially suitable habitat subject to license requirements and vegetation management. While this would reduce vegetation management activities within the Proposed Project Area, the lands removed from the existing FERC Project Boundary could be subject to different management practices, including the potential for encroachment by non-native invasive species. However, because the boundary modification would not result in ground disturbance or habitat removal and would not directly affect listed botanical species or their habitat, it is our professional judgment that this modification would result in a less-than-significant impact to tree anemone, if present.

Special-Status Wildlife

Reducing the acreage of the existing FERC Project Boundary would decrease the area subject to license requirements and associated vegetation management. While this would reduce vegetation management activities within the Proposed Project Area, the lands removed from the existing FERC Project Boundary could be subject to different management practices, including the potential for encroachment by non-native invasive species. However, because the boundary modification would not result in ground disturbance or habitat removal and would not directly affect listed wildlife species or their habitat, it is our professional judgment that this modification would result in a less than significant impact to listed wildlife species, if present.

Special-Status Reptiles

As noted above, reducing the acreage of the existing FERC Project Boundary would decrease the area subject to license requirements and associated vegetation management. While this would reduce vegetation management activities within the Proposed Project Area, the lands removed from the existing FERC Project Boundary could be subject to different management practices, including the potential for encroachment by non-native invasive species. However, because the boundary modification would not result in ground disturbance or habitat removal and would not directly affect listed terrestrial reptile species or their habitat, it is our professional judgment that this modification would result in a less than significant impact to listed reptile species, if present.

Special-Status Avian Species

Proposed Project operations may influence bald eagles primarily through alteration of aquatic foraging habitat and potential disturbance of nests. The Proposed FERC Project Boundary modification would not reduce suitable nesting or foraging habitat subject to the license; accordingly, the boundary change would result in no impact on bald eagles.

Special-Status Bats

Reducing the acreage of the existing FERC Project Boundary would decrease the area subject to license requirements and associated vegetation management and/or tree removal. Therefore, impacts to special-status bats are anticipated to be less than significant.

Flow Management Measures

Alterations to aquatic conditions under the Proposed Project would derive from (1) additional flow releases to maintain temperature criteria, (2) updated flow operations, and (3) whitewater boating flows. Despite these changes, Kerckhoff Reservoir would continue to be operated within its historical range of water surface elevations, typically varying by about five feet except during periodic maintenance drawdowns. With implementation of the Flow Management Measures, monthly average water surface elevations would be slightly reduced compared to current operation in all months except May, with the largest difference in October (about 1.5 feet lower). From July through February (excluding October), monthly averages would be 0.5 to 0.6 foot lower than existing conditions, while spring averages would be less than 0.3 foot lower.

These modest changes are not expected to adversely affect fish populations that constitute bald eagle prey, and prey resources in Kerckhoff Reservoir would be maintained under the Proposed Project. Similarly, in the PBR, implementation of the proposed Flow Management Measures would maintain and/or enhance fish and aquatic resources relative to existing conditions (see Section 4.4 *Biological Resources – Aquatics and Fisheries*), thereby maintaining the prey base for bald eagles.

Changes in the Proposed Project flow regime could impact riparian communities by changes in reservoir water surface elevation and flow within the PBR. However, these flow changes are designed to reduce rapid flow fluctuations and subsequently protect native aquatic species. Therefore, these measures would have no impact on special-status species, if present.

With respect to special-status avian species, PG&E, in coordination with local agency biologists, would annually monitor the existing bald eagle nest and new nests identified over the license term, consistent with the Wildlife Management Plan (PG&E 2023). Monitoring results would be evaluated every five years. If monitoring indicates potential effects on productivity or resulting in disturbance of nesting eagles, the five-year monitoring summary would recommend adaptive changes to monitoring or protection measures, subject to approval by CDFW, USFWS, USFS, and BLM (as applicable). With continued operation within historical ranges and annual monitoring, the potential impacts of Flow Management Measures on special-status avian species over the term of the license are expected to be negligible.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact BIO-1.

Impact Analysis without Mitigation

In summary, there would be a **Potentially Significant Impact** to special-status species or their habitats with Proposed Project construction activities.

Impact with Mitigation

To reduce the potentially significant impact to special-status bats from Proposed Project construction associated with the K1 Powerhouse decommissioning, Recommended Mitigation Measure BIO-2: Roosting Bats could be adopted. This measure would require construction activities to occur outside of bat maternity season if feasible, require pre-construction surveys for special-status bats or their habitat by a qualified biologist if work does occur during the maternity season, and the implementation of appropriate PM&Es if special-status bats or active roosts are identified within the construction area.

Implementation of Recommended Mitigation Measure BIO-2 would require PG&E to develop and implement BMPs for the protection of special-status roosting bats while conducting K1 Powerhouse construction activities. Implementation of Recommended Mitigation Measure BIO-2 would reduce the potentially significant impact associated with

the Proposed Project construction to **Less than Significant with Mitigation Incorporated**.

On March 11, 2026, State Water Board staff provided Recommended Mitigation Measure BIO-2 to PG&E staff and requested that PG&E agree to implement the measure to ensure that Proposed Project construction impacts remain less than significant with mitigation. On March 17, 2026, PG&E responded that it does not plan to agree to mitigation measures to reduce Proposed Project impacts to a less than significant level without first reviewing the draft EIR upon its circulation. On March 19, 2026, PG&E provided comments and suggested edits to the mitigation measures shared on March 11, 2026 (personal email communication, J. Hartman and C. McCormick, March 5, 2026). Without commitment from PG&E, implementation of Recommended Mitigation Measure BIO-2 is uncertain.

Without implementation of Recommended Mitigation Measure BIO-2 or comparable action, the Proposed Project's impacts to special-status roosting bats are **Significant and Unavoidable.**

Mitigation Measures

Recommended Mitigation Measure BIO-2: Roosting Bats

PG&E shall ensure the following for activity related to the retirement of the K1 Powerhouse, K1 Tunnel plug, and associated facilities:

- If feasible, work should be scheduled between September 1 and April 30 to avoid the bat maternity season
- If work is conducted during the bat maternity season (May 1 to August 31), a pre-construction survey for special-status bat habitat shall be conducted by a qualified biologist (e.g., who is experienced in the identification of special-status bat habitat) in advance of any construction activity to identify signs of potential bat use (e.g., large cavities or crevices in rocks). The survey shall be conducted no more than 14 days prior to activity commencement with pre-determined buffer zones as determined by the qualified biologist

- If special-status roosting bats or active roosts are identified, the qualified biologist shall develop and implement avoidance and minimization measures to prevent disturbance. Such measures may include establishment of no-disturbance buffers, seasonal work restrictions, phased exclusion consistent with accepted wildlife handling guidelines, and/or monitoring during construction. Avoidance and minimization measures shall be implemented prior to and during construction activities, as applicable
- Special status and roosting bats shall be allowed to escape the K1 Tunnel prior to sealing the tunnel

Level of Significance

Significant and Unavoidable Impact

4.5.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project, discussed in Section 4.5.4.1.1. The decrease of flow fluctuations below Kerckhoff Dam under Alternative 1 operations would not increase the risk of a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species.

For that reason, impacts to special-status bat species from construction activities associated with the K1 Powerhouse decommissioning remain and are anticipated to be potentially significant for Alternative 1.

Impact Analysis without Mitigation

Therefore, similar to the Proposed Project, there would be a **Potentially Significant Impact** to special-status species or their habitats with Alternative 1 construction activities.

Impact Analysis with Mitigation

To reduce the potentially significant impact to special-status bats from Proposed Project construction associated with the K1 Powerhouse decommissioning, Recommended Mitigation Measure BIO-2: Roosting Bats could be adopted. This measure would require construction activities to occur outside of bat maternity season if feasible, require pre-construction surveys for special-status bats or their habitat by a qualified biologist if work does occur during the maternity season, and the implementation of appropriate PM&Es if special-status bats or active roosts are identified within the construction area.

Implementation of Recommended Mitigation Measure BIO-2 would reduce the potentially significant impact associated with Alternative 1 construction activities to **Less than Significant with Mitigation Incorporated**.

On March 11, 2026, State Water Board staff provided Recommended Mitigation Measure BIO-2 to PG&E staff and requested that PG&E agree to implement the measure to ensure that Alternative 1 construction impacts remain less than significant with mitigation. On March 17, 2026, PG&E responded that it does not plan to agree to mitigation measures to reduce Proposed Project impacts to a less than significant level without first reviewing the draft EIR upon its circulation. On March 19, 2026, PG&E provided comments and suggested edits to the mitigation measures shared on March 11, 2026 (personal email communication, J. Hartman and C. McCormick, March 19, 2026). Without commitment from PG&E, implementation of Recommended Mitigation Measure BIO-2 is uncertain.

Without implementation of Recommended Mitigation Measure BIO-2 or comparable action, Alternative 1's impacts to special-status roosting bats are **Significant and Unavoidable**.

Mitigation Measures

Recommended Mitigation Measure BIO-2: Roosting Bats

Level of Significance

Significant and Unavoidable Impact

4.5.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project, discussed in Section 4.5.4.1.1. The decrease of flow fluctuations below Kerckhoff Dam under Alternative 2 operations would not increase the risk of a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species.

Impacts to special-status bat species from construction activities associated with the K1 Powerhouse decommissioning remain and are anticipated to be potentially significant for Alternative 2. Therefore, there would be a **Potentially Significant Impact** as a result of construction activities under Alternative 2 for potential impact BIO-1.

Impact Analysis without Mitigation

Similar to the Proposed Project and Alternative 2, and as described above, there would be a **Potentially Significant Impact** to special-status or their habitats with Alternative 2 construction or operational activities.

Impact Analysis with Mitigation

As described in for the Proposed Project and Alternative 2, Recommended Mitigation Measure BIO-2 would avoid the sensitive roosting season if feasible and perform pre-construction surveys if necessary to ensure that impacts to roosting bats do not occur. This measure would require construction activities to occur outside of bat maternity season if feasible, require pre-construction surveys for special-status bats or their habitat by a qualified biologist if work does occur during the maternity season, and the implementation of appropriate PM&Es if special-status bats or active roosts are identified within the construction area. Implementation of Recommended Mitigation Measure BIO-2 would reduce the potentially significant impact associated with

Alternative 2 construction activities to **Less than Significant with Mitigation Incorporated**.

On March 11, 2026, State Water Board staff provided Recommended Mitigation Measure BIO-2 to PG&E staff and requested that PG&E agree to implement the measure to ensure that Alternative 2 construction impacts remain less than significant with mitigation. On March 17, 2026, PG&E responded that it does not plan to agree to mitigation measures to reduce Proposed Project impacts to a less than significant level without first reviewing the draft EIR upon its circulation. On March 19, 2026, PG&E provided comments and suggested edits to the mitigation measures shared on March 11, 2026 (personal email communication, J. Hartman and C. McCormick, March 19, 2026). Without commitment from PG&E, implementation of Recommended Mitigation Measure BIO-2 is uncertain.

Without implementation of Recommended Mitigation Measure BIO-2 or comparable action, Alternative 2's impacts to special-status roosting bats are **Significant and Unavoidable**.

Mitigation Measures

Recommended Mitigation Measure BIO-2: Roosting Bats

Level of Significance

Significant and Unavoidable Impact

4.5.4.2 Potential Impacts Related to Sensitive Natural Communities

Impact BIO-2: Would the 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 California Department of Fish and Game or United States Fish and Wildlife Service?

4.5.4.2.1 Proposed Project

Construction

Under the Proposed Project, PG&E would construct the Vista Day Use Area, install a new flow gage upstream of Kerckhoff Reservoir, and upgrade the radial gates on Kerckhoff Dam. Vegetation communities identified at the proposed site of the Vista Day Use Area and access road, which is previously disturbed, are primarily Annual Grasses. Vegetation communities surrounding the new flow gage were not surveyed as part of the FERC license application but are likely to include perennial riverine and riparian habitats, which are discussed in Section 4.4 *Biological Resources – Aquatics and Fisheries* under *Section* 4.4.4.2 *Potential Impacts Related to Riparian Habitat.*

Construction activities under the Proposed Project that may impact sensitive natural communities would either be small in scale (inflow gage construction) or occur in a previously disturbed area (Vista Day Use Area construction) and are unlikely to result in habitat-level impacts. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact BIO-2.

Operation

Nine vegetation alliances ranked as S2 or S3[24] by the CDFW as California Sensitive Natural Communities were identified within the Proposed FERC Project Boundary. Six of these are riparian and wet meadow communities:

[24] Alliance State Ranks:

- Button Willow Thickets Shrubland Alliance (S2)
- Oregon Ash Groves Forest Alliance (S3)
- Deer Grass Beds Alliance (S2)
- Fremont Cottonwood Forest and Woodland Alliance (S3)
- Red Willow Thickets Alliance (S3)
- Common Monkeyflower Seep Alliance (S3)

Potential impacts on these riparian and wet meadow communities are evaluated in riparian resources in Section 4.4 *Biological Resources – Aquatics and Fisheries* and were focused on fluctuations in water surface elevation in the reservoir or changes to the flow regime in the PBR as a product of new ramping measures. Because reservoir fluctuations would continue to remain within the baseline operating band of elevations, and the ramping measures that would affect the flow regime in the PBR were developed to reduce flow fluctuations below Kerckhoff Dam, impacts to riparian and meadow habitats were considered less than significant.

The remaining three—California Buckeye Groves Alliance (S3), California Bay Forest and Woodland Alliance (S3), and Valley Oak Forest and Woodland Alliance (S3)—occur primarily as sub-habitats within upland oak and mixed hardwood communities. In addition, several pure stands of Valley Oak Forest and Woodland Alliance (S3) are located in the vicinity of the Smalley Cove Recreation Area.

Routine vegetation management (manual/mechanical trimming or limbing and hazard tree removal) would occur only within the defined buffers around existing facilities, where vegetation cover is generally sparse. The surrounding habitats would remain

S2 Imperiled: Vegetation is imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state.
S3 Vulnerable: Vegetation is vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state.

largely unaffected by the Proposed Project. Hazard tree removal would occur only on an as-needed basis (typically annually), and within a maximum buffer of approximately 200 feet along 5.5 miles of roads and around existing hydroelectric facilities, including Smalley Cove Recreation Area and at Kerckhoff Dam. As detailed in the special-status bat discussion in Section 4.5.4.1, only a small number of trees (generally less than 24 inches in DBH) are removed on an annual basis (e.g., an average of 22.5 trees per year were removed between 2018 and 2023). Considering the small number of trees affected, the limited area within which removal is required, and the local abundance of California Buckeye Groves, California Bay Forest and Woodland, and Valley Oak Forest and Woodland Alliance (all three alliances occur throughout many of the state's mountain ranges and are relatively common on the windward side of the southern Sierras), hazard tree removal would not result in habitat-level impacts (CNPS 2026a).

The Vegetation Management and Pest Control Plan includes measures to minimize potential impacts on sensitive habitats including the following:

- Reducing herbicide effects on non-target vegetation
- Controlling invasive species that compete with native forage
- Monitoring treated areas for effectiveness

Therefore, vegetation management activities conducted over the term of a new license are expected to reduce the potential impact on sensitive species.

PG&E would conduct a trail assessment to determine whether a plan is needed to improve conditions along the J-2 Stream Gage access trail for whitewater boating access (two days per year). Potential improvements could include widening the trail to a maximum of three feet, selective vegetation clearing, and avoiding surface disturbance in rocky outcrops or erodible soils. The habitat in the vicinity of the trail is mapped as Gray Pine and Mixed Interior Hardwood, which may include sub-habitat of two sensitive alliances: California Buckeye Groves (S3) and California Bay Forest and Woodland (S3). As part of this assessment, a small number of trees may need to be removed to increase the trail width for safer access by whitewater boaters. However, the total number of trees is expected to be minimal and would not affect sensitive habitat at a

landscape scale. Before implementing any trail improvement measures, as described in the Proposed Project's Whitewater Notification and Access Measure, PG&E would evaluate potential impacts on terrestrial biological resources in consultation with BLM and resource agencies as needed (e.g., CDFW, USFWS). The trail improvement plan would then be submitted to FERC for review and approval prior to implementation. If any section of the trail is to adversely affect sensitive resources, that section of the trail would be excluded from improvements.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact BIO-2.

The measures included within the Vegetation Management and Pest Control Plan, Recreation Management Plan, and Whitewater Notification and Access Measure (all subject to review and approval by FERC and consultation with BLM and other resource agencies) are designed to reduce any potential impacts to sensitive natural communities. Therefore, there would be a **Less than Significant Impact** to sensitive natural communities with Proposed Project construction and operational activities for potential impact BIO-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.5.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 is similar to the Proposed Project and aims to reduce flow fluctuations in the PBR by implementing reduced rates of change in releases for boating flows, ramp downs, and ramp ups. Reduced fluctuation or rate of fluctuation in flows in the PBR would potentially benefit riparian habitat by reducing the potential for scour of suitable habitat and established stands of riparian flora. Alternative 1 would not change

construction or maintenance activities, as described for the Proposed Project. Therefore, there would be a **Less than Significant Impact** to sensitive natural communities with Alternative 1 construction and operational activities for potential impact BIO-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.5.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. The flow measures are similar to the Proposed Project, with slight modifications that include additional flow steps or longer time periods in a given flow step compared to the Proposed Project. These measures aim to reduce large flow fluctuations in the PBR by implementing reduced rates of change in releases for boating flows and ramp downs. As such, these changes would likely have a beneficial impact, if any, on riparian habitat or other sensitive natural communities within the PBR. Therefore, there would be a **Less than Significant Impact** to sensitive natural communities with Alternative 2 construction and operational activities for potential impact BIO-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.5.4.3 Potential Impacts Related to Wetlands

Impact BIO-3: Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

4.5.4.3.1 Proposed Project

Construction and Operation

The analysis related to wetlands for potential impact BIO-3 is contained in Section 4.4 *Biological Resources – Aquatics and Fisheries* under Section 4.4.4.3 *Potential Impacts Related To Wetlands*. Based on the analysis, there would be a **Less than Significant Impact** as a result of construction or operational activities under the Proposed Project for potential impact BIO-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.5.4.3.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

The analysis related to wetlands for potential impact BIO-3 is contained in Section 4.4 *Biological Resources – Aquatics and Fisheries* under Section 4.4.4.3 *Potential Impacts Related To Wetlands*. Based on the analysis, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 1 for potential impact BIO-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.5.4.3.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

The analysis related to wetlands for potential impact BIO-3 is contained in Section 4.4 *Biological Resources – Aquatics and Fisheries* under Section 4.4.4.3 *Potential Impacts Related To Wetlands*. Based on the analysis, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 2 for potential impact BIO-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.5.4.4 Potential Impacts Related to Resident or Migratory Wildlife Corridors

Impact BIO-4: Would the project 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?

4.5.4.4.1 Proposed Project

Construction and Operation

The SJR is identified as a potential riparian corridor by the California Essential Habitat Connectivity Project. Implementation of the Proposed Project's Recreation Management Plan, Wildlife Management Plan, and Vegetation Management and Pest Control Plan does not include the construction of any features that would physically impede wildlife movement. Additionally, implementation of the Proposed Project's Vegetation Management and Pest Control Plan would maintain or even improve habitat integrity through invasive species management. As a result, the Proposed Project would not interfere substantially with the movement of any native resident or wildlife species or migratory corridors for terrestrial species.

Aquatic species (migratory fish) are addressed in Section 4.4 *Biological Resources – Aquatics and Fisheries*. However, there are no fish passage facilities associated with the Kerckhoff Hydroelectric Project, and none would be constructed under the Proposed Project.

Therefore, there would be **No Impact** as a result of construction and operational activities under the Proposed Project for potential impact BIO-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.5.4.4.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project discussed above in Section 4.5.4.4.1. Alternative 1 would not impact 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.

Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 1 for potential impact BIO-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.5.4.4.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project discussed above in Section 4.5.4.4.1. Alternative 2 would not impact 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.

Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 2 for potential impact BIO-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.5.4.5 Potential Impacts Related to Local Policies or Ordinances

Impact BIO-5: Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

4.5.4.5.1 Proposed Project

Construction and Operation

Land Management Plan for the United States Forest Service Sierra National Forest

Various Proposed Project components within USFS-SNF have the potential to affect terrestrial biological resources. However, a collection of avoidance and minimization measures would be implemented through plans including the Proposed Project's Project Road and Trail Maintenance Plan, Vegetation Management and Pest Control Plan, and the Wildlife Management Plan. By implementing these PM&E's, construction and operational activities under the Proposed Project are consistent with the goals, policies, and guidance provided in the USFS-SNF Land Management Plan.

For example, the Proposed Project is consistent with the standards and guidelines for Forestwide Components for Terrestrial Ecosystems as follows:

- Hazard trees are only removed in the case of imminent threat to life and property
- Structural diversity is maintained by only selectively removing trees as needed
- Vegetation management is minimized to the extent feasible so that essential habitat elements required for nesting, roosting, and denning are retained
- Implementation of invasive species removal serves to enhance native habitat

The Proposed Project is consistent with the standards and guidelines for Forestwide Components for Animal and Plant Species as follows:

- To minimize disturbance to wildlife, the Proposed Project's Wildlife Management Plan identified sensitive seasons during which work would not occur within defined distance of nests, dens, and roosts

- WNS decontamination protocols are identified to minimize the spread of the fungus known to cause WNS
- Only herbicides and pesticides with negligible or low toxicity are identified for use in vegetation management and pest control. Mechanical control methods are prioritized where feasible
- The management plans are adaptive, as they include monitoring the status of target species and provide for development of additional avoidance and minimization measures, as needed, to prevent significant adverse potential impacts on wildlife and their habitats

United States Bureau of Land Management Bakersfield Field Office Resource Management Plan

The BLM's *Bakersfield Field Office Record of Decision and Approved Resource Management Plan* (BLM 2014) is considered relevant because the Proposed Project is located within the SJR Gorge Recreation Area.

Implementation of the Proposed Project, including management and maintenance plans, is consistent with the following goals and policies identified in the BLM's RMP.

BR-G-1: Contribute to maintaining the biotic diversity within the Planning Area. Ensure public lands provide for a diversity of native species, ecosystems, and ecosystem processes.

As detailed above for the USFS-SNF Land Management Plan, the Proposed Project implements measures that serve to improve habitat quality (conducting invasive species removal) and protect special-status species (implementing WNS decontamination protocols, enforcing seasonal limitations for construction and vegetation management, performing nesting bird surveys and implementing impact avoidance buffers, implementing pesticide management procedures, and committing to long-term monitoring and reporting).

BR-G-2: Promote the recovery of state and federally listed species. Promote conservation of other plant and animal species to prevent future listings.

See the species-specific discussion for the bald eagle in Section 4.5.4.1, including the species-specific avoidance and minimization measures implemented to avoid direct and indirect potential impacts on the species.

BR-G-3: Promote the success of recovery plans, conservation plans, wildlife management plans, vegetation and weed management plans, and other regional conservation strategies.

The above-referenced plans provide the mechanism for implementing sound wildlife habitat management practices.

Fresno County General Plan

Proposed Project components within Fresno County jurisdiction may have the potential to affect terrestrial biological resources. However, multiple PM&E's, including the Proposed Project's Project Road and Trail Maintenance Plan (Access Roads 1 and 2), Vegetation Management and Pest Control Plan (none proposed on County lands), and the Wildlife Management Plan have been developed to minimize and mitigate for potential impacts and be consistent with local policies and plans. Habitat occurring within Fresno County jurisdiction is limited to upland alliances and cover types. See Section 4.4 for a discussion of Proposed Project components with potential to affect aquatic and fisheries resources. Implementation of the Proposed Project is consistent with the goals and policies of the Fresno County General Plan (Fresno County 2024) provided below, followed by the reasoning:

- Goal OS-E: To help protect, restore, and enhance habitats in Fresno County that support fish and wildlife species so that populations are maintained at viable levels
- Policy OS-E.1: The County shall support efforts to avoid the "net" loss of important wildlife habitat where practicable

Implementation of the Proposed Project does not result in a net loss of native vegetation communities on Fresno County lands.

- Policy OS-E.2: The County shall require adequate buffer zones between construction activities and significant wildlife resources

The Proposed Project's Wildlife Management Plan identifies species-specific buffers for construction activities.

- Policy OS-E.3: The County shall require development in areas known to have particular value for wildlife to be carefully planned and, where possible, located so that the value of the habitat for wildlife is maintained

No new development is proposed on Fresno County land.

- Policy OS-E.4: The County shall encourage private landowners to adopt sound wildlife habitat management practices, as recommended by CDFW officials and USFWS

The above-referenced plans provide the mechanism for implementing sound wildlife habitat management practices.

- Policy OS-E.7: The County shall continue to closely monitor pesticide use in areas adjacent to habitats of special-status plants and animals

Per the Proposed Project's Vegetation Management and Pest Control Plan, pesticides are not proposed for use on Fresno County lands and only those herbicides with negligible or low toxicity on wildlife would be used.

- Policy OS-E.9: Prior to approval of discretionary development permits, the County shall require, as part of any required environmental review process, a biological resources evaluation of the project site by a qualified biologist

A thorough evaluation of existing conditions and potential impacts on biological resources is presented herein.

- Policy OS-E.14: The County shall require a minimum 200-foot-wide wildlife corridor along particular stretches of the SJR and Kings River, whenever possible

The Proposed Project does not change the width of available habitat associated with the SJR for wildlife movement.

- Goal OS-F: To preserve and protect the valuable vegetation resources of Fresno County
- Policy OS-F.5: The County shall establish procedures for identifying and preserving rare, threatened, and endangered plant species that may be adversely affected by public or private development projects

A thorough evaluation of existing conditions and potential impacts on terrestrial biological resources is presented herein.

- Policy OS-F.7: The County shall require developers to take into account a site's natural topography with respect to the design and siting of all physical improvements in order to minimize grading

No physical Proposed Project components are proposed on Fresno County land.

- Policy OS-F.10: The County shall require that new developments preserve natural woodlands to the maximum extent possible

Implementation of the Proposed Project does not result in a net loss of native vegetation communities on Fresno County lands.

- Policy OS-F.11: The County shall promote the preservation and management of oak woodlands by encouraging landowners to follow the Fresno County Oak Management Guidelines shown below and to prepare an Oak Management Plan for their property

No new development, grazing, or harvesting of oaks is proposed. The Proposed Project would implement continuous vegetation management to maintain a fire-safe property environment consistent with the Fresno County Oak Management Guidelines.

Madera County General Plan

The Madera County General Plan (Madera County 1995) is relevant because a portion of the Proposed Project is located within Madera County. Implementation of the

Proposed Project is consistent with the goals and policies of the Madera County General Plan provided below, followed by the reasoning:

- Goal 5.E: To protect, restore, and enhance habitats that support fish and wildlife species so as to maintain populations at viable levels
- 5.E.1. The County shall identify and protect critical nesting and foraging areas, important spawning grounds, migratory routes, waterfowl resting areas, oak woodlands, wildlife movement corridors, and other unique wildlife habitats critical to protecting and sustaining wildlife populations

The Proposed Project would not adversely affect critical nesting and foraging areas, important spawning grounds, migratory routes, waterfowl resting areas, oak woodlands, wildlife movement corridors, and other unique wildlife habitats.

- 5.E.2. The County shall require development in areas known to have particular value for wildlife to be carefully planned and, where possible, located so that the reasonable value of the habitat for wildlife is maintained

No new development is proposed.

- 5.E.3. The County shall encourage private landowners to adopt sound wildlife habitat management practices, as recommended by the California Department of Fish and Game officials and USFWS

The above-referenced plans provide the mechanism for implementing sound wildlife habitat management practices.

- 5.E.8. The County shall ensure close monitoring of pesticide use in areas adjacent to habitats of special-status plants and animals

Per the Proposed Project's Vegetation Management and Pest Control Plan, the pesticides, including herbicides and rodenticides, proposed for use on the Proposed Project exhibit negligible or low toxicity to predators that may consume contaminated prey. Pest control is required to prevent burrowing mammals from undermining the integrity of facilities such as the Kerckhoff Reservoir Dam. A portion of the dam is on

Madera County lands. As detailed in Section 4.5.4.1, mechanical control is prioritized. A first-generation, anti-coagulant rodenticides would be used only when ground squirrels or gophers are present at substantial populations and their activity poses a threat to the integrity of the structures. Use of rodenticides for vertebrate pest control would only occur as needed when the pest is present (i.e., if an active infestation is documented) for a four- to six-week period (generally April through July) in any given year. As detailed in Section 4.5.4.1, potential for impacts on predators would be low.

- 5.E.10. Prior to approval of discretionary development permits involving parcels within a significant ecological resource area, the County shall require, as part of the environmental review process, a biotic resources evaluation of the sites by a qualified biologist

A thorough evaluation of existing conditions and potential impacts on terrestrial biological resources is presented herein.

- 5.E.11. The County shall provide for a minimum 200-foot wildlife corridor along the SJR between Friant Dam and the Highway 145 crossing, consistent with the SJR Parkway Plan

The Proposed Project does not change the width of available habitat associated with the SJR for wildlife movement.

- Goal 5.F: To preserve and protect the valuable vegetation resources of Madera County
- 5.F.6. The County shall require that new development preserve natural woodlands to the maximum extent possible

No new development is proposed on Madera County Lands.

- Goal 5.H: To preserve and enhance open space lands to maintain the natural resources of the county
- 5.H.1. The County shall support the preservation and enhancement of natural land forms, natural vegetation, and natural resources as open space. To the extent

feasible, the County shall permanently protect as open space areas of natural resource value, including wetlands preserves, riparian corridors, woodlands, and floodplains

The Proposed Project enhances natural habitat through invasive species removal.

- 5.H.2. The County shall require that new development be designed and constructed to preserve the following types of areas and features as open space to the maximum extent feasible: a. High erosion hazard areas; b. Scenic and trail corridors; c. Streams and streamside vegetation; d. Wetlands; e. Other significant stands of vegetation; f. Wildlife corridors; and g. Any areas of special ecological significance

No new development is proposed on Madera County Lands.

- 5.H.3. The County shall support the maintenance of open space and natural areas that are interconnected and of sufficient size to protect biodiversity, accommodate wildlife movement, and sustain ecosystems

The Proposed Project would not adversely affect Madera County lands and, as a result, would not prevent Madera County from achieving this goal.

In summary, the Proposed Project would not be anticipated to conflict with any local policies or ordinances protecting biological resources. Therefore, there would be a **Less than Significant Impact** as a result of construction and operational activities under the Proposed Project for potential impact BIO-5.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.5.4.5.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project discussed above in Section 4.5.4.5.1. Alternative 1 would not conflict with any local policies or ordinances protecting biological resources or prevent Fresno or Madera counties from achieving their specified plan goals. Therefore, there would be a **Less than Significant Impact** as a result of construction and operational activities under Alternative 1 for potential impact BIO-5.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.5.4.5.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project discussed above in Section 4.5.4.5.1. Alternative 2 would not conflict with any local policies or ordinances protecting biological resources or prevent Fresno or Madera counties from achieving their specified plan goals. Therefore, there would be a **Less than Significant Impact** as a result of construction and operational activities under Alternative 2 for potential impact BIO-5.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.5.4.6 Potential Impacts Related to Conservation Plans

Impact BIO-6: Would the project conflict with the provisions of an adopted Habitat Conservation Plan; Natural Community Conservation Plan; or other approved local, regional, or state Habitat Conservation Plan?

4.5.4.6.1 Proposed Project

Construction and Operation

The Proposed Project does not fall within an adopted Habitat Conservation Plan; Natural Community Conservation Plan; or other approved local, regional, or state habitat conservation plan. Therefore, there would be **No Impact** as a result of construction and operational activities under the Proposed Project for potential impact BIO-6.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.5.4.6.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project discussed above in Section 4.5.4.6.1. Alternative 1 would not impact an adopted Habitat Conservation Plan; Natural Community Conservation Plan; or other approved local, regional, or state habitat conservation plan. Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 1 for potential impact BIO-6.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.5.4.6.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project discussed above in Section 4.5.4.6.1. Alternative 2 would not impact an adopted Habitat Conservation Plan; Natural Community Conservation Plan; or other approved local, regional, or state habitat conservation plan. Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 2 for potential impact BIO-6.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.5.5 Literature Cited

Baker, M.D., M.J. Lacki, G.A. Falxa, P.L. Droppelman, R.A. Slack, and S.A. Slankard. 2008. *"Habitat use of pallid bats in coniferous forests of Northern California."* Northwest Science, Vol. 82, No. 4: 269–275.

BLM (United States Bureau of Land Management). 2014. *Bakersfield Field Office Record of Decision and Approved Resource Management Plan.* United States Department of the Interior, Bureau of Land Management. December. Accessed: April 3, 2026. Retrieved from: https://www.govinfo.gov/content/pkg/GOVPUB-I53-PURL-gpo83734/pdf/GOVPUB-I53-PURL-gpo83734.pdf.

_____. 2019. *BLM list of California Department of Food and Agriculture noxious weeds with 2015 additions edited for species expected to be encountered on a Rangeland Health Assessment in Bakersfield*.

California Consortium of Herbaria Portal. 2025. Biodiversity data provided by the participants of the Consortium of California Herbaria. Accessed March 7, 2025. https://ucjeps.berkeley.edu/consortium/.

Cal-IPC (California Invasive Plant Council). 2019. The Cal-IPC Inventory. Online database. Accessed: October 2019. Retrieved from: https://www.cal-ipc.org/plants/inventory/.

CDFA (California Department of Food and Agriculture). 2016. *Pest Rating Proposals and Final Ratings*. Last updated on May 13, 2016. Accessed: July 2019. Retrieved from: https://blogs.cdfa.ca.gov/Section3162/?p=1958

_____. 2019. *Encycloweedia: Weed Ratings*. Accessed: April 5, 2026. Retrieved from: http://www.cdfa.ca.gov/plant/ipc/encycloweedia/winfo_weedratings.html

CDFG (California Department of Fish and Game). 2009. *Protocols for surveying and evaluating impacts to special-status native plant populations and natural communities.* November 24.

CDFW (California Department of Fish and Wildlife). 2015. *California State Wildlife Action Plan*.

_____. 2018. *State of California, California Natural Resources Agency Department of Fish and Wildlife. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities.* State of California, California Natural Resources Agency Department of Fish and Wildlife. March 20.

_____. 2019. California Wildlife Habitat Relationship [online database]. Version 9.0. Accessed: April 5, 2026. Retrieved from: https://wildlife.ca.gov/Data/CWHR.

_____. 2023. *Natural Communities*. Accessed: April 5, 2026. Retrieved from: https://www.wildlife.ca.gov/Data/VegCAMP/NaturalCommunities#sensitive%20natural%20communities.

CDPR (California Department of Pesticide Regulation). 2018. *An investigation of anticoagulant rodenticide data submitted to the Department of Pesticide Regulation.* Department of Pesticide Regulation, Pesticide Registration Branch. November 16.

CNPS (California Native Plant Society). 2026a. *Rare Plant Inventory* (online edition, v8-03 0.39). Accessed: April 5, 2026. Retrieved from: http://www.rareplants.cnps.org/.

_____. 2026b. Calscape plant search. Accessed April 5, 2026. Retrieved from: https://calscape.org/search

FERC (Federal Energy Regulatory Commission). 2025. Updated list of Threatened, Endangered, Proposed, and Candidate Species, and Proposed and Final Critical Habitats under the Endangered Species Act generated by ECOS-IPaC website. Kerckhoff Hydroelectric Project (FERC Project No. 96-048). December 29.

Fraser, J.D., L.D. Frenzel, and J.E. Mathisen. 1985. "The impact of human activities on breeding bald eagles in north-central Minnesota." *Journal of Wildlife Management,* Vol. 49, No. 3: 585–592.

Fresno County. 2024. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

Guinn, J.E. 2013. "Generational habituation and current bald eagle populations." *Human–Wildlife Interactions*, Vol. 7, No. 1: 69–76.

Langwig, K.E., W.F. Frick, R. Reynolds, K.L. Parise, K.P. Drees, J.R. Hoyt, T.L. Cheng, T.H. Kunz, J.T. Foster, and A. Marm Kilpatrick. 2015. "Host and pathogen ecology drive the seasonal dynamics of a fungal disease, white-nose syndrome." *Proceedings of the Royal Society: Biological Sciences*, Vol. 282, Issue 1799: 2,014–2,325. January 22, 2015.

Madera County. 1995. *Madera County General Plan Policy Document.* Adopted October 24. Accessed: April 3, 2026. Retrieved from:https://www.maderacounty.com/home/showpublisheddocument/40825/638615574804870000.

Palmer, J.M., K.P. Drees, J.T. Foster, and D.L. Lindner. 2018. "Extreme sensitivity to ultraviolet light in the fungal pathogen causing white-nose syndrome of bats."

Nature Communications, Vol. 9, No. 35. Accessed: April 5, 2026. Retrieved from: https://doi.org/10.1038/s41467-017-02441-z.

Personal Email Communication from L. Quick, Environmental Resources Management, Inc., to J. Hartman, Pacific Gas and Electric Company, San Francisco, CA, on October 24, 2023.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding "Kerckhoff: Prefilling Meeting & CEQA Discussion," on January 13, 2026.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding "Kerckhoff: Ramping Follow-Up," on March 5, 2026.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding "Kerckhoff CEQA Mitigation Measures" on March 19, 2026.

PG&E (Pacific Gas and Electric Company). 2022. *Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. May 26.

_____. 2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

Reclamation (Bureau of Reclamation). 2014. *Upper San Joaquin River Basin Storage Investigation Draft Environmental Impact Statement*. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region. Accessed: April 5, 2026. Retrieved from: https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=821

USFS (United States Forest Service). 2009. *Vegetation Descriptions, South Sierran Ecological Province, CALVEG Zone 4*. April 27. Accessed: April 5, 2026. Retrieved from: https://www.fs.usda.gov/sites/nfs/files/legacy-media/r05/zone4des042709www.pdf.

_____. 2019a. *Classification and Assessment with Landsat of Visible Ecological Groupings (CALVEG)*. Accessed: April 17, 2019. Retrieved from: https://data.fs.usda.gov/geodata/edw/datasets.php.

_____. 2019b. *Region 5 Forester 2013 sensitive plant species list for the Sierra National Forest.*

_____. 2023a. *Land Management Plan for the Sierra National Forest: Fresno, Madera, and Mariposa Counties, California*. Accessed: April 5, 2026. Retrieved from: https://acconsensus.org/wp-content/uploads/2024/08/05-SNF_LMP_final_20230504_Web.pdf.

_____. 2023b. *Pesticide Management & Coordination*. Accessed: April 3, 2026. Retrieved from: https://www.fs.usda.gov/science-technology/forest-health-protection/integrated-pest-management/pesticide-management.

USEPA (United States Environmental Protection Agency). 2019. Glyphosate: Proposed Interim Registration Review Decision. Case Number 0178. Docket Number EPA-HQ-OPP-2009-0361. Accessed April 5, 2026. Retrieved from: https://downloads.regulations.gov/EPA-HQ-OPP-2009-0361-2344/content.pdf.

USFWS (United States Fish and Wildlife Service). 2000. *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants*. January 2000. Accessed April 5, 2026. Retrieved from: https://www.fws.gov/sites/default/files/documents/botanical-plant-inventory-guidelines.pdf.

_____. 2007. *National Bald Eagle Management Guidelines*. May. Accessed: April 5, 2026. Retrieved from:https://www.fws.gov/sites/default/files/documents/national-bald-eagle-management-guidelines_0.pdf.

_____. 2023. *Information for Planning and Conservation (IPaC)*. United States Department of the Interior, Fish and Wildlife Service, Washington, D.C. Accessed: April 5, 2026. Retrieved from: https://ipac.ecosphere.fws.gov/.

_____. 2026. *National Wetlands Inventory (NWI)*. United States Department of the Interior, Fish and Wildlife Service, Washington, D.C. Accessed: April 5, 2026. Retrieved from: https://www.fws.gov/program/national-wetlands-inventory.

USGS (U.S. Geological Survey). 2023. USGS The National Map (TNM) National Hydrography Dataset (NHD). Accessed: April 5, 2026. Retrieved from: https://apps.nationalmap.gov/viewer/.

Weller, T.J., and C.J. Zaber. 2001. “Characteristics of fringed myotis day roosts in Northern California.” *Journal of Wildlife Management,* Vol. 65, No. 3: 489–497

White-nose Syndrome (WNS) Response Team. 2018. *United States National White-nose Syndrome Decontamination Protocol.* Version September 13, 2018.

Wood, P.B., T.C. Edwards, Jr., and M.W. Collopy. 1989. “Characteristics of bald eagle nesting habitat in Florida.” J*ournal of Wildlife Management* 53(2): 441–449.

4.6 CULTURAL RESOURCES

This section describes existing conditions and analyzes potential impacts on cultural resources that could result from implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts on cultural resources from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.6-1).

Table 4.6-1: CEQA Checklist for Cultural Resources

Would the Project:	**Proposed Project**	**Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping**	**Alternative 2: Proposed Project with BLM Revised 4(e) Conditions**
Impact CR-1: Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Impact CR-2: Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact CR-3: Disturb any human remains, including those interred outside of dedicated cemeteries?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

4.6.1 Environmental Setting

This section describes the prehistorical and historical setting of the study area (defined in Section 4.6.1.1), details the methodology, and summarizes the known cultural resources within the Proposed Project and the immediate vicinity. The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E), and on public lands administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and United States Bureau of Reclamation (Reclamation) under BLM management.

4.6.1.1 Existing Conditions Methodology

4.6.1.1.1 Literature Review and Consultation

The existing conditions for the Proposed Project, Alternative 1, and Alternative 2 are based on the following technical studies completed for PG&E's Federal Energy Regulatory Commission (FERC) relicensing efforts:

- *Volume V, Appendix A: Archaeological Resources Survey Report from TSR-04, Cultural Resources, Archaeological Resources (Study CUL 1a)* (Wisely et al. 2020) *and Archaeological Resources Evaluation Report, Kerckhoff Hydroelectric Project FERC Project No. 96 (CUL 1b)* (Cardno 2020)

- *Technical Study Report (TSR-14) Cultural Resources, Historic-Era Built Environment Inventory and Evaluation (CUL 1c)* (PG&E 2020)
- *Final Historic Properties Management Plan* (HPMP; West et al. 2021)

4.6.1.1.2 Cultural Resources Study Area

Cultural resources represent things, structures, places, or archaeological sites that can be either prehistoric or historic in origin. When determining the study area, PG&E must take into account whether any historic property within the undertaking's area of potential effects (APE) could be affected by the construction, operation, and maintenance of the Proposed Project.

On January 16, 2018, FERC designated PG&E as its non-federal representative for the purposes of consultation pursuant to Section 106 of the National Historic Preservation Act (NHPA). On February 25, 2019, PG&E reached out to the California State Historic Preservation Office (California SHPO) in support of relicensing the Kerckhoff Hydroelectric Project as designated as FERC's non-federal representative for the purposes of consultation pursuant to Section 106 of the NHPA. In response, on March 27, 2019, the California SHPO asked for more information regarding the APE and asked for PG&E in defining the APE to consider both direct and indirect effects and include a narrative description and mapping of the APE.

The APE was developed in consultation with the Proposed Project's Cultural Resources Working Group (CRWG), which includes Native American Tribes;[1] land management agencies, including BLM and the USFS-SNF; the California SHPO; PG&E as the licensee; and interested individuals. Per the Proposed Project's Historic Properties Management Plan (HPMP), Reclamation was invited to be part of the CRWG because portions of the Proposed Project are located on its property; however, the agency declined to participate because the relicensing did not constitute an undertaking under Section 106 for its purposes.

[1] PG&E consulted with the following Tribes: North Fork Rancheria of Mono Indians, Mono Nation, Picayune Rancheria, North Fork Mono Tribe, Cold Springs Rancheria, Dunna Wo-Wah Tribal Government, Table Mountain Rancheria, and Wuksache Tribe.

The APE was submitted by PG&E to the California SHPO on February 12, 2021, and the California SHPO approved PG&E's final description and reasoning of the APE on March 26, 2021. If PG&E identifies any new resources or proposes alterations to the Proposed Project Area, these would be integrated into the Proposed Project's HPMP, after consultation with stakeholders. Since the 2021 APE submittal, construction of a day use area (Vista Day Use Area) that would be connected to a BLM foot trail, installation of an upstream flow gage, and upgrades to the Kerckhoff Dam radial gates have been proposed, which alter the Proposed Project Area; these elements, therefore, would be analyzed pursuant to the provisions of the Proposed Project's HPMP.

The study area for the cultural resources technical studies is the area within the existing FERC Project Boundary plus the area within 200 feet of any Kerckhoff Hydroelectric Project facility that is not within the existing FERC Project Boundary (excluding buried features such as the Kerckhoff 1 [K1] and Kerckhoff 2 [K2] Tunnels), where the Proposed Project may cause a substantial adverse change in the significance of a historical resource or an archaeological resource, or disturb any human remains, including those outside of a dedicated cemetery. The study area is identical to the APE for the NHPA Section 106 process, defined as the area where the Proposed Project could directly or indirectly cause alterations in the use or character of a historic resource. The Advisory Council on Historic Preservation and the California SHPO provide guidance for federal agencies and delegated licensees regarding potential impacts that may occur immediately or directly, are reasonably foreseeable and may occur later, and may be caused by indirect impacts, as well as potential cumulative impacts resulting from the Proposed Project.

Land ownership of the study area includes 328.1 acres owned by the federal government, 162.5 acres owned by PG&E, and 41.1 acres of other privately owned land, for a total of 507.96 acres. The study area encompasses all land and facilities necessary for Proposed Project operation. As stated above, construction of the Vista Day Use Area, installation of an upstream flow gage, and upgrades to the Kerckhoff Dam radial gates were proposed after the 2021 HPMP (West et al. 2021) and must be analyzed pursuant to the provisions of the HPMP and are within the study area. All

accessible cultural resources located within the HPMP 2021 study area were inventoried and assessed as part of the cultural resources studies and are considered part of the affected environment for cultural resources.

As noted in Section 3.3.7.2 of FERC's (2025) Environmental Assessment, FERC's staff-recommended boundary would remove 129.1 acres of land from the current FERC Project Boundary. NRHP-eligible and potentially eligible cultural resources intersect some of the lands proposed for removal from the FERC Project Boundary.[2] According to a filing from the Advisory Council on Historic Preservation, FERC's jurisdiction over hydroelectric projects does not constitute "federal ownership or control" as meant in federal regulations,[3] and therefore, surrendering land once within PG&E's FERC Project Boundary would not result in an adverse effect to historic properties on that land in and of itself.

4.6.1.2 Precontact Context

The general trend throughout precontact California has been an increase in population density over time, coupled with greater sedentism and the use of a greater diversity of food resources. There is abundant evidence that humans have been in the New World for at least the past 11,500 years. There is also fragmentary but growing evidence that humans were present long before then. Linguistic and genetic studies have suggested that a date of 20,000 to 40,000 years ago for the human colonization of the New World may be plausible. The evidence of this earlier occupation is not yet conclusive, but it is beginning to be accepted by archaeologists. The Meadowcroft Rockshelter in Pennsylvania and Monte Verde in Chile, for instance, are two early sites that have produced apparently reliable dates as early as 10,550 Before Common Era (BCE).

[2] PG&E does not include portions of two NRHP-eligible districts that extend beyond the FERC Project Boundary but will consider these historic properties in their entirety when assessing potential effects within the boundary. *See* California SHPO's March 26, 2021 letter.

[3] 36 CFR 800.5(a)(2)(vii) 2025.

These earliest known remains indicate very small, mobile populations apparently dependent on hunting large game animals as the primary subsistence strategy.

The study area is situated in the foothills of the Sierra Nevada, and both Central Valley chronologies and Sierra Nevada chronologies have been reviewed to understand the area's archaeology. In the early 1970s, Fredrickson (1974) proposed three basic periods for the Central and San Joaquin Valley and the adjoining foothills: Paleoindian, Archaic, and Emergent. Rosenthal et al. (2007) further refined time periods based on newly calibrated radiocarbon dates. The following framework is based on their discussion, except where noted. As many of the cultural groups occupying California's Central Valley share many similar types of cultural material, overarching cultural groups within the San Joaquin Valley region are subdivided into two types: the foothill tradition and the valley tradition. Given the study area location, foothill tradition site types and artifacts are the most likely type to be encountered in the APE. Within the Sierra Nevada, chronological sequences are highly regionalized and proposed by researchers working in discrete areas, including the Kerckhoff Reservoir. The chronology below is developed from Moratto (1984), as well as from Varner (1983), who conducted excavations at the Kerckhoff Reservoir (Varner 1983; Hull 2007).

4.6.1.2.1 Paleoindian (11,550 to 8550 BCE)

The Paleoindian period has a relatively faint cultural resource footprint in California. The earliest evidence for occupation in the San Joaquin Valley is a style of spear point, similar to the Cloves points, also thinned and flaked at the point base, found at Tracy Lake, the Woolfsen mound in Merced County, and at Tulare Lake. These sites are located along the shores of old Pleistocene lakes, which held water at a time when the environment was much wetter (Rosenthal et al. 2007). These sites are few and remain undated by scientific means, but the assemblage types indicate probable ages of 11,500 to 7,500 years old (Moratto 1984). Varner (1983) identified the Fluted Point Tradition, 10,000 to 7000 BCE, for the archaeological sites found on the shorelines of the ancient Pleistocene lakes noted above. Varner noted that the people who occupied these sites may have ventured into the nearby foothills near the study area (Varner 1983).

4.6.1.2.2 Lower Archaic (8550 to 5550 BCE)

The Lower Archaic in the Central Valley and nearby foothills is similarly represented in the archaeological record as the Paleoindian. Very few sites date to the Lower Archaic, and most recorded resources are isolated finds. Flaked stone tools, such as stemmed points and chipped stone crescents, are found along the old shorelines of Tulare Lake. The Lower Archaic period economy appears to have emphasized mobile foraging; one site in Kern County contained a small artifact assemblage with flaked stone crescents, a spear point, and the faunal remains of freshwater fish and water birds (Rosenthal et al. 2007). Points from this period remain large and include Lake Mojave, Silver Lake, and Pinto point types that mirror Great Basin point types. Unlike the valley floor, Lower Archaic sites found in the foothills of the Sierra Nevada have milling tools, including handstones, milling slabs, and various cobble tools, that appear to be related to the processing of various seeds, like acorns and pine nuts, and possibly small animals (Rosenthal et al. 2007).

Relationships between foothill and valley floor archaeology have not been explored for this early period, primarily because valley archaeology from the Lower Archaic and Early Middle Archaic periods lack data. Thus, it is unclear to researchers whether foothill sites and valley sites are two different cultural traditions or seasonal expressions of a single culture.

Varner (1983) referred to the Millingstone Tradition for the period between 7000 and 4000 BCE, which correlates with the expansion of milling equipment discussed above. Many areas in California have seen this shift to the processing of vegetal resources in this approximate timeline (Varner 1983).

4.6.1.2.3 Middle Archaic (5550 to 550 BCE)

More distinct cultural adaptations for the valley floor and foothills are visible in sites that date to the Middle Archaic. Artifact assemblages for the foothill tradition are composed of flaked stone dart points and cobble tools similar to those of the Lower Archaic. Tabular pendants, incised slate, and perforated stone plummets are rather rare but nevertheless have wide distribution. Middle Archaic foothill sites are also characterized

by rock-filled hearths and ovens, as well as cairn capped graves (Rosenthal et al. 2007). Middle Archaic sites in the foothills that date between 4050 and 2050 BCE include expedient cobble tools used for scraping, mulling, chopping, and pounding, all activities thought to be related to processing vegetal foods, such as acorns and pine nuts (Rosenthal et al. 2007).

Sites of the valley tradition in the later Middle Archaic are fairly well represented in the archaeological record. Notably, evidence of trade and interaction is inferred from the presence of non-local utilitarian and ceremonial items at valley sites. Trade also presumably occurred within foothill peoples.

During the Middle Archaic, there was a substantial change in climate, and dry conditions prevailed throughout central California. As rising sea levels pushed inland, creating the Sacramento-San Joaquin Delta, the landscape of the Proposed Project Area also changed dramatically. After a period of soils deposition, the landscape stabilized. According to Rosenthal et al. (2007), this stabilization is revealed by buried soils found throughout central California, and many Middle Archaic sites are associated with these buried soils.

The beginnings of other technologies such as cordage, twined basketry, basketry awls, simple pottery and other baked clay objects, stone plummets, bird bone tubes, and shell beads appear in the Middle Archaic. The presence of exotic items, such as obsidian and shell ornaments, suggests an active exchange system (Rosenthal et al. 2007).

Specific to the study area, Varner (1983) proposed one period that overlaps the Middle Archaic: the Strawberry and Lamont Phases, which date between 4000 and 1200 BCE. This period is characterized by the large, heavy projectile points and spear points that are Pinto style and Humboldt Concave base style (Varner 1983).

4.6.1.2.4 Upper Archaic (550 BCE to 1100 CE)

Environmental conditions changed at the start of the Upper Archaic, or the Late Holocene. The technologies that existed in the Middle Archaic became highly specialized in the Upper Archaic period, as evidenced by new types of tools, as well as

widely traded goods like saucer- and saddle-shaped Olivella beads, Haliotis ornaments, obsidian biface “roughouts,” and ceremonial blades. Economies focused on seasonally available resources that could be harvested and processed in large quantities, such as acorns. In the Sierra Nevada, three obsidian quarries provided obsidian to much of the San Joaquin Valley and southern California: Bodie Hills, Casa Diablo, and Coso (Rosenthal et al. 2007). In the lower foothills, areas along riparian corridors were settled. Discrete cemeteries contained flexed or extended burials and were located away from living areas. The differences in burial practices have led some researchers to propose that different populations occupied the same riparian areas. Sites of this period contain numerous shaped milling and grinding stone implements for food preparation. Projectile points become progressively more regularized in shape and somewhat smaller through time (Rosenthal et al. 2007).

Varner (1983) noted several different phases for the years from 1200 BCE to 600 CE: Crane Flat, Chowchilla, Exchequer, Long Meadow, and Canebreak. As noted by other researchers, point types become smaller over time and include Elko, Gypsum, and Sierra Concave Base. Milling equipment is still prevalent and includes mortars and pestles, and manos and metates. As noted above, obsidian was the primary flaked material (Varner 1983).

4.6.1.2.5 Emergent (1100 CE to Historic-Period)

The Late or Emergent period (further divided into Lower and Upper) ranges in the valley floor and foothills from as early as 1100 CE to the time of European settlement of this general area in the late 1700s. Intensive fishing, hunting, and harvesting of acorns and small hard seeds typify this period (Moratto 2004). Additionally, ethnographic accounts have indicated that freshwater mussels, such as the western pearlshell mussel (*Margaritifera falcata*), were a significant resource for Tribes in the Central Valley (Hezier and Whipple 1971; Whitman 2020). Yokuts women in villages along the San Joaquin River (SJR) actively collected these mussels, along with other shellfish. Beyond their use as a food source, mussel shells served various purposes, including in trade, for the use of tools, and for ornamentation, within the subsistence economy of this area (Kroeber 1925). A general increase in population and settlements, a more regularized

exchange system, and an increase in evidence of ceremonialism characterizes the Augustine Pattern. Distinctive artifacts include small-notched points that are indicative of the introduction and spread of bow-and-arrow usage, bone awls used in basketry, clay effigies, elaborately incised bone whistles, flanged soapstone stone pipes, and occasional pottery.

Cremation was also practiced, in a limited way, for individuals of high status during the Lower Emergent period and then more generally applied across the population during the Upper Emergent period. An increase in ornamental artifacts occurred, with rectangular Olivella sequin beads and banjo-type Haliotis ornaments (Kuksu cult), a common occurrence in burials. Overall, this suggests an increase in social status and ranking. Other Upper Emergent characteristics include Stockton serrated points, Olivella lipped and clam disc beads, bead drills, magnesite cylinders, hopper mortars, pre-interment grave-pit burning with tightly flexed burials, and grave-associated items of ground stone. The arrival of Spanish explorers and the establishment of missions disrupted these life ways in the late eighteenth century (Moratto 2004).

Varner (1983) noted the following phases, named for various excavations or places where important excavations occurred in the Sierra Nevada: 600 to 1300 CE (Tamarack, Raymond, Dinkey, Deer Creek, and Sawtooth) and 1300 to 1850 CE (Mariposa, Madera, Glen, Tule Meadow, and Chimney). Artifact assemblages found in the sites occupied between 600 and 1300 CE included small Rose Spring and Eastgate style projectile points likely used as arrow tips and various processing tools for seeds and acorns, such as mortars and pestles. Sites occupied after 1300 CE include small Desert Side-Notched and Cottonwood Triangular projectile points, or arrowheads; Owens Valley Brownware pottery, a style imported from the east side of the Sierras in the Owens Valley; and the extensive use of steatite, a softer and more easily shaped soapstone rock used extensively among native Californians for cooking vessels and making beads. Milling equipment used remains the mortar and pestle (Varner 1983).

4.6.1.3 Historical Context

In 1542, Juan Rodriguez Cabrillo explored the California coast by ship, entering San Diego Bay and claiming Alta California for Spain. Cabrillo passed by several of the California islands on his voyage. Sixty years later, Sebastian Vizcaino sailed into San Diego Bay. Exploration of the land was slower to come. Don Gaspar de Portola searched Alta California for suitable mission sites in 1769, traveling overland along the coast.

Historians generally divide California's historic era into four periods: the pre-historic Native era, which extended for thousands of years (and discussed above), the Spanish or Mission period (1769 to 1834), the Mexican or Rancho period (1821 to 1848), and the American period (1848 to present).

4.6.1.3.1 Spanish/Mission Period (1769 to 1834)

California's first appointed governor was Gaspar de Portola in 1767, and his first command by the Viceroy of Mexico was to expel the Jesuits from Baja California. This prompted the launch of military and Franciscan expeditions from Baja California into the region, and, with it, the official start of the historical period in California. Following the expulsion of the Jesuits from Baja California, the Spanish established colonial military outposts in Alta, the first of which was El Presidio Real de San Diego in 1769 with Pedro Fages as its commander. The Spanish continued to construct military outposts as their expeditions traveled north (Beebe and Senkewicz 2001).

During this period, the Spanish constructed 21 missions in California, from south to north along El Camino Real, the first of which was San Diego de Alcala, founded by Father Junipero Serra (California Missions Foundation 2023). This period also introduced the era of "Missionization," a period of forced conversion of the Native Americans who occupied the region.

The Spanish government was awarding ranchos (land grants) to soldiers and other Spanish Californios by the 1790s; vast tracts of land were used for livestock and farming. No missions were founded near the study area, and the last mission to be

founded was San Francisco Solano in 1823. Further attempts by the Spanish to construct additional missions were thwarted due to the costly endeavor each new mission posed. Later, as Spain lost its rule over New Spain and secularization was sought by the new government, the mission system was disbanded in 1834.

4.6.1.3.2 Rancho Period (1821 to 1848)

Mexico became independent of Spain in 1821, and the Decree of Secularization in 1834 effectively ended the Spanish/Mission period in California. The following years were marked by the proliferation of cattle ranching throughout the region as the Mexican governor, Pio Pico, granted vast tracts of land to Mexican (and some American) settlers. The former mission lands were then opened for grants by the Mexican government to citizens who would colonize the area and develop the land, generally for grazing cattle and sheep (Lech 2004). This act relegated the missions to retain only enough acreage for the church and its associated buildings and for land to support those who lived on mission property. In 1833, 11 years after gaining independence from Spain, the Mexican government's Secularization Act changed missions into civil parishes, and those natives who had inhabited regions adjacent to a Spanish Period mission were to obtain half of all mission possessions, including land. However, in most instances, this did not occur, and the Secularization Act resulted in transferring large mission tracts to politically prominent individuals.

On June 14, 1846, a small number of Californians, mostly of American rather than Mexican origin, aided by John C. Fremont, an agent of the United States government, seized control of the citadel of Sonoma from Mexican officials and hoisted a flag with a grizzly bear that read "Republic of California," declaring California a free and independent republic. The short-lived Bear Flag Revolt resulted in a republic that lasted for less than a month (Hulaniski 1917).

The proliferation of herd animals on traditional Native American lands greatly changed the landscape of California as non-native grasses and other non-native species were rapidly spread by cattle ranching and sheep herding (Moratto 1984). Ranchos and the grazing of horses, sheep, and cows on the traditional aboriginal lands are largely

credited with the destruction of native California flora, traditional plants, and native animal habitat. The area around the Proposed Project, described as a vast jungle or swamp by an early explorer Caleb Strong Merrill, was not part of a grant or rancho (California Secretary of State 2023).

Jedidiah Strong Smith was the first American to record traveling near the study area. He reached the SJR in 1826 (Hulaniski 1917). Pueblo de las Juntas was a small settlement founded near the confluence of the SJR and the Fresno slough. This was one of the first settlements in the San Joaquin Valley, occupied by Spanish and Mexican explorers, pioneers, and refugees (Hulaniski 1917).

4.6.1.3.3 American Period (1848 to Present)

Following the signing of the Treaty of Guadalupe Hidalgo in 1848, the United States took possession of California. The treaty bound the United States to honor the legitimate land claims of Mexican citizens residing in captured territories. Gold was discovered in California in 1848. By 1849, the Gold Rush brought many speculators from the eastern United States and European countries flocking to California to make their fortune. The rapid growth of the region was substantial, and it is estimated that as many as 300,000 people arrived in the region during this period, heralding the start of industry, transportation, and changes in legislature. Gold was discovered near the study area in the Millerton region of the Sierra Nevada foothills in 1850. Conflicts between the influx of miners and the local Native American populations prompted the U.S. government to establish Camp Barbour, which was later fortified and renamed Fort Miller. The fort was occupied until 1864 (Military Museum 2023).

On September 9, 1850, California became the 31st state in the Union. The Land Act of 1851 established a board of Land Commissioners to review and adjudicate land claims and charged the Surveyor General with surveying confirmed land grants. To investigate and confirm titles of California, American officials acquired the provincial records of the Spanish and Mexican governments that were in Monterey. Those records, most of which were transferred to the U.S. Surveyor General’s Office in San Francisco, included land deeds and sketch maps (Gutierrez and Orsi 1998). Following California’s

statehood, 27 counties were created including Mariposa County, which, at the time, incorporated present-day Fresno and Madera counties, including the study area.

From the 1890s to the 1930s, hydroelectric technology transformed the Sierra Nevada area by harnessing rivers and watersheds to serve the demands of the economy of the city, industry and agriculture. Construction of the Kerckhoff Hydroelectric Project began in May 1919 to provide power to Central Valley towns and farms. The Kerckhoff Dam was completed in December 15, 1919, and the K1 Powerhouse was completed on August 15, 1920. The license was transferred to PG&E in 1930. The K1 Powerhouse was retrofitted in 1961 to allow for semi-automatic operation. Operation of the Kerckhoff Dam and K1 Intake Structure and Tunnel were also augmented in the 1950s to allow for automatic operation and motor-operated controls. In 1974, PG&E demolished the K1 Powerhouse tramway and built an augmented vehicular road to service the powerhouse and penstock alignment. To increase power production, PG&E completed construction of the K2 Powerhouse and associated facilities in 1983.

4.6.2 Regulatory Background

The following subsections contain an overview of regulations related to cultural resources.

4.6.2.1 Federal

4.6.2.1.1 Federal Power Act

The Federal Power Act (Title 16 United States Code [USC] Chapter 12), originally enacted as the Federal Water Power Act in 1920, amended multiple times, to coordinate the development of hydroelectric power projects. The Federal Power Act created FERC and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations [CFR] Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.6.2.1.2 National Register of Historic Places

The preservation of historic properties became national policy with the passage of the Antiquities Act of 1906, the Historic Sites Act of 1935, and the NHPA of 1966. Federal, state, and local agencies; private groups; and citizens use NRHP as a guide to identify the historical resources and determine which properties are to be protected, to the extent prudent and feasible, from substantial adverse change. The NRHP may also include various other types of historical resources that meet the criteria for eligibility, including the following:

- Individual historic resources
- Resources that contribute to a historic district
- Resources identified as significant in historic resource surveys
- Resources with a significant rating of Categories 1 through 4 in the State Inventory (Categories 3 and 4 refer to potential eligibility for the NRHP)

A resource shall be historically significant if it meets the criteria for listing on the NRHP, including the following:

- It is associated with events that have made a significant contribution to the broad patterns of history (Criterion A)
- It is associated with the lives of persons significant to our past (Criterion B)
- It embodies the distinctive characteristics of a type, period, region, or method of construction; or represents the work of a master, possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction (Criterion C)
- It has yielded, or has the potential to yield, information important to prehistory or history (Criterion D)

In addition to the previously listed criteria, a resource must retain integrity to be considered historically significant. Integrity is the authenticity of the physical identity that is evidenced by the survival of characteristics that existed during the resource's period of significance. Historical resources must retain enough of their historic character or appearance to be recognizable as historical resources and convey the reasons for their

significance. Rehabilitation or restoration does not necessarily discount a resource from eligibility. Integrity must also be evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association.

4.6.2.1.3 Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC Section 3002, Section 5) of 1990 provides a process for federal agencies and museums to repatriate or transfer certain Native American cultural items, specifically human remains, funerary objects, sacred objects, and objects of cultural patrimony, to lineal descendants and culturally affiliated Native American Tribes, Alaska Native Corporations, and Native Hawaiian organizations. This act 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 to the ownership provisions above (25 USC Section 3002(d)).

4.6.2.1.4 American Antiquities Act

The American Antiquities Act of 1906 was the first law that established protections for archaeological resources on public lands. The act obligated federal agencies that managed the public lands to preserve archaeological sites and historic-era structures for present and future generations of Americans. The act also authorized the President to designate as national monuments, landmarks, structures, and objects of historic or scientific interest.

4.6.2.1.5 Archaeological Resources Protection Act

The Archaeological Resources Protection Act (ARPA) of 1979 was enacted for the present and future benefit of the American people to protect archaeological resources on public lands and Native American lands and foster increased cooperation and exchange of information between governmental authorities, professional archaeologists, and private individuals with archaeological collections obtained before ARPA was passed (16 USC Section 470aa (b)). The act provides professional archaeologists and

law enforcement with tools to protect resources and includes a clear definition of an "archaeological resource" that makes the act enforceable (16 USC Section 470bb).

4.6.2.1.6 American Indian Religious Freedom Act

The American Indian Religious Freedom Act of 1978 (42 USC Section 1996) protects Native American religious practices, ethnic heritage sites, and land uses.

4.6.2.1.7 Executive Order 11593 of 1971 and Executive Order 13007 of 1996

Executive Order (EO) 11593, Protection and Enhancement of the Cultural Environment, states that the federal government, specifically the agencies of the executive branch, will provide leadership to the nation for the preservation, restoration, and maintenance of the historic and cultural environment. EO 13007, Indian Sacred Sites, states that each executive branch agency that manages federal lands, to the extent practicable, will accommodate access to and ceremonial use of sacred sites by Native American religious practitioners and will avoid adversely affecting these sacred sites. These agencies will also maintain confidentiality of the sacred sites.

4.6.2.1.8 United States Bureau of Land Management Bakersfield Field Office Resource Management Plan

The *Bakersfield Field Office Record of Decision and Approved Resource Management Plan* (BLM 2014) is considered relevant because the Proposed Project is located within BLM's SJR Gorge Recreation Area. This plan provides direction for the management and protection of natural resources on public lands administered by the BLM. Relevant management goals, objectives, decisions, and administrative actions in this plan related to cultural resources are as follows (BLM 2014):

- **Goal [CR-G-1].** Identify, preserve, and protect significant cultural resources and ensure that they are available for appropriate uses by present and future generations (Federal Land Policy and Management Act [FLPMA], Section 103(c), 201(a) and (c); NHPA, Section 110(a); ARPA, Section 14(a)
- **[CR-G-2].** Seek to reduce imminent threats and resolve potential conflicts from natural or human-caused deterioration, or potential conflict with other resource uses

(FLPMA Section 103(c), NHPA 106, 110 (a) (2)) by ensuring that all authorizations for land use and resource use will comply with the NHPA Section 106

- **Objective [CR-O-2].** Design BLM actions and authorizations to minimize impacts on cultural resources including places of traditional cultural and religious importance to Native Americans
- **Decision [CR-D-1].** Allocate evaluated cultural resources within the decision area as "scientific use" for study, determination of eligibility and appropriate recordation, pending assignment to another use category
- **[CR-D-3].** Restore or stabilize cultural resources when they are damaged or deteriorating to the extent possible
- **Administrative Actions SHPO/NHPA.** Continue to regularly communicate with the California SHPO to share information and obtain technical advice on issues related to compliance with Sections 106 and 110 of the NHPA, in accordance with the BLM California State Protocol

4.6.2.1.9 Sierra National Forest Land Management Plan

The United States Forest Service (USFS) uses the direction in the revised *Land Management Plan for the Sierra National Forest* (USFS 2023), pursuant to the 2012 Forest Service Planning Rule (36 CFR Part 219), to guide its decisions regarding the relicensing of the Proposed Project and the development of associated license conditions. It provides general direction for achieving forest-wide desired conditions and management directions to meet those conditions. Desired conditions and guidelines related to cultural resources and relevant to the Proposed Project are as follows:

- **Desired Condition (CULT-FW-DC) 01.** Cultural resources (buildings, sites, districts, structures, and objects) with scientific, cultural, or social values are preserved and protected for their cultural importance. Site integrity and stability are protected and maintained on sites that are susceptible to imminent risks or threats, or where the values are rare or unique. Priority heritage assets are stable, and their significant values are protected; vandalism, looting, theft, and human-caused damage to heritage resources are rare. Site significance and integrity are maintained through conservation and preservation efforts

- **Desired Condition CULT-FW-DC 02.** Cultural resources, traditional cultural places (TCP), and sacred sites are protected through project design and consultation with Native American Indian tribes, tribal cultural leaders, and consulting parties
- **Guideline (CULT-FW-GDL) 01.** Cultural artifacts should only be collected for diagnostic dating purposes, answering research questions, or protection of the artifact when special circumstances require collection. Artifact collections should be curated at nearby facilities and accessible to local tribes and researchers

4.6.2.2 State

4.6.2.2.1 California Register of Historical Resources

As provided in Public Resource Code (PRC) Section 5020.4, the California Legislature established the California Register of Historical Resources (CRHR) in 1992. The CRHR is used as a guide by state and local agencies, private groups, and citizens to identify the state historical resources and include which properties are to be protected, to the extent prudent and feasible, from substantial adverse change. The CRHR, as instituted by the PRC, automatically includes all California properties already listed in the NRHP. It also includes those formally determined to be eligible for listing in the NRHP (Categories 1 and 2 in the State Inventory of Historical Resources), as well as specific listings of the State Historical Landmarks and in the State Inventory of Historical Resources and specific listings of State Historical Landmarks and State Points of Historical Interest.

In the CEQA Guidelines, Section 15064.5 defines cultural resources as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, or scientific importance. A historical resource is a resource listed in, or determined to be eligible for listing in, the CRHR. Historical resources as defined in subdivision (k) of Section 4020.1, and included as such in a local register, or deemed significant pursuant to criteria set forth in subdivision (g) of Section 5024.1, are presumed to be historically or culturally significant for purposes of this section. The significance of cultural resources must be determined before mitigation measures are developed, as only significant cultural resources need to be addressed. Pursuant to

Section 15064.5, a resource shall be considered historically significant if it meets the criteria for listing in the CRHR (PRC SS 5024.1, Title 14 California Code of Regulations [CCR], Section 4852), including the following:

- Is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States (Criterion 1);
- Is associated with the lives of persons important to local, California, or national history (Criterion 2);
- 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 (Criterion 3); or
- Has yielded, or may be likely to yield, information important in prehistory or history of the local area, California, or the nation (Criterion 4)

In addition to the above criteria, the CRHR states that a resource must retain integrity to be considered historically significant. Integrity is the authenticity of the physical identity that is evidenced by the survival of characteristics that existed during the resource's period of significance. Historical resources must retain enough of their historical character or appearance to be recognizable as historical resources and convey the reasons for their significance. Rehabilitation or restoration does not necessarily discount a resource from eligibility. Integrity must also be evaluated regarding the retention of location, design, setting, materials, workmanship, feeling, and association. A resource that has lost its historical character or appearance may still have sufficient integrity for the CRHR if it maintains the potential to yield significant scientific or historical information or specific data.

An adverse impact on a cultural resource is defined in the CRHR as follows:

- Makes substantial adverse change in the significance of a historical resource by physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings

- Demolishes or materially alters those physical characteristics of a historical resource that conveys its significance and that justify its inclusion in, or eligibility for inclusion in, the CRHR, or inclusion in a local register

Section 7052 of the State Health and Safety Code establishes a felony penalty for mutilating, disinterring, or otherwise disturbing human remains, except by relatives. Penal Code Section 622.5 provides misdemeanor penalties for injuring or destroying objects of historical or archaeological interest location on public or private lands but specifically excludes the landowner. Section 5097.5 of the PRC defines this as a misdemeanor the unauthorized disturbance or removal of archaeological, historical, or paleontological resources located on public lands.

The CRHR may also include other types of historical resources that meet the criteria for eligibility, including the following:

- Individual historical resources
- Resources that contribute to a historical district
- Resources identified as significant in historical resource surveys
- Resources with a significance rating of Categories 3 through 5 in the State Inventory (Categories 3 and 4 refer to potential eligibility for the NRHP, and Category 5 indicates a property with local significance)

The CRHR follows the NRHP in using the 50-year threshold. A resource is usually considered for its historical significance after it reaches the age of 50 years. This threshold is not absolute but was selected as a reasonable span of time after which a professional evaluation of historical value and importance can be made.

4.6.2.3 Local

4.6.2.3.1 Madera County General Plan

The Madera County General Plan (Madera County 1995) is relevant because a portion of the Proposed Project is located within Madera County. The plan includes information regarding land uses in the vicinity of the Proposed Project and management goals and

policies relevant to the Proposed Project Area. The General Plan provides an overall framework for development of the county and protection of its natural and cultural resources. Relevant policies regarding cultural resources management are in General Plan, Section 4 *Recreational and Cultural Resources*:

- **Goal 4.D.** To identify, protect, and enhance Madera County's important historical, archaeological, paleontological, and cultural sites and their contributing environment
- **Policy 4.D.8.** The County shall support the registration of cultural resources in appropriate landmark designations (i.e., NRHP, California Historical Landmarks, Points of Historical Interest, or Local Landmark). The County shall assist private citizens seeking these designations for their property
- **Policy 5.H.5.** The County shall require that significant natural, open space, and cultural resources be identified in advance of development and incorporated into site-specific development project design

4.6.2.3.2 Fresno County General Plan

The Fresno County General Plan (Fresno County 2024) is relevant because the Proposed Project is located within Fresno County. The Fresno County General Plan (Fresno County 2024) is a comprehensive, long-term framework for the protection of the county's agricultural, natural, and cultural resources and development in the county. Relevant goals, policies, and programs for cultural resources management are contained in the Open Space and Conservation Element (Fresno County 2024):

- **Goal OS-J.** To identify, protect, and enhance Fresno County's important historical, archaeological, paleontological, geological, and cultural sites and their contributing environment, and promote and encourage preservation, restoration, and rehabilitation of Fresno County's historically significant resources in order to promote historical awareness, community identify, and to recognize the county's valued assets that have contributed to past county events, trends, styles of architecture, and economy
- **OS-J.2 Historic Resources Consideration.** The County shall consider historic resources during preparation or evaluation of plans and discretionary development

projects that may impact buildings or structures. For a project forecasted on a property that includes buildings, structures, objects, sites, landscapes, or other features that are 45 years of age or older at the time of permit application, the project applicants shall be responsible for preparing and implementing the recommendations of a historical resources evaluation completed by qualified cultural resources practitioners

- **OS-J.4 Cultural Resources Protection and Mitigation.** The County shall require that discretionary development projects, as part of any required CEQA review, identify and protect important historical, archaeological, tribal, paleontological, and cultural sites and resources. For projects requiring ground disturbance and located within a high or moderate cultural sensitivity area, a cultural resources technical report may be warranted, including accurate archival research and site surveys conducted by qualified cultural resources practitioners. The need to prepare such studies shall be determined based on the tribal consultation process and initial outreach to local or state information centers
- **OS-J.10 Cultural Resource Preservation.** The County shall use the State Historic Building Code and existing legislation and ordinances to encourage preservation of cultural resources and their contributing environment

4.6.3 Analysis Methodology

4.6.3.1 Analytical Approach

The Area of Analysis for the analysis sections below is the study area for the cultural resources technical studies which includes the existing FERC Project Boundary plus a 200-foot buffer around any Kerckhoff Hydroelectric Project facility that is not within the existing FERC Project Boundary. A cultural resources review was completed for the study area of all previous work, including archival research, pedestrian and reconnaissance surveys, building surveys, and interviews with Native American community members and other stakeholders from the CRWG. The study includes both an archaeological study and an architectural study; both were developed in consultation with the CRWG. To determine the presence or absence of archaeological resources

within the study area, PG&E contracted with Cardno to complete an archaeological study, whereas PG&E completed the architectural study.

In a letter dated December 3, 2019, the California SHPO stated that the *Archaeological Resources Evaluation Report, Kerckhoff Hydroelectric Project FERC Project No. 96 (CUL 1b)* (Cardno 2020) NRHP Archaeological Draft Plan was adequate and would represent a good faith effort to identify historic properties. Further, in a letter dated January 9, 2020, the California SHPO concurred with the NRHP eligibility determinations provided in the *Technical Study Report (TSR-14) Cultural Resources, Historic-Era Built Environment Inventory and Evaluation (CUL 1c)* (PG&E 2020) regarding the technical study for cultural resources for the historic built inventory and evaluation. The following resources were determined to be not NRHP eligible: Kerckhoff Dam and Reservoir, K1 Intake Structure and Tunnel, Kerckhoff Powerhouse and Penstocks, Old SJR Bridge Abutment and Footings, SJR Bridge No. 42C-0003, Kerckhoff Hydroelectric Project Gages, Kerckhoff Dam Wood Storage Building, Kerckhoff Dam Storage Building, K1 Powerhouse Tramway and Hoist House, K1 Warehouse, K1 Communication Building, K1 Cottage No. 2, K1 Incinerator, and the K1 Transportation Infrastructure.

Results are documented in the Proposed Project's HPMP (West et al. 2021). In 2023, construction of the Vista Day Use Area, installation of the new upstream gage, and the upgrade of two gates on Kerckhoff Dam were proposed; these areas were not subject to investigation in the 2021 HPMP. These activities would be subject to be under review pursuant to the HPMP prior to construction activities occurring.

4.6.3.2 Archaeological Study

The archival review included a literature search of the study area defined in the cultural resources technical reports as part of the CUL 1 Archaeological and Built-Environment Study Plan, which is discussed below. It additionally included a one-mile buffer (referred to here as the study area) completed at Southern San Joaquin Valley Information Center (SSJVIC) of the California Historical Resources Information System (CHRIS). Additionally, a review of PG&E's confidential cultural database, as well as the BLM and

USFS-SNF archives at the respective agency offices, was completed. Additional archival research was completed for the evaluation of the significance of resources for the NRHP and the CRHR, including a review of General Land Office Records, deeds, land patent records, Indian Allotment records and maps, data from the Fresno and Madera county assessor's offices, PG&E regional cultural studies, diagnostic historical artifacts dating, previous archaeological excavations in the study area, and pertinent ethnographies.

The literature search at the SSJVIC identified 107 previous cultural resources studies completed within the 1-mile radius of the study area. A total of 37 of these studies were completed within the study area. An additional 20 studies partially intersect the study area. The literature search identified 106 known cultural resources in the study area. The San Joaquin River Gorge Archaeological District (SJRGA) intersects the study area, and three sites within this district that are contributing elements, intersect the study area.

As part of CUL 1, Cardno, on behalf of PG&E, completed an intensive (approximately 49-foot transects) archaeological survey between April and May in 2019. A total of 216.74 acres of the 507.96-acre study area was surveyed. According to guidance in the Proposed Project's HPMP, archaeological resources that may be affected by the Proposed Project that had not been previously evaluated for the NRHP and the CRHR were to be evaluated, if conditions allowed, and 12 archaeological sites were evaluated per a testing and evaluation plan. The survey and evaluative testing were completed during the summer and fall prior to snow fall, when the Kerckhoff Reservoir is at its lowest water levels; however, most of the lakebed is not surveyed, as the lake was not dry. PG&E plans to complete additional archaeological survey and/or testing of the dry lakebed when the water level is low enough to do so. Areas that were not surveyed in the Proposed FERC Project Boundary modification will be surveyed upon issuance of the license and the implementation of the Proposed Project's HPMP.

A total of 24 archaeological sites (Table 4.6-2) were identified within the study area because of the above archival search and pedestrian survey. Prior to the completion of

the evaluation phase, six archaeological sites had previous recommendations of eligibility: three sites were determined eligible for the NRHP, and three sites were recommended not eligible for the NRHP. As discussed in Section 4.6.2 *Regulatory Background*, if a site is determined eligible for the NRHP, it is also considered eligible for the CRHR.

A total of 24 sites are within the APE. Two sites are contributing elements to the SJRGA; 14 sites are recommended as contributing elements to Traditional Cultural Landscape (TCL); 6 sites are recommended ineligible; and 2 sites are unevaluated. Two archaeological sites remain unevaluated and will be assumed eligible until determined otherwise.

Table 4.6-2: Archaeological Resources Identified within the Study Area

Resource Number(s)	Description	Current NRHP/CRHR Status
P-10-000636/P-10-000637/RG-004	Prehistorical site, part of SJRGA	**Eligible** Previously determined individually eligible for NRHP and contributor to SLAD
P-10-000664, FS-05-15-55-00188	BRM feature on island in Kerckhoff Reservoir	**Contributing element** TCL 1 and not individually eligible
P-10-000668	Lithic debitage (obsidian), flaked stone tools(obsidian), and BRM features	**Eligible** Previously determined eligible for NRHP and contributor to SJRGA
P-10-001316	Historic-era site associated with Kerckhoff Dam	**Not eligible**
P-10-001436	BRM feature submerged under Kerckhoff Reservoir	**Contributing** TCL 1 and individually eligible
P-10-001437	BRM feature submerged under Kerckhoff Reservoir	**Contributing** TCL 1 and individually eligible

Resource Number(s)	Description	Current NRHP/CRHR Status
P-10-003029/ P-20-002192	San Joaquin River Bridge footings and foundation remains	**Not eligible**
P-10-006317	K1 Powerhouse complex	**Not eligible**
P-10-007142	Historic-era stacked rock features near Kerckhoff Dam	**Not eligible**
P-10-007143	BRM features and a possible pestle	**Unevaluated**
P-10-007144	BRM feature and midden	**Unevaluated**
P-10-007145	Historic-era concrete footings, metal pipes, flats, a ditch, and stacked rock features	**Not eligible**
P-20-000286, FS-05-15-00136	Multicomponent prehistoric, ethnohistorical and historic-era site	**Contributing** TCL 1
P-20-000287, FS-05-15-55-00137	Prehistorical site, partially submerged under Kerckhoff Reservoir	**Contributing** TCL 1 and individually eligible
P-20-000291, FS-05-15-55-00141	Multicomponent prehistorical and historic-era site near Smalley Cove	**Contributing** TCL 1
P-20-000292, FS-05-15-55-00142	Prehistorical partially submerged under Kerckhoff Reservoir	**Contributing** TCL 1 and individually eligible
P-20-000293, FS-05-15-55-00143	Prehistorical site near Smalley Cove	**Contributing** TCL 1 and individually eligible

Resource Number(s)	Description	Current NRHP/CRHR Status
P-20-000294/ P-20-000847, FS-05-15-55-0144	Prehistorical site partially submerged under Kerckhoff Reservoir	**Contributing** TCL 1 and individually eligible
P-20-000360/ P-20-000848, FS-05-15-55-00187	Prehistorical site submerged under Kerckhoff Reservoir	**Contributing** TCL 1
P-20-000849	BRM feature, submerged under Kerckhoff Reservoir	**Contributing** TCL 1
P-20-000850	BRM feature, submerged under Kerckhoff Reservoir	**Contributing** TCL 1
P-20-002375, FS-05-15-55-01199	Prehistorical site partially submerged under Kerckhoff Reservoir	**Contributing** TCL 1 and individually eligible
P-20-003189	Historic-era ditch segments	**Not eligible**
P-20-003190	BRM feature submerged under Kerckhoff Reservoir	**Contributing** TCL 1

BRM = bedrock milling; CRHR = California Register of Historical Resources; NRHP = National Register of Historic Places; TCL = Traditional Cultural Landscape

4.6.3.3 Architectural Study

As part of CUL 1, an architectural study was conducted that included archival research, agency and public outreach, and an architectural reconnaissance survey. The archival study focused on the development of a historical context to evaluate the built environment and included reviews of the PG&E Photo Archives in San Francisco, PG&E Central Engineering Archives in Brisbane, PG&E Facility Archives at the Auberry Service Center, California State Library, California State University Archives and Special Collections, Fresno County Library, Eastern Fresno County Historical Society, and the Fresno-based Pop Laval Collection (which includes a photograph collection of the hydroelectric development of the Kerckhoff Hydroelectric Project). Engineering

periodicals, newspapers, maps, contextual accounts of the development of the hydroelectric industry in California and development of infrastructure in the Sierra Nevada, and previous cultural resources studies completed by PG&E in the region—including the *Archaeological Resources Evaluation Report, Kerckhoff Hydroelectric Project, FERC No. 96 (CUL 1b)* (Cardno 2020)—were also reviewed.

Agency and public outreach included soliciting information from interested parties with knowledge about the built environment in the study area. The following agencies were contacted: USFS-SNF, specifically District Archaeologist Erin Potter and Heritage Program Manager Jeff Irwin; BLM, specifically SJR Gorge Staff Sommer Shaw and Archaeologist Amy Girado. The staff of the Fresno State Special Collections and the Eastern Fresno County Historical Society were also contacted.

The archival review identified five built environment resources that have been previously inventoried and evaluated for the NRHP under Section 106 of the NHPA with the California SHPO concurrence: Kerckhoff Dam and Reservoir (P-10-006316/P-20-003015); K1 Intake Structure and Tunnel (P-10-006264); K1 Powerhouse and Penstocks (P-10-006317); Old SJR Bridge Abutment and Footings (P-20-002192); and SJR Bridge No. 42C-0003. An additional nine historic-era built resources were identified from the archival search that had not been inventoried or evaluated. A field inventory was completed in May 2019 as part of the relicensing study and evaluation efforts for the built environment. Results are documented in the Proposed Project's HPMP for the Proposed Project but do not include the Vista Day Use Area; the new upstream flow gage location; and the Kerckhoff Dam, where gates would be replaced. However, the HPMP provides for provisions for conducting studies prior to starting construction at the Kerckhoff Hydroelectric Project.

All were evaluated as not eligible for listing in the NRHP and CRHR (Table 4.6-3). The California SHPO concurred with these findings on January 9, 2020 (West et al. 2021). Additionally, the California SHPO concurred with PG&E's NRHP determinations of eligibility in a letter dated November 13, 2020. The following resources were determined NRHP eligible: P-20-000287/FS-05-15-55-00137; P-20-000292/FS-05-15-55-00142; P-

20-000294/P-20-000847/FS-05-15-55-00144; and P-20-002375/FS-05-15-55-01199. The following resources were determined to be not eligible for the NRHP: Tramway and Kerckhoff Dam Camp, K1 Powerhouse Complex, stacked rock feature near Kerckhoff Dam, construction remains, and historic-era ditch north of Kerckhoff Reservoir. In a letter dated October 2, 2020, PG&E stated that, in consultation with the CRWG, it identified two TCLs (TCL-1, Tsobotebau, and TCL-2, the North Fork Mono Trail) and determined both sites are NRHP eligible as historic districts. On December 2, 2020, the California SHPO provided concurrence on the eligibility determinations.

Table 4.6-3: Architectural Resources Identified within the Study Area

Resource Name	NRHP/CRHR Status
Kerckhoff Dam and Reservoir	Not eligible
K1 Intake Structure and Tunnel	Not eligible
K1 Powerhouse and Penstocks	Not eligible
Kerckhoff Project Gages	Not eligible
Kerckhoff Dam Wood Storage Building	Not eligible
Kerckhoff Dam Storage Building	Not eligible
K1 Powerhouse Tramway and Hoist House	Not eligible
K1 Warehouse	Not eligible
K1 Communication Building	Not eligible
K1 Cottage No. 2	Not eligible
K1 Incinerator	Not eligible
K1 Transportation Infrastructure	Not eligible
Old SJR Bridge Abutment and Footings	Not eligible
SJR Bridge No. 42C-0003	Not eligible

CRHR = California Register of Historical Resources; No. = number; NRHP = National Register of Historic Places

4.6.3.4 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on cultural resources if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5 (CR-1);
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5 (CR-2); or
- Disturb any human remains, including those interred outside of dedicated cemeteries (CR-3)

4.6.3.5 Environmental Management Measures and Monitoring Plans

PG&E would implement environmental management measures and monitoring plans designed to protect, maintain, and enhance environmental, recreational, and cultural resources over the term of the new FERC license.

Monitoring plans that are relevant to cultural resources management include the Proposed Project's and alternative Recreation Management Plan, Vegetation Management and Pest Control Plan, Project Road and Trail Maintenance Plan, and HPMP. All plans below are included under the Proposed Project, Alternative 1, and Alternative 2.

4.6.3.5.1 Recreation Management Plan

PG&E would implement the Proposed Project's Recreation Management Plan to manage public use of the Proposed Project's recreation resources over the term of the license. The Proposed Project's Recreation Management Plan includes monitoring to estimate recreation use at Proposed Project recreation developments and detect and address potential impacts of Proposed Project recreation use on environmental and cultural resources. PG&E would plan and design developments located on BLM-managed lands, such as the Vista Day Use Area, in consultation with the BLM to meet regional direction, regulations, design, and other applicable standards in place at the design time. PG&E would also prepare a construction plan for approval by the BLM that

includes a description of the measures to avoid potential impacts on sensitive resources (i.e., cultural or Tribal cultural resources). When and where necessary to minimize the potential impacts of Proposed Project-related recreation use on environmental and cultural resources within the Proposed FERC Project Boundary, PG&E would identify and implement appropriate best management practices (BMPs) and avoidance and minimization measures that may be necessary to protect cultural resources and review and incorporate measures contained in other resource management plans (e.g., Proposed Project's HPMP), including new plans that may be developed or existing plans that may be revised during the license term. Every 12 years after re-licensure, PG&E would review the Proposed Project's Recreation Management Plan with agencies and Tribes, as necessary, and, if necessary, revise the plan.

4.6.3.5.2 Vegetation Management and Pest Control Plan

PG&E would implement the Proposed Project's Vegetation Management and Pest Control Plan to define a framework for implementation of invasive weed and pest management and routine vegetation and fuels management within the Proposed Project Area, which could affect cultural and Tribal cultural resources, including culturally significant plant gathering sites. Vegetation management activities include the removal of hazardous trees and use of pesticides in combination with manual vegetation removal around PG&E facilities.

Vegetation management activities have the potential to impact archaeological sites, portions of the NRHP-eligible TCL 1, Tsobotebau, and culturally sensitive plants that contribute to the NRHP-eligible properties through ground disturbance vegetation removal and use of herbicides and pesticides.

To reduce potential direct and indirect impacts to culturally significant plants and trees that contribute to the significance of NRHP-eligible archaeological properties and the setting of cultural resources during routine vegetation management activities, PG&E will coordinate with the CRWG at the annual HPMP meeting and determine the appropriate management protocol. The HPMP prescribes site-specific protection and treatment

measures for each site located with the APE depending on the type of potential impacts from ongoing Proposed Project operations and maintenance.

4.6.3.5.3 Project Road and Trail Maintenance Plan

Paved, gravel, and native soil roadbeds are regularly maintained to access the Kerckhoff Hydroelectric Project and PG&E facilities. Maintenance activities of these Kerckhoff Hydroelectric Project roads include grading, ditch excavation, and culvert replacement, which has the potential to affect cultural resources within the immediate vicinity. Maintenance activities must be reviewed by qualified personnel to determine if the proposed activity would have potential impacts to historic properties and cultural resources.

To reduce potential impacts on historical properties and cultural resources, PG&E would coordinate with the CRWG at the annual HPMP meeting and/or prior to road maintenance activities to determine if the proposed activities have the potential to affect these resources and the appropriate management protocol, if needed. The HPMP prescribes site-specific protection and treatment measures for each site located within the APE depending on the type of potential effect from ongoing Proposed Project operations and maintenance.

4.6.3.5.4 Historic Properties Management Plan

Activities associated with the Proposed Project have the potential to impact known and unknown cultural resources (e.g., unrecorded resources that could be discovered during the term of the proposed new license) within the Proposed FERC Project Boundary that are potentially eligible for inclusion in the CRHR. To mitigate potential adverse effects on cultural resources, PG&E developed the Proposed Project's HPMP (West et al. 2021) as part of the relicensing effort to guide the management of prehistorical and historic-period properties that are listed in, eligible for listing in, or unevaluated for listing in the NRHP during the term of the proposed new license. The Proposed Project's HPMP provides the procedures required to comply with federal and state laws and regulations and conduct consultation with Tribes, agencies, and the California SHPO for the continued management of historical properties under the proposed new license

pursuant to Section 106 of the NHPA. These measures include avoidance, protection, monitoring, and mitigation measures. Furthermore, the HPMP identifies the goals for preserving historic properties, establishes guidelines for routine maintenance and operation, and establishes procedures for consulting with California SHPO, Tribal Historic Preservation Officers (THPOs), Indian Tribes, historic preservation experts, and the public concerning effects to historic properties. Properties that have not been evaluated for listing on the NRHP are to be managed as if they are eligible in the same manner as listed or eligible properties that have been formally evaluated. PG&E developed the Proposed Project's HPMP in consultation with the CRWG. The Proposed Project's HPMP is required to be implemented and provides actions that are required to avoid potential impacts on historical resources and cultural resources that have yet to be evaluated for inclusion in the NRHP or CRHR. Avoidance is the preferred action for all historical properties. The required actions in the Proposed Project's HPMP are summarized below (West et al. 2021).

Summary of General Management Measures from the Historic Properties Management Plan

The following on-site historical property protection actions in the HPMP are required to be implemented as part of any license issuance (West et al. 2021) for the continued operation and maintenance of the project (O&M), which includes the following actions: general repair, replacement of constituent components, electrical and mechanical upgrade and maintenance, and structural and material enforcement, as well as reservoir fluctuation, vegetation management and development, road maintenance, use and construction, project boundary development and emergency repairs. However, these measures do not apply to non-routine projects such as major modifications or additions to project facilities that require immediate action to prevent system damage or personal injury or death. These activities would be addressed individually by PG&E to ensure compliance with Section 106 requirements and would involve its own separate consultation for the proceeding, though the measures in the HPMP would apply to identifying and resolving effects from such activities.

Flag and Avoid. Avoidance is the preferred protection measure for all historical properties. During the planning stage of any undertaking, all work locations for the undertaking should be reviewed by PG&E's Cultural Resources Specialist (CRS) so that historical properties that may be affected can be identified for flag and avoid protection. Qualified personnel will work with the Proposed Project team to adjust the design where possible to avoid cultural resources. If such avoidance is not possible, the CRS will consult with the CRWG to determine the nature of potential impacts and any mitigation necessary at the annual HPMP meeting. Appropriate agencies will be notified of activities, and the appropriate flagging type and duration to mark resources will be determined in discussion with the agency.

Barriers. Barriers, such as fences, boulders, and gates, can be an effective protection measure where the potential impact is the result of access by people, cars, or other machinery. PG&E's CRS will develop any permanent barriers in collaboration with the CRWG and other PG&E resource specialists (e.g., recreation resources, vegetation resources, biological resources such as amphibians, reptiles), who will ensure that the size, extent, and placement of barriers is effective in minimizing impacts from accessing historical properties and that the placement of barriers does not affect cultural resources.

Stabilization and Protection. Some sites within the APE may be subjected to impacts that may be either minimized or eliminated through additional physical management. Such management might include rerouting a trail to avoid an archaeological site, erecting signage or fencing, and/or gating an access road to a particularly sensitive area. PG&E's CRS may develop erosion control measures in collaboration with the CRWG and its vegetation, biological, and recreation specialists. These erosion control measures may include adding a combination of riprap and native rock or plantings of native vegetation (e.g., sedge) where practical to stabilize cultural deposits along the reservoir shoreline or create erosion control features to divert water and run off away from sensitive cultural areas. PG&E will consult with the CRWG to develop appropriate protection measures to address potential impacts. Site condition monitoring may also be implemented to test the effectiveness of stabilization and protection measures.

Site Testing and Data Recovery. Avoidance, barriers, stabilization, and protection are not always possible. When impacts on archaeological sites are unavoidable or unanticipated, PG&E will evaluate any unevaluated resources for the NRHP through a testing or evaluation program (e.g., subsurface testing and archival research). The evaluation plan developed for the *Archaeological Resources Evaluation Report, Kerckhoff Hydroelectric Project FERC Project No. 96 (CUL 1b)* (Cardno 2020) will be used as a framework in developing site-specific testing and evaluation plans. Any archaeological sites determined eligible for the NRHP, for which adverse impacts are unavoidable, will be treated to mitigate the identified impacts. PG&E will consult with the CRWG, including land management agencies, at either the annual HPMP meeting or on a case-by-case basis regarding any determinations of eligibility, analysis of impacts, or proposed treatment measures.

Redesign of Project Facilities and Features. In some instances, impacts may be caused by Proposed Project-related facilities and features such as a system road bisecting a site, a culvert draining onto sensitive archaeological deposits, or a recreation area overlapping with a significant site component. Redesign or modification of these facilities and/or Proposed Project features in coordination with the CRS and stakeholders is a practical and effective way to eliminate a potential impact in such cases.

Additional Studies. Inventory and evaluation of submerged resources within Kerckhoff Reservoir archaeological and ethnographic inventories and evaluations of resources surrounding and within Kerckhoff Reservoir were predominantly conducted during summer and fall 2019 when the Kerckhoff Reservoir was low. However, to fully document and evaluate submerged resources under Criterion D for listing in the NRHP, PG&E intends to conduct surveys and limited testing of the dry lakebed reservoir during any drawdown that results in sufficiently low reservoir levels for enough time to allow such study to be safely completed. These surveys and evaluations, which would occur within five years after license issuance, but may be conducted prior to license issuance, are contingent on the reservoir being maintained at a low level (well below current seasonal lows) for a sufficient amount of time to safely conduct the additional studies

(e.g., no risk of dam releases upstream or sudden filling of the reservoir). These studies will be most successful if planned in coordination with PG&E Kerckhoff Hydroelectric Project operation planned annual outages and regular maintenance activities, which typically occur during naturally low flow periods between September and December. If necessary, PG&E may need to coordinate with Southern California Edition (SCE), which operates hydroelectric projects upstream of Kerckhoff Reservoir, to determine flows into the reservoir. PG&E will consult with the CRWG on the testing plan and schedule for the studies prior to implementation.

Studies to Address FERC Project Boundary Modifications. Approved modifications to the existing FERC Project Boundary after the license issuance may require additional surveys in areas not previously surveyed if additional lands can be safely surveyed. These surveys will be conducted and planned in consultation with the CRWG and landowners. Testing and evaluation of Site P-20-000291/ FS-05-15-55-00141, located within the Smalley Cove Recreation Area, will be conducted to determine site extents and data potential under Criterion D for the NRHP. This site was determined to contribute to TCL-1, Tsobotebau, under Criterion A for the NRHP; however, results regarding individual eligibility under Criterion D were inconclusive during the relicensing study. PG&E, in consultation with the CRWG and the California SHPO, will test and evaluate this site prior to license issuance or within one year of license issuance. If the opportunity to perform the above studies occurs before the license is issued, the studies will be done and considered complete.

Tribal Resources Documentation. Within one year of license issuance, PG&E will complete district and/or site records for TCL-1, Tsobotebau, and TCL-2, North Fork Mono Trail, within the APE. This work may include additional research with the Dumna and BLM regarding the ethnographic trail system, associated ethnobotanically sensitive areas, and archaeological sites located in the SJR Gorge between K1 and K2 powerhouses. This will likely include an update to the SJRGA record to include additional Tribal resources identified during CUL 2. If the opportunity to complete the records occurs before the license is issued, it will be done and considered complete.

Project-Specific Consultation. Where general property protection measures are unable to prevent adverse impacts on historical properties, the CRS will initiate Proposed Project-specific consultation with the CRWG and any other stakeholders. Such consultation will seek to address, avoid, and/or mitigate any adverse impacts on historical properties. If such alternatives cannot be developed through consultation, PG&E will work with stakeholders to develop appropriate mitigation.

Annual Meeting. An annual HPMP implementation meeting will be held within the first quarter of each year. All cultural resources stakeholders (i.e., members of the CRWG) will be invited. The purpose of the annual meeting will be to discuss implementation of the HPMP and other resource management plans for the Proposed Project as they relate to cultural resource management (e.g., Vegetation Management and Pest Control Plan, Recreation Management Plan, Aquatic Resources Plan, and Wildlife Management Plan). This annual meeting will provide a forum and include a field visit, if applicable and desired by CRWG members, to discuss all activities required by the plan and any cultural resource concerns. The timing of the meeting will be scheduled so that annual vegetation management activities can be discussed. The meeting will be accompanied by an annual report that summarizes activities undertaken under the HPMP for the previous year. The meeting may include, but is not limited to, a discussion of the following resource topics:

- HPMP annual report and previous year's activities
- Any monitoring from the previous year
- Exempt and screened activities conducted in previous year
- Any identified impacts and management measures implemented in previous year
- Annual bald eagle nest monitoring results per the Proposed Project's Wildlife Management Plan
- Proposed routine annual operation activities (including vegetation management activities)
- Proposed operational activities with the potential to affect cultural resources
- Any cultural resource concerns or updates
- Any updates to TCLs or existing resources within the Proposed Project APE

- Environmental Sensitive Area maps, developed with tribal input, for distribution to vegetation, recreation, roads, and trail maintenance personnel and contractors
- Protection and/or treatment measures
- Access to tribal resources
- Any updates to the CRWG points of contact
- Opportunities for a site visit, if warranted and requested by members of the CRWG
- Opportunities for cooperation in site stewardship, and
- Opportunities for tribal input on PG&E personnel training materials

Site Condition Monitoring. Site condition data for all cultural resources within the APE were collected during the relicensing studies in 2018 and 2019. These monitoring data will be used as a baseline upon which comparisons of current and ongoing site conditions will be made through periodic monitoring. The proposed monitoring program will be dependent on identified Proposed Project operation activities but will occur at an interval of no less than every three years. Monitoring will occur for all sites that are NRHP eligible or are unevaluated and pending NRHP determinations. Monitoring will be conducted by a qualified archaeologist under the Secretary of the Interior's Professional Qualification Standards (PQS) (36 CFR Part 61) in collaboration with PG&E's CRS. Site condition assessment forms will be used to document specific disturbances, impacts, or other physical alterations observed at any site. Sites will also be photo-documented, as necessary, and appropriate. A non-invasive marker (e.g., a prominent tree) may be used for photographic reference points (photo station) to record an ongoing impact. The locations of photo stations, the compass bearing used to take any photographs, and the subject matter being photographed will be noted on the site condition assessment forms. Additionally, Global Positioning System points and shapes will be taken at photo locations and areas where specific disturbances are observed. Information regarding the results of monitoring will be disseminated in the Annual HPMP Implementation Report for the year of monitoring.

Treatment of Unanticipated Discoveries. Proposed operations, maintenance, and construction activities have the potential to expose and/or damage previously unidentified cultural resources or previously unknown constituents of previously

recorded cultural resources. In the event unanticipated discoveries are made, the following steps should be taken:

All work in the immediate area will cease and all artifacts left in place until PG&E's CRS (or designee) and agency specialist, if on federal land and as appropriate, are able to assess and evaluate the find.

1. If the cultural materials constitute isolated material, or an "isolated find" (e.g., less than five unformed-non-diagnostic artifacts per square meter, isolated formed tools, isolated historical items), PG&E's CRS (or designee) will document the material as such to current National Park Service standards on a Primary Record, and the construction activity may continue without any further consultation. An exception would be for isolated cultural materials or a feature that could be eligible for the NRHP on its own merit following application of the NRHP criteria (e.g., rock art, paleo-period projectile point)
2. If the cultural materials constitute a "site" (e.g., greater than five unformed artifacts per square meter) or an isolated find that may be eligible for the NRHP on its own merit, PG&E's CRS (or designee) will document the property to current National Park Service standards, and the material will be assumed eligible for the NRHP in accordance with 36 CFR 800.13
3. Following documentation, where feasible, measures will be taken to protect newly discovered sites from further disturbance. PG&E's CRS will consult with stakeholders, as appropriate, to seek ways to avoid, minimize, or mitigate potential adverse effects
4. PG&E will notify the California SHPO and Tribes via email within 48 hours of the new site discovery in accordance with 36 CFR 800.13(b)(3). The notification will describe any assessment of NRHP eligibility (either formal or informal) and the recommended actions to be undertaken to resolve potential adverse effects
5. In accordance with 36 CFR 800.13(b)(3), the California SHPO and the Tribes will have 48 hours to respond to the notification of a new site discovery. Any response will be considered by the PG&E, who will assume the lead role as designated by FERC and coordinate with agency leads, as appropriate. If no response is received

within 48 hours, PG&E will assume that no comments are forthcoming, that the California SHPO and Tribes concur with the proposed actions, and that it may proceed with implementing the actions. Following completion of the actions, work in the vicinity of the find may continue

6. Following completion of all construction activities, PG&E will provide California SHPO, Tribes, and agencies, as appropriate, with a report of the actions that were undertaken during construction activities and copies of all field documentation and consultation. This report will describe in detail the isolated finds and potential historical properties (sites) identified during construction activities, describe all measures undertaken to resolve potential adverse effects, and include copies of all consultation documents

Treatment of Human Remains. As addressed in Section 5.3.3 of the HPMP, human remains, graves, and cemeteries that may be encountered during Proposed Project-related activities are protected by state and/or federal law. On privately owned lands, the California Health and Safety Code (7050.5, 7051, 7054) and California Public Resources Code (5097) prohibit damage, defacement, or disinterment of human remains without legal authority and establish civil and criminal penalties. Under federal law, the provisions of ARPA, American Indian Religious Freedom Act, and NAGPRA protect human graves, associated funerary objects, and the free expression of Native American religious beliefs. These statutes extend and are also applicable to anyone who knowingly loots precontact or historical Native American and/or other graves. Human remains and associated funeral artifacts must be treated with respect, and sensitivity must be had towards all interested parties whenever human remains are concerned Accordingly, PG&E if human remains are found on lands administered by BLM, USFS, or Reclamation, they would be treated in accordance with NAGPRA and the federal management agency’s protocols for compliance with NAGPRA. If human remains are discovered on private lands, PG&E would comply with state statutes regarding notifying the appropriate parties and treatment of human remains.

Archaeological and Tribal Resources Site-Specific Management Measures

Section 5.4 of the Proposed Project's HPMP provides detailed site-specific measures for Tribal and archaeological sites within the APE. If new resources are discovered within the APE, the general management measures of inadvertent discoveries would be followed to address any new effects. There are four main types of Tribal resources identified in the Study Area: (1) areas of intense ethnobotanical patterns; (2) areas of ceremony and cultural tradition; (3) TCL 1, which includes a previously documented TCP, contributing elements and associated archaeological sites; and (4) TCL 2, North Mono Trail, which includes various branches of communication, trails, and crossing as part of the larger Mono Trail.

Road maintenance, vegetation management, recreation, reservoir fluctuation, and Proposed Project-related maintenance could affect archaeological and Tribal resources. As discussed above, measures such as flag and avoid, annual meetings, low-level survey, annual site-condition monitoring, and Proposed Project-specific consultation are recommended measures to address any effects from the above activities on archaeological and tribal resources.

Identifying and Evaluating Properties

Pursuant to Section 6.4 of the Proposed Project's HPMP, the CRS must identify any historic properties located within the area of an operation and maintenance activity, which is described above, in accordance with 36 CFR 800.4(a)(2-4) and 36 CFR 800.4(b). Any properties that have not been evaluated, the CRS must conduct such an evaluation or oversee a qualified cultural resources specialist in the evaluation of the property if potential adverse effects cannot be avoided. Any cultural resource investigations would be performed under an appropriate permit and/or approval. For archaeological test or data recovery investigations on federal lands, the CRS or their designated contractor would complete an ARPA permit application and submit it for agency approval prior to initiating the investigation.

4.6.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures and plans were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down-ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied

length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach (PBR) of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cfs for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the PBR cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient[4] storage and powerhouse capacity to meet this requirement.

[4] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.6.4.1 Potential Impacts Related to Historical Resources

Impact CR-1: Would the project cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?

4.6.4.1.1 Proposed Project

Construction

Potential impacts to cultural resources, particularly historical resources, are likely to occur from construction of the Proposed Project. Potential impacts are considered adverse when an activity may alter, directly or indirectly, the characteristics of historical resources listed, or qualified for listing, in the CRHR and the NRHP.

A total of 24 previously and newly recorded sites are located within the study area.[5] Of these, 8 sites are not eligible and do not require further management, 7 sites are individually eligible, and 14 sites are contributing resources to NRHP-eligible TCL 1, Tsobotebau. The California SHPO concurred with these determinations on November 13, 2020. All eligible and contributing and resources, as well as those with

[5] The study area includes the existing FERC Project Boundary plus the area within 200 feet of any Kerckhoff Hydroelectric Project facility that is not within the existing FERC Project Boundary.

unknown eligibility, are subject to management under the HPMP. The site-specific protection and treatment measures for each site are outlined in the HPMP.

In addition to cultural resources four types of Tribal Cultural Resources have been identified in the study area, including: ethnobotanical importance; areas of ceremony and cultural tradition; TCL 1, which includes previously documented traditional cultural places; contributing elements and associated archaeological sites; and TCL 2, North Fork Mono Trail, which includes a network of communication, trails, and crossings. For more information related to Tribal Cultural Resources, see Section 4.19 *Tribal Cultural Resources*.

At least 13 potential ethnobotanical sensitive areas or concentrations of culturally important plants are located within the study area. Of these, seven are located at and surrounding archaeological sites; two are located within TCL 1, Tsobotebau; and four are adjacent to TCL 2, North Fork Mono Trail. The remaining four have not yet been identified as NRHP-eligible properties. The site-specific protection and treatment measures for each area and/or site are outlined in the HPMP.

Potential impacts on historical resources within the study area could occur during construction of the Vista Day Use Area and the installation of one new flow gage upstream of Kerckhoff Reservoir. These activities include paving, installing picnic sites with shade structures and a double-vault restroom, installing signage, refurbishing an existing trail, and other activities that could adversely affect historical resources. However, these areas would be subject to review under the HPMP prior to construction activities taking place, and implementation of the measures within HPMP would be applied to these construction activities.

The retirement of the K1 Powerhouse and the replacement of manually operated gates on Kerckhoff Dam would have no impact on historical resources during construction. As discussed, in a letter dated November 13, 2020, the California SHPO determined that the Kerckhoff Hydroelectric Project facilities are not eligible for listing in the NRHP. Retirement would leave most facilities in place with minimal disturbance and no effect on known historical resources.

Under the Proposed Project, the existing FERC Project Boundary would be modified to remove lands that are not necessary for operation. Historical resources outside of the revised boundary would no longer be managed under the HPMP. However, these resources remain subject to state and federal protections, as well as the protections provided by the jurisdictional oversight from Fresno and Madera counties, the USFS-SNF, and the BLM.

PG&E would implement the Recreation Management Plan, Vegetation Management and Pest Control Plan, Project Road and Trail Maintenance Plan, and the HPMP, including flag-and-avoid procedures and archaeological monitoring. PG&E would comply with requirements from the BLM and USFS-SNF during ground-disturbing activities and would consult and obtain approval from appropriate agencies prior to activities that could result in impacts. In the event of an inadvertent discovery of historical resources, work would cease immediately, appropriate parties would be notified, and treatment measures would be developed in consultation with the California SHPO, Tribes, and other consulting parties, as appropriate.

In addition, the Proposed Project's Recreation Management Plan requires PG&E to prepare a construction plan that includes a description of measures to avoid potential impacts on historical resources. Furthermore, the Proposed Project's HPMP includes development of a cultural resource monitoring plan. Therefore, there would be **Less than Significant Impact** as a result of construction under the Proposed Project for potential impact CR-1.

Operation

Under Proposed Project operation, potential impacts on historic resources within the study area could occur as a result of proposed modifications to the existing FERC Project Boundary and ongoing recreational and maintenance activities.

Pursuant to the Proposed Project's HPMP, avoidance is the preferred management method for all historic properties. However, if avoidance is not possible, PG&E would consult with the CRWG, land management agencies, and the California SHPO to determine appropriate mitigation measures. Potential measures include: stabilization

and protection, site testing and data recovery, redesign of Proposed Project facilities and features, and additional studies.

Maintenance activities, including road and trail grading, paving, and accessibility improvements could adversely affect cultural resources. The HPMP provides guidance for routine operation and maintenance activities, vegetation management, hazard tree removal, and treatment of unanticipated discoveries. Ongoing maintenance at Smalley Cove Recreation Area and at the proposed Vista Day Use Area could adversely affect cultural resources. Shoreline recreational activities may also increase public access, resulting in potential vandalism, looting or degradation of site integrity. The HPMP requires PG&E to coordinate with the CRWG at the annual HPMP meeting and/or prior to recreation management planning to determine whether planned activities may have the potential to affect these resources and determine the appropriate management protocols.

The HPMP also includes measures to protect historic properties during reservoir fluctuations. PG&E would implement proactive monitoring, update site inventories, as needed, and report results annually to the CRWG. All site condition assessments would be conducted by a qualified archaeologist who meets the Secretary of the Interior's Professional Qualification Standards pursuant to 36 CFR Part 61, in coordination with PG&E's CRS.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact CR-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.6.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination as the Proposed Project, as discussed in Section 4.6.4.1.1. Construction activities under Alternative 1 would be the same as those described for the Proposed Project and would not introduce any additional ground disturbing activities. In addition, the Proposed Project's HPMP would provide measures to protect historic properties during construction. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 1 for potential impact CR-1.

Operation

Based on the Alternative 1 operations modeling results (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), operations would modify the magnitude and timing of flows released from Kerckhoff Dam through implementation of the LTOR boating flows and associated down-ramping measures, as well as the Alternative 1 Ramp Up Measure. These operational changes could result in short-term fluctuations in Kerckhoff Reservoir water surface elevations and controlled flow transitions in the PBR, which have the potential to temporarily expose historical resources that are usually underwater. These fluctuations would remain in existing normal operational range of 980.0 feet msl to 984.5 feet msl and within areas already subject to periodic inundation and exposure, repeated water level changes could contribute to shoreline erosion and temporarily expose historical resources that are typically submerged. However, these effects on historic resources are consistent with those discussed in the Proposed Project.

As discussed in the Proposed Project, there would be measures to minimize the effects on historic resources as a result of implementation of Alternative 1. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 1 for potential impact CR-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.6.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction impacts as the Proposed Project, discussed in Section 4.6.4.1.1. Construction activities under Alternative 2 would be the same as those described for the Proposed Project and would not introduce additional ground-disturbing activities or construction-related erosion risks to historic properties. In addition, the Proposed Project's HPMP would provide measures to protect historic properties during project construction. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 2 for potential impact CR-1.

Operation

Alternative 2 would have similar operational impacts when compared to the Proposed Action. Based on the Alternative 2 operations modeling results (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), implementation of Alternative 2 would result in limited and episodic erosion effects within the Area of Analysis. The Modified EOS Flow Recession Measure resulted in drawdown of Kerckhoff Reservoir toward the K2 Powerhouse minimum operating reservoir elevation, producing short-term reservoir elevation fluctuations; however, all modeled fluctuations remained within the normal operating range of Kerckhoff Reservoir (approximately 980.0 to 984.5 feet msl).

The Subsequent Spill Ramp Down Measure, Modified Spill Season Flow Measure, and POM ramp-down components employed more gradual ramping schedules and were successfully implemented with minimal or no sustained reservoir fluctuations. Although

the POM Initial Release Protocol could potentially alter the timing of flow changes in the PBR, it did not create conditions that would substantially increase erosion potential.

The Proposed Project Area has historically experienced frequent hydrologic variability associated with operations and regional inflow conditions. Accordingly, Alternative 2 operations could result in repeated water level changes could contribute to shoreline erosion and temporarily expose historical resources that are typically submerged. However, these effects on historic resources are consistent with those discussed in the Proposed Project on historic resources and generally consistent with baseline conditions.

As discussed in the Proposed Project, there would be measures to minimize the effects on historic resources as a result of implementation of Alternative 2. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 2 for potential impact CR-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.6.4.2 Potential Impacts Related to Archaeological Resources

Impact CR-2: Would the Project cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?

4.6.4.2.1 Proposed Project

Construction

Construction of the Proposed Project has the potential to affect archaeological resources. Impacts are considered adverse if an activity directly or indirectly alter the characteristics of an archaeological resource that is listed in, or eligible for listing in, the CRHR or the NRHP.

A total of 24 previously and newly recorded archaeological sites have been identified within the study area. Of these, eight sites are not eligible and do not require further management, seven sites are individually eligible for listing, and the remainder contribute to NRHP-eligible TCL 1, Tsobotebau. On November 13, 2020, the California SHPO concurred with these determinations. Archaeological sites determined eligible, contributing, or of unknown eligibility require management under the HPMP, which includes site-specific protection and treatment measures.

In addition to cultural resources four types of Tribal Cultural Resources have been identified in the study area, including: ethnobotanical importance; areas of ceremony and cultural tradition; TCL 1, which includes previously documented traditional cultural places; contributing elements and associated archaeological sites; and TCL 2, North Fork Mono Trail, which includes a network of communication, trails, and crossings. For more information related to Tribal Cultural Resources, see Section 4.19 *Tribal Cultural Resources*.

At least 13 ethnobotanically sensitive areas or concentrations of culturally important plants are located within the study area. Seven of these are associated with archaeological sites, two occur within TCL 1, and four are adjacent to TCL 2. The remaining four have not been identified as NRHP-eligible properties. Site-specific protection and treatment measures for these areas are also addressed in the HPMP.

The retirement of the K1 Powerhouse and replacement of manually operated gates at Kerckhoff Dam would not affect archaeological resources during construction. The California SHPO determined that the Kerckhoff Hydroelectric Project facilities are not eligible for listing in the NRHP on November 13, 2020. Retirement activities would leave most facilities in place, with minimal disturbance and no effect on known archaeological resources.

Under the Proposed Project, the existing FERC Project Boundary would be modified to remove lands not required. Archaeological resources located outside the revised Project Boundary would no longer be subject to management and protection measures under the FERC license, including the HPMP. However, such resources would remain subject

to applicable state and federal regulations, as well as protections provided by jurisdictions such as Fresno and Madera counties, the USFS-SNF, and the BLM.

Construction-related activities, particularly for the development of the Vista Day Use Area and installation of a new flow gage upstream of Kerckhoff Reservoir have the potential to adversely affect archaeological resources. These activities include paving, installation of picnic facilities (shade structures and a double-vault restroom), signage installation, trail refurbishment, and other ground-disturbing activities outside previously developed areas. Such activities could disturb archaeological deposits. However, these areas would be subject to review under the HPMP prior to construction activities taking place, and implementation of the measures within HPMP would be applied to these construction activities. In contrast, retirement of the K1 Powerhouse and replacement of manually operated gates at Kerckhoff Dam would not affect archaeological resources during construction.

Construction of the Vista Day Use Area would occur on BLM land and must comply with all applicable BLM requirements for the protection of archaeological resources. The HPMP includes measures to protect archaeological resources during construction, such as flag-and-avoid procedures, archaeological monitoring, and provisions for the treatment of unanticipated discoveries. The HPMP also requires consideration of the potential for exposure of archaeological resources, implementation of a proactive monitoring program, and development of site-specific protection and treatment measures.

If a proposed activity cannot avoid an adverse effects, treatment would be based on the nature and extent of the effect and may include avoidance and protection, data recovery, or interpretation. PG&E would develop a treatment plan in consultation with the California SHPO and the CRWG, as appropriate.

The Recreation Management Plan requires PG&E to prepare a construction plan that includes measures to avoid impacts on archaeological resources. With implementation of these measures, including those specified in the HPMP, potential impacts to archaeological resources during construction would be avoided or minimized.

Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact CR-2.

Operation

Under Proposed Project operation, potential impacts on archaeological resources within the study area could occur as a result of modifications to the existing FERC Project Boundary and ongoing recreation and maintenance activities.

Operation and maintenance activities have the potential to adversely affect archaeological resources. Road and trail maintenance activities such as grading, paving, replacement of control features, and vegetation management could disturb archaeological resources located within or adjacent to Project roads and trails. Maintenance and upgrades at Smalley Cove Recreation Area and the proposed Vista Day Use Area, including utility replacement, paving, and construction of accessible features, could also result in ground disturbance affecting archaeological deposits. Shoreline recreation activities at Kerckhoff Reservoir, including the creation and maintenance of boat-in access points, may increase public access and result in potential impacts such as looting, vandalism, or degradation of site integrity.

The HPMP requires PG&E to coordinate with the CRWG to evaluate whether proposed activities could affect archaeological resources and to identify appropriate management measures. The HPMP also includes provisions addressing reservoir fluctuations, including monitoring for exposure of archaeological resources, protection measures to address looting and erosion, and procedures to update site inventories as needed.

In addition, the HPMP provides for the protection of archaeological resources during operation and maintenance activities, including measures for electrical and communication maintenance, vegetation management, and hazard tree removal. The HPMP also includes provisions for the treatment of unanticipated discoveries encountered during these activities.

Pursuant to the HPMP, avoidance is the preferred management approach for all archaeological resources. Where avoidance is not feasible, PG&E would consult with

the CRWG, applicable land management agencies, and the California SHPO to determine appropriate treatment measures. Such measures may include stabilization and protection, archaeological testing and data recovery, redesign of Proposed Project features, or additional study.

With implementation of these measures, including avoidance, monitoring, consultation, and treatment as outlined in the HPMP, potential adverse effects on archaeological resources during Project operation would be avoided or minimized. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact CR-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.6.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination as the Proposed Project, as discussed in Section 4.6.4.2.1. Construction activities under Alternative 1 would be the same as those described for the Proposed Project and would not introduce any additional ground disturbing activities. In addition, the Proposed Project's HPMP would provide measures to archaeological resources during project construction. Therefore, there would be a **Less than Significant Impact** as a result of construction under Alternative 1 for potential impact CR-2.

Operation

Similar to the Proposed Project, Alternative 1 would result in fluctuating water levels in the Kerckhoff Reservoir, thus having the potential to affect archaeological resources located in and adjacent to the reservoir.

Based on the Alternative 1 operations modeling results (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), operations would modify the magnitude and timing of flows released from Kerckhoff Dam through implementation of the LTOR boating flows and associated down-ramping measures, as well as the Alternative 1 Ramp Up Measure. These operational changes could result in short-term fluctuations in Kerckhoff Reservoir water surface elevations and controlled flow transitions in the PBR, which have the potential to temporarily expose historical resources that are usually underwater. These fluctuations would remain in existing normal operational range of 980.0 feet msl to 984.5 feet msl and within areas already subject to periodic inundation and exposure, repeated water level changes could contribute to shoreline erosion and temporarily expose historical resources that are typically submerged. However, these effects on archaeological resources are consistent with those discussed in the Proposed Project.

As discussed in the Proposed Project, there would be measures to minimize or avoid the effects on archaeological resources as a result of implementation of Alternative 1. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 1 for potential impact CR-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.6.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination as the Proposed Project, as discussed in Section 4.6.4.2.1. Construction activities under Alternative 2 would be the same as those described for the Proposed Project and would not introduce any additional ground disturbing activities. In addition, the Proposed Project's HPMP would

provide measures to archaeological resources during project construction. Therefore, there would be a **Less than Significant Impact** as a result of construction under Alternative 2 for potential impact CR-2.

Operation

Based on the Alternative 2 operations modeling results (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), implementation of Alternative 2 would result in limited and episodic erosion effects within the Area of Analysis consistent with baseline conditions. The Modified EOS Flow Recession Measure resulted in drawdown of Kerckhoff Reservoir toward the K2 Powerhouse minimum operating reservoir elevation, producing short-term reservoir elevation fluctuations; however, all modeled fluctuations remained within the normal operating range of Kerckhoff Reservoir (approximately 980.0 to 984.5 feet msl).

The Subsequent Spill Ramp Down Measure, Modified Spill Season Flow Measure, and POM ramp-down components employed more gradual ramping schedules and were successfully implemented with minimal or no sustained reservoir fluctuations. Although the POM Initial Release Protocol altered the timing of flow changes in the PBR, it did not create conditions that would substantially increase erosion potential as compared with baseline conditions.

The Proposed Project Area has historically experienced frequent hydrologic variability associated with operations and regional inflow conditions. Accordingly, Alternative 2 operations could result in repeated water level changes could contribute to shoreline erosion and temporarily expose archaeological resources that are typically submerged. However, these effects on archaeological resources are consistent with those discussed in the Proposed Project on archaeological resources and less than significant as compared with baseline conditions.

As discussed in the Proposed Project, there would be measures to minimize the effects on historic resources as a result of implementation of Alternative 2. Therefore, there

would be a **Less than Significant Impact** as a result of operational activities under Alternative 2 for potential impact CR-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.6.4.3 Potential Impacts Related to Human Remains

Impact CR-3: Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

4.6.4.3.1 Proposed Project

Construction and Operation

No human remains are known to exist in the study area based on record searches and cultural resources investigations for the Proposed Project.

Construction activities associated with the Proposed Project may include ground-disturbing activities such as grading, excavation, trenching, and installation of utilities, which have the potential to encounter previously unknown human remains. If human remains are present within the APE, inadvertent disturbance could occur during ground-disturbing activities, potentially resulting in damage to the remains or associated funerary objects.

During operation, fluctuating water levels and increased recreational access could expose potential expose previously submerged human remains within the reservoir fluctuation zone or adjacent upland areas. However, the likelihood of such discoveries is considered low given the disturbed nature of the Proposed Project Area and the absence of known burial sites.

The Proposed Project's HPMP requires PG&E to comply with state and federal law regarding human remains and associated or unassociated funerary objects discovered during any ground-disturbing activity or maintenance activities. In accordance with the California Health and Safety Code, the construction contractor would immediately halt within the burial area and a 100-foot buffer and notify the county coroner and a qualified professional archaeologist to determine the nature of the remains. The coroner would examine all discoveries of human remains within 48 hours of receiving notice, in accordance with Section 7050(b) of the Health and Safety Code.

If the coroner determines that the remains are those of a Native American, the corner would notify the Native American Heritage Commission (NAHC) by phone within 24 hours (Health and Safety Code Section 7050(c)). After the coroner's findings are presented, the county, the archaeologist, and the NAHC-designated Most Likely Descendent would determine the ultimate treatment and disposition of the remains and take appropriate steps to ensure that additional human interments are not disturbed.

With implementation of measures outlined in the HPMP, which include avoidance, monitoring, consultation, and treatment, potential adverse effects on human remains during Project construction and operation would be avoided or minimized. Therefore, there would be a **Less than Significant Impact** as a result of construction and operational activities under the Proposed Project for potential impact CR-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.6.4.3.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Construction activities under Alternative 1 would be identical to those of the Proposed Project and would involve similar types of ground disturbance as the Proposed Project.

Based on the Alternative 1 operations modeling results (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), operations would modify the magnitude and timing of flows released from Kerckhoff Dam through implementation of the LTOR boating flows and associated down-ramping measures, as well as the Alternative 1 Ramp Up Measure. These operational changes could result in short-term fluctuations in Kerckhoff Reservoir water surface elevations and controlled flow transitions in the PBR, which have the potential to incrementally influence erosion conditions within the Area of Analysis.

Modeling results indicate that implementation of the Spill Year Boating Flows and Down-Ramping of Spill Flows Measure would result in small but frequent reservoir elevation fluctuations as flows are gradually reduced. These fluctuations would remain within the normal operating range of Kerckhoff Reservoir (approximately 980.0 to 984.5 feet msl), with most variability occurring within a narrow elevation band, and would occur for a limited number of days each year depending on WY type. While repeated short-term fluctuations could incrementally increase erosion potential along reservoir shorelines compared to baseline conditions, these effects would be episodic, limited in magnitude, and confined to areas historically exposed to operational water level changes.

Operation measures under Alternative 1 would involve changes to spill recession and flow ramping; however, these measures would not involve ground disturbance or activities that could expose buried human remains. Changes in reservoir elevation and flow conditions would occur within the existing operational range and would not create new exposure pathways for human remains.

With implementation of measures outlined in the HPMP, which include avoidance, monitoring, consultation, and treatment, potential adverse effects on human remains during Project construction and operation would be avoided or minimized. Therefore, there would be a **Less than Significant Impact** as a result of construction and operational activities under Alternative 1 for potential impact CR-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.6.4.3.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Construction activities under Alternative 2 would be the same as those described for the Proposed Project in Section 4.6.4.3.1. As such, the potential for inadvertent discovery of human remains would be unchanged.

Based on the Alternative 2 operations modeling results (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), implementation of Alternative 2 would result in limited and episodic erosion effects within the Area of Analysis. The Modified EOS Flow Recession Measure resulted in drawdown of Kerckhoff Reservoir toward the K2 Powerhouse minimum operating reservoir elevation, producing short-term reservoir elevation fluctuations; however, all modeled fluctuations remained within the normal operating range of Kerckhoff Reservoir (approximately 980.0 to 984.5 feet msl).

The Subsequent Spill Ramp Down Measure, Modified Spill Season Flow Measure, and POM ramp-down components employed more gradual ramping schedules and were successfully implemented with minimal or no sustained reservoir fluctuations. Although the POM Initial Release Protocol altered the timing of flow changes in the PBR, it did not create conditions that would substantially increase erosion potential.

The Proposed Project Area has historically experienced frequent hydrologic variability associated with operations and regional inflow conditions. Accordingly, while Alternative 2 operations could result in localized and short-term changes in erosion potential, erosion conditions are not expected to further degrade compared to baseline conditions.

Operation measures under Alternative 2 would modify spill patterns, ramping rates, and flow releases; however, these actions would not involve ground disturbance and would not increase the likelihood of disturbing buried human remains. Although reservoir elevations and downstream water levels may fluctuate, these changes would not constitute a mechanism for exposing or disturbing human remains beyond existing baseline conditions.

With implementation of measures outlined in the HPMP, which include avoidance, monitoring, consultation, and treatment, potential adverse effects on human remains during Project construction and operation would be avoided or minimized. Therefore, there would be a **Less than Significant Impact** as a result of construction and operational activities under Alternative 2 for potential impact CR-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.6.5 Literature Cited

Beebe, R.M., and R.M. Senkewicz. 2001. Lands of Promise and Despair: Chronicles of Early California, 1535-1846. Berkeley: Heyday Books.

BLM (United States Bureau of Land Management). 2014. *Bakersfield Field Office Record of Decision and Approved Resource Management Plan.* United States Department of the Interior, Bureau of Land Management. December. Accessed: April 3, 2026. Retrieved from: https://www.govinfo.gov/content/pkg/GOVPUB-I53-PURL-gpo83734/pdf/GOVPUB-I53-PURL-gpo83734.pdf

California Missions Foundation. 2023. The California Missions. Accessed: April 5, 2026. Retrieved from: https://californiamissionsfoundation.org/the-california-missions/

California Secretary of State. 2023. Deseños Collection. Accessed: April 5, 2026. Retrieved from: https://www.sos.ca.gov/archives/collections/disenos-collection

Cardno. 2020. *Archaeological Resources Evaluation Report, Kerckhoff Hydroelectric Project FERC Project No. 96 (CUL 1b)*. Prepared for Pacific Gas and Electric Company.

FERC (Federal Energy Regulatory Commission). 2025. *Environmental Assessment for Hydropower License for the Kerckhoff Hydroelectric Project*. December. Accessed: April 5, 2026. Retrieved from: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20251231-3001&optimized=false&sid=e4353735-bc31-414a-8938-299c96575f03.

Fredrickson, D.A. 1974. "Cultural Diversity in Early Central California: A View from the North Coast Ranges." *Journal of California Anthropology*, Vol. 1(1): 41-53.

Fresno County. 2024. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February 2024. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf

Gutierrez, R.A. and R.J. Orsi. 1998. *Contested Eden: California before the Gold Rush*. Berkley, California: University of California Press

Hezier, Robert F. and M.A. Whipple. 1971. The California Indians: A Source Book. Berkely: University of California Press.

Hulaniski, F.J. 1917. *The History of Contra Costa County, California*. The Elms Publishing Company, Inc., Berkeley.

Hull, K.L. 2007. T*he Sierra Nevada: Archaeology in the Range of Light*. In California Prehistory: Colonization, Culture, and Complexity, edited by T. L. Jones and K. Klar, pp. 177–190. AltaMira Press, Walnut Creek.

Kroeber, A.L. 1925. "*Handbook of the Indians of California*." Bureau of American Ethnology Bulletin, Vol. 78: 1–995. (Facsimile reprint 1966, California Book Company, Ltd., Berkeley.)

Lech, S. 2004. *Along the Old Roads, A History of the Portion of Southern California that became Riverside County, 1772–1893*. Published by the author.

Madera County. 1995. *Madera County General Plan Policy Document.* Adopted October 24. Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/40825/638615574804870000.

Military Museum. 2023. Historic California Posts, Camps, Stations and Airfields: Fort Miller. Accessed: April 5, 2026. Retrieved from: https://www.militarymuseum.org/FtMiller.html.

Moratto, M.J. 1984. *California Archaeology*. Academic Press, Orlando, FL.

Moratto, M.H. 2004. *California Archaeology* with new introduction by Moratto (Michael). Collins Books. Coyote Press, Salinas, CA.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding "Kerckhoff: Prefilling Meeting & CEQA Discussion," on January 13, 2026.

PG&E (Pacific Gas and Electric Company). 2020. *Technical Study Report (TSR-14) Cultural Resources, Historic-Era Built Environment Inventory and Evaluation (CUL 1c)*.

Rosenthal, J.S., G.G. White, and M.Q. Sutton. 2007. The Central Valley: A View from the Catbird's Seat. California Prehistory, Colonization, Culture, and Complexity. Edited by Terry L. Jones and Kathryn A. Klar. pp. 147–164. AltaMira Press, Lanham.

USFS (United States Forest Service). 2023. *Land Management Plan for the Sierra National Forest. Fresno, Madera, and Mariposa Counties, California*. Accessed: April 3, 2026. Retrieved from: https://acconsensus.org/wp-content/uploads/2024/08/05-SNF_LMP_final_20230504_Web.pdf.

Varner, D.M. 1983. Applied archaeology on the San Joaquin River: the Kerckhoff Project, Madera, County, California. Prepared for Pacific Gas and Electric Company, San Francisco, California.

West, C., P. Allen, and M. Tiley. 2021. *Final Historic Properties Management Plan. Kerckhoff Hydroelectric Project, Fresno and Madera Counties, CA, FERC Project*

No. 96. Pacific Gas and Electric Company. Final June. Prepared by Cardno for Pacific Gas and Electric Company, San Francisco, California. June.

Wisely, J., R. Johnson, and C. West. 2020. *Volume V, Appendix A: Archaeological Resources Survey Report from TSR-04, Cultural Resources, Archaeological Resources (Study CUL 1a), Kerckhoff Hydroelectric Project, FERC Project No. 96*. Prepared by Cardno for Pacific Gas and Electric Company, San Francisco, California.

4.7 ENERGY

This section describes existing conditions and analyzes potential impacts on energy from implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts on energy from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.7-1).

Table 4.7-1: CEQA Checklist for Energy

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact EN-1: Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Impact EN-2: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	No Impact	No Impact	No Impact

4.7.1 Environmental Setting

4.7.1.1 Electricity and Gas

In 2024, California was the fourth largest electricity producer in the nation, but also the nation's second largest importer of electricity, receiving roughly one-fifth to one-third of its supply from outside the state. In the same year, California had the second highest energy consumption in the nation, but the third lowest per capita energy consumption. In 2024, California was also the nation's second highest producer of conventional hydroelectric power generation (EIA 2025). Approximately 57 percent of electricity generation was from renewable sources in 2024.

In 2024, the transportation sector accounted for roughly 42 percent of California's total energy consumption, with the industrial sector accounting for roughly 22 percent. Residential and commercial end-use sectors had similar consumption, accounting for roughly 17 percent of the state energy usage each (EIA 2025).

Fresno and Madera counties are mostly serviced by Pacific Gas and Electric Company (PG&E or Applicant). The California Energy Commission (CEC) published that in 2024, the total electricity consumption in Fresno County was approximately 8,000 gigawatt hours with the residential and commercial sectors responsible for approximately 39 percent and 32 percent, respectively (CEC 2025a). In 2024, Madera County consumed approximately 1,700 gigawatt hours of electricity; the residential and commercial sectors were the largest consumers (30 percent and 21 percent, respectively) (CEC 2025a). Additionally, in 2024, the total gas consumption for Fresno County was 3.0×10^{13} British thermal units (Btu) and 5.1×10^{12} Btu for Madera County (CEC 2025a).

In 2024, approximately 23 percent of PG&E's total energy deliveries were sourced from Eligible Renewable Resources (PG&E 2025a), as shown in Table 4.7-2.

Table 4.7-2: Composition of PG&E's 2023 Total Eligible Renewable Resource

Source	Percent of Bundled Retails Sales
Biomass and Waste	3
Geothermal	0
Wind	4
RPS-eligible hydroelectric	1
Solar	14
Total	23

Source: PG&E 2025a

RPS = Renewables Portfolio Standard

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is one such producer of hydroelectric power that consists of the Kerckhoff Reservoir formed by Kerckhoff Dam, the Kerckhoff 1 (K1) and Kerckhoff 2 (K2) powerhouses, two tunnels that convey water from the reservoir to the powerhouses, auxiliary facilities, and access roads. The Kerckhoff Hydroelectric Project has an authorized installed capacity of 162.72 megawatts.

PG&E ceased operations of the K1 Powerhouse in 2017 and thusly under baseline conditions does not contribute to energy generation. The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by PG&E, and on public lands administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and United States Bureau of Reclamation (Reclamation) under BLM management.

4.7.1.2 Transportation Fuels

Eighty-six percent of petroleum consumed in California is used in the transportation sector (EIA 2025); the industrial sector is the second largest consumer at approximately 10 percent. Gasoline and diesel, both petroleum-derived products, are the two most common fuels used for land vehicle travel. California accounts for roughly 9 percent of the nation's petroleum consumption (EIA 2025).

California ranks third in the nation for petroleum-refining capabilities, often operating near or at maximum capacity due to high demand. California requires all motorists to use a specific blend of motor gasoline, called California Reformulated Gasoline, to reduce emissions (EIA 2025). In 2024, the CEC estimated that 378 and 63 million gallons of gasoline were sold in Fresno and Madera counties, respectively. This is in addition to the estimated 82 and 44 million gallons of diesel fuel sold in 2024 for the same counties (CEC 2025b).

4.7.2 Regulatory Background

The following subsections contain an overview of regulations related to energy.

4.7.2.1 Federal

4.7.2.1.1 Federal Power Act

The Federal Power Act (Title 16 United States Code [USC] Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created the Federal Energy Regulatory Commission (FERC) and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations [CFR] Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.7.2.1.2 National Energy Conservation Policy Act of 1978

The National Energy Conservation Policy Act (42 USC Section 8201 et seq.) provides the underlying authority for federal management goals and requirements concerning the conservation of energy. This act serves to promote the federal government and suppliers of energy to increase efficiency and reduce the demand for nonrenewable sources such as oil.

4.7.2.1.3 National Energy Policy Act of 2005

The National Energy Policy Act of 2005 (42 USC Section 13201 et seq.) seeks to reduce the national reliance on nonrenewable energy resources, increase energy efficiency, and promote the use of hydropower and geothermal energy. This act provides pathways to reach its goal such as providing loan guarantees to entities that develop or use innovative technologies, as well as tax incentives and subsidies for energy conservation improvements. It also increases the mix of biofuels into gasoline sold in the United States.

4.7.2.1.4 Energy Independence and Security Act of 2007

The Energy Independence and Security Act, signed December 2007, aims to move the United States toward a greater energy independence, increase efficiency of buildings and vehicles, reduce petroleum use by setting new automobile efficiency standards, and increase the availability of renewable energy.

4.7.2.1.5 United States Environmental Protection Agency

The United States Environmental Protection Agency (USEPA) has different emission regulations and standards for all types of off-road compression-ignition (diesel) engines used in vehicles and construction equipment. These include engines used in excavators and forklifts; utility equipment such as generators, pumps, and compressors; marine engines; and aircraft engines depending on engine tier. Standards and regulations mainly apply to designers and manufacturers of off-road and heavy equipment engines (USEPA 2025).

4.7.2.1.6 United States Forest Service

The United States Forest Service (USFS) uses the direction in the revised *Land Management Plan for the Sierra National Forest* (USFS 2023), pursuant to the 2012 Forest Service Planning Rule (36 CFR 219), to guide its decisions regarding the relicensing of the Proposed Project and the development of associated license conditions. This plan is intended to identify the desired long-term conditions and provide guidance on achieving those conditions. The revised land management plan includes goals and standards related to energy use that are applicable to the Proposed Project:

- **NRG-FW-GOAL 01:** Encourage licensee acquisition of private lands within areas withdrawn by FERC where beneficial for resource protection
- **NRG-FW-GOAL 02:** When new hydroelectric developments are proposed, or relicensing occurs on existing developments, forest personnel will coordinate with project proponents and the California Department of Fish and Wildlife to ensure associated fish, wildlife, and plant habitats and resources are maintained near current levels on new proposals and improved where needed on relicense proposals

4.7.2.2 State

4.7.2.2.1 Warren-Alquist Act

The Warren-Alquist Act (Public Resources Code [PRC] Section 25000 et seq.) established the CEC in 1974 in response to the state's growing demand for energy resources. The CEC serves as the state's primary energy policy and planning agency. This act, updated every year, established a state policy to reduce wasteful and unnecessary uses of energy.

4.7.2.2.2 State of California Integrated Energy Policy

The CEC is required under PRC Section 2530(a) to develop an integrated plan for electricity, natural gas, and transportation fuels every two years. The CEC conducts assessments and forecasts all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices. The results are provided in the *Integrated Energy Policy Report*, most recently published in 2023; the 2025 report is under development (CEC 2025c). The overall goal is to provide policy recommendations to improve energy efficiency and reduce greenhouse gas (GHG) emissions statewide.

4.7.2.2.3 California Renewables Portfolio Standard

California's Renewables Portfolio Standard (RPS) program was established in 2002 by Senate Bill (SB) 1078 to mandate that utilities deliver a percentage of electricity from renewable sources. The initial requirement called for 20 percent of electricity retail sales to be served by renewable resources by 2017. In 2015, SB 350 increased the RPS

mandate to 50 percent by 2030 and required 65 percent RPS for long-term contracts of 10 years or more. In 2018, SB 100 again increased the RPS to 60 percent by 2020 and mandated 100 percent of the state's electricity to come from eligible renewable or carbon-free resources by the end of 2045 (California Public Utilities Commission 2025). PG&E's voluntary goal is to deliver 70 percent RPS clean electricity by 2030, which is above the compliance obligation. In 2023, approximately 32 percent of PG&E's delivered electricity came from RPS-eligible sources, including solar (20 percent), wind (6 percent), geothermal (0.3 percent), small hydroelectric (3 percent), and various forms of bioenergy (3 percent) (PG&E 2025b).

4.7.2.2.4 State Greenhouse Gas Regulations

In 2002, the California legislature passed Assembly Bill (AB) 1493, recognizing that global warming is a public health concern. It identified motor vehicles as a major source of GHG and that reducing emissions would protect public health and the environment. This bill required the California Air Resources Board (CARB) to adopt regulations to reduce GHG emissions from passenger vehicles beginning in 2009. On November 17, 2022, CARB approved amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation aimed at further reducing emissions from the off-road sector. The CARB standards for off-road vehicles (excluding locomotives, aircraft, waterborne vessels, portable equipment, and agriculture) require that the oldest and highest polluting off-road diesel vehicles with Tier 1 or 2 engines be phased out to reduce nitrogen oxide (NO_X) and particulate matter emissions; prohibit the addition of high-emitting vehicles to a fleet; and require the use of R99 or R100 renewable diesel in off-road diesel vehicles. The amendments began in 2024 and will continue through the end of 2036 and include changes to enhance enforceability and encourage the adoption of zero-emission technologies (CARB 2022).

On June 1, 2005, Executive Order S-3-05 was signed, setting GHG reduction targets for the state with an ultimate reduction of 80 percent to pre-1990 levels by 2050. The state then followed with the passing of AB 32, Global Warming Solution Act of 2006. This required a sharp reduction of GHG emissions to improve the environment and natural resources while maintaining the economy.

4.7.2.3 Local

4.7.2.3.1 San Joaquin Valley Air Pollution Control District

The San Joaquin Valley Air Pollution Control District (Valley Air District), formed in 1991, has jurisdiction over all point and area sources (except for mobile sources, consumer productions, and pesticides) in the San Joaquin Valley Air Basin, a 27,000-square mile, 8-county area. The Valley Air District's primary approach to implementing air quality plans is to adopt rules and regulations reviewed by CARB that regulate emissions from construction activities and stationary sources (Valley Air District 2025).

4.7.2.3.2 Fresno Council of Governments

The Fresno County General Plan includes goals related to energy use and utilities in the Public Services and Services Element (Fresno County 2024). Priorities related to energy use in the General Plan include energy conservation, use of renewable energy, energy efficiency and renewable energy upgrades of existing residences, reducing energy demand during extreme heat events, ensuring climate resilience of energy infrastructure, and efficiency in transportation design plan (Fresno County 2024).

4.7.2.3.3 Madera County General Plan

The Air Quality Element of the Madera County General Plan aims to incorporate state and federal regulatory policies into the policies and objectives set forth by the county (Madera County 2010). This plan covers goals to address air quality as related to energy expenditure. Madera County Air Quality Policy E1 promotes the increased use of energy conservation features, renewable sources of energy, and low-emission equipment in new and existing development projects within the county (Madera County 2010).

4.7.3 Analysis Methodology

4.7.3.1 Analytical Approach

Consistent with PRC Section 21100(b)(3), this energy impacts analysis section evaluates the potential for the Proposed Project to result in a substantial increase in energy demand and/or wasteful use of energy. Informed by Appendix F *Energy*

Conservation of the CEQA Guidelines, potential impacts were evaluated to determine whether Proposed Project activities would be considered excessive, wasteful, or inefficient. The Area of Analysis includes PG&E's service area in Fresno and Madera counties, with consideration of state energy goals. As the Proposed Project would continue to generate hydroelectric power, this impact analysis focuses on the energy requirements associated with construction and operation of the Proposed Project and its potential impact on California's RPS requirements.

Construction activities would involve short-term consumption of energy resources in the form of electricity and fuels to run equipment and vehicles. Routine operation activities within the Area of Analysis, such as inspections and maintenance, recreational facility maintenance, powerline and communication maintenance, facility painting, sediment management, and other activities, would involve ongoing consumption of energy resources in the form of electricity and fuels to run equipment and vehicles.

Section 4.3 *Air Quality* describes the anticipated types of equipment that would be used for Proposed Project construction and hours of operation. The California Emissions Estimator Model (CalEEMod) operates under the assumption that all vehicles and equipment use diesel fuel. To maintain consistency with Sections 4.3 *Air Quality* and 4.9 *Greenhouse Gas Emissions,* fuel consumption for vehicles, including boats and trucks, and equipment was calculated using default diesel emission factors provided by The Climate Registry (2023). However, turbine-powered helicopters generally operate on jet fuel, which was used to calculate energy consumption for helicopter use during construction.

4.7.3.2 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on energy if it would do the following:

- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation (EN-1); and

- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency (EN-2)

4.7.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping

components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down-ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cubic feet per second (cfs) for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the Project Bypass Reach cannot exceed a maximum of 1

foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient[1] storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are

[1] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description.*

4.7.4.1 Potential Impacts Related to Energy Consumption

Impact EN-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?

4.7.4.1.1 Proposed Project

Construction

The total estimated energy consumption for construction activities, including truck, boat, and helicopter trips, would be 11,918.4 gallons of diesel fuel and 6,685.5 gallons of jet fuel, or an estimated total 2,547.2 million Btu (Table 4.7-3). This expenditure of energy for Proposed Project construction represents a small percentage of total annual energy consumption in California. In 2023, the total energy consumption for California was 6,817 trillion Btu (EIA 2025). Thus, estimated energy use for Proposed Project construction represents less than 0.0005 percent of the total state expenditure in 2023.

Table 4.7-3: Proposed Project Fuel Energy Consumption During Construction

Type (use)	Quantity (gallons)	Energy (million Btu)[a]
Diesel and Gasoline (construction equipment, trucks, and boats)	11,918.4	1,644.7
Jet fuel (helicopter)	6,685.5	902.5
Total	**18,603.9**	**2,547.2**

Btu = British thermal units
[a] Based on U.S. Energy Information Administration (EIA) conversion factor.

Fuel energy consumed during construction would be short term and localized. Energy use due to construction activities under the Proposed Project would cease once construction was complete. The construction equipment and vehicles used during construction would contain up-to-date emission control technology and would comply with the latest USEPA and CARB fuel (RFG, low carbon fuel standard) emission and Corporate Average Fuel Economy (CAFE) standards (United States Department of Transportation 2014). The Proposed Project would not have wasteful, inefficient, or unnecessary consumption of energy resources during construction.

Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact EN-1.

Operation

The continued operation of the Proposed Project would not require significant amounts of new energy use and would continue to produce energy for the term of the new license, but at an approximately 3 percent reduction due to the retirement of the K1 Powerhouse. However, PG&E ceased operations of the K1 Powerhouse in 2017 and, under baseline conditions, the K1 Powerhouse does not generate energy and would not result in operational impacts that would decrease energy production. PG&E would continue to implement an internal spill management protocol. This protocol prohibits creating spill at the dam due to market economics during energy oversupply conditions, meaning PG&E stopped providing certain CAISO ancillary (market) services that could induce reservoir spills and adopted an internal protocol to avoid spilling water solely due

to market oversupply (personal email communication, J. Hartman and C. McCormick, March 4, 2026), resulting in additional diversions through the K2 Powerhouse. Ongoing operation of the new flow gage and upgraded gates would require minimal electricity, and the new Vista Day Use Area would not require additional electricity. Maintenance activities would require limited vehicle trips, as necessary, and all vehicles would comply with fuel and emission standards (United States Department of Transportation 2014). Additionally, there would be negligible, if any, increase in vehicle trips due to Proposed Project operation. The Proposed Project would not have wasteful, inefficient, or unnecessary consumption of energy resources from operational activities.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact EN-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.7.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination for construction and operation activities as described in Section 4.7.4.1.1. Alternative 1 would alter the timing, duration, and magnitude of flows below Kerckhoff Dam, but it would not result in a significant increase or decrease in vehicle trips or energy use for operations and maintenance. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 1 for potential impact EN-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.7.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination for construction and operation activities as described in Section 4.7.4.1.1. Alternative 2 would alter the timing, duration, and magnitude of flows below Kerckhoff Dam, but it would not result in a significant increase or decrease in vehicle trips or energy use for operations and maintenance. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 2 for potential impact EN-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.7.4.2 Potential Impacts Related to Renewable Energy or Energy Efficiency Plans

Impact EN-2: Would the Project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

4.7.4.2.1 Proposed Project

Construction and Operation

Fresno and Madera counties currently do not have any renewable energy or energy efficiency plans pertaining to construction activities (i.e., on-road and off-road vehicle use). There are existing engine emission standards that require use of highly efficient combustion systems. CARB regulations are implemented through vehicle manufacturer and registration compliance, including cars, boats, and helicopters. Vehicles used during Proposed Project construction and operation would already incorporate these

standards as applicable; therefore, the Proposed Project would not violate existing fuel efficiency standards for vehicles.

As a hydroelectric project generating renewable energy, operation of the Proposed Project would continue to help meet local and state goals of facilitating the development of renewable energy technologies and resources as well as meeting the California Integrated Energy Policy, RPS mandates, and state and local GHG emission regulations. Therefore, construction and operation of the Proposed Project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact EN-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.7.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination for construction and operation activities as described in Section 4.7.4.2.1 for potential impact EN-2. The alteration of the timing, duration, and magnitude of flows below Kerckhoff Dam under Alternative 1 would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact EN-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.7.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination for construction and operation activities as described in Section 4.7.4.2.1 for potential impact EN-2. The alteration of the timing, duration, and magnitude of flows below Kerckhoff Dam under Alternative 2 would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact EN-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.7.5 Literature Cited

CARB (California Air Resources Board). 2022. CARB approves amendments to Off-Road Regulation to further reduce emissions. Accessed: April 3, 2026. Retrieved from: https://ww2.arb.ca.gov/news/carb-approves-amendments-road-regulation-further-reduce-emissions#:~:text=California%20Air%20Resources%20Board,-Main%20navigation&text=The%20amendments%20will%20require%20fleets,in%20off%2Droad%20diesel%20vehicles.

CEC (California Energy Commission). 2025a. Energy Consumption Data Files. Accessed: April 3, 2026. Retrieved from: https://www.energy.ca.gov/files/energy-consumption-data-files.

_____. 2025b. California Retail Fuel Outlet Annual Reporting (CEC-A15) Results. Accessed: April 3, 2026. Retrieved from: https://www.energy.ca.gov/data-reports/energy-almanac/transportation-energy/california-retail-fuel-outlet-annual-reporting.

_____. 2025c. 2025 Integrated Energy Policy Report. Accessed: April 3, 2026. Retrieved from:https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report-iepr/2025-integrated-energy-policy-report.

California Public Utilities Commission. 2025. Renewables Portfolio Standard (RPS) Program. Accessed: April 3, 2026. Retrieved from: https://www.cpuc.ca.gov/rps/.

EIA (U.S. Energy Information Administration). 2025. California State Energy Profile. Accessed: April 3, 2026. Retrieved from: https://www.eia.gov/state/print.php?sid=CA#:~:text=California%20Quick%20Facts,gasoline%20among%20the%2050%EIA20states.

Fresno County. 2024. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

Madera County. 2010. *Madera County Air Quality Element*. Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/2846/636934376261100000.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas & Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff Internal Spill Protocol – K2 Generation,” on March 4, 2026.

PG&E (Pacific Gas and Electric Company). 2025a. 2025 *Corporate Sustainability Report*. Accessed: April 3, 2026. Retrieved from: https://www.pgecorp.com/assets/pgecorp/csr/csr_2025/assets/pge-csr-2025.pdf.

_____. 2025b. Renewable Energy and Storage. Accessed: April 3, 2026. Retrieved from: https://www.pgecorp.com/sustainability/corporate-sustainability/corporate_sustainability_report_2024/planet/clean_energy/renewable_energy_storage.html.

The Climate Registry. 2023. *2023 Default Emissions Factors*. Accessed: April 3, 2026. Retrieved from: https://theclimateregistry.org/wp-content/uploads/2023/06/2023-Default-Emission-Factors-Final-1.pdf.

United States Department of Transportation. 2014. Corporate Average Fuel Economy (CAFE) Standards. Accessed: April 3, 2026. Retrieved from: https://www.transportation.gov/mission/sustainability/corporate-average-fuel-economy-cafe-standards.

USEPA (United States Environmental Protection Agency). 2025. Regulations for Emissions from Heavy Equipment with Compression-Ignition (Diesel) Engines. Accessed: April 3, 2026. Retrieved from: https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-emissions-heavy-equipment-compression.

USFS (United States Forest Service). 2023. *Land Management Plan for the Sierra National Forest: Fresno, Madera, and Mariposa Counties, California.* Accessed: April 3, 2026. Retrieved from: https://acconsensus.org/wp-content/uploads/2024/08/05-SNF_LMP_final_20230504_Web.pdf.

Valley Air District (San Joaquin Valley Air Pollution Control District). 2025. About the District. Accessed: April 3, 2026. Retrieved from: https://ww2.valleyair.org/about.

4.8 GEOLOGY AND SOILS

This section describes existing conditions and analyzes potential impacts on geology and soils from implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts on geology and soils from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.8-1).

Table 4.8-1: CEQA Checklist for Geology and Soils

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact GEO-1: Directly or indirectly cause 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? Refer to Division of Mines and Geology Special Publication 42.	No Impact	No Impact	No Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact GEO-2: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Impact GEO-3: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Impact GEO-4: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Impact GEO-5: Result in substantial soil erosion or the loss of topsoil?	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated
Impact GEO-6: 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?	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated
Impact GEO-7: Be located on expansive soil, as defined in Table 18-1-B of the	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?			
Impact GEO-8: 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?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Impact GEO-9: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

4.8.1 Environmental Setting

4.8.1.1 Regional Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located in the foothills of the western slope of the Sierra Nevada on the San Joaquin River (SJR) in a sparsely populated area of Fresno and Madera counties, California, in the south-central portion of the Sierra Nevada geomorphic province of California. The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public lands administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and United States Bureau of Reclamation (Reclamation) under BLM management.

The Kerckhoff Hydroelectric Project Area is defined as all areas within the existing Federal Energy Regulatory Commission (FERC or Commission) Project Boundary. Generally, the Kerckhoff Hydroelectric Project Area is characterized by hills and mountain ranges that are separated by alluvial basins. Rock units near the Kerckhoff Hydroelectric Project primarily consist of Mesozoic granitics (including granodiorite, quartz diorite, and tonalite) with lesser areas of Pre-Cenozoic granitic and metamorphic rocks. The topography of the region is fairly variable, as the Sierra Nevada's elevations range from a few hundred feet above mean sea level (msl) in the foothill areas of the Sacramento and San Joaquin valleys to 14,496 feet msl at Mount Whitney (PG&E 2022).

The southern Sierra Nevada is located between two complex zones of seismicity and tectonic deformation (the San Andreas Fault Zone to the west and the Sierra Nevada Frontal fault system to the east) that form the boundary between the Pacific and North American lithospheric plates. These deformation zones bound the Sierra Nevada and the Central Valley, which form a crustal-scale semi-rigid block known as the Sierra Nevada microplate. The microplate, which is characterized by low levels of Quaternary faulting and seismicity, is generally considered to move independently relative to both the Pacific and North American plates (PG&E 2022).

4.8.1.2 Stratigraphic Units

Three general rock groups characterize the geology of the Sierra Nevada: (1) Mesozoic and Pre-Cenozoic metamorphosed sedimentary and volcanic rocks; (2) Mesozoic granitic rocks of the Sierra Nevada batholith; and (3) Cenozoic volcanic and sedimentary rocks. Mesozoic and Pre-Cenozoic metamorphic rock types consist of schist, slate, quartzite, marble, calc-silicate hornfels, amphibolite, and serpentine; the strength and erosion resistance of these metamorphic rocks are comparable to those of unweathered granitic rocks (PG&E 2022). Mesozoic granodioritic rocks form most of the Sierra Nevada, and the rock types present include diorite, gabbro, quartz-monzodiorite, quartz diorite, tonalite, and granodiorite. Cenozoic volcanic rock consists of ash flow deposits that originated in the Great Basin and andesitic volcanoes at higher elevations,

as well as the Cenozoic sedimentary rocks that formed from erosion of volcanic material during uplift of the Sierra Nevada batholith (PG&E 2022).

Rock units near the Kerckhoff Hydroelectric Project primarily consist of Mesozoic granitics (including granodiorite, quartz diorite, and tonalite) with lesser areas of Pre-Cenozoic granitic and metamorphic rocks, as well as Pre-Cenozoic metasedimentary and metavolcanics rocks (PG&E 2022).

4.8.1.3 Soils

Soils in the vicinity of the Kerckhoff Hydroelectric Project consist of upland soil series, which are found on hilly to mountainous topography and are formed in place through decomposition and disintegration of the underlying material. The upland soil groups are generally distinguished by their thickness with respect to depth to bedrock: shallow, moderate, and deep. Soils with shallow depth and moderate depth to bedrock, as detailed below, are more common because of their geographic location and elevation (PG&E 2022):

- Shallow depth to bedrock: This group of upland soils has a loam-to-clay-loam texture with low organic matter, and some areas have calcareous subsoils. These soils usually have a shallow depth to weathered bedrock (less than 2 feet). These soils are found in areas of low to moderate rainfall that support grasslands used primarily for grazing. Tilled areas are subject to considerable erosion (PG&E 2022)
- Moderate depth to bedrock: This group of upland soils is found on hilly to steep upland areas having medium rainfall and that can support grasslands. These soils have a sandy-loam-to-clay-loam texture and moderate depth to weathered bedrock of about 2 feet (PG&E 2022)
- Deep depth to bedrock: This group of upland soils is characterized by a moderate to strongly acidic reaction, especially in the subsoils, which can extend 3 to 6 feet before reaching bedrock. Bedrock consists of metasedimentary and granitic rocks. Soils forming on granitic rocks consist of decomposed granitic sands. These soils receive 35 to 80 inches of precipitation per year and support extensive forests (PG&E 2022)

A summary of the overall characteristics of the types of soil that occur in the vicinity of the Kerckhoff Hydroelectric Project is provided below (PG&E 2022):

- Ahwahnee Ahwahnee Family: Moderately deep, well-drained soils formed in material weathered from granitic rocks. These soils are located on foothills and mountains. Slopes are 2 to 75 percent
- Auberry – Auberry Family: Deep, well-drained soils formed in material weathered from intrusive, acid igneous rocks. These soils are located on foothills and mountainous uplands. Slopes are 5 to 75 percent
- Coarsegold: Moderately deep, well-drained soils that formed from weathered schist. These soils are located in mountainous areas and have slopes of 8 to 75 percent
- Hideaway: Well-drained medium-textured soils developed on basaltic flow rock. These soils occur on nearly level to rolling relief in areas capped by the basaltic flow. The soils are brown, very stony loams or clay loams, strongly acid, and shallow to bedrock
- Sierra: Well-drained soils found on gently sloping to very steep slopes. These soils are formed in residuum from granitic rocks and typically consist of coarse sandy loam
- Tollhouse: Shallow, somewhat excessively or excessively drained soils formed in material weathered from granitic rocks. Tollhouse soils are located on strongly sloping to very steep mountain slopes
- Toomes: Very shallow and shallow, well to somewhat excessively drained soils formed in material weathered from tuff breccia, basalt, and andesite. These soils are located on ridges and plateaus. Slopes are 2 to 75 percent
- Trabuco: Well-drained soils that occur on slopes from 9 to 50 percent. These soils are formed in material weathered from basic igneous rock and typically consist of loam
- Vista: Moderately deep, well-drained soils formed in material weathered from decomposed granitic rocks. These soils are located on hills and mountainous uplands at slopes of 2 to 85 percent

Additionally, expansive soils are those that contain significant amounts of clays that expand when wet and can cause damage to foundations if moisture collects beneath structures. Soils exhibiting moderately high to high expansion potential have not been identified within the Kerckhoff Hydroelectric Project Area (Fresno County 2024).

4.8.1.4 Seismicity

4.8.1.4.1 Fault Zones

The Alquist-Priolo Act requires the establishment of “earthquake fault zones” along known active faults in California. A fault is considered active if it has generated earthquakes accompanied by surface rupture during historic time (approximately the last 200 years) or has shown evidence of fault displacement during the Holocene period (active within the last 11,700 years) (Bryant and Hart 2007). A fault is considered potentially active if there is evidence of fault displacement during the Quaternary period (approximately the last 1.6 million years). A fault is considered inactive if the most recent documented fault displacement pre-dates the Quaternary period.

The Kerckhoff Hydroelectric Project is more than 50 miles from active faults. Earthquake ground-shaking hazard potential is low in the Kerckhoff Hydroelectric Project Area (PG&E 2022). However, in the past, the Kerckhoff Hydroelectric Project Area has experienced ground shaking associated with earthquakes originating from the San Andreas fault (situated approximately 95 miles west of the Kerckhoff Hydroelectric Project), Owens Valley fault group (situated approximately 65 miles east of the Kerckhoff Hydroelectric Project), and White Wolf fault group (situated approximately 140 miles south of the Kerckhoff Hydroelectric Project) (PG&E 2022).

4.8.1.4.2 Strong Ground Motion

Although the Kerckhoff Hydroelectric Project is not located within an active earthquake zone as defined by the Alquist-Priolo Act, it is in a region that is subject to ground shaking from earthquakes generated on nearby active faults. The United States Geological Survey (USGS) Working Group on California Earthquake Probabilities has estimated there is a 100 percent chance of at least one magnitude 6.0 earthquake and

a 75 percent chance of at least one magnitude 7.0 earthquake occurring in Southern California between 2014 and 2044 (Working Group on California Earthquake Probabilities 2015). The Kerckhoff Hydroelectric Project could experience seismic ground shaking due to displacement on active faults within the region. Seismic ground shaking can result in structural damage and trigger other geologic hazards such as liquefaction. Ground shaking is controlled by the earthquake magnitude, duration, and distance from the source, and ground conditions will also influence potential impacts from strong ground motions. Seismic waves attenuate with distance from their sources, and local soil conditions may amplify or dampen seismic waves as they travel from the underlying bedrock to the ground surface.

4.8.1.5 Landslides

Hazards related to slope instability and landslides are generally associated with foothill areas and mountainous terrain. The foothills of the Sierra Nevada province, where the Kerckhoff Hydroelectric Project is located, are prone to landslides due to the presence of unconsolidated soil over bedrock. However, an erosion study conducted for the Proposed Project found no evidence of deep-seated landslides or large-scale mass-wasting features within the Kerckhoff Hydroelectric Project Area (PG&E 2022). All observed erosion sites are located around the upper half of the Kerckhoff Reservoir, and four of these sites are located within the FERC Project Boundary for the Kerckhoff Hydroelectric Project. However, the 2025 FERC Environmental Assessment for Hydropower License found no significant soil instability or mass movement has been observed around the reservoir (E-1, FERC 2025).

Within the Kerckhoff Hydroelectric Project Area, landslides have previously been observed along Access Roads 1, 2, and 3, with a small amount of raveling[23] occurring along Access Road 3. No landslides were observed along the access roads associated with the Kerckhoff 2 (K2) Powerhouse (PG&E 2022). A landslide in May 2023 affected the helicopter landing zone for Kerckhoff Dam. PG&E reported the incident to FERC

[23] A term used to describe pavement that is progressively disintegrating from the surface downward.

and will continue to monitor the landslide area for additional movement and will include this monitoring in its Dam Safety Surveillance and Monitoring Plan.

4.8.1.6 Subsidence

The Kerckhoff Hydroelectric Project is located in an area that has not had historical or current recorded subsidence (USGS 2023). Subsidence is a phenomenon associated primarily with groundwater withdrawal and can occur from operations involving the removal of large amounts of groundwater from certain types of soils. Subsidence can also result from earthquake-induced ground failure and the settling and compaction of unconsolidated sediments during liquefaction. Soils susceptible to subsidence include those with high silt or clay content.

Some areas of the San Joaquin Valley, including parts of western Fresno County, have experienced substantial subsidence related to groundwater withdrawal. Within Fresno County, subsidence has generally stabilized, except during drought periods. Areas within Fresno County where subsidence has historically occurred include the Westlands Water District and the Pleasant Valley Water District (Fresno County 2024). Within Madera County, the risk of subsidence is considered to be very low because there is no high-water table (Madera County 1995a).

4.8.1.7 Erosion

Erosion is the process by which rocks, soil, and other land materials are broken down over time. The rate of erosion depends on several factors, including soil type and geologic parent materials, slope and placement of soils, and human activity. The potential for erosion is highest in loose unconsolidated soils. Slope steepness and absence of vegetation also increase natural erosion rates. Thus, erosion potential is high in steep, unvegetated areas, especially those disturbed by grading or other construction activities.

The Kerckhoff Hydroelectric Project is located within a generalized erosion hazard area characterized by steep slopes exceeding 30 percent (Fresno County 2024). Valley side slopes along the SJR inner gorge within portions of the Kerckhoff Hydroelectric Project

Area appear relatively stable (PG&E 2019a). Bedrock is frequently exposed on these slopes, which likely contributes to the stability of the valley walls and the absence of mass-wasting[24] features. The lack of fresh erosion scars, alluvial fans, or sediment accumulation pathways in parts of the Kerckhoff Hydroelectric Project Area indicates that large-scale sediment inputs from mass wasting and hillslope erosion are not occurring (PG&E 2023).

Regional sediment sources are limited due to upstream reservoir trapping. Stored sediment volume in Kerckhoff Reservoir has changed only slightly since early measurements, indicating low long-term sediment input and low sediment transport potential. No significant soil instability or mass movement has been observed around the Kerckhoff Reservoir (FERC 2025). The reservoir is considered to be in sediment equilibrium, meaning finer-grained sediments (e.g., sand) continue to move downstream into the Kerckhoff Hydroelectric Project Bypass Reach (PBR), while rockfalls supply coarser-grained sediments (e.g., gravel and boulders) along the inner gorge of the SJR below the dam (PG&E 2023). Sediment influx from Site H is not expected to have a discernable effect on overall water quality, including turbidity.

Minor bank erosion is present along Fish Creek at erosion Site H, located on PG&E property about 600 feet upstream of Kerckhoff Reservoir in Smalley Cove. Approximately 230 feet of erosion is present here, likely worsened by livestock grazing, and providing a direct sediment transport pathway into the reservoir (PG&E 2023; FERC 2025).

Based on *Technical Study Report 10: Project Roads and Trails Assessment (Study LAND 1)* for the Kerckhoff Hydroelectric Project, the conditions of Access Roads 1 and 2 range from fair to poor, with noted washouts, rutting, and erosion from cattle traffic (PG&E 2019b, 2020a). Potential impacts from sediment transport to drainages along Access Roads 1 and 2 appear to be low and low to moderate, and higher impacts are

[24] Mass wasting is the movement of rock and soil down slope under the influence of gravity. Rock falls, slumps, and debris flows are all examples of mass wasting. Often lubricated by rainfall or agitated by seismic activity, these events may occur very rapidly and move as a flow.

noted on a few shorter, steeper hydrologic segments (e.g., minor landslides) (PG&E 2020b).

4.8.1.8 Liquefaction

Liquefaction occurs when seismic activity transforms unconsolidated sediments into a slurry during a strong seismic event. The vast majority of liquefaction hazards are associated with sandy soils and silty soils of low plasticity (California Geological Survey 2008). In order to be susceptible to liquefaction, potentially liquefiable soils must be saturated or nearly saturated. In general, liquefaction hazards are most severe in saturated soils within the upper 50 feet of the ground surface. Liquefaction potential at the Kerckhoff Hydroelectric Project is very low because soils consist primarily of bedrock and coarse-grained materials on steep slopes with minimal unconsolidated saturated sediments and are well to excessively drained (PG&E 2022). However, the potential for liquefaction increases with shallow groundwater. Along the Kerckhoff Hydroelectric PBR (defined as the SJR from Kerckhoff Dam downstream to the Kerckhoff 1 [K1] Powerhouse and from the K1 Powerhouse to the K2 Powerhouse), maximum depths to groundwater range between 6.5 and 8.5 feet (PG&E 2022), which may increase the potential for liquefaction in that area.

Soil types within Fresno and Madera counties are not conducive to liquefaction because they are either too coarse in texture or too high in clay content (Fresno County 2024; Madera County 1995a); however, no specific countywide assessments to identify liquefaction hazards have been performed.

4.8.1.9 Paleontology

The BLM Potential Fossil Yield Classification (PFYC) System is a predictive model for areas that are likely to produce fossils of scientific interest and widely used to evaluate potential impacts on fossils in ground-disturbing actions or to help inform research to provide baseline guidance for assessing paleontological resources (BLM 2016).

As stated above, rock units in the Kerckhoff Hydroelectric Project Area primarily consist of Mesozoic granitics (including granodiorite, quartz diorite, and tonalite) with lesser

areas of Pre-Cenozoic granitic and metamorphic rocks, as well as Pre-Cenozoic metasedimentary and metavolcanics rocks. According to the PFYC System, igneous and metamorphic geologic units, such as the rock units primarily present near the Kerckhoff Hydroelectric Project, are categorized as Class 1 (Very Low), which means they are not likely to contain recognizable paleontological resources (BLM 2016). Based on their origin directly from molten magma, igneous rocks are devoid of fossil remains or traces. Metasedimentary rocks have been altered by metamorphic processes, which typically destroy their original fossil content or alter their original chronologic or stratigraphic context, usually making any potential fossil material remaining (if still intact) indiscernible and therefore nonsignificant.

4.8.2 Regulatory Background

The following subsections contain an overview of regulations related to geology and soils.

4.8.2.1 Federal

4.8.2.1.1 Federal Power Act

The Federal Power Act (Title 16 United States Code (USC) Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created FERC and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations (CFR) Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.8.2.1.2 International Building Code

Published by the International Code Council, the purpose of the International Building Code (IBC) is to establish minimum structural requirements to provide a reasonable level of safety, public health and general welfare through structural strength, and safety

to life and property from fire and other hazards attributed to the built environment. The provisions of the IBC apply to the construction, alteration, relocation, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of buildings or structures, as well as any appurtenances connected to applicable buildings or structures. The IBC also incorporates the requirements and regulations set forth in several other International Code Council codes, including the International Energy Conservation Code, the International Existing Building Code, the International Fire Code, and the International Fuel Gas Code. The IBC is in use or adopted in all 50 states and is updated every 3 years to ensure that new construction methods and technologies are incorporated into existing codes. Section 1803.5.3 of the IBC provides criteria for the identification of expansive soils and specifies that soils with an expansion index of 20 or greater require additional foundation design considerations.

4.8.2.1.3 Uniform Building Code

Published by the International Conference of Building Officials, the Uniform Building Code (UBC) provides complete regulations covering all major aspects of building design and construction relating to fire and life safety and structural safety. This is the code that has been adopted by most western states. Volume 1 of the 1997 UBC contains the administrative, fire and life safety, and field inspection provisions, including all nonstructural provisions and those structural provisions necessary for field inspections. Volume 2 contains provisions for structural engineering design, including the design provisions formerly in the UBC Standards. Volume 3 contains the remaining material testing and installation standards previously published in the UBC Standards.
Table 18-1-B of the UBC provides criteria for expansive soils and specifies that soils with an expansion index of 20 or greater require additional foundation design considerations.

4.8.2.1.4 Federal Water Pollution Control Act and Clean Water Act

The discharge of pollutants into waters of the United States, including discharge of sediment to surface water, are regulated by the Federal Water Pollution Control Act of 1972 and Clean Water Act (CWA) of 1977. The CWA applies to the Kerckhoff

Hydroelectric Project primarily through Section 401, which requires a Water Quality Certification from the California State Water Resources Control Board (State Water Board) to ensure compliance with state water quality standards and protection of beneficial uses of the SJR. For geology and soils resources, this means that Proposed Project operations and maintenance must prevent erosion, sedimentation, and other activities that could degrade water quality.

4.8.2.1.5 United States Bureau of Land Management

Bakersfield Field Office Resource Management Plan

Proposed Project activities that occur on public lands managed by BLM must be consistent with BLM's *Bakersfield Field Office Record of Decision and Approved Resource Management Plan* (RMP) (BLM 2014). The Bakersfield RMP identifies comprehensive management direction for all resources and uses and provides broad-scale guidance on project implementation for renewable energy, fluid mineral, livestock grazing, and recreation management. The Kerckhoff Dam and the K1 and K2 powerhouses are located within the BLM-managed SJR Gorge Special Recreation Management Area, which is also identified as a special recreation management area in BLM's Bakersfield RMP. The BLM Bakersfield RMP identifies comprehensive management direction for all resources and uses. Relevant objectives to Proposed Project geology and soils resources include the following:

- **2.1.7 Soil Resources:** Manage public lands to meet the minimum Standards for Rangeland Health such that soils exhibit functional biological and physical characteristics that are appropriate to soil type, climate, and landform
- Appendix 3: Best Management Practices/Standard Operating Procedures provides guidance relevant to geology and soils
- **6.3.5 Soils:** Assess the need for soil stabilization following wildfires. Use the Emergency Stabilization and Rehabilitation process to determine and implement needed actions

The BLM preliminary 4(e) condition No. 21 would require PG&E to develop and implement an Erosion and Sediment Control Management Plan in consultation with

stakeholders within one year of finalization of the conditions by FERC. The plan would provide direction for treating erosion, controlling sedimentation, and reclaiming disturbed sites upon Proposed Project-affected lands during the term of the new license (FERC 2025).

4.8.2.1.6 United States Forest Service

Sierra National Forest Land Management Plan

The United States Forest Service (USFS) uses guidance in the revised *Land Management Plan for the Sierra National Forest* (USFS 2023), pursuant to the 2012 Forest Service Planning Rule (36 CFR Part 219), for decision-making regarding the relicensing of the Proposed Project and the development of associated license conditions. The revised USFS-SNF Land Management Plan aims to help sustain forest and watershed health and productivity by addressing tree mortality, restoring forest conditions, facilitating use of fire to achieve desired conditions, and providing for sustainable recreation. All authorized uses to occupy and use National Forest System (NFS) lands are evaluated and determined to be in the public interest. Most of the management direction is related to extraction and potential development of mineral resources. Goals and objectives relevant to the Proposed Project geology and soils resources include the following:

- **Goal (GEO-FW-GOAL) 03:** Undertake efforts to return disturbed areas to former vegetated condition and address potential water quality issues on abandoned mine lands
- **Standard (GEO-FW-STD) 01:** Ensure that plans of operation, reclamation plans, and reclamation bonds address the costs of removing facilities, equipment, and materials; isolating and neutralizing or removing toxic or potentially toxic materials; salvaging and replacing topsoil; and preparing the seed bed and revegetating to meet the objectives of the land allocation in which the operation is located

According to the plan, Kerckhoff Reservoir is located in the San Joaquin Conservation Watershed, which contains much of the middle and upper SJR watershed area of the USFS-SNF (USFS 2023).

The USFS preliminary 4(e) condition No. 29 would require PG&E to develop and implement an Erosion and Sediment Control Management Plan in consultation with stakeholders. The plan would provide direction for treating erosion, controlling sedimentation, and reclaiming disturbed sites upon Proposed Project-affected lands during the term of the new license. The plan will be filed with FERC after license issuance, subject to prior review and approval by USFS (FERC 2025).

4.8.2.2 State

4.8.2.2.1 Alquist-Priolo Earthquake Fault Zoning Act

California enacted the Alquist-Priolo Special Studies Zones Act in 1972 (later renamed to the Alquist-Priolo Earthquake Fault Zoning Act in 1994). The Alquist-Priolo Act requires the establishment of “earthquake fault zones,” along known active faults, in California. Regulations on development within these zones are enforced to reduce potential damages resulting from fault displacement. As described in Section 4.8.1.4, the Kerckhoff Hydroelectric Project has low earthquake ground-shaking hazard potential but has experienced ground shaking associated with earthquakes in the vicinity of the Kerckhoff Hydroelectric Project.

4.8.2.2.2 Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 addresses earthquake hazards other than fault rupture, such as liquefaction and seismically induced landslides. Seismic hazard zones are to be mapped by the State Geologist to assist local governments in planning land use. The Seismic Hazards Mapping Act states that “it is necessary to identify and map seismic hazard zones in order for cities and counties to adequately prepare the safety element of their general plans and to encourage land use management policies and regulations to reduce and mitigate those hazards to protect public health and safety.”

4.8.2.3 Local

The Health and Safety Elements of the Fresno County General Plan and the Madera County General Plan provide goals and policies to minimize the loss of life, injury, and

property damage due to seismic and geological hazards and seek to ensure that new buildings and facilities are designed to withstand seismic and geologic hazards (Fresno County 2023; Madera County 1995b). Goals and policies relevant to the Proposed Project geology and soil resources include the following:

- **Fresno County General Plan Health and Safety Element Policy HS-D.3:** The County shall require that a soils engineering and geologic-seismic analysis be prepared by a California-registered engineer or engineering geologist prior to permitting development, including public infrastructure projects, in areas prone to geologic or seismic hazards (i.e., fault rupture, ground shaking, lateral spreading, lurch cracking, fault creep, liquefaction, subsidence, settlement, landslides, mudslides, unstable slopes, or avalanche)
- **Fresno County General Plan Health and Safety Element Policy HS-D.7:** The County shall ensure compliance with State seismic and building standards in the evaluation, design, and siting of critical facilities, including police and fire stations, school facilities, hospitals, hazardous material manufacture and storage facilities, bridges, large public assembly halls, and other structures subject to special seismic safety design requirements
- **Fresno County General Plan Health and Safety Element Policy HS-D.9:** The County shall require the preparation of drainage plans for development or public infrastructure projects in hillside areas to direct runoff and drainage away from unstable slopes
- **Madera County General Plan Health and Safety Element Policy 6.A.1:** The County shall require the preparation of a soils engineering and geologic-seismic analysis prior to permitting development in areas prone to geological or seismic hazards (i.e., ground shaking, landslides, liquefaction, critically expansive soils)

4.8.3 Analysis Methodology

4.8.3.1 Analytical Approach

For this analysis, the potential Proposed Project impacts related to geology and soil resources were evaluated against applicable regulations (described above) and the

CEQA significance criteria. The Area of Analysis for addressing geology and soil resources is the Kerckhoff Hydroelectric Project Area.

4.8.3.2 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on geology and soils if it would:

- Directly or indirectly cause 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 (refer to Division of Mines and Geology Special Publication 42) (GEO-1);
  - Strong seismic ground shaking (GEO-2);
  - Seismic-related ground failure, including liquefaction (GEO-3); and
  - Landslides (GEO-4);
- Result in substantial soil erosion or the loss of topsoil (GEO-5);
- 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 (GEO-6);
- Be located on expansive soil, as defined in Table 18-1-B of the UBC (1994), creating substantial direct or indirect risks to life or property (GEO-7);
- 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 (GEO-8); or
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature (GEO-9)

4.8.3.3 Environmental Management Measures and Monitoring Plans

The following Proposed Project monitoring plans and environmental management measures designed to protect, maintain, or enhance resources are pertinent to geology and soil resources. These plans identified in the following subsections are included under the Proposed Project and both Alternatives.

4.8.3.3.1 Vegetation Management and Pest Control Plan

The removal of vegetation from Proposed Project areas for maintenance purposes could inadvertently lead to erosion and sedimentation. To minimize any possible effects of this kind, the Proposed Project's Vegetation Management and Pest Control Plan specifies PG&E's responsibilities for invasive weed management, pest control, vegetation and fuels management, and the protection of resources during these activities over the license term. The plan identifies where vegetation management would be needed, details the types of vegetation management activities that may be used; and describes the procedure for hazard tree removal.

4.8.3.3.2 Project Road and Trail Maintenance Plan

The Project Road and Trail Maintenance Plan includes regularly inspecting and maintaining roads and trails to ensure safe access to Kerckhoff Hydroelectric Project facilities. The maintenance performed under the Project Road and Trail Maintenance Plan would be coordinated with activities conducted under the Proposed Project's Vegetation Management and Pest Control Plan for appropriate vegetation maintenance and in accordance with the Proposed Project's Historic Properties Management Plan (HPMP).

4.8.3.3.3 Recreation Management Plan

The Proposed Project's Recreation Management Plan includes guidance on construction, maintenance, and operation of existing and Proposed Project recreation facilities, managing Kerckhoff Reservoir shoreline access, and minimizing resource damage from recreation use.

4.8.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam to be automated, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down-ramping operations with specific water year (WY) and implementation

criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the PBR of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cubic feet per second (cfs) for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the PBR cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures.

Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The State Water Board evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation

(HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.8.4.1 Potential Impacts Related to Rupture of a Known Earthquake Fault

Impact GEO-1: Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

4.8.4.1.1 Proposed Project

Construction and Operation

Construction activities under the Proposed Project would occur on the western slope of the Sierra Nevada within the Sierra Nevada microplate, an area characterized by low levels of Quaternary faulting and seismicity. No active faults have been identified within or near the Proposed Project, and the Proposed Project is not located within an Alquist-Priolo Earthquake Fault Zone. The nearest major active faults are part of the Owens Valley fault group, located approximately 65 miles east of the Proposed Project. As a result, construction activities under the Proposed Project would not be subject to surface rupture of a known earthquake fault.

Operation of the Proposed Project, which includes retiring the K1 Powerhouse, recreational facility improvements and implementing minor hydroelectric facility modifications, would continue within the same geologic setting and would not involve relocation of the dam, reservoir, or other facilities into areas of known faulting. Existing geologic investigations and mapping confirm that the Proposed Project would not

directly or indirectly cause substantial adverse effects related to rupture of a known earthquake fault. Operation of the Proposed Project would not occur in active fault zones and would not increase the risk of loss, injury, or death from rupture of known earthquake faults due to construction or operational activities. Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact GEO-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.8.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project, discussed in Section 4.8.4.1.1. The modifications to flow management measures under Alternative 1 would not affect geologic conditions or increase the risk of loss, injury, or death from rupture of known earthquake faults. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact GEO-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.8.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project, discussed in Section 4.8.4.1.1. The modifications to flow management measures under

Alternative 2 would not affect geologic conditions or increase the risk of loss, injury, or death from rupture of known earthquake faults. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact GEO-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.8.4.2 Potential Impacts Related to Strong Seismic Ground Shaking

Impact GEO-2: Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

ii. Strong seismic ground shaking?

4.8.4.2.1 Proposed Project

Construction and Operation

Construction activities under the Proposed Project would occur within the Sierra Nevada microplate, an area of generally low seismicity. The Proposed Project is not located within an Alquist-Priolo Earthquake Fault Zone, and no major active faults or shear zones have been identified in the immediate vicinity of Proposed Project facilities. Although the Proposed Project Area may experience seismic ground shaking from distant regional faults, including the San Andreas Fault Zone (approximately 95 miles west), the Sierra Nevada Frontal Fault system (approximately 65 miles east), the Owens Valley fault group (approximately 65 miles east), and the White Wolf fault group (approximately 140 miles south), the California Seismic Safety Commission classifies the ground-shaking hazard potential in the Area of Analysis as low.

Construction and operation of the Proposed Project would not exacerbate existing seismic ground-shaking hazards or introduce new sources of seismic risk. Proposed

Project facilities would remain in their existing locations, and proposed recreational improvements would be designed in accordance with applicable federal seismic and structural safety standards. As a result, the Proposed Project would not substantially increase the risk of loss, injury, or death associated with strong seismic ground shaking.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under the Proposed Project for potential impact GEO-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project, discussed in Section 4.8.4.2.1. The modifications to flow management measures under Alternative 1 would not affect regional seismic conditions or increase the risk of loss, injury, or death associated with strong seismic ground shaking. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 1 for potential impact GEO-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project, discussed in Section 4.8.4.2.1. The modifications to flow management measures under Alternative 2 would not affect regional seismic conditions or increase the risk of loss, injury, or death associated with strong seismic ground shaking. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 2 for potential impact GEO-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.3 Potential Impacts Related to Liquefaction

Impact GEO-3: Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

iii. Seismic-related ground failure, including liquefaction?

4.8.4.3.1 Proposed Project

Construction and Operation

Construction activities under the Proposed Project would occur in a geologically stable area underlain by granitic bedrock and well-drained upland soils, which exhibit low susceptibility to liquefaction. The Proposed Project Area is not located within an Alquist-Priolo Earthquake Fault Zone, and no active faults have been identified in the vicinity of Proposed Project facilities. Although groundwater depths in portions of the Kerckhoff Hydroelectric PBR range between approximately 6.5 and 8.5 feet, soils in the Area of Analysis are generally well-drained to excessively drained and shallow to moderately deep over bedrock, which limits the potential for liquefaction.

Construction and operation of the Proposed Project would not introduce new liquefiable soils, substantially alter groundwater conditions, or increase surface water runoff in a manner that would elevate the risk of seismic-related ground failure. Proposed recreational improvements, including the Vista Day Use Area, would be designed in accordance with applicable federal building and seismic safety standards. As a result, the Proposed Project would not substantially increase the risk of loss, injury, or death associated with seismic-related ground failure, including liquefaction.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under the Proposed Project for potential impact GEO-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.3.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project, discussed in Section 4.8.4.3.1. The modifications to flow management measures under Alternative 1 would not introduce new liquefiable soils, alter groundwater conditions, or increase runoff in a manner that would elevate the risk of seismic-related ground failure, including liquefaction. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 1 for potential impact GEO-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.3.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project, discussed in Section 4.8.4.3.1. The modifications to flow management measures under Alternative 2 would not introduce new liquefiable soils, alter groundwater conditions, or increase runoff in a manner that would elevate the risk of seismic-related ground failure, including liquefaction. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 2 for potential impact GEO-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.4 Potential Impacts Related to Landslides

Impact GEO-4: Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

iv. Landslides?

4.8.4.4.1 Proposed Project

Construction

Construction activities under the Proposed Project would occur in a geologically stable area underlain by granitic bedrock and well-drained soils, which exhibit low susceptibility to deep-seated landslides. Field investigations and slope instability studies for the Proposed Project identified no evidence of significant mass soil movement or instability within the Area of Analysis. No deep-seated landslides or large-scale mass wasting sites were identified near Proposed Project facilities or within the reservoir area. No significant soil instability or mass movement has been observed around the reservoir (E-1, FERC 2025). Minor localized surface degradation and small shallow slope failures

have been observed along portions of Access Roads 1, 2, and 3, including limited raveling along Road 3. These features are associated with existing road cuts and do not pose a substantial hazard to Proposed Project facilities or public safety.

Construction activities under the Proposed Project would not involve large-scale grading or slope modification and would not exacerbate existing landslide hazards or introduce new risks. PG&E would continue to conduct site-specific geotechnical evaluations, as appropriate, and comply with applicable federal seismic and geotechnical design standards.

Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact GEO-4.

Operation

Under the Proposed Project, PG&E would continue routine maintenance in accordance with the Vegetation Management and Pest Control Plan, the Project Road and Trail Maintenance Plan, and other existing maintenance programs, incorporating BMPs to prevent soil instability, erosion, and sedimentation. Non-routine maintenance activities would continue to include agency consultation, resource-specific avoidance and minimization measures, and permitting as needed.

Proposed flow environmental management measures are designed to reduce flow fluctuations within the PBR and would maintain Kerckhoff Reservoir operations within the existing operating band. As a result, operations would not increase slope instability within the reservoir or downstream areas in a manner that would elevate the risk of landslides compared to baseline conditions.

A localized landslide that occurred in May 2023 affected the helicopter landing zone at Kerckhoff Dam. PG&E reported the incident to FERC and incorporated monitoring of the affected area into its Dam Safety Surveillance and Monitoring Plan to evaluate any potential future movement. Similar incidents within the Proposed Project Boundary are expected to be infrequent and would continue to be addressed through established FERC reporting and dam safety procedures.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact GEO-4.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.4.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction impacts as the Proposed Project, discussed in Section 4.8.4.4.1. Construction activities under Alternative 1 would occur within the same geologic setting and would not involve changes to slope conditions or ground-disturbing activities that would exacerbate landslide hazards. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 1 for potential impact GEO-4.

Operation

Operation under Alternative 1 would include modifications to flow management measures but would not alter slope stability, drainage patterns, or geologic conditions in a manner that would increase the potential for landslides, mass wasting, or slope failure. Although some Alternative 1 measures may result in minor, short-term changes in reservoir elevations, all modeled fluctuations would remain within the existing operating band and would not increase the risk of slope instability compared to baseline conditions. The Proposed Project Area has historically been exposed to variable hydrologic conditions associated with Kerckhoff Hydroelectric Project operations and regional hydrology, and Alternative 1 would not introduce sustained or atypical conditions that could affect slope stability. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 1 for potential impact GEO-4.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.4.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction impacts as the Proposed Project, discussed in Section 4.8.4.4.1. Construction activities under Alternative 2 would occur within the same geologic setting and would not involve changes to slope conditions or ground-disturbing activities that would exacerbate landslide hazards. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 2 for potential impact GEO-4.

Operation

Operation under Alternative 2 would include modifications to flow management measures but would not alter slope stability, drainage patterns, or geologic conditions in a manner that would increase the potential for landslides. Although some Alternative 2 measures may result in minor, short-term changes in reservoir elevations, all modeled fluctuations would remain within the existing operating band and would not increase the risk of slope failure or mass wasting compared to baseline conditions. The Proposed Project Area has historically been exposed to variable hydrologic conditions, and it is not expected that slope instability would further degrade under Alternative 2.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 2 for potential impact GEO-4.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.5 Potential Impacts Related to Erosion

Impact GEO-5: Would the Project result in substantial soil erosion or the loss of topsoil?

4.8.4.5.1 Proposed Project

Construction

Soils in the Area of Analysis consist primarily of upland soil series (e.g., Ahwahnee, Auberry, Tollhouse, and Vista) that are well drained, coarse textured (loam to sandy loam), and shallow to moderately deep over granitic bedrock, with slopes ranging from about 2 to 85 percent. Although generally stable, these soils are susceptible to erosion when disturbed on steeper slopes. Field investigations and erosion studies conducted for the Kerckhoff Hydroelectric Project relicensing identified no deep-seated landslides or large-scale mass-wasting features within the Area of Analysis and no evidence of significant soil instability around Kerckhoff Reservoir. Existing erosion is limited to localized features, such as an approximately 230-foot reach of bank erosion along Fish Creek, which appears to be more closely associated with cattle grazing than Kerckhoff Hydroelectric Project operations.

Under the Proposed Project, ground-disturbing activities would primarily occur during retirement of the K1 Powerhouse and construction of the Vista Day Use Area near the K2 Powerhouse, including installation of a paved access road between Access Road 6A and the day use area, picnic sites, parking, and associated amenities, resulting in disturbance of approximately 2.72 acres. Additional minor ground disturbance could occur at construction staging areas and along existing access roads. Modification of the FERC Project Boundary would remove Access Road 6, which would become a shared BLM/PG&E road managed under a separate maintenance agreement that incorporates erosion and sedimentation control measures outside of the Proposed Project's Road and Trail Maintenance Plan. The existing trail to Gage J-2 would be abandoned and

allowed to return to native conditions, eliminating erosion potential from Proposed Project-related use.

Ground-disturbing construction activities (e.g., grading, excavation, and equipment movement) could temporarily expose erodible soils and result in localized soil erosion and loss of topsoil during precipitation events. Such erosion could also result in short-term, localized sediment discharge within the Area of Analysis.

Impact Analysis without Mitigation

Therefore, prior to mitigation, there would be a **Potentially Significant Impact** related to erosion and loss of topsoil from construction activities under the Proposed Project for potential impact GEO-5.

Impact Analysis with Mitigation

To reduce the potentially significant impact, implementation of Mitigation Measure GEO-1: Erosion and Sediment Control Plan would require PG&E to develop and implement a Proposed Project-wide plan erosion and sediment control program applicable to all lands within the Proposed Project area. Mitigation Measure GEO-1 includes, among other elements, inventory and monitoring to identify erosion sites; criteria for prioritizing erosion treatment; site-specific erosion control and reclamation measures; effectiveness monitoring; and emergency erosion response procedures. For new construction and non-routine maintenance, Mitigation Measure GEO-1 further requires development of site-specific temporary erosion controls and long-term reclamation measures prior to ground disturbance.

Construction activities that disturb sufficient acreage would also be subject to Mitigation Measure WQ-3: Construction General Permit, Water Quality Monitoring and Protection Plans, and Dewatering Plans, which requires compliance with the State Water Board's Construction General Permit and preparation of site-specific plans where the permit does not apply. These mitigation measures would further reduce the potential for construction-related erosion and sediment discharge.

Therefore, there would be a **Less than Significant Impact** on potential for erosion and loss of topsoil as a result of construction activities under the Proposed Project for potential impact GEO-5 with incorporation of Mitigation Measures GEO-1 and WQ-3.

Operation

Under the Proposed Project, PG&E would continue routine maintenance activities in accordance with existing management programs that incorporate best management practices intended to minimize soil instability, erosion, and sedimentation. In addition, PG&E's proposed flow environmental management measures (as described in Section 2.4.2.1 *Proposed Project Environmental Management Measures*) would maintain Kerckhoff Reservoir operations within the existing operating band and reduce rapid flow fluctuations within the PBR, such that Proposed Project operations would not be expected to increase erosion within the reservoir or downstream areas compared to baseline conditions.

Although routine operations generally result in minimal erosion effects, non-routine maintenance or other ground-disturbing operational activities (e.g., repairs, road or trail maintenance, or site restoration) could disturb soil and expose erodible areas.

Impact Analysis without Mitigation

Therefore, prior to mitigation, there would be a **Potentially Significant Impact** on erosion and loss of topsoil from operational activities under the Proposed Project for potential impact GEO-5.

Impact Analysis with Mitigation

To reduce the potentially significant impact, implementation of Mitigation Measure GEO-1 would require Proposed Project-wide monitoring, identification, treatment, and verification of erosion sites, and would require development of site-specific temporary erosion controls and long-term reclamation measures prior to any ground-disturbing operational activities. Where operational activities disturb sufficient acreage, applicable requirements of Mitigation Measure WQ-3 would also apply. With implementation of Mitigation Measure GEO-1, and WQ-3 where applicable, operational activities involving

ground disturbance would be conducted with erosion control and reclamation measures designed to minimize erosion and loss of topsoil.

Therefore, there would be a **Less than Significant Impact** on potential for erosion and loss of topsoil as a result of operational activities under the Proposed Project for potential impact GEO-5 with incorporation of Mitigation Measures GEO-1 and WQ-3.

Mitigation Measures

Mitigation Measure GEO-1: Erosion and Sediment Control Plan

Mandatory Section 4(e) conditions issued by BLM and USFS require PG&E to develop and implement an Erosion and Sediment Control Management Plan in consultation with applicable stakeholders. The plan shall establish measures to address erosion, control sedimentation, and reclaim disturbed areas for PG&E activities that have the potential to result in erosion on all lands within the Proposed Project Area over the term of the new license.

Consistent with mandatory Section 4(e) conditions issued by BLM and USFS, within two years of license issuance, PG&E shall develop an Erosion and Sediment Control Plan in consultation with the State Water Board, BLM, USFWS, USFS, and other interested parties, and subject to prior review and approval.

The plan shall provide direction for treating erosion, controlling sedimentation, and reclaiming disturbed sites within the Proposed Project Boundary during the term of the new license. The Erosion and Sediment Control Plan shall include the following guidelines for existing Kerckhoff Hydroelectric Project-affected areas:

- Methods for initial and periodic inventory and monitoring of the entire Proposed Project Area to identify erosion sites and sites needing reclamation caused by Proposed Project facilities and operations and assessment of site conditions for each erosion site. Periodic monitoring and inventory will include recording effectiveness of erosion and reclamation treatment measures and identification of new erosion and reclamation sites for the term of the new license

- Criteria for ranking and treating erosion and reclamation sites including a risk rating and hazard assessment for scheduling erosion treatment measures and monitoring at each site
- Erosion control and reclamation measures that incorporate current standards, follow USFS regulations and guidance (e.g. Forest Plan, Road Management Objectives, BMPs), and shall be customized to site-specific conditions
- A schedule for treatment (e.g., repair, mitigate, monitor) of erosion and reclamation sites, including a list of sites requiring immediate mitigation and schedule for their implementation
- Effectiveness monitoring of completed erosion control treatment measures after treatment to determine if further erosion control measures are needed. If erosion control measures are not effective, PG&E shall implement additional erosion control measures approved by the State Water Board and continue monitoring until the site has stabilized
- Protocols for emergency erosion and sediment control

Erosion Control Guidelines for New Construction or Non-Routine Maintenance

- At least 90 days before ground disturbance commences, PG&E shall develop site-specific temporary erosion control measures and long-term reclamation measures for each new construction or non-routine maintenance project. The temporary measures shall be designed to prevent erosion, stream sedimentation, dust, and soil mass movement during the period of ground disturbance until replaced by permanent reclamation measures within the Proposed Project Area
- The plan shall ensure compliance with the SR/SJR Basin Plan and any amendments hereto, including following water quality objectives below:
  - Turbidity:
    - Where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2
    - Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU

- Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent
- In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected

– Dissolved Oxygen

- For surface waterbodies outside the legal boundaries of the Delta, the monthly median of the mean daily DO concentration shall not fall below 85 percent of saturation in the main water mass, and the 95th percentile concentration shall not fall below 75 percent of saturation. The DO concentrations shall not be reduced below the following minimum levels at any time:

  - Waters designated WARM 5.0 mg/L
  - Waters designated COLD 7.0 mg/L
  - Waters designated SPWN 7.0 mg/L

– Suspended Material

- Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses

– Settleable Materials

- Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses

Reporting and Consultation

- Beginning within the first full calendar year of the new license, PG&E shall provide an annual report of erosion control and monitoring activities of the previous year during the annual consultation meeting. The annual report shall be provided to the State Water Board, BLM, USFWS, USFS, and other interested parties. Electronic

data (tabular and spatial) shall be provided along with the report. Documentation shall include a GIS database for maps keyed to a narrative description of detailed, site-specific, erosion treatment measures and sediment monitoring results

Mitigation Measure WQ-3: Construction General Permit, WQMP, and Dewatering Plans

When applicable, PG&E shall comply with the State Water Board's National Pollutant Discharge Elimination System (NPDES) *General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit)[25] (State Water Board 2022), *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* (Dredge or Fill Procedures) (State Water Board 2019, 2021), and amendments thereto the aforementioned documents to protect water quality standards and beneficial uses identified in the SR/SJR Basin Plan (Central Valley Regional Water Board 2019) during construction activities.

For construction and maintenance activities with the potential to impact water quality standards or beneficial uses identified in the SR/SJR Basin Plan that are not subject to the Construction General Permit, or a condition of the Kerckhoff Hydroelectric Project FERC license, PG&E shall prepare and implement site-specific Water Quality Monitoring and Protection Plans (WQMP Plans). At a minimum, the WQMP Plan shall include the following:

- Description of site conditions and the proposed activity
- Detailed descriptions, design drawings, and specific topographic locations of all control measures in relation to the proposed activity

[25] State Water Board Order WQ 2022-0057-DWQ and National Pollutant Discharge Elimination System No. CAS000002, and any amendments thereto. Available at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction/general_permit_reissuance.html

- Measures to address other potential water quality impairments associated with the proposed activity
- A monitoring program to assess Proposed Project impacts to water quality, including quality assurance/quality control measures that will be implemented
- Water quality monitoring locations for each Proposed Project activity, including background monitoring locations as applicable
- A list of parameters that will be monitored, including sampling types and sampling frequency
- A reporting schedule for water quality data and the response and reporting associated with any water quality objective exceedances

Prior to commencing any planned work that requires a water diversion or in-water work, PG&E shall submit a Dewatering and Diversion Plan to the Deputy Director for review and consideration of approval. The Dewatering and Diversion Plan shall be submitted at least 60 days before the anticipated activity is expected to occur. The Deputy Director may require modifications as part of any approval. PG&E shall not implement any activities associated with the Dewatering and Diversion Plan that may impact water quality or beneficial uses until receipt of Deputy Director and any other required approvals. For planned work that involves any instream dewatering, diversion of water, or in-water work, PG&E shall include the following:

- An overview of all in-water work that will require dewatering or diversion of water
- Timeframe(s) for required dewatering or diversion work
- Description of coffer dams or equivalent barriers that will be used to isolate the construction area from instream flows
- Description of measures, if needed, that will be implemented to avoid potential fish stranding and entrainment
- Provisions to maintain required minimum instream flows (MIFs). If temporary modification of MIFs are required, PG&E shall provide a written description of the modification, reason(s) for its necessity, measures that will be implemented to protect water quality and beneficial uses, and the proposed timeline for modification and return to the required MIFs

- Proposed monitoring and reporting related to the dewatering, diversion, and turbidity of water
- Description of how, upon completion of construction activities, flow will resume with the least disturbance to the substrate, water quality, and beneficial uses as practical

Planned activities shall not cause increased turbidity greater than allowable levels identified in the SR/SJR Basin Plan and amendments thereto.

- Where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2
- Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU
- Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent

In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

If turbidity exceedances are expected to result from sediment disturbance related to planned work activities despite implementation of all reasonable best management practices, PG&E shall consult with the State Water Board and Central Valley Regional Water Quality Control Board (Central Valley Regional Water Board) staff to determine an allowable zone of dilution in which turbidity in excess of the limits may be allowed.

Level of Significance

Less than Significant Impact with Mitigation Incorporated

4.8.4.5.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction impacts as the Proposed Project, discussed in Section 4.8.4.5.1. Construction activities under Alternative 1 would be the same as those described for the Proposed Project and would not introduce additional ground-disturbing activities. Operational modifications under

Alternative 1 are limited to changes in flow management measures and would not alter construction methods or increase erosion potential during construction.

Impact Analysis without Mitigation

Therefore, prior to mitigation, there would be a **Potentially Significant Impact** related to erosion and loss of topsoil from construction activities under Alternative 1 for potential impact GEO-5.

Impact Analysis with Mitigation

To reduce the potentially significant impact, implementation of Mitigation Measure GEO-1 would require Proposed Project-wide monitoring, identification, and treatment of erosion sites for the term of the license. Site-specific erosion control and reclamation measures would be implemented for any ground-disturbing operational activities and for erosion sites identified during routine monitoring. These requirements would ensure that erosion is identified early and addressed using appropriate control and stabilization measures.

Construction activities that disturb sufficient acreage would also be subject to Mitigation Measure WQ-3, which requires compliance with the State Water Board's Construction General Permit and preparation of site-specific plans where the permit does not apply. These mitigation measures would further reduce the potential for construction-related erosion and sediment discharge.

Therefore, there would be a **Less than Significant Impact** on potential for erosion and loss of topsoil as a result of construction activities under Alternative 1 for potential impact GEO-5 with incorporation of Mitigation Measures GEO-1 and WQ-3.

Operation

Based on the Alternative 1 operations modeling results (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), operations would modify the magnitude and timing of flows released from Kerckhoff Dam through implementation of the LTOR boating flows and associated down ramping measures, as well as a modified

ramp up protocol. These operational changes could result in short-term fluctuations in Kerckhoff Reservoir water surface elevations and controlled flow transitions in the PBR, which have the potential to incrementally influence erosion conditions within the Area of Analysis.

Modeling results indicate that implementation of the Spill Year Boating Flows and Down Ramping of Spill Flows Measure would result in small but frequent reservoir elevation fluctuations as flows are gradually reduced. These fluctuations would remain within the normal operating range of Kerckhoff Reservoir (approximately 980.0 to 984.5 feet msl), with most variability occurring within a narrow elevation band, and would occur for a limited number of days each year depending on WY type. While repeated short-term fluctuations could incrementally increase erosion potential along reservoir shorelines compared to baseline conditions, these effects would be episodic, limited in magnitude, and confined to areas historically exposed to operational water level changes.

During implementation of the Non-Spill Year Boating Flows and Down Ramping Measure, Kerckhoff Reservoir elevations would generally be lower than baseline conditions due to reduced inflows; however, the frequency of elevation fluctuations would be similar to or lower than baseline conditions. In addition, this measure was only intermittently successful in sustaining boating flows across the modeled period, which would further limit the duration and extent of any erosion-related effects.

The Stranding Protection Down Ramping Measure and the September – October Down Ramp Measure would introduce more gradual and controlled flow reductions in the PBR and result in relatively minor and short-duration reservoir elevation changes. These measures are designed to reduce abrupt stage changes and are not expected to substantially alter erosion processes within Kerckhoff Reservoir or along the PBR.

Overall, Alternative 1 operations would not introduce sustained or atypical hydrologic conditions beyond those historically experienced at the Kerckhoff Hydroelectric Project. All modeled reservoir fluctuations would remain within the established operating range, and the Area of Analysis has historically been subject to frequent water level changes

associated with Kerckhoff Hydroelectric Project operations and regional hydrologic variability. Accordingly, while Alternative 1 could result in localized and short-term changes in erosion potential, these effects would be episodic, limited in magnitude, and would occur within the historical operating range of Kerckhoff Reservoir.

Impact Analysis without Mitigation

Therefore, prior to mitigation, there would be a **Potentially Significant Impact** on potential for erosion and loss of topsoil from operational activities under Alternative 1 for potential impact GEO-5.

Impact Analysis with Mitigation

To reduce the potentially significant impact, implementation of Mitigation Measure GEO-1 would require Proposed Project-wide monitoring, identification, and treatment of erosion sites for the term of the license. Site-specific erosion control and reclamation measures would be implemented for any ground-disturbing operational activities and for erosion sites identified during routine monitoring. These requirements would ensure that erosion is identified early and addressed using appropriate control and stabilization measures.

With implementation of Mitigation Measure GEO-1, and WQ-3 where applicable, operational activities involving ground disturbance would be conducted with erosion control and reclamation measures designed to minimize erosion and loss of topsoil.

Therefore, there would be a **Less than Significant Impact** on potential for erosion and loss of topsoil as a result of operational activities under Alternative 1 for potential impact GEO-5 with incorporation of Mitigation Measures GEO-1 and WQ-3.

Mitigation Measures

Mitigation Measure GEO-1: Erosion and Sediment Control Plan

Mitigation Measure WQ-3: Construction General Permit, WQMP, and Dewatering Plans

Level of Significance

Less than Significant Impact with Mitigation Incorporated

4.8.4.5.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction impacts as the Proposed Project, discussed in Section 4.8.4.5.1. Construction activities under Alternative 2 would be the same as those described for the Proposed Project and would not introduce additional ground-disturbing activities or construction-related erosion risks.

Impact Analysis without Mitigation

Therefore, prior to mitigation, there would be a **Potentially Significant Impact** on potential for erosion and loss of topsoil from construction activities under Alternative 2 for potential impact GEO-5.

Impact Analysis with Mitigation

To reduce the potentially significant impact, implementation of Mitigation Measure GEO-1 would require Proposed Project-wide monitoring, identification, and treatment of erosion sites for the term of the license. Site-specific erosion control and reclamation measures would be implemented for any ground-disturbing operational activities and for erosion sites identified during routine monitoring. These requirements would ensure that erosion is identified early and addressed using appropriate control and stabilization measures.

Construction activities that disturb sufficient acreage would also be subject to Mitigation Measure WQ-3, which requires compliance with the State Water Board's Construction General Permit and preparation of site-specific plans where the permit does not apply. These mitigation measures would further reduce the potential for construction-related erosion and sediment discharge.

Therefore, there would be a **Less than Significant Impact** on potential for erosion and loss of topsoil as a result of construction activities under Alternative 2 for potential impact GEO-5 with incorporation of Mitigation Measures GEO-1 and WQ-3.

Operation

Based on the Alternative 2 operations modeling results (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), implementation of Alternative 2 would result in limited and episodic erosion effects within the Area of Analysis. The Modified EOS Flow Recession Measure resulted in drawdown of Kerckhoff Reservoir toward the K2 Powerhouse minimum operating reservoir elevation, producing short-term reservoir elevation fluctuations; however, all modeled fluctuations remained within the normal operating range of Kerckhoff Reservoir (approximately 980.0 to 984.5 feet msl).

The Subsequent Spill Ramp Down Measure, Modified Spill Season Flow Measure, and POM ramp down components employed more gradual ramping schedules and were successfully implemented with minimal or no sustained reservoir fluctuations. Although the POM Initial Release Protocol altered the timing of flow changes in the PBR, it did not create conditions that would substantially increase erosion potential.

The Proposed Project Area has historically experienced frequent hydrologic variability associated with Kerckhoff Hydroelectric Project operations and regional inflow conditions. Accordingly, while Alternative 2 operations could result in localized and short-term changes in erosion potential, erosion conditions are not expected to further degrade compared to baseline conditions.

Impact Analysis without Mitigation

Therefore, prior to mitigation, there would be a **Potentially Significant Impact** on potential for erosion and loss of topsoil from operational activities under Alternative 2 for potential impact GEO-5.

Impact Analysis with Mitigation

To reduce the potentially significant impact, implementation of Mitigation Measure GEO-1 would require Proposed Project-wide monitoring, identification, and treatment of erosion sites for the license term. Site-specific erosion control and reclamation measures would be implemented for erosion sites identified through monitoring or associated with ground-disturbing operational activities and for erosion sites identified during routine monitoring. These requirements would ensure that erosion is identified early and addressed using appropriate control and stabilization measures. With implementation of Mitigation Measure GEO-1, and WQ-3 where applicable, operational activities involving ground disturbance would be conducted with erosion control and reclamation measures designed to minimize erosion and loss of topsoil.

Therefore, there would be a **Less than Significant Impact** on potential for erosion and loss of topsoil from Alternative 2 operations for potential impact GEO-5 with incorporation of Mitigation Measures GEO-1 and WQ-3.

Mitigation Measures

Mitigation Measure GEO-1: Erosion and Sediment Control Plan

Mitigation Measure WQ-3: Construction General Permit, WQMP, and Dewatering Plans

Level of Significance

Less than Significant Impact with Mitigation Incorporated

4.8.4.6 Potential Impacts Related to Unstable Soils

Impact GEO-6: Would the Project 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?

4.8.4.6.1 Proposed Project

Construction

Construction activities under the Proposed Project would occur on the western slope of the Sierra Nevada within the Sierra Nevada microplate, a geologically stable area underlain by granitic bedrock and metamorphic rocks that provide strong structural stability. No portions of the Proposed Project are located within a designated Alquist-Priolo Earthquake Fault Zone, and known active faults are located approximately 65 miles from the Proposed Project Area. Although groundwater depths within the PBR range from approximately 6.5 to 8.5 feet, soils in the Area of Analysis are generally well-drained to excessively drained and shallow to moderately deep over bedrock, which limits the potential for liquefaction, lateral spreading, subsidence, or collapse.

Soils in the Area of Analysis consist primarily of upland soil series (e.g., Ahwahnee, Auberry, Tollhouse, and Vista) that are well drained, coarse textured (loam to sandy loam), and occur on slopes ranging from approximately 2 to 85 percent. Field investigations and erosion studies conducted for the Kerckhoff Hydroelectric Project relicensing identified no deep-seated landslides or large-scale mass-wasting features within the Area of Analysis and no evidence of significant soil instability around Kerckhoff Reservoir.

Construction under the Proposed Project would include retirement of the K1 Powerhouse, minor facility modifications, and construction of the Vista Day Use Area. These activities would not require large-scale excavation or grading on unstable slopes and would occur primarily in areas characterized by exposed bedrock or well-drained

upland soils. Design documents for the Vista Day Use Area would comply with BLM standards and applicable federal seismic and geotechnical design requirements. Proposed Project monitoring plans would be coordinated with BLM's Bakersfield RMP (BLM 2014) and USFS-SNF's Land Management Plan (USFS 2023).

Impact Analysis without Mitigation

Although the regional geologic setting is generally stable, construction activities involving ground disturbance (e.g., excavation, grading, and use of heavy equipment) have the potential to adversely interact with existing geologic units and steep or over-steepened slope configurations, particularly in previously modified cut-slope areas. Ground disturbance could locally reduce soil or rock mass strength or alter subsurface conditions if not properly engineered and stabilized. Therefore, prior to mitigation, there would be a **Potentially Significant Impact** related to unstable soils or geologic units from construction activities under the Proposed Project for potential impact GEO-6.

Impact Analysis with Mitigation

Implementation of Mitigation Measure GEO-1 would require PG&E to develop and implement a Proposed Project-wide plan (applicable to all lands within the Proposed Project Area) that includes inventory and monitoring of site geologic conditions; criteria for prioritizing locations requiring engineering attention; site-specific stabilization and ground support measures; performance monitoring; and emergency response procedures. For new construction and non-routine maintenance, Mitigation Measure GEO-1 would further require the development of site-specific temporary construction controls and long-term stabilization measures prior to ground disturbance. These requirements would minimize adverse interactions with geologic units and slope configurations and reduce the potential for localized ground instability during and after construction.

With implementation of Mitigation Measure GEO-1, the potential for construction-related unstable soils and geologic units would be reduced to a less than significant level. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact GEO-6.

Operation

Under the Proposed Project, PG&E would continue routine maintenance activities in accordance with existing management programs and would implement proposed flow environmental management measures (as described in Section 2.4.2.1 *Proposed Project Environmental Management Measures*). These measures would reduce rapid flow fluctuations within the PBR and maintain Kerckhoff Reservoir operations within the existing operating band. As a result, Proposed Project operations would not be expected to increase the potential for soil instability, mass movement, or other forms of geologic instability compared to baseline conditions.

Routine operations would not alter underlying geology or soil conditions; however, non-routine maintenance or other operational activities involving ground disturbance (e.g., repairs, road or trail maintenance, or site restoration) could disturb soils on steep slopes or in previously disturbed areas such as road cuts.

Impact Analysis without Mitigation

Therefore, prior to mitigation, operational activities involving ground disturbance could result in a **Potentially Significant Impact** related to unstable soils or geologic units under the Proposed Project for potential impact GEO-6.

Impact Analysis with Mitigation

To reduce the potentially significant impact, implementation of Mitigation Measure GEO-1 would require Proposed Project-wide monitoring and identification of areas where site geologic conditions or slope configurations warrant additional engineering oversight; implementation of site-specific stabilization and ground support measures tailored to site conditions; performance monitoring with corrective actions as needed; and emergency response protocols. For new construction or non-routine maintenance, Mitigation Measure GEO-1 would further require the development of site-specific temporary construction controls and long-term stabilization measures prior to ground disturbance. With implementation of Mitigation Measure GEO-1, ground-disturbing operational activities would be conducted using measures designed to minimize

adverse interactions with geologic units and slope configurations and reduce the potential for localized ground instability.

Although the Proposed Project would not introduce a mechanism for geologic or soil instability, implementation of Proposed Project-wide monitoring and corrective actions provides an added level of protection against localized slope or soil conditions that could develop over the license term due to natural processes or existing site conditions. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact GEO-6.

Mitigation Measures

Mitigation Measure GEO-1: Erosion and Sediment Control Plan

Level of Significance

Less than Significant Impact with Mitigation Incorporated

4.8.4.6.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction impacts as the Proposed Project, discussed in Section 4.8.4.6.1. Construction activities under Alternative 1 would be the same as those described for the Proposed Project and would not introduce additional ground-disturbing activities or construction methods that would increase interactions with geologic units or slope configurations beyond those already evaluated.

Impact Analysis without Mitigation

Therefore, prior to mitigation, there would be a **Potentially Significant Impact** related to unstable soils or geologic units from construction activities under Alternative 1 for potential impact GEO-6.

Impact Analysis with Mitigation

To reduce the potentially significant impact, implementation of Mitigation Measure GEO-1 would require construction activities under Alternative 1 be subject to Proposed Project-wide requirements for monitoring site geologic conditions and implementing appropriate stabilization and construction controls to address localized ground stability considerations. Therefore, there would be a **Less than Significant Impact** related to unstable soils or geologic units as a result of construction activities under Alternative 1 for potential impact GEO-6 with incorporation of Mitigation Measure GEO-1.

Operation

Under Alternative 1, operations would modify the magnitude and timing of flows released from Kerckhoff Dam through implementation of the LTOR boating flows and associated down-ramping measures, as well as a modified ramp-up protocol. These operational changes would not involve ground disturbance, excavation, grading, or modification of facilities, slopes, or foundations.

Alternative 1 would not alter the underlying geologic setting, soil conditions, or slope configurations within the Area of Analysis. All flow-related operational changes would occur within the historical operating range of Kerckhoff Reservoir and would not introduce new or atypical loading, unloading, or groundwater conditions that could affect deep-seated soil or bedrock stability. No changes to infrastructure or reservoir operations under Alternative 1 would create a mechanism for inducing landslides, lateral spreading, subsidence, liquefaction, or collapse.

Accordingly, Alternative 1 operations would not increase the potential for geologic instability beyond existing conditions. The Kerckhoff Hydroelectric Project would not be located on a geologic unit or soil that would become unstable as a result of Alternative 1 operations, and no on- or off-site geologic hazards related to instability would be expected to occur. However, ongoing monitoring and treatment of erosion or soil conditions under Mitigation Measure GEO-1 would ensure that any localized or emerging instability concerns are identified and addressed in a timely manner.

Impact Analysis without Mitigation

Therefore, prior to mitigation, operational activities involving ground disturbance could result in a **Potentially Significant Impact** related to unstable soils or geologic units under Alternative 1 for potential impact GEO-6.

Impact Analysis with Mitigation

To reduce the potentially significant impact, implementation of Mitigation Measure GEO-1 would provide Proposed Project-wide monitoring and adaptive management to address localized erosion or slope conditions that could otherwise contribute to instability over time. Ongoing monitoring and treatment of erosion or soil conditions under Mitigation Measure GEO-1 would ensure that any localized or emerging instability concerns are identified and addressed in a timely manner. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 1 for potential impact GEO-6 with incorporation of Mitigation Measure GEO-1.

Mitigation Measures

Mitigation Measure GEO-1: Erosion and Sediment Control Plan

Level of Significance

Less than Significant Impact with Mitigation Incorporated

4.8.4.6.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction impacts as the Proposed Project, discussed in Section 4.8.4.6.1. Construction activities under Alternative 2 would be the same as those described for the Proposed Project and would not introduce additional ground-disturbing activities or construction methods that would increase interactions with geologic units or slope configurations beyond those already evaluated.

Impact Analysis without Mitigation

Therefore, prior to mitigation, there would be a **Potentially Significant Impact** related to unstable soils or geologic units from construction activities under Alternative 2 for potential impact GEO-6.

Impact Analysis with Mitigation

To reduce the potentially significant impact, implementation of Mitigation Measure GEO-1 would require construction activities under Alternative 1 be subject to Proposed Project-wide requirements for monitoring site geologic conditions and implementing appropriate stabilization and construction controls to address localized ground stability considerations. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 2 for potential impact GEO-6 with incorporation of Mitigation Measure GEO-1.

Operation

Under Alternative 2, operations would modify flow management measures through implementation of the BLM's revised Section 4(e) Conditions, including a Modified EOS Flow Recession Measure, Subsequent Spill Ramp Down Measure, and Modified POM. These operational changes would not involve ground disturbance, excavation, grading, or modification of facilities, slopes, or foundations.

Alternative 2 would not alter the underlying geologic setting, soil conditions, or slope configurations within the Area of Analysis. All flow-related operational changes would occur within the historical operating range of Kerckhoff Reservoir and would not introduce new or atypical loading, unloading, or groundwater conditions that could affect soil or bedrock stability. No Alternative 2 operational measure would create a mechanism for inducing landslides, lateral spreading, subsidence, liquefaction, or collapse.

Accordingly, Alternative 2 operations would not increase the potential for geologic or soil instability beyond existing conditions. The Kerckhoff Hydroelectric Project would not be

located on a geologic unit or soil that would become unstable as a result of Alternative 2 operations.

Impact Analysis without Mitigation

Therefore, prior to mitigation, operational activities involving ground disturbance could result in a **Potentially Significant Impact** related to unstable soils or geologic units under Alternative 2 for potential impact GEO-6.

Impact Analysis with Mitigation

To reduce the potentially significant impact, implementation of Mitigation Measure GEO-1 would provide Proposed Project-wide monitoring and adaptive management to address localized erosion or slope conditions that could otherwise contribute to instability over time. Ongoing monitoring and treatment of erosion or soil conditions under Mitigation Measure GEO-1 would ensure that any localized or emerging instability concerns are identified and addressed in a timely manner. Therefore, there would be a **Less Than Significant Impact** related to geologic or soil instability as a result of operational activities under Alternative 2 for potential impact GEO-6 with incorporation of Mitigation Measure GEO-1.

Mitigation Measures

Mitigation Measure GEO-1: Erosion and Sediment Control Plan

Level of Significance

Less than Significant Impact with Mitigation Incorporated

4.8.4.7 Potential Impacts Related to Expansive Soils

Impact GEO-7: Would the Project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

4.8.4.7.1 Proposed Project

Construction

Construction activities under the Proposed Project would occur on the western slope of the Sierra Nevada within the Sierra Nevada microplate, a geologically stable area underlain by granitic bedrock and metamorphic rocks and associated well-drained upland soils. These geologic materials do not contain clay-rich minerals typically associated with expansive soils.

Soils in the Area of Analysis consist primarily of upland soil series (e.g., Ahwahnee, Auberry, Tollhouse, and Vista) that are well-drained, coarse-textured (loam to sandy loam), and shallow to moderately deep over granitic bedrock, with slopes ranging from about 2 to 85 percent, with low shrink-swell potential. No evidence of significant mass soil movement, slumping, or instability has been reported near Kerckhoff Reservoir or Kerckhoff Hydroelectric Project facilities. Soils with moderately high or high expansion potential have not been identified within the Proposed Project Area.

Construction activities under the Proposed Project would not introduce new expansive soils or modify existing soil conditions in a manner that would increase risks related to expansive soils. When appropriate, PG&E would conduct site-specific geotechnical and soils investigations prior to construction, and construction activities would follow applicable engineering recommendations and standards. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact GEO-7.

Operation

Under the Proposed Project, PG&E would continue routine maintenance activities in accordance with the Vegetation Management and Pest Control Plan, the Project Road

and Trail Maintenance Plan, and other existing management programs, incorporating BMPs to prevent soil instability, erosion, and sedimentation. Operational activities would not alter soil conditions or introduce expansive soils.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact GEO-7.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.7.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction impacts as the Proposed Project, discussed in Section 4.8.4.7.1. Construction activities under Alternative 1 would not involve development on expansive soils, as defined in Table 18-1-B of the Uniform Building Code (1994), and would not create substantial direct or indirect risks to life or property. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 1 for potential impact GEO-7.

Operation

Alternative 1 has the same analysis and impact determination for operational impacts as the Proposed Project, discussed in Section 4.8.4.7.1. Operation under Alternative 1 would not alter soil conditions or introduce expansive soils that could create substantial direct or indirect risks to life or property. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 1 for potential impact GEO-7.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.7.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction impacts as the Proposed Project, discussed in Section 4.8.4.7.1. Construction activities under Alternative 2 would not involve development on expansive soils, as defined in Table 18-1-B of the Uniform Building Code (1994), and would not create substantial direct or indirect risks to life or property. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 2 for potential impact GEO-7.

Operation

Alternative 2 has the same analysis and impact determination for operational impacts as the Proposed Project, discussed in Section 4.8.4.7.1. Operation under Alternative 2 would not alter soil conditions or introduce expansive soils that could create substantial direct or indirect risks to life or property. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 2 for potential impact GEO-7.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.8 Potential Impacts Related to Water Disposal Systems

Impact GEO-8: Would the Project 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?

4.8.4.8.1 Proposed Project

Construction and Operation

The Proposed Project would not involve installation or use of septic tanks or subsurface wastewater disposal systems. Waste generated at the proposed Vista Day Use Area would be managed through a pit toilet, with waste periodically removed using standard pump-out procedures and transported to an approved off-site treatment or disposal facility. As a result, the suitability of on-site soils for septic systems would not be a limiting factor for the Proposed Project.

Operation of the pit toilet would be conducted in accordance with PG&E's Hazards Management Business Plan and applicable handling and disposal requirements. Proposed Project soils would not be relied upon to support wastewater disposal, and construction or operational activities would not create conditions requiring the use of septic systems or alternative on-site wastewater disposal methods.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under the Proposed Project for potential impact GEO-8.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.8.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project, discussed in Section 4.8.4.8.1. The modifications to flow management measures under Alternative 1 would not involve installation or use of septic tanks or subsurface wastewater disposal systems. Waste generated at the Vista Day Use Area would continue to be managed through a pit toilet with periodic pump-out and off-site disposal at an approved facility. Proposed Project soils would not be relied upon to support wastewater disposal, and modifications to flow management measures under Alternative 1 would not affect soil suitability for septic or alternative wastewater disposal systems. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 1 for potential impact GEO-8.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.8.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project, discussed in Section 4.8.4.8.1. The modifications to flow management measures under Alternative 2 would not involve installation or use of septic tanks or subsurface wastewater disposal systems. Waste generated at the Vista Day Use Area would continue to be managed through a pit toilet with periodic pump-out and off-site disposal at an approved facility. Proposed Project soils would not be relied upon to support wastewater disposal, and modifications to flow management measures under Alternative 2 would not affect soil suitability for septic or alternative wastewater disposal systems. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 2 for potential impact GEO-8.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.9 Potential Impacts Related to Paleontological and Geological Resources

Impact GEO-9: Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

4.8.4.9.1 Proposed Project

Construction and Operation

Construction activities under the Proposed Project would occur on the western slope of the Sierra Nevada within the Sierra Nevada geomorphic province. The geologic setting consists primarily of Mesozoic granitic rocks (including granodiorite, quartz diorite, and tonalite), with lesser areas of metamorphic and metavolcanic rocks. According to the Bureau of Land Management's Potential Fossil Yield Classification (PFYC) System, these igneous and metamorphic rock units are classified as PFYC Class 1 (Very Low), indicating a very low potential to contain significant paleontological resources. Sedimentary formations typically associated with fossil preservation, such as marine shales or limestones, are absent from the Area of Analysis.

No unique geologic features, such as caves, volcanic plugs, or notable mineralogical formations, have been identified within the Proposed Project Area or proposed construction locations. Construction and operational activities would occur primarily within previously disturbed areas or on exposed granitic bedrock with minimal soil cover and would not affect fossil-bearing formations or unique geologic feature.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under the Proposed Project for potential impact GEO-9.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.9.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project, discussed in Section 4.8.4.9.1. Alternative 1 would not involve ground-disturbing activities in geologic units with paleontological sensitivity or affect any unique geologic features. Modifications to flow management measures under Alternative 1 would not result in the direct or indirect destruction of a unique paleontological resource or site or a unique geologic feature. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 1 for potential impact GEO-9.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.4.9.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project, discussed in Section 4.8.4.9.1. Alternative 2 would not involve ground-disturbing activities in geologic units with paleontological sensitivity or affect any unique geologic features. Modifications to flow management measures under Alternative 2 would not result in the direct or indirect destruction of a unique paleontological resource or site or a unique geologic feature. Therefore, there would be a **Less than Significant Impact**

as a result of construction or operational activities under Alternative 2 for potential impact GEO-9.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.8.5 Literature Cited

BLM (United States Bureau of Land Management). 2014. *Bakersfield Field Office Record of Decision & Approved Resource Management Plan*. U.S. Department of the Interior, Bureau of Land Management. December 2014. Accessed: April 3, 2026. Retrieved from: https://www.govinfo.gov/content/pkg/GOVPUB-I53-PURL-gpo83734/pdf/GOVPUB-I53-PURL-gpo83734.pdf

_____. 2016. *Potential Fossil Yield Classification System for Paleontological Resources on Public Lands*. United States Department of the Interior, Bureau of Land Management. Accessed: April 3, 2026. Retrieved from: https://www.blm.gov/sites/blm.gov/files/uploads/IM2016-124_att1.pdf

Bryant, W.A. and Hart, E.W. 2007. *Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act With Index to Earthquake Fault Zones Maps*. Special Publication 42, 42 p.

California Geological Survey. 2008. *Guidelines for Evaluating and Mitigating Seismic Hazards in California.* Special Publication 117A.

Central Valley Regional Water Board (Central Valley Regional Water Quality Control Board). 2019. *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region*. Fifth Edition, Revised February 2019 (with Approved Amendments). The Sacramento River Basin and San Joaquin River Basin. Accessed: April 3, 2026. Retrieved from: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201902.pdf.

FERC (Federal Energy Regulatory Commission). 2025. *Environmental Assessment for the Kerckhoff Hydroelectric Project, FERC Project No. 96-048*. Washington, D.C. December. Accessed: April 5, 2026. Retrieved from: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20251231-3001&optimized=false&sid=e4353735-bc31-414a-8938-299c96575f03.

Fresno County. 2023. *Fresno County General Plan Background Report.* General Plan Review and Revision; Public Review Draft. April. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/2/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr-background-report-2023-05-10.pdf.

____. 2024. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

Madera County. 1995a. *Madera County General Plan Background Report*. Adopted October 24. Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/2852/636480653566630000.

____. 1995b. *Madera County General Plan Policy Document*. Adopted October 24. Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/government/community-economic-development-department/divisions/planning-division/planning-forms-and-documents/-folder-269.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

PG&E (Pacific Gas and Electric Company). 2019a. *Technical Study Report 01: Channel Form and Fluvial Processes (Study GEO 1), Kerckhoff Hydroelectric Project,*

FERC Project No. 96. Pacific Gas and Electric Company, San Francisco, CA. May 2019.

____. 2019b. *Technical Study Report 08: Recreation Facility Assessment (Study REC 2), Kerckhoff Hydroelectric Project, FERC Project No. 96.* Pacific Gas and Electric Company, San Francisco, CA. December 2019.

____. 2020a. *Technical Study Report 10: Project Roads and Trails Assessment (Study LAND 1).* Pacific Gas and Electric Company, San Francisco, CA. April 2020.

____. 2020b. *Technical Study Report 12: Project Road-Related Erosion (Study GEO 3), Kerckhoff Hydroelectric Project, FERC Project No. 96.* Pacific Gas and Electric Company, San Francisco, CA. June 2020.

____. 2022. *Kerckhoff Hydroelectric Project, FERC Project No. 96, Final License Application, Exhibit E*. Revised May 2022.

____. 2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

State Water Board (California State Water Resources Control Board). 2019. Wetland and Riparian Area Protection Policy (WRAPP): Clean Water Act Section 401 Certification and Wetlands Program. Accessed: March 31, 2026. Available at: https://www.waterboards.ca.gov/water_issues/programs/cwa401/wrapp.html.

_____. 2021. State Water Resources Control Board Resolution No. 2021-0012: Confirmation that the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State are in Effect as State Policy for Water Quality Control. April 6. Accessed: March 31, 2026. Available at: https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2021/rs2021-0012.pdf.

_____. 2022. NPDES 20220 Construction Stormwater General Permit Reissuance. Accessed: March 31, 2026. Available at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction/general_permit_reissuance.html.

USFS (United States Forest Service). 2023. *Land Management Plan for the Sierra National Forest: Fresno, Madera, and Mariposa Counties, California.* Accessed:

April 3, 2026. Retrieved from: https://acconsensus.org/wp-content/uploads/2024/08/05-SNF_LMP_final_20230504_Web.pdf.

USGS (United States Geological Service). 2023. Areas of Land Subsidence in California. Accessed: April 3, 2026. Retrieved from: https://ca.water.usgs.gov/land_subsidence/california-subsidence-areas.html

Working Group on California Earthquake Probabilities. 2015. *UCERF3: A New Earthquake Forecast for California's Complex Fault System*. U.S. Geological Survey Fact Sheet 2015–3009.

4.9 GREENHOUSE GAS EMISSIONS

This section describes existing conditions and analyzes potential impacts on greenhouse gas (GHG) emissions as a result of implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts on GHG emissions from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.9-1).

Table 4.9-1: CEQA Checklist for Greenhouse Gas Emissions

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

4.9.1 Environmental Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public lands administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and United States Bureau of Reclamation (Reclamation) under BLM management.

4.9.1.1 Climate Change

Climate change refers to any measurable alteration in climatic conditions that lasts for an extended period—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 up. This phenomenon is called the greenhouse effect and is necessary to support life on earth; however, excessive buildup of GHGs can change the earth's climate and result in undesirable effects on ecosystems, which affect human health and welfare. Average temperatures have risen across the contiguous 48 states since 1901, with an increased rate of warming over the past 30 years. The highest average annual temperature across the contiguous 48 states over the past 131 years occurred in 2024, and eight of the warmest years on record have occurred since 2015 (USGCRP 2025). 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. 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 (USGCRP 2025).

4.9.1.2 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, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride. CO_2, CH_4, and nitrous oxide are the most significant GHGs in the atmosphere and account for approximately 97 percent of GHG emissions in the United States (USEPA 2025). Some GHGs have a stronger greenhouse effect than others. This is because these gases differ in two key ways: (1) their ability to absorb energy, and (2) how long they persist in the atmosphere (i.e., lifetime). The Intergovernmental Panel on Climate Change 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 GHGs will absorb over a given period, 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 carbon dioxide equivalent (CO_2e). The GWP is used to convert GHGs to CO_2e. This is done by multiplying the mass of the gas emitted by its GWP. For instance, a project that generates 10 MT of CH_4, which has a GWP of 28, would be equivalent to 280 MT of CO_2e—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 CO_2 over that same period (CARB 2026).

4.9.1.3 Regional Setting

Annual average temperatures in California have increased by about 2.5 degrees Fahrenheit (°F) since measurements were first recorded in 1895. Recent years were notably warm, with 2014 being the warmest on record and 9 of the 10 warmest years occurring since 2014 (OEHHA 2022). Some of these warmest years coincided with some of the driest years in the instrumental record and led to exacerbated drought conditions due to increased land surface temperatures, evapotranspiration, and evaporative demand. Minimum, average, and maximum temperatures have increased overall. Minimum temperatures (which reflect overnight low temperatures) have increased the fastest (OEHHA 2022).

The Proposed Project is in the San Joaquin Valley, which makes up the southern half of California's Central Valley and is bordered by the Sierra Nevada in the east, the Coast Ranges in the west, and the Tehachapi Mountains in the south. The San Joaquin Valley is in a Mediterranean Climate Zone, which is characterized by sparse rainfall, occurring mainly in winter. Summers are hot and dry, with summertime maximum temperatures often exceeding 100°F (Valley Air District 2015).

4.9.1.4 State Emissions Inventory

In 2023, emissions from statewide GHG-emitting activities were 360.4 million metric tons (MMT) of carbon dioxide equivalent (CO_2e), which was 11.2 MMT CO_2e (3.0 percent) lower than 2022 levels (CARB 2025). Since the peak level in 2004, California's GHG emissions have generally followed a decreasing trend, with statewide emissions dropping below the 2020 Assembly Bill (AB) 32 GHG Limit in 2014 and remaining below ever since (CARB 2025). The transportation sector remains the largest source of GHG emissions in the state, accounting for 38 percent of statewide emissions in 2023 (CARB 2025). Emissions from the electricity sector accounted for 15.9 percent of 2023 statewide GHG emissions, a 4.2 percent decrease compared to 2022 due to reduced generation and increases in solar generation (CARB 2025). Fossil gas-powered generation decreased by 5.0 terawatt-hours (3.9 percent) compared to 2022 (CARB 2025). While yearly fluctuations in hydropower availability result in small changes to GHG intensity, the overall downward trend prevails for GHG intensity from electricity generation (CARB 2025).

4.9.2 Regulatory Background

The following subsections contain an overview of regulations related to GHG emissions.

4.9.2.1 Federal

4.9.2.1.1 Federal Power Act

The Federal Power Act (Title 16 United States Code (USC) Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal

Power Act created the Federal Energy Regulatory Commission (FERC) and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations [CFR] Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.9.2.1.2 *Massachusetts v. United States Environmental Protection Agency*

On April 2, 2007, in Massachusetts v. USEPA, 549 U.S. 497, the Supreme Court found that GHGs are air pollutants covered by the Clean Air Act (CAA). This decision led the way to developing regulations that limit the amount of GHGs emitted from vehicles and stationary sources (e.g., power plants and refineries). The United States Environmental Protection Agency (USEPA) has established reporting regulations that require specific facilities and industries to report their GHG emissions annually. 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.

4.9.2.2 State

California has developed several regulations and goals to reduce GHG emissions within the state. Those relevant to the Proposed Project are summarized below.

4.9.2.2.1 Executive Order S-03-05

Executive Order (EO) S-03-05 established GHG reductions targets for the state of California in June 2005. The targets called for a reduction of GHG emissions to 2000 levels by 2010; a reduction of GHG emissions to 1990 levels by 2020; and a reduction of GHG emissions to 80 percent below 1990 levels by 2050. The California Environmental Protection Agency secretary is required to coordinate development and implementation of strategies to achieve the GHG reduction targets.

4.9.2.2.2 Assembly Bill 32

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 and 80 percent below 1990

levels by 2050, 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 (CARB 2022). This is accomplished in part by using 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 *2022 Scoping Plan for Achieving Carbon Neutrality* lays out a path to achieve targets for carbon neutrality and reduce anthropogenic GHG emissions by 85 percent below 1990 levels no later than 2045 (CARB 2022).

4.9.2.2.3 Senate Bill 375

In addition to policy directly guided by AB 32, the California Legislature in 2008 enacted Senate Bill (SB) 375 (the Sustainable Communities and Climate Protection Program), which provided for regional coordination in land use and transportation planning and funding to help meet the AB 32 GHG reduction goals. SB 375 aligns regional transportation planning efforts, regional GHG emissions reduction targets, and land use and housing allocations. SB 375 requires that regional transportation plans (RTP) developed by the state's 18 metropolitan planning organizations (MPO) incorporate Sustainable Communities Strategies (SCS) that achieve GHG emission reduction targets set by CARB and coordinate regional housing and transportation.

SB 375 also requires the CARB to set emission reduction targets for automobiles and light duty trucks for 2020 and 2035 for each MPO, and to update the regional targets at least every eight years. The targets set for Fresno County in the 2022 RTP/SCS specified a 6 percent per capita reduction in emissions from cars and light duty trucks by 2020 and a 13 percent per capita reduction in emissions by 2035 (FCOG 2022). The GHG targets set for Madera County called for a 10 percent per capita reduction by 2020

and a 16 percent per capita reduction by 2035 (MCTC 2022). SB 375 required that the Fresno Council of Government (FCOG) and Madera County Transportation Commission (MCTC) demonstrate in their SCS that GHG emission reduction targets will be met for 2020 and 2035. Proposed Project consistency with the FCOG 2022 RTP/SCS (FCOG 2022), as well as the MCTC 2022 RTP/SCS (MCTC 2022) and subsequent amendments, would support AB 32 and SB 32 GHG reduction goals.

4.9.2.2.4 Executive Order B-30-15

In April 2015, EO B-30-15 was signed that added the intermediate target of reducing GHG emissions to 40 percent below 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.

4.9.2.2.5 Senate Bill 32

SB 32 expands upon AB 32 to reduce GHG emissions. It was signed in September 2016 and sets into law the mandated GHG emission reduction target established by EO B-30-15. CARB is responsible for ensuring that California meets this goal. The provisions of SB 32 were added to Section 38566 of the Health and Safety Code subsequent to the bill's approval, which went into effect January 1, 2017.

4.9.2.2.6 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.

4.9.2.2.7 Renewables Portfolio Standard (SB 100)

California's Renewables Portfolio Standard (RPS) Program, established in 2002 by SB 1078, 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 megawatts [MW] or less). PG&E's voluntary goal is to deliver 70 percent RPS clean electricity by 2030, which is above the compliance obligation (PG&E 2023).

4.9.2.2.8 Regulation for the Mandatory Reporting of Greenhouse Gas Emissions

Title 17, CCR, Sections 95100 through 95163 establish mandatory GHG reporting, verification, and other requirements for operators of certain facilities that directly emit GHGs, suppliers of certain fuels and CO_2, electric power entities, verifiers of GHG emissions data reports and offset project data reports submitted pursuant to the cap-and-trade regulation, and verification bodies. The Mandatory Reporting of Greenhouse Gas Emissions Regulation was originally adopted in 2007 and updated in 2011 to meet the needs of the Cap-and-Trade Program.

4.9.2.2.9 California Cap-and-Trade Regulation

Title 17, California Code of Regulations (CCR), Sections 95801 through 96022 establish California's Cap-and-Trade Regulation, which was issued in 2012 to reduce emissions of GHGs in different sectors and enforce the GHG Cap-and-Trade Program. The Cap-and-Trade Program is enforced by CARB and relies on data collected through the Mandatory Reporting of GHG Emissions Regulation to identify major sources of GHG emissions in California. The Cap-and-Trade Program sets a statewide limit for major sources of GHG emissions that declines each year; consequently, the regulation applies an aggregate GHG allowance budget on covered entities. One allowance is equal to one MT of CO_2e emissions. Fewer allowances are created every year and the annual cap declines, reducing overall emissions in line with California's emissions targets. The latest version was issued in 2018.

4.9.2.3 Local

4.9.2.3.1 Regional Transportation Plans

Per SB 375, the FCOG is the federally recognized MPO and regional planning agency for Fresno County and serves as a forum for regional issues relating to transportation, the economy, community development, and the environment. The FCOG has prepared the 2022 RTP/SCS for the region (FCOG 2022). The FCOG's 2022 RTP/SCS (FCOG 2022) addresses GHG emissions reductions and other air pollutant emissions related to transportation, with the goal of preparing for future growth in a sustainable manner through 2046. Policies in the FCOG 2022 RTP/SCS are implemented to protect the region's air quality, and they build on the short-range program's successes, both federal and California policies and mandates related to air quality and GHG emissions, and available funding. Long-term strategies are those that are often aimed at changing attitudes and behavior toward new and alternate transportation systems and fuels, alternative means of commuting to work, and land use changes over time.

As noted above, the MCTC is the regional planning agency for Madera County and serves as a forum for regional issues related to transportation, the economy, community development, and the environment. The MCTC 2022 RTP/SCS (MCTC 2022) and subsequent amendments address GHG emissions reductions and other air pollutant emissions related to transportation, with the goal of preparing for future growth in a sustainable manner through the year 2046. Policies in the MCTC 2022 RTP/SCS and subsequent amendments are implemented to protect the region's air quality and meet GHG reduction targets.

4.9.2.3.2 San Joaquin Valley Air Pollution Control District

CEQA requires lead agencies to establish specific procedures for administering its responsibilities under CEQA, including orderly evaluation of projects and preparation of environmental documents. The Proposed Project is located within the jurisdiction of the San Joaquin Valley Air Pollution Control District (Valley Air District). In August 2008, the Valley Air District's Governing Board adopted the Climate Change Action Plan (CCAP) in response to this CEQA requirement. The CCAP directed the Valley Air District Air

Pollution Control Officer to assist lead agencies, Proposed Project proponents, permit applicants, and interested parties in assessing and reducing the impacts of Proposed Project-specific GHG emissions on global climate change. To that end, on December 17, 2009, the Valley Air District adopted the following:

- Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA
- District Policy – Addressing GHG Emission Impacts for Stationary Source Projects under CEQA when Serving as the Lead Agency

The Guidance is intended for San Joaquin Valley land-use agencies when they are the lead agency for CEQA and for land-use development projects. The District Policy is only relevant to projects for which the Valley Air District has discretionary approval authority over the project and is serving as the lead agency for CEQA purposes.

4.9.2.3.3 Fresno County General Plan

The Fresno County General Plan includes goals related to air quality and climate change in the Transportation and Circulation, Open Space and Conservation, and Health and Safety Elements (Fresno County 2024). The goals include to improve the sustainability of and resiliency of Fresno County through continued efforts to reduce the causes of and adapt to climate change specifically by supporting plans, standards, regulations, incentives, and investments based on sound science to reduce the impacts of climate change; to collaborate with federal, state, and local agencies, property owners and residents to reduce generation of GHG emissions; and to develop plans to meet GHG emission reductions consistent with EO B-55-18.

4.9.2.3.4 Madera County General Plan

The Air Quality element of the Madera County General Plan includes goals and objectives applicable to GHG emissions and climate change (Madera County 2010). The goals are focused on integrating land use, transportation, housing, and air quality plans and district and public utility programs to reduce air and GHG emissions from area sources and energy consumption. The goals are aimed at designing and developing land use, transportation, and housing projects in order to reduce harmful

pollutant emissions and to protect public health. The specific goals related to GHG emissions in the General Plan that are relevant to the Proposed Project include:

AQ Goal A1: Achieve effective communication, cooperation, coordination, and education in developing and implementing countywide and regional programs to improve air quality and to reduce potential climate change impacts.

AQ Goal B1: Improve Air Quality, Land Use, and Transportation Planning Integration and reduce impacts through appropriate project location, design and application of best available technologies.

AQ Goal C1: Use Air Quality Assessment and Mitigation programs and resources of the Valley Air District and other agencies to minimize air pollution, related public health effects, and potential climate change impacts within the County.

AQ Goal E1: Minimize air emissions and potential climate change impacts related to energy consumption in the County.

AQ Goal G2: Reduce Madera County's proportionate contribution of greenhouse gas emissions and the potential impact that may result on climate change from internal governmental operations and land use activities within its authority.

4.9.3 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. Neither CEQA Guidelines Section 15064.4 nor any other law requires or endorses a specific analytical methodology or quantitative criterion for determining the significance of GHG emissions-related impacts. Rather, lead agencies are to make a "good faith effort" to "describe, calculate or estimate" GHG emissions and consider the extent to which a project would increase or reduce GHG emissions; exceed a locally applicable threshold of

significance; or comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions." Under the Valley Air District's CEQA guidance for GHGs, a project would not have a significant GHG impact on the environment if it is consistent with an applicable plan to reduce GHG emissions.

The *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA* was developed by the Valley Air District as guidance for analyzing and mitigating GHG impacts in its jurisdiction (Valley Air District 2009b). A GHG emissions analysis is required to be included in CEQA documents for all non-exempt projects. The Valley Air District guidance does not limit a lead agency's authority in establishing its own process and guidance for determining the significance of project-related impacts on the global climate (Valley Air District 2009b). The Valley Air District's best performance standards are specifically directed at reducing GHG emissions from stationary sources, from improved energy efficiency, and from reduced VMT. No GHG emission reduction measures for land use development projects have been published by the Valley Air District at this time. Therefore, this analysis evaluates the GHG emissions from the Proposed Project, Alternative 1, and Alternative 2 relative to compliance with applicable plans, policies, regulations, and requirements adopted to reduce or mitigate GHG emissions. The Area of Analysis for greenhouse gas emissions includes the area under jurisdiction of the Valley Air District.

4.9.3.1 Analytical Approach

This analysis focuses on the potential impacts from estimated construction and operation GHG emissions due to the Proposed Project, Alternative 1, and Alternative 2. The analysis also includes an assessment of GHG emissions due to reducing the size of the existing FERC Project Boundary and to implementing new management and maintenance measures. The Area of Analysis for greenhouse gas emissions includes the area under jurisdiction of the Valley Air District.

Emissions from construction activities, including developing the Vista Day Use Area and installing an inflow gage above Kerckhoff Reservoir, for the Proposed Project were

estimated using the California Emissions Estimator Model (CalEEMod), Version 2022.1.1.29. The construction emissions associated with helicopter and boat use were calculated separately and are discussed below. CalEEMod uses widely accepted methodologies and data to quantify emissions estimates that include the (1) USEPA AP-42 Emissions Factors, (2) CARB OFFROAD2017 emissions factors for off-road equipment, and (3) EMFAC2021 (v1.0.1) emissions factors for on-road vehicles. Model input data for construction activities for the Proposed Project include specific location information; an equipment list; hours of operation, schedule, and estimated vehicle trip quantities and length (Appendix D *Kerckhoff Air Emissions Modeling*). The timing of individual construction activities varies between the different proposed tasks but would predominantly take place in the late summer of License Years 1, 2, 4, and 10. The Kerckhoff 1 (K1) Powerhouse-proposed modification/retirement actions are planned to occur between April and October of License Year 10.

Although operational emissions are not anticipated to significantly change under the Proposed Project or Alternatives, these emissions were still calculated conservatively and included in the estimate. Model input data for operations include routine inspection and maintenance vehicle trips, along with energy usage for lighting and equipment. To capture energy usage in CalEEMod, the “general heavy industry” land use type was selected, which represents a conservatively high estimate since this land use type contains on-site energy consumption emission rates for on-site employees. As there would be no permanent on-site employees for the Proposed Project or the Alternatives, the use of this land use type would presumably result in an overestimate of operation emissions.

4.9.3.1.1 Helicopter and Boat Assumptions for Construction Emissions

Kerckhoff Dam is only accessible by boat or helicopter. A boat and helicopter would be used to assist in the upgrade of the two manual radial gates on the dam. The method of transportation for the concrete to the tunnel plug site would include concrete trucks, helicopters, and concrete line pumps. Boats are launched from a dock on the north end of the reservoir near the A.G. Wishon Powerhouse (part of PG&E’s Crane Valley Hydroelectric Project, FERC No. 1354) for transit to a small private dock located on the

south shore of the reservoir near Kerckhoff Dam. At the dam, a series of trails and stairways extend from the dock and the intake structures to the south abutment of the dam. It is assumed that no more than one boat would be used at any one time and would make five trips per day, four days per week for three months, beginning in September 2028. The boat emissions are included in Appendix D-2 *Kerckhoff Detailed Report* and were estimated manually using emissions factors from the 2022 Port of Long Beach Air Emissions Inventory (Port of Long Beach 2023).

A helicopter would be used to assist in the upgrade of the two manual radial gates on the dam and for the K1 Powerhouse-proposed modification/retirement actions. PG&E uses six helicopter landing zones (HLZ) in the Kerckhoff Hydroelectric Project for operation. Four zones—HLZ at Gage J-1, HLZ at Gage J-2, HLZ at the Gage J-2 low-flow measurement site, and HLZ at Gage J-7—are used to access gaging stations. One HLZ—at Smalley Cove—is located near Smalley Cove Campground, and another HLZ is located near the Kerckhoff 2 (K2) Powerhouse (Appendix A *Project Facilities and Maps*: Appendix A-2, Map A2-1 and Maps A2-2a through Map A2-2e). It is assumed that no more than one helicopter would be used at any one time and would be operated for four hours per day, four days per week. For the upgrade of two manual radial gates on the dam, a helicopter would be used to carry equipment for two weeks beginning in September 2028. A Blackhawk helicopter would be used for two days, and a dual-engine turboshaft helicopter would be used for the remainder of the task. For the K1 Powerhouse modification/retirement activities, a helicopter would be used for four weeks beginning in License Year 10. A Blackhawk helicopter would be used for two days, and a dual-engine turboshaft helicopter would be used for the remainder of the task. The helicopter emissions are included in Appendix D *Kerckhoff Air Emissions Modeling* and were estimated manually using GHG emission factors from the Swiss Federal Office of Civil Aviation (FOCA) *Guidance on Determination of Helicopter Emissions* (FOCA 2015).

4.9.3.2 Criteria for Determining Significance

According to the Valley Air District's CEQA Guidance for analysis of GHG emissions, a project would not have a significant GHG impact if it is consistent with an applicable

qualified plan to reduce GHG emissions (Valley Air District 2009a). The potential for the Proposed Project, Alternative 1, and Alternative 2 to conflict with an applicable plan, policy, or regulation adopted for the purposes of reducing emissions of GHG was assessed by examining potential conflicts with the GHG reduction measures related to implementation of AB 32 and SB 32 goals, with CARB's Climate Change Scoping Plans, and with California's RPS (SB 100) and local RTPs (SB 375).

4.9.3.2.1 CEQA Guidelines Appendix G

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on GHG emissions if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment (GHG-1); or
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs (GHG-2)

4.9.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the

Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down-ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated non-spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cfs for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the Project Bypass Reach cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1

and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.9.4.1 Potential Impacts Related to Greenhouse Gas Emissions

Impact GHG-1: Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

4.9.4.1.1 Proposed Project

Construction

The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities; constructing the Vista Day Use Area and associated trail; installing one new operational flow gage; and upgrading two manually operated radial gates on Kerckhoff Dam. GHG emissions resulting from these construction activities would be generated from fuel combustion, off-road construction equipment, mobile sources delivering materials and construction workers to and from the Area of Analysis, and boat and helicopter operations.

Proposed Project construction-related GHG emissions (Table 4.9-2, Appendix D-2 Kerckhoff Detailed Report) would occur over relatively short-term periods and would, therefore, contribute a relatively small portion of the Proposed Project's overall lifetime GHG emissions. However, GHG emissions can persist in the atmosphere for a long period and contribute to cumulative global GHG impacts. It is common practice to amortize construction-related GHG emissions over a project's lifetime to include these emissions as part of a project's annualized total emissions; thus, any GHG reduction measures would address construction GHG emissions as part of the operational GHG reduction strategies. The life of the Proposed Project is 50 years. Therefore, the estimated four years of annual GHG emissions from construction, plus the boat and helicopter emissions, were amortized over the 50-year Proposed Project period. The total construction emissions for the Proposed Project were estimated to be 237 MT CO_2e which would produce amortized GHG construction emissions of approximately 4.7 MT CO_2e per year. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact GHG-1.

Table 4.9-2: Proposed Project Construction-Related GHG Emissions Estimates

Source	CO_2e Emissions (MT)
CalEEMod Construction Emissions	155
Helicopter Emissions	64
Boat Emissions	18
Total Construction Emissions	237
Amortized Construction Emissions (MT/year)	4.7

Operation

Operation and maintenance activities that would emit GHGs include off-road construction equipment, vehicle use during routine maintenance, and energy usage for lighting and equipment. Routine activities under the Proposed Project include inspections, sediment management, vegetation management, pest management, road and trail maintenance, recreation facility maintenance, power line and communication maintenance, facility painting, and other activities. Table 4.9-3 summarizes the estimated GHG emissions from operation and maintenance activities and the amortized construction emissions combined (Appendix D-2 *Kerckhoff Detailed Report)*.

Table 4.9-3: Total Estimated GHG Emissions from Operations and Maintenance and Amortized Construction

Proposed Project Activity	CO_2e Emissions (MT per year)
CalEEMod Operations Emissions	113
Amortized Construction Emissions	4.7
Total Emissions	117.7

The estimated CO_2e emissions from annual operation emissions combined with the construction emissions amortized over 50 years would be 117.7 MT per year (Table 4.9-3). Under the Valley Air District's CEQA guidance for GHGs, a project would not have a significant GHG impact on the environment if it is consistent with an applicable

plan to reduce GHG emissions. Many California Air Districts use a mass emissions threshold, also known as a “bright-line” significance threshold; previously used thresholds range from 1,100 MT per year to 10,000 MT CO_2e per year for the construction and operational phases of land-use projects (e.g., Bay Area Air Quality Management District 2017; Placer County Air Pollution Control District 2026).

Although the Proposed Project would generate short-term GHG emissions from construction, as well as GHG emissions from long-term operation and maintenance activities, the combined emissions are well below the commonly used bright-line screening threshold of 1,100 MT per year of CO_2e. It is likely that the estimated GHG emissions from operations would decrease over the 50-year license term compared to the values shown in Table 4.9-3 due to the development of more efficient emission control technology and use of electric vehicles. Thus, the Proposed Project would be consistent with local and regional plans, such as the FCOG 2022 RTP/SCS, the MCTC 2022 RTP/SCS, and subsequent amendments that support state plans (specifically AB 32 and SB 32 GHG reduction goals).

Under the Proposed Project, PG&E would develop the Vista Day Use Area and reconstruct an existing BLM trail that connects the day use area to the BLM’s San Joaquin River Trail. The addition of a new recreation site and trail improvements would likely lead to additional vehicle traffic from recreationists and from maintenance vehicles and a corresponding increase in GHG emissions. Thus, recreation-related GHG emissions would likely be higher under the Proposed Project but would be dispersed over time.

Vehicle trips for installation of the new inflow gage upstream of Kerckhoff Reservoir and associated maintenance would be minimal and would produce negligible GHG emissions.

Further, the Proposed Project includes modifying the existing FERC Project Boundary to remove lands no longer necessary for operation of the Proposed Project. The total acreage of the modified FERC Project Boundary would be reduced by approximately 24 percent (PG&E 2023) (Appendix A *Project Facilities and Maps*: Appendix A-3, Map

A3-1 and Maps A3-2a through A3-2o). This change would result in less land requiring maintenance and a corresponding reduction in GHG emissions compared to existing conditions.

The existing Kerckhoff Hydroelectric Project has an installed generating capacity of 162.72 MW. The annual generation between 1984 and 2019 averaged 471,424 MWh, with approximately 94 percent (441,152 MWh) of the total generated by the K2 Powerhouse. The Proposed Project would reduce energy generation by approximately 3 percent as compared to historical generation due to the retirement of the K1 Powerhouse. However, under baseline conditions, the K1 Powerhouse does not generate energy and would not result in operational impacts that would decrease energy production. Power generation is estimated to be decreased by only 0.5 percent with implementation of the proposed flow management measures under the Proposed Project. This would result in a reduction of 16,500 MWh from the Proposed Project's existing total annual energy generation. This loss of renewable energy may necessitate an increase in energy from other sources, such as other renewable sources, which would have zero GHG emissions, or from fossil fuels which would produce GHG emissions. The State of California has developed progressive legislation aimed at reducing GHG emissions and incentivizes the use of renewable energy sources through the Renewable Portfolio Standard and Cap and Invest Program (CARB 2025). Further, PG&E's voluntary goal is to deliver 70 percent RPS clean electricity by 2030, which is above the SB 100 RPS compliance obligation of 60 percent (PG&E 2023). Thus, it is likely that the reduced energy produced by the Kerckhoff Hydroelectric Project under the Proposed Project would be replaced with clean, renewable sources.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact GHG-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.9.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction activities as described in Section 4.9.4.1.1. Alternative 1 would not change any construction activities included in the Proposed Project. Under Alternative 1, construction activities would emit the same quantity of greenhouse gas emissions estimated for the Proposed Project. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 1 for potential impact GHG-1.

Operation

Alternative 1 has the same analysis and impact determination for operation activities as described in Section 4.9.4.1.1. Under Alternative 1, flow fluctuations downstream of Kerckhoff Dam would be reduced and the number of whitewater flow release days would increase from baseline conditions. Depending on WY type, this could result in additional whitewater boating opportunities and a corresponding increase in mobile source activity and associated emissions in the vicinity of the Kerckhoff Hydroelectric Project.

While Alternative 1 would result in additional whitewater boating opportunities and could have a corresponding increase in mobile source activity, as discussed in Section 4.17 *Recreation*, overall recreational use within the Area of Analysis is low due to its remote location, limited access, and the requirement for expert-level boating skills in certain reaches. Given these constraints, any incremental increase in visitation would be limited in scale, and associated emissions would remain minor relative to baseline conditions. Accordingly, the impact would not be significant.

Although future operations of the K2 Powerhouse under this alternative have not been specifically quantified, and a detailed calculation of GHG emissions under Alternative 1 would therefore be speculative, it is our professional judgment that GHG emissions from K2 Powerhouse operations would be comparable to existing conditions. In addition, retirement of the K1 Powerhouse would result in an overall reduction in GHG emissions if energy needs are replaced with sources of renewable generation.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 1 for potential impact GHG-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.9.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction activities as described in Section 4.9.4.1.1. Alternative 2 would not change any construction activities included in the Proposed Project. Under Alternative 2, construction activities would emit the same quantity of greenhouse gas emissions estimated for the Proposed Project. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 2 for potential impact GHG-1.

Operation

Alternative 2 has the same analysis and impact determination for operation activities as described in Section 4.9.4.1.1. Under Alternative 2, flow fluctuations downstream of Kerckhoff Dam would be reduced and the number of whitewater flow release days would increase from baseline conditions. Depending on WY type, this could result in additional whitewater boating opportunities and a corresponding increase in mobile source activity and associated emissions in the vicinity of the Kerckhoff Hydroelectric Project.

Although future operations of the K2 Powerhouse under this alternative have not been specifically quantified, and a detailed calculation of GHG emissions under Alternative 2 would therefore be speculative, it is our professional judgment that GHG emissions from K2 Powerhouse operations would be comparable to existing conditions. In addition,

retirement of the K1 Powerhouse would result in an overall reduction in GHG emissions if energy needs are replaced with sources of renewable generation.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 2 for potential impact GHG-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.9.4.2 Potential Impacts Related to Plans, Policies, or Regulations

Impact GHG-2: Would the Project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

4.9.4.2.1 Proposed Project

Construction and Operation

As discussed in the context of potential impact GHG-1, GHG emissions during construction and operation would not exceed a bright-line significance threshold. The Proposed Project would not conflict with the following local, regional, and state plans:

- FCOG 2022 RTP/SCS
- MCTC 2022 RTP/SCS
- AB 32
- SB 32
- CARB's Climate Change Scoping Plan
- California's RPS (SB 100)

The FCOG's 2022 RTP/SCS and the MCTC 2022 RTP/SCS and subsequent amendments address GHG emissions reductions related to transportation, with the goal of preparing for future growth in a sustainable manner through the year 2046. Although

the Proposed Project would result in a temporary increase in VMT during the construction phase, and a slight increase in VMT due to increased recreational use and maintenance activities, GHG-related impacts would not be significant enough to interfere with the FCOG 2022 or MCTC 2022 GHG emission reduction targets for 2035. Further, the SCS strategies for both FCOG and MCTC include encouraging outdoor recreation and maintaining and improving roadways and trails. Therefore, the Proposed Project would be consistent with the FCOG 2022 RTP/SCS, as well as the MCTC 2022 RTP/SCS and subsequent amendments, which in turn would support AB 32 and SB 32 GHG reduction goals.

Decarbonizing the electricity sector is a crucial pillar of CARB's 2022 Scoping Plan (CARB 2022). It depends on both using energy more efficiently and replacing fossil-fueled generation with renewable and zero carbon resources, including solar, wind, energy storage, geothermal, biomass, and hydroelectric power. The RPS Program and the Cap-and-Trade Program continue to incentivize the use and development of renewables over fossil generation to serve state demand. SB 100 increased RPS stringency to require 60 percent renewables by 2030 and for California to provide 100 percent of its retail sales of electricity from renewable and zero-carbon resources by 2045. PG&E's voluntary goal is to deliver 70 percent RPS clean electricity by 2030, which is above their required compliance obligation of 60 percent (PG&E 2023). PG&E is on track to meet or exceed its clean energy procurement targets to ensure reliable electric service, help California achieve its climate policy goals, and support customer energy needs (PG&E 2023).

California's adopted plans, policies, and regulations aimed at reducing GHG emissions recognize the important role of renewable energy, such as hydroelectricity, to achieve GHG emission reductions. Implementation of the Proposed Project would continue to serve as a renewable energy source, with only a minor reduction in annual generation, and would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under the Proposed Project for potential impact GHG-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.9.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

***Construction* and Operation**

Alternative 1 has the same analysis and impact determination for construction and operation activities as described in Section 4.9.4.2.1. Alternative 1 would not change any construction activities included in the Proposed Project. Under Alternative 1, construction activities would emit the same quantity of greenhouse gas emissions estimated for the Proposed Project. Alternative 1 would only change the manner in which spills are released from Kerckhoff Dam compared to Proposed Project Operations. It is unknown if Alternative 1 would cause an increase or decrease in generation compared to the Proposed Project during operation. Considering PG&E's commitment to delivering renewable energy, any lost generation would likely be replaced by renewable sources.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 1 for potential impact GHG-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.9.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination for construction and operation activities as described in Section 4.9.4.2.1. Alternative 2 would not change any construction activities included in the Proposed Project. Under Alternative 2, construction activities would emit the same quantity of greenhouse gas emissions estimated for the Proposed Project. It is unknown if Alternative 2 would cause an increase or decrease in generation compared to the Proposed Project. Considering PG&E's commitment to delivering renewable energy, any lost generation would likely be replaced by renewable sources.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 2 for potential impact GHG-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.9.5 Literature Cited

Bay Area Air Quality Management District. 2017. CEQA Thresholds of Significance. Accessed April 5, 2026. Retrieved from: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/tools/ceqa-guidelines-may-2017-thresholds-table-pdf.pdf?la=en.

CARB (California Air Resources Board). 2022. *2022 Scoping Plan for Achieving Carbon Neutrality*. Accessed: April 5, 2026. Retrieved from: https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf.

_____. 2025. *California Greenhouse Gas Emissions from 2000–2023: Trends of Emissions and Other Indicators (2025 Edition)*. Accessed: April 5, 2026. Retrieved from: https://ww2.arb.ca.gov/ghg-inventory-data.

_____. 2026. *GHG Global Warming Potentials*. Accessed: April 5, 2026. Retrieved from: https://ww2.arb.ca.gov/ghg-gwps.

FCOG (Fresno Council of Governments). 2022. *2022 Regional Transportation Plan and Sustainable Communities Strategy*. Accessed: April 5, 2026. Retrieved from: https://www.fresnocog.org/project/regional-transportation-plan/.

FOCA (Swiss Federal Office of Civil Aviation). 2015. *Guidance on the Determination of Helicopter Emissions*. Edition 2, December

Fresno County. 2024. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

OEHHA (California Office of Environmental Health Hazard Assessment). 2022. *Indicators of Climate Change in California*. Fourth Edition. Accessed: April 5, 2026. Retrieved from: https://oehha.ca.gov/climate-change/epic-2022.

Madera County. 2010. *Madera County General Plan Air Quality Element*. Accessed April 5, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/2846/636934376261100000.

MCTC (Madera County Transportation Commission). 2022. *Madera County 2022 Regional Transportation Plan and Sustainable Communities Strategy*. September. Accessed: April 5, 2026. Retrieved from: https://www.maderactc.org/224/Your-Madera-2046-RTP-SCS.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

PG&E (Pacific Gas and Electric Company). 2023. *Renewable Energy and Storage. Corporate Sustainability Report 2022*. Accessed: April 5, 2026. Retrieved from: https://www.pgecorp.com/corp_responsibility/reports/2022/pf03_renewable_ener

gy_storage.html#:~:text=Our%20voluntary%20goal%20is%20to,by%20the%20end%20of%202045.

Placer County Air Pollution Control District. 2026. Thresholds of Significance. Accessed April 5, 2026. Retrieved from https://www.placer.ca.gov/7550/Thresholds-of-Significance.

Port of Long Beach. 2023. *Air Emissions Inventory - 2022*. September. Accessed: April 5, 2026. Retrieved from: https://polb.com/environment/air/#emissions-inventory.

USEPA (United States Environmental Protection Agency). 2025. Inventory of U.S. Greenhouse Gas Emissions and Sinks. Accessed April 5, 2026. Available: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks.

USGCRP (United States Global Change Research Program). 2023. *Fifth National Climate Assessment*. Crimmins, A.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, B.C. Stewart, and T.K. Maycock, Eds. United States Global Change Research Program, Washington, D.C.

Valley Air District (San Joaquin Valley Air Pollution Control District). 2009a. *Final Staff Report: Addressing Greenhouse Gas Emissions Impacts under California Environmental Quality Act*. Accessed: April 5, 2026. Retrieved from:https://ww2.valleyair.org/media/mdfm0lsd/1-ccap-final-ceqa-ghg-staff-report-dec-17-2009.pdf.

_____. 2009b. *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA*. Accessed: April 5, 2026. Retrieved from:https://ww2.valleyair.org/media/dnsnicdv/3-ccap-final-lu-guidance-dec-17-2009.pdf.

_____. 2015. *Guidance for Assessing and Mitigating Air Quality Impacts*. Accessed: April 5, 2026. Retrieved from: https://www.valleyair.org/media/g4nl3p0g/gamaqi.pdf.

4.10 HAZARDS AND HAZARDOUS MATERIALS

This section describes existing conditions and analyzes potential impacts related to hazards and hazardous materials that could result from implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts related to hazards and hazardous material from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.10-1).

Table 4.10-1: CEQA Checklist for Hazards and Hazardous Materials

Would the Project:	**Proposed Project**	**Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping**	**Alternative 2: Proposed Project with BLM Revised 4(e) Conditions**
Impact HM-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact HM-2: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	Less than Significant with Mitigation Incorporated	Less than Significant with Mitigation Incorporated	Less than Significant with Mitigation Incorporated
Impact HM-3: Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	No Impact	No Impact	No Impact
Impact HM-4: 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?	No Impact	No Impact	No Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact HM-5: 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?	No Impact	No Impact	No Impact
Impact HM-6: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	No Impact	No Impact	No Impact
Impact HM-7: Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

4.10.1 Environmental Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public lands administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and United States Bureau of

Reclamation (Reclamation) under BLM management. The Proposed Project is located in the foothills of the western slope of the Sierra Nevada on the San Joaquin River (SJR) in a sparsely populated area of Fresno and Madera counties, California.

4.10.1.1 Airports

No public use airports are located within 10 miles of the Proposed Project, defined as all areas located within the Proposed Federal Energy Regulatory Commission (FERC or Commission) Project Boundary. Two private airfields are located near the Proposed Project: Johnston Field-5CL9 is approximately 0.4 mile southeast of the northern extent of the Proposed Project, and Friant VORTAC Federal Responsibility Area 115.6 is approximately two miles west of the Proposed Project (Google 2023). The Topham-Ranch Auberry Airport is approximately three miles west of the Proposed Project. The Proposed Project is not within the footprint of any airport land use plan.

4.10.1.2 Schools

There are no schools within a quarter mile of the Proposed Project. Three schools are located in Prather, California, between approximately 2.6 miles to 3.7 miles from the Proposed Project (PG&E 2022).

4.10.1.3 Existing Hazardous Materials/Sites

Two comprehensive hazardous materials databases—the California State Water Resources Control Board (State Water Board) GeoTracker website and the California Environmental Protection Agency (CalEPA), Department of Toxic Substances Control (DTSC) EnviroStor database—were reviewed to identify site containing hazardous materials near the Proposed Project (State Water Board 2025; DTSC 2025a). No sites with hazardous materials, including large-quantity hazardous waste generators or superfund sites, are located within one mile of the Proposed Project. Ten sites within approximately five miles of the Proposed Project contain hazardous materials but are either closed or are open but unlikely to pose a risk because they are further than one mile away from the Proposed Project.

4.10.1.4 Wildland Fire Hazards

As defined by the California Department of Forestry and Fire Protection (CAL FIRE), the majority of the Proposed Project is located within a Federal Responsibility Area,[25] with smaller portions of the Proposed Project located within State Responsibility Areas.[26] The majority of Proposed Project Area located within State Responsibility Areas is designated as a very high fire hazard severity zone, with a small area near the northern portion of Kerckhoff Reservoir designated as a high fire hazard severity zones (CAL FIRE 2024a). Additionally, the Proposed Project is located within areas mapped by the California Public Utilities Commission (CPUC) as high fire threat districts (HFTD). The HFTD identifies three tiers of elevated risk for wildfires associated with utilities, with Tier 3 being the highest risk. The Proposed Project mainly occurs within CPUC HFTD Tier 2, with limited areas north and east of Kerckhoff Reservoir within HFTD Tier 3 (CPUC 2025). Fire protection services and equipment near the Proposed Project work areas are discussed in detail in Section 4.16 *Public Services* and fire protection regulations are further discussed in Section 4.21 *Wildfire*.

4.10.2 Regulatory Background

The following subsections contain an overview of regulations related to hazards and hazardous materials.

4.10.2.1 Federal

4.10.2.1.1 Federal Power Act

The Federal Power Act (Title 16 United States Code [USC] Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was

[25] Federal Responsibility Areas are areas which the federal agencies are responsible for wildland fire protection under various federal laws.

[26] State Responsibility Areas are the areas where the State of California is financially responsible for preventing and suppressing wildfires. State Responsibility Areas do not include lands within city boundaries or in federal ownership.

created to coordinate the development of hydroelectric power projects. The Federal Power Act created FERC and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations [CFR] Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.10.2.1.2 Resource Conservation and Recovery Act

Under the Resource Conservation and Recovery Act (RCRA) (42 USC Section 6901 et seq.), enacted in 1976, individual states may implement their own hazardous waste programs in lieu of RCRA as long as the state program is at least as stringent as the federal RCRA requirements. The federal government approved California's RCRA program, called the Hazardous Waste Control Law (HWCL), in 1992. In California, the RCRA program is administered by CalEPA's DTSC, per direction of the United States Environmental Protection Agency (USEPA).

4.10.2.1.3 Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 USC Chapter 103) and associated Superfund Amendments provide the USEPA with the authority to identify hazardous sites, require site remediation, and recover the costs of site remediation from polluters. In addition, CERCLA enabled the revision of the National Oil and Hazardous Substances Pollution Contingency Plan. The plan provides the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants.

4.10.2.1.4 Clean Water Act

The Clean Water Act (CWA) gives the USEPA the authority to regulate the discharge of pollutants and hazardous materials into the waters of the United States. As part of the CWA, USEPA oversees and enforces the Oil Pollution Prevention regulation (40 CFR Part 112). The regulation requires facilities to prepare, amend, and implement spill

prevention, control, and countermeasure plans that describe a comprehensive spill prevention program that minimizes the potential for discharges from specific sources. The USEPA designates hazardous substances under the CWA and determines quantities of designated hazardous substances that must be reported (40 CFR Part 116) or that may be discharged into waters of the United States (40 CFR Part 117).

4.10.2.1.5 United States Department of Transportation Hazardous Materials Regulations

The United States Department of Transportation Hazardous Materials Regulations (49 CFR Parts 100–185) cover all aspects of hazardous materials packaging, handling, and transportation.

4.10.2.2 State

4.10.2.2.1 Hazardous Waste Control Law

The HWCL (California Health and Safety Code Chapter 6.5 Section 25100 et seq.) authorizes the DTSC, a department within CalEPA, to regulate the generation, transportation, treatment, storage, and disposal of hazardous wastes. Also, DTSC can delegate enforcement responsibilities to local jurisdictions that enter into agreements with DTSC for the generation, transport, and disposal of hazardous materials under the authority of HWCL. Businesses that store more than the state-defined threshold quantities of hazardous materials (generally 55 gallons of a liquid, 200 cubic feet of a gas, or 500 pounds of a solid) must prepare a Hazardous Materials Business Plan (HMBP) and electronically file the HMBP to the California Environmental Reporting System (DTSC 2025b). A HMBP must include the following:

- An inventory of hazardous materials at a facility
- Emergency response plans and procedures to be followed in the event of a reportable release or threatened release of a hazardous material
- Requirements to train employees in safety procedures in the event of a release or threatened release of hazardous material, including onboarding for new employees and annual refresher courses for existing employees

- A site map that depicts north orientation, loading areas, internal roads, adjacent streets, storm and sewer drains, access and exit points, emergency shutoffs, evacuation staging areas, hazardous material handling and storage areas, and emergency response equipment

4.10.2.2.2 Hazardous Substance Account Act

The Hazardous Substance Account Act (California Health and Safety Code Chapter 6.8 Section 25300 et seq.) is California's equivalent to CERCLA. It addresses hazardous waste sites and apportions liability for them. The Hazardous Substance Account Act also provides that owners are responsible for the cleanup of such sites and the removal of toxic substances, where possible.

The two state agencies with primary responsibility for enforcing federal and state regulations related to hazardous material transport and responding to hazardous materials transportation emergencies are the California Highway Patrol and California Department of Transportation, respectively.

4.10.2.2.3 Occupational Health and Safety

The California Division of Occupational Safety and Health (Cal/OSHA) assumes primary responsibility for developing and enforcing workplace safety regulations within the state (California Code of Regulations [CCR] Title 8). Cal/OSHA standards are more stringent than federal Occupational Safety and Health Administration regulations and take precedence.

4.10.2.2.4 Hazardous Materials Management

The California Office of Emergency Services is the state office responsible for establishing emergency response and spill notification plans related to hazardous materials accidents. Title 26 of the CCR is a compilation of the chapters or titles of the CCR that are applicable to hazardous materials management.

4.10.2.2.5 Porter-Cologne Water Quality Control Act

As discussed in more detail in Section 4.11 *Hydrology and Water Quality*, the Porter-Cologne Water Quality Control Act (California Water Code, Division 7) is the provision of the California Water Code that regulates water quality in California and authorizes the State Water Board and nine Regional Water Quality Control Boards to implement and enforce the regulations. The Porter-Cologne Water Quality Control Act provides several means of enforcement for unauthorized discharge of pollutants to waters of the state, including cease and desist orders, cleanup and abatement orders, administrative civil liability orders, civil court actions, and criminal prosecution. The Proposed Project is under the jurisdiction of the Central Valley Regional Water Quality Control Board (Central Valley Regional Water Board).

4.10.2.2.6 Unified Hazardous Waste and Hazardous Materials Management Regulatory Program

The State of California mandated the Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (CCR Title 27) in 1993. The program was created to consolidate, coordinate, and make consistent the administrative requirements, permits, inspections, and enforcement activities for six hazardous materials programs. The program has the following six elements:

- Hazardous waste generators and hazardous waste on-site treatment
- Underground storage tanks
- Aboveground petroleum storage act
- Hazardous materials release response plans and inventories
- California accidental release prevention
- Uniform fire code hazardous materials management plans and hazardous materials inventory statements

At the local level, this is accomplished by identifying a Certified Unified Program Agency that coordinates all these activities to streamline the process for local businesses. The Fresno County Department of Environmental Health and the Madera County

Environmental Health Division are approved by CalEPA as the Certified Unified Program Agency for these respective counties.

4.10.2.2.7 California Government Code 65962.5

Government Code 65962.5 requires DTSC to compile and update the Cortese List each year (DTSC 2025c). The Cortese List is a list of hazardous waste facilities subject to corrective action, land designated as a hazardous waste property or border zone property, and information on waste disposals on public land. The Kerckhoff Hydroelectric Project is not listed on the Cortese List.

4.10.2.2.8 California Health and Safety Code

DTSC regulates hazardous materials through the requirements and responsibilities outlined in the California Health and Safety Code (primarily Chapters 6.5 through 10.6 of Division 20) (California Public Law 2025). Chapter 6.5, which identifies hazardous waste control regulations related to transportation, treatment, recycling, disposal, enforcement, and permitting of hazardous waste, and Chapter 6.10, which identifies regulations pertaining to hazardous materials release cleanups, would apply to the Proposed Project.

4.10.2.2.9 California Code of Regulations Title 22, Division 4.5

These regulations are enforced by DTSC and include environmental health standards for the management of hazardous waste, including standards for identification and listing of hazardous waste (Chapter 11) and standards applicable to generators and transporters of hazardous waste (Chapters 12 through 13) (DTSC 2025d).

4.10.2.2.10 California Code of Regulations Title 8, Industrial Relations

Cal/OSHA is primarily responsible for developing and enforcing standards for ensuring worker safety, which would apply to the Proposed Project. CCR Title 8 includes regulations related to control of hazards, labeling, and training requirements for hazardous chemicals, prevention of hazardous exposure, management of hazardous materials, and operations involving hazardous wastes.

4.10.2.2.11 California Labor Code, Division 5

These regulations pertain to safety in employment, including appropriate training on the use and handling of hazardous materials and the operation of equipment and machines that use, store, transport, or dispose of hazardous materials. Division 5, Part 1, Chapter 2.5 identifies provisions related to hazardous substances information and training. Division 5, Part 7 identifies provisions related to volatile flammable liquids.

4.10.2.3 Local

Local plans that were reviewed include the Health and Safety Elements of the Fresno County General Plan (Fresno County 2024a) and Madera County General Plan (Madera County 1995). These general plans address goals and policies pertaining to safety and hazardous materials safety, including emergency management and response, fire hazards, and flood hazards.

The Fresno County Multi-Jurisdictional Hazard Mitigation Plan, Madera County Operational Area Emergency Operations Plan, and Madera County Local Hazard Mitigation Plan Update provide hazard mitigation and emergency response protocols for the area of the Proposed Project (Fresno County 2024b; Madera County 2010; Madera County 2017). They are multi-jurisdictional plans developed through cooperation among various local governments, including Fresno County, unincorporated Fresno County, Madera County, and nearby communities and special districts. These plans identify and analyze existing hazards (such as earthquakes, fire, and floods), assess community vulnerability and mitigation capabilities, provide mitigation strategies, a mitigation action plan, and an implementation program.

4.10.3 Analysis Methodology

The methodology for analyzing potential impacts from hazards and hazardous materials includes identifying the types of hazardous materials that would be used during Proposed Project construction and operation. Potential impacts on the environment and public health from hazards and hazardous materials were further evaluated using information on the existing uses of the Proposed Project and adjacent properties, historical uses, and known contamination to determine the likelihood of encountering

hazardous materials. Specifically, the impacts analysis used information from DTSC's EnviroStor database (DTSC 2025a), the State Water Board's GeoTracker database (State Water Board 2025), CAL FIRE, and local planning documents. The Proposed Project Area includes all areas located within the Proposed FERC Project Boundary. The Area of Analysis includes all areas within two miles of the Proposed FERC Project Boundary.

4.10.3.1 Analytical Approach

Potential Proposed Project impacts related to hazards and hazardous materials were evaluated against the CEQA significance criteria and are discussed below. The analysis included identifying the hazardous materials currently contained on site, that would be contained within the Proposed FERC Project Boundary, and that would be used during construction activities, and evaluating those materials in context with the current HMBPs and proposed Environmental Management Measures and Monitoring Plans.

4.10.3.2 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on hazards and hazardous materials if it would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials (HM-1);
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (HM-2);
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school (HM-3);
- 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 (HM-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 (HM-5);

- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan (HM-6); or
- Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires (HM-7)

4.10.3.3 Environmental Management Measures and Monitoring Plans

The following monitoring plans designed to protect, maintain, or enhance resources are pertinent to hazards and hazardous materials. The plans identified would be included under the Proposed Project, Alternative 1, and Alternative 2.

4.10.3.3.1 Vegetation Management and Pest Control Plan

The Proposed Project's Vegetation Management and Pest Control Plan specifies PG&E's responsibilities for invasive weed management, pest control, vegetation and fuels management, and the protection of resources during these activities over the license term. Herbicides and pest control chemicals may be used as part of planned vegetation management and pest control. The monitoring plan specifies the removal of trees when deemed a hazard.

4.10.3.3.2 Project Road and Trail Maintenance Plan

The Proposed Project's Project Road and Trail Maintenance Plan specifies PG&E's role in regularly inspecting and maintaining the Kerckhoff Hydroelectric Project roads and trails to ensure safe access to Kerckhoff Hydroelectric Project facilities. The Proposed Project Road and Trail Maintenance Plan specifies that in the event of an emergency incident that blocks road/trail access to a Kerckhoff Hydroelectric Project facility and/or threatens public safety, PG&E shall notify the appropriate land management agency (i.e., BLM or United States Forest Service [USFS]) or property owner to coordinate repair work.

4.10.3.3.3 Hazardous Materials Business Plan

The Kerckhoff Hydroelectric Project has two Hazardous Materials Business Plans: one for the Kerckhoff 1 (K1) Powerhouse and one for the Kerckhoff 2 (K2) Powerhouse. The HMBPs include spill prevention and response plans, contact information and notification plans, descriptions and locations of hazardous materials on site, containment and cleanup procedures, evacuation plans, emergency equipment, and worker training methods. The hazardous materials at the K1 Powerhouse include 350 gallons of hydraulic fluid, wet cell batteries, 355 gallons of DTE heavy medium lubricating oil, 220 gallons of lubricating oil, 4,000 gallons of insulating oil, and compressed nitrogen and sulfur hexafluoride. The hazardous materials at the K2 Powerhouse include approximately 2,000 gallons of DTE heavy medium lubricating oil, 800 gallons of hydraulic fluid, approximately 12,000 gallons of insulating oil, wet cell batteries, and compressed nitrogen gas, hydrogen gas, carbon dioxide gas, and sulfur hexafluoride gas. Both HMBPs would remain in place for the Proposed Project.

4.10.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the

Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cubic feet per second (cfs) for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the Project Bypass Reach cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient[27] storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

[27] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.10.4.1 Potential Impacts Related to Transport, Use, or Disposal of Hazardous Materials

Impact HM-1: Would the Project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

4.10.4.1.1 Proposed Project

Construction

Proposed Project construction includes activities associated with retiring the K1 Powerhouse, developing the Vista Day Use Area, installing a new flow gage, and upgrading the radial gates at the dam. These construction activities would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Construction activities would require the use of motorized heavy equipment, such as trucks, excavators, pavers, forklifts, helicopters, boats, and air compressors. Although this equipment requires the use of hazardous materials, such as gasoline, diesel, oil, hydraulic fluid, transmission fluid, lubricating grease, and/or other fluids, these materials would be transported to the construction work areas according to United States Department of Transportation standards and used in designated construction staging areas or other suitable locations identified prior to the onset of construction.

Hazardous waste material generated during construction that cannot be recycled by PG&E would be disposed of at a landfill authorized to handle such materials. Prior to commencing construction, PG&E would develop a construction plan including measures to avoid impacts on resources, identifying permitting and regulatory requirements, and identifying erosion and control measures to avoid or minimize accidental releases of hazardous materials to the land or water (PG&E 2023). Furthermore, FERC proposes an erosion and sediment control management plan as part of the new license.

Concrete would be used to plug the K1 Tunnel. It is estimated that 350 yards of concrete would be required for the plug, assuming a plug length of approximately 35

feet and a cross-sectional area of 289 square feet. PG&E plans to perform concrete work during dry conditions to avoid the release of wet material and to minimize the potential for exposure of site workers to the wet concrete. Once dry, the concrete would no longer pose a hazard.

PG&E would train workers in the safe handling of hazardous materials prior to the initiation of construction, which would further reduce the risk of minor exposures of the environment, the public, or site workers to potentially hazardous materials during construction.

Any potential for exposure of the public and site workers to potentially hazardous materials during Proposed Project construction would be minimized or avoided through implementation of the existing HMBPs for the K1 and K2 powerhouses, which include spill prevention and response provisions and worker training in safe handling and spill response procedures. The containment and cleanup procedures listed in the HMBPs include monitoring for leaks or pressure buildup; providing structural and absorbent physical barriers; using absorbent material for spills; covering or blocking drains; eliminating sources of ignition for flammable hazards; stop processes, turning off water, gas or electrical utilities; and hiring licensed waste contractors. In addition, the HMBPs include provisions for notifying emergency personnel and evacuating persons in impacted areas. Spill control and clean-up material on site includes absorbent materials, storage containers for used absorbent, berm and diking equipment, and spill overpack drums.

Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact HM-1.

Operation

Ongoing operation and maintenance of Proposed Project facilities would involve the use of hazardous materials, such as fuels, hydraulic fluid, lubricants, and/or other chemicals and materials. The amount of hazardous materials at the Proposed Project during operation would be slightly less than existing operations because less insulting oil would

be stored in the K1 Powerhouse. There would thus be a corresponding reduction in the potential hazard to the public through the routine transport, use, or disposal of hazardous materials.

The same amount of hazardous material would be used and stored at the K2 Powerhouse as under the existing conditions. The existing HMBP for the K2 Powerhouse includes spill prevention and response provisions which would remain in place for the Proposed Project. The spill prevention provisions include monitoring for leaks or ruptures in storage containers or cylinders, providing structural and absorbent physical barriers as well as absorbent materials for containment and cleanup, if necessary; stop processes covering drains. Emergency response provisions include notifying and evacuating people in threatened or impacted areas, calling 911 for assistance, providing evacuation maps to workers, and providing verbal, cell phone or radio alarm signals. On-site emergency equipment would include chemical protective suits, aprons, gloves, boots; safety glasses, goggles or face shields; hard hats; eyewash station; fire extinguishers; absorbent material and storage container for used material; berm and/or diking equipment; and spill overpack drums.

Herbicides and pest control chemicals may be used as part of planned vegetation management and pest control. The Proposed Vegetation Management and Pest Control Plan includes environmental management measures to minimize the potential for impacts on environmental and cultural resources during implementation of vegetation management and pest control activities (PG&E 2023). These measures include only using pesticides approved by USEPA and the California Department of Pesticide Regulation, protocols requiring individuals applying herbicides or pesticides to complete training, using a licensed professional for pesticide applications, and following herbicide and pesticide application methods consistent with state and federal regulations and landowner (BLM or USFS) requirements (PG&E 2023).

The Vista Day Use Area would have one chemical pit toilet, which requires the use of chemicals for maintenance and periodic waste removal. During operation, waste removal would occur using standard procedures for pit toilets through the use of

motorized pumps, which move the sludge in a vacuum truck for transport to a designated location such as a sewage treatment facility or a composting facility.

Operation of the Proposed Project would not create a significant hazard to the public or environment. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact HM-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.10.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction activities as described in Section 4.10.4.1.1. Alternative 1 would not change any construction activities included in the Proposed Project. Under Alternative 1, hazardous materials used during construction would be transported, used, and disposed of in accordance with relevant regulations, hazardous substance control and emergency response procedures in the current HMBPs, and as described in construction specific best management practices (BMPs) to be developed at a later date. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 1 for potential impact HM-1.

Operation

Alternative 1 has the same analysis and impact determination for operation as described in Section 4.10.4.1.1. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 1 would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials during operation. Therefore, there would be a **Less than**

Significant Impact as a result of operational activities under Alternative 1 for potential impact HM-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.10.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction activities as described in Section 4.10.4.1.1. Alternative 2 would not change any construction activities included in the Proposed Project. Under Alternative 2, hazardous materials used during construction would be transported, used, and disposed of in accordance with relevant regulations, hazardous substance control and emergency response procedures in the current HMBPs, and as described in construction specific BMPs to be developed at a later date. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 2 for potential impact HM-1.

Operation

Alternative 2 has the same analysis and impact determination for operation as described in Section 4.10.4.1.1. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 2 would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials during operation. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 2 for potential impact HM-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.10.4.2 Potential Impacts Related to the Release of Hazardous Materials into the Environment

Impact HM-2: Would the Project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

4.10.4.2.1 Proposed Project

Construction

Proposed Project construction would require the use of motorized equipment and vehicles, including trucks, boats, and helicopters, which would use oils, fuels, or lubricants. During construction activities, there would be more vehicles and equipment, and consequently more fuel and oil, on site. Potential impacts to the environment (e.g., soil contamination, impaired water quality) would be minimized through implementation of the HMBPs. However, the potential remains for a significant impact if an accidental release of hazardous materials to the environment were to occur.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** to the public or environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials as a result of construction activities under the Proposed Project for potential impact HM-2.

Impact Analysis with Mitigation

To reduce the potentially significant impact, Mitigation Measure WQ-3: Construction General Permit, WQMP, and Dewatering Plans would require PG&E to comply with the Construction General Permit or conditions of the FERC license. For activities that are not subject to the Construction General Permit or conditions described in the FERC license, PG&E would prepare a Water Quality Monitoring and Protection Plan that

would describe all control measures designed to protect water quality from an accidental release of hazardous materials, and the specific parameters and locations to be monitored to identify and evaluate water quality impacts. Mitigation Measure WQ-3 would reduce potential significant impacts to the public and environment from the accidental release of hazardous materials. Therefore, there would be a **Less than Significant Impact** to the public or environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials with incorporation of Mitigation Measure WQ-3.

Operation

As discussed above, operation and maintenance of Proposed Project facilities would involve the limited use and storage of hazardous materials, such as fuels, hydraulic fluid, lubricants, or chemicals, which could impact the environment if an accidental release to the environment were to occur. The quantity of hazardous materials would be slightly less than existing conditions because of retirement of the K1 Powerhouse. There is the potential for chemical or waste leakage from the pit toilet to occur due to a break in or failure of the toilet or during waste removal. Additionally, herbicides and pest control chemicals may be used during existing vegetation management and pest control measures and during implementation of the Proposed Project's Vegetation Management and Pest Control Plan. PG&E's existing HMBPs for the K1 and K2 powerhouses would remain in place for the Proposed Project. Fuels and hazardous material and wastes would be transported, stored, used, and disposed of in accordance with relevant regulations, such as the California Health and Safety Codes and Department of Transportation Hazardous Materials Regulations. Implementation of hazardous substance control and emergency response procedures and worker environmental training programs, as described in the HMBP, would minimize or avoid potential impacts from an accidental release. However, the potential remains for a significant impact if an accidental release of hazardous materials to the environment were to occur during routine or non-routine operation and maintenance activities.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** to the public or environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials as a result of construction or operational activities under the Proposed Project for potential impact HM-2.

Impact Analysis with Mitigation

To reduce the potentially significant impact, Mitigation Measure WQ-3: Construction General Permit, WQMP, and Dewatering Plans would require PG&E to comply with the Construction General Permit or conditions of the FERC license. For activities that are not subject to the Construction General Permit or conditions described in the FERC license, PG&E would prepare a Water Quality Monitoring and Protection Plan that would describe all control measures designed to protect water quality from accidental release of hazardous materials and the specific parameters and locations to be monitored to identify and evaluate water quality impacts. Mitigation Measure WQ-3 would reduce potential significant impacts to the public and environment from the accidental release of hazardous materials. Therefore, there would be a **Less than Significant Impact** to the public or environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials with incorporation of Mitigation Measure WQ-3.

Mitigation Measures

Mitigation Measure WQ-3: Construction General Permit, WQMP, and Dewatering Plans

When applicable, PG&E shall comply with the State Water Board's National Pollutant Discharge Elimination System (NPDES) *General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Construction General

Permit)[28] (State Water Board 2022), *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* (Dredge or Fill Procedures) (State Water Board 2019, 2021), and amendments thereto the aforementioned documents to protect water quality standards and beneficial uses identified in the SR/SJR Basin Plan (Central Valley Regional Water Board 2019) during construction activities.

For construction and maintenance activities with the potential to impact water quality standards or beneficial uses identified in the SR/SJR Basin Plan that are not subject to the Construction General Permit, or a condition of the Kerckhoff Hydroelectric Project FERC license, PG&E shall prepare and implement site-specific Water Quality Monitoring and Protection Plans (WQMP Plans). At a minimum, the WQMP Plan shall include the following:

- Description of site conditions and the proposed activity
- Detailed descriptions, design drawings, and specific topographic locations of all control measures in relation to the proposed activity
- Measures to address other potential water quality impairments associated with the proposed activity
- A monitoring program to assess Proposed Project impacts to water quality, including quality assurance/quality control measures that will be implemented
- Water quality monitoring locations for each Proposed Project activity, including background monitoring locations as applicable
- A list of parameters that will be monitored, including sampling types and sampling frequency

[28] State Water Board Order WQ 2022-0057-DWQ and National Pollutant Discharge Elimination System No. CAS000002, and any amendments thereto. Available at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction/general_permit_reissuance.html

- A reporting schedule for water quality data and the response and reporting associated with any water quality objective exceedances

Prior to commencing any planned work that requires a water diversion or in-water work, PG&E shall submit a Dewatering and Diversion Plan to the Deputy Director for review and consideration of approval. The Dewatering and Diversion Plan shall be submitted at least 60 days before the anticipated activity is expected to occur. The Deputy Director may require modifications as part of any approval. PG&E shall not implement any activities associated with the Dewatering and Diversion Plan that may impact water quality or beneficial uses until receipt of Deputy Director and any other required approvals. For planned work that involves any instream dewatering, diversion of water, or in-water work, PG&E shall include the following:

- An overview of all in-water work that will require dewatering or diversion of water
- Timeframe(s) for required dewatering or diversion work
- Description of coffer dams or equivalent barriers that will be used to isolate the construction area from instream flows
- Description of measures, if needed, that will be implemented to avoid potential fish stranding and entrainment
- Provisions to maintain required minimum instream flows (MIFs). If temporary modification of MIFs are required, PG&E shall provide a written description of the modification, reason(s) for its necessity, measures that will be implemented to protect water quality and beneficial uses, and the proposed timeline for modification and return to the required MIFs
- Proposed monitoring and reporting related to the dewatering, diversion, and turbidity of water
- Description of how, upon completion of construction activities, flow will resume with the least disturbance to the substrate, water quality, and beneficial uses as practical

Planned activities shall not cause increased turbidity greater than allowable levels identified in the SR/SJR Basin Plan and amendments thereto.

- Where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2
- Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU
- Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent

In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

If turbidity exceedances are expected to result from sediment disturbance related to planned work activities despite implementation of all reasonable best management practices, PG&E shall consult with the State Water Board and Central Valley Regional Water Quality Control Board (Central Valley Regional Water Board) staff to determine an allowable zone of dilution in which turbidity in excess of the limits may be allowed.

Level of Significance

Less than Significant with Mitigation Incorporated

4.10.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination for construction and operation activities as described in Section 4.10.4.2.1. Alternative 1 would not change any construction activities included in the Proposed Project. Under Alternative 1, the same potential for an unset or accidental release of hazardous materials to the environment would exist.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** to the public or environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials as a result of construction and operational activities under Alternative 1 for potential impact HM-2.

Impact Analysis with Mitigation

To reduce the potentially significant impact, Mitigation Measure WQ-3 would require PG&E to comply with the Construction General Permit or conditions of the FERC license. For activities that are not subject to the Construction General Permit or conditions described in the FERC license, PG&E would prepare a Water Quality Monitoring and Protection Plan that would describe all control measures designed to protect water quality from an accidental release of hazardous materials, and the specific parameters and locations to be monitored to identify and evaluate water quality impacts. Mitigation Measure WQ-3 would reduce potential significant impacts to the public and environment from the accidental release of hazardous materials. Therefore, there would be a **Less than Significant Impact** to the public or environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials with incorporation of Mitigation Measure WQ-3.

Mitigation Measures

Mitigation Measure WQ-3: Construction General Permit, WQMP, and Dewatering Plans

Level of Significance

Less than Significant with Mitigation Incorporated

4.10.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination for construction and operation activities as described in Section 4.10.4.2.1. Alternative 2 would not change any construction activities included in the Proposed Project. Under Alternative 2, the same potential for an unset or accidental release of hazardous materials to the environment would exist.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** to the public or environment through reasonably foreseeable upset and accident conditions involving

the release of hazardous materials as a result of construction and operational activities under Alternative 2 for potential impact HM-2.

Impact Analysis with Mitigation

To reduce the potentially significant impact, Mitigation Measure WQ-3 would require PG&E to comply with the Construction General Permit or conditions of the FERC license. For activities that are not subject to the Construction General Permit or conditions described in the FERC license, PG&E would prepare a Water Quality Monitoring and Protection Plan that would describe all control measures designed to protect water quality from an accidental release of hazardous materials, and the specific parameters and locations to be monitored to identify and evaluate water quality impacts. Mitigation Measure WQ-3 would reduce potential significant impacts to the public and environment from the accidental release of hazardous materials. Therefore, there would be a **Less than Significant Impact** to the public or environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials with incorporation of Mitigation Measure WQ-3.

Mitigation Measures

Mitigation Measure WQ-3: Construction General Permit, WQMP, and Dewatering Plans

Level of Significance

Less than Significant with Mitigation Incorporated

4.10.4.3 Potential Impacts Related to Existing or Proposed Schools

Impact HM-3: 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?

4.10.4.3.1 Proposed Project

Construction and Operation

No existing or proposed schools are located within 0.25 mile of the Proposed Project. The Proposed Project would not emit hazardous emissions or handle hazardous or

acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school. Therefore, there would be **No Impact** as a result of construction and operational activities under the Proposed Project for potential impact HM-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.10.4.3.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same impact analysis and impact determination as described in Section 4.10.4.3.1 for potential impact HM-3. The spill recession or ramping requirements under Alternative 1 would not affect hazardous materials usages for construction or operation activities as described in the Proposed Project. In addition, Alternative 1 does not require relocation of the Proposed Project, and thus no existing or proposed schools would be located within 0.25 mile. Alternative 1 would not emit hazardous emissions or require handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school. Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 1 for potential impact HM-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.10.4.3.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same impact analysis and impact determination as described in Section 4.10.4.3.1 for potential impact HM-3. The spill recession or ramping requirements under Alternative 2 would not affect hazardous materials usages for construction or operation activities as described in the Proposed Project. In addition, Alternative 2 does not require relocation of the Proposed Project, and thus no existing or proposed schools would be located within 0.25 mile. Alternative 2 would not emit hazardous emissions or require handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school. Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 2 for potential impact HM-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.10.4.4 Potential Impacts Related to Hazardous Materials Sites

Impact HM-4: 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?

4.10.4.4.1 Proposed Project

Construction and Operation

The Proposed Project is not located on a site included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, and thus, would not create a significant hazard to the public or the environment. Therefore, there would be

No Impact as a result of construction and operational activities under the Proposed Project for potential impact HM-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.10.4.4.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same impact analysis and impact determination as described in Section 4.10.4.4.1 for potential impact HM-4. Alternative 1 does not require relocation of the Proposed Project to a site included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 1 for potential impact HM-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.10.4.4.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same impact analysis and impact determination as described in Section 4.10.4.4.1 for potential impact HM-4. Alternative 2 does not require relocation of the Proposed Project to a site included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Therefore, there would be **No Impact**

as a result of construction and operational activities under Alternative 2 for potential impact HM-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.10.4.5 Potential Impacts Related to Airport Safety Hazards

Impact HM-5: 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?

4.10.4.5.1 Proposed Project

Construction and Operation

There are no public airports or public use airports located within two miles of the Proposed Project. Additionally, the Proposed Project is not located within any Airport Influence Areas as outlined in an airport land use plan. Therefore, there would be **No Impact** as a result of construction and operational activities under the Proposed Project for potential impact HM-5.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.10.4.5.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same impact analysis and impact determination as described in Section 4.10.4.5.1 for potential impact HM-5. Alternative 1 does not require relocation of the Proposed Project within two miles of a public or public use airport. Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 1 for potential impact HM-5.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.10.4.5.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same impact analysis and impact determination as described in Section 4.10.4.5.1 for potential impact HM-5. Alternative 2 does not require relocation of the Proposed Project within two miles of a public or public use airport. Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 2 for potential impact HM-5.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.10.4.6 Potential Impacts Related to Emergency Response Plans

Impact HM-6: Would the Project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

4.10.4.6.1 Proposed Project

Construction and Operation

PG&E has not identified any road closures needed for Proposed Project construction or operation. The Proposed Project would not impair the implementation of or physically interfere with an adopted emergency response or evacuation plan. The Proposed Project's Project Road and Trail Maintenance Plan specifies that in the event of an emergency incident that blocks road/trail access to a Kerckhoff Hydroelectric Project facility and/or threatens public safety, PG&E would notify the appropriate land management agency (i.e., the BLM or USFS) or property owner to coordinate repair work. Therefore, there would be **No Impact** as a result of construction and operational activities under the Proposed Project for potential impact HM-6.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.10.4.6.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same impact analysis and impact determination as described in Section 4.10.4.6.1 for potential impact HM-6. Alternative 1 would not change any construction activities included in the Proposed Project and does not require relocation of the Proposed Project. The spill recession or ramping requirements under Alternative 1 would not impair implementation of or interfere with an adopted emergency response plan or emergency evacuation plan. Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 1 for potential impact HM-6.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.10.4.6.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same impact analysis and impact determination as described in Section 4.10.4.6.1 for potential impact HM-6. Alternative 2 would not change any construction activities included in the Proposed Project and does not require relocation of the Proposed Project. The spill recession or ramping requirements under Alternative 2 would not impair implementation of or interfere with an adopted emergency response plan or emergency evacuation plan. Therefore, there would be **No Impact** as a result of construction and operational activities under the Alternative 2 for potential impact HM-6.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.10.4.7 Potential Impacts Related to Wildland Fires

Impact HM-7: Would the Project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

4.10.4.7.1 Proposed Project

Construction

As defined by CAL FIRE, The majority of the Proposed Project is located within a Federal Responsibility Area, with smaller portions of the Proposed Project located within State Responsibility Areas designated as a high fire hazard severity zone, except for several small patches surrounding the northern portion of Kerckhoff Reservoir designated as moderate fire hazard severity zones (CAL FIRE 2024a). Also, the Proposed Project is located within areas mapped by CPUC as HFTD Tiers 2 and 3.

PG&E conducts fire prevention, fuels management, and fire suppression activities in accordance with CAL FIRE's Strategic Plan (CAL FIRE 2024b) and in coordination with USFS and BLM, through cooperative agreements (PG&E 2023).

Heat or sparks from vehicles or equipment during Proposed Project construction have the potential to ignite dry vegetation and cause fires. The potential for ignition during construction activities would be minimized through implementation of the fire prevention and Mitigation Measures included in PG&E's *2026–2028 Wildfire Mitigation Plan* (PG&E 2025) and PG&E's standard for Preventing and Mitigating Fires while Performing PG&E Work (PG&E 2024). The Wildfire Mitigation Plan is a system-wide corporate compliance plan that applies across PG&E's electric service territory and is part of PG&E's ongoing operational framework; it is not specific to the Kerckhoff Hydroelectric Project and is not a condition of the FERC license. The Wildfire Mitigation Plan describes strategies to reduce the potential for ignitions and methods for preventing, preparing for, suppressing, reporting, and investigating fires. These methods include pre-work readiness assessments, quality assurance and quality control procedures for maintenance and investigations, employee training, and assessments of work that may or may not be performed depending on wildfire risk (PG&E 2025).

Preventive measures relevant to Proposed Project construction include completing wildfire risk assessments prior to beginning work; keeping at least one dry chemical fire extinguisher in all vehicles, as well as supplemental devices depending on vehicle type; not driving on unimproved roadways except when performing required work or during an emergency; parking in areas cleared of vegetation or on dirt cleared down to bare mineral soil, particularly when idling; turning off motors of unoccupied vehicles; maintaining situational awareness for potential ignitions; ensuring firefighting tools and equipment are within the immediate work area and readily accessible; and removing all flammable material (e.g., grass, leaf litter, including snags) down to mineral soil, for a minimum of 10 feet around the jobsite when performing activities from which a spark may originate or when using portable tools powered by an internal combustion engine (PG&E 2024).

Furthermore, mandatory 4(e) conditions issued by USFS and BLM would require PG&E to develop and implement a Fire Prevention and Response Plan, in consultation with USFS, BLM, and CAL FIRE, as a condition of any new FERC license for the Kerckhoff Hydroelectric Project. The Fire Prevention and Response Plan would establish project-specific procedures for fire prevention, reporting, emergency response, and coordination with responding agencies (FERC 2025).

Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact HM-7.

Operation

Operation and maintenance activities under the Proposed Project would not be substantially different than existing conditions. PG&E would implement the Vegetation Management and Pest Control Plan which includes fuels management measures to reduce fire hazards. All PG&E vehicles contain basic fire suppression equipment (e.g., fire extinguishers, shovels, rakes), and motorized equipment have spark arrestors to prevent accidental fire ignition (PG&E 2023). All activities would be completed in accordance with procedures described in PG&E's Wildfire Mitigation Plan (PG&E 2025) and the standard for Preventing and Mitigating Fires while Performing PG&E Work (PG&E 2024) described above.

In addition, activities associated with the Proposed Project would not significantly increase the population of the area or add structures to the Proposed Project beyond day-use only sites. Further, as described in the Proposed Recreation Management Plan, the Vista Day Use Area would be used for short durations during the day, would accommodate up to 20 vehicles in a paved parking area, would not include amenities that directly involve fire grills or fire pits, and would include a bulletin board that would likely display rules and regulations (i.e., day use only, no campfires, and pack-in/pack-out trash).

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact HM-7.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.10.4.7.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction activities as described in Section 4.10.4.7.1. Alternative 1 would not change any construction activities or require relocation of the Proposed Project, and the same fire prevention and mitigation measures described above would be followed. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 1 for potential impact HM-7.

Operation

Alternative 1 has the same analysis and impact determination for operation as described in Section 4.10.4.7.1. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 1 would not change the potential impacts related exposing people or structures to risk of loss, injury, or death involving wildland fires. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 1 for potential impact HM-7.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.10.4.7.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction activities as described in Section 4.10.4.7.1. Alternative 2 would not change any construction activities or require relocation of the Proposed Project, and the same fire prevention and mitigation measures described above would be followed. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 2 for potential impact HM-7.

Operation

Alternative 2 has the same analysis and impact determination for operation as described in Section 4.10.4.7.1. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 2 would not change the potential impacts related exposing people or structures to risk of loss, injury, or death involving wildland fires. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 2 for potential impact HM-7.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.10.5 Literature Cited

CAL FIRE (California Department of Forestry and Fire Protection). 2024a. Fire Hazard Severity Zones Viewer. Accessed: April 3, 2026. Retrieved from: https://hub-calfire-forestry.hub.arcgis.com/apps/CALFIRE-Forestry::fire-hazard-severity-zone-viewer/explore.

_____. 2024b. *Strategic Plan*. State of California, California Natural Resources Agency, California Department of Forestry and Fire Protection. Accessed: April 3, 2026. Retrieved from: https://www.fire.ca.gov/about/cal-fire-strategic-plan-2024.

California Public Law. 2025. Miscellaneous Health and Safety Provisions. Division 20. Accessed: April 3, 2026. Retrieved from: https://california.public.law/codes/health_and_safety_code,_division_20

Central Valley Regional Water Board (Central Valley Regional Water Quality Control Board). 2019. *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region*. Fifth Edition, Revised February 2019 (with Approved Amendments). The Sacramento River Basin and San Joaquin River Basin. Accessed: April 3, 2026. Retrieved from: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201902.pdf.

CPUC (California Public Utilities Commission). 2025. CPUC High Fire Threat District. Accessed: April 3, 2026. Retrieved from: https://www.arcgis.com/apps/webappviewer/index.html?id=5bdb921d747a46929d9f00dbdb6d0fa2

DTSC (Department of Toxic Substances Control). 2025a. EnviroStor. Accessed: April 3, 2026. Retrieved from: https://www.envirostor.dtsc.ca.gov/public/

_____. 2025b. Hazardous Materials Business Plan Program. Accessed: April 3, 2026. Retrieved from: https://calepa.ca.gov/hazardous-materials-business-plan-program/

_____. 2025c. Hazardous Waste and Substances Site List. Accessed: April 3, 2026. Retrieved from: https://www.envirostor.dtsc.ca.gov/public/search.asp?cmd=search&reporttype=CORTESE&site_type=CSITES,OPEN,FUDS,CLOSE&status=ACT,BKLG,COM&reporttitle=HAZARDOUS+WASTE+AND+SUBSTANCES+SITE+LIST.

_____. 2025d. DTSC Regulations. California Code of Regulations, Title 22, Division 4.5. Accessed: April 3, 2026. Retrieved from: https://dtsc.ca.gov/title22/.

FERC (Federal Energy Regulatory Commission). 2025. *Environmental Assessment for the Kerckhoff Hydroelectric Project, FERC Project No. 96-048*. Washington, D.C.

Fresno County. 2024a. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-

and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

_____. 2024b. *Fresno County Multi-Jurisdictional Hazard Mitigation Plan*. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-health/fresno-county-hmp-final.pdf.

Google. 2023. Google Earth Pro Version 7.3.6.9345 Software (airports and schools in Proposed Project vicinity). Accessed: October 2023.

Madera County. 1995. *Madera County General Plan Policy Document*. Adopted October 24. Accessed: April 3, 2026. Retrieved from:https://www.maderacounty.com/home/showpublisheddocument/40825/638615574804870000.

_____. 2010. *Madera County Operational Area Emergency Operations Plan.* Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/3610/636533672515870000.

_____. 2017. *Madera County Local Hazard Mitigation Plan Update.* Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/17258/637031054575530000.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

PG&E (Pacific Gas and Electric Company). 2022. Response to Additional Information Request for the Final License Application FERC Docket Number: P-96-048. September 20. Accessed April 3, 2026. Retrieved from: https://elibrary.ferc.gov/eLibrary/docinfo?accession_number=20220921-5016&sid=de9d1463-7d3f-40ec-ac72-aa481e406a3c.

_____. 2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

_____. 2024. Preventing and Mitigating Fires while Performing PG&E Work. Utility Standard: EMER-4102S. Accessed April 3, 2026. Retrieved from: https://www.pge.com/assets/pge/docs/outages-and-safety/outage-preparedness-and-support/emer-4102s-preventing-and-mitigating-fires-while-performing-pge-work.pdf.

_____. 2025. *2026–2028 Wildfire Mitigation Plan*. Volumes 1 and 2. April 4, 2025. Accessed: April 3, 2026. Retrieved from: https://www.pge.com/assets/pge/docs/outages-and-safety/outage-preparedness-and-support/pge-2026-2028-base-wmp-vol1-r0.pdf and https://www.pge.com/assets/pge/docs/outages-and-safety/outage-preparedness-and-support/pge-2026-2028-base-wmp-v2-r1.pdf.

State Water Board (California State Water Resources Control Board). 2019. Wetland and Riparian Area Protection Policy (WRAPP): Clean Water Act Section 401 Certification and Wetlands Program. Accessed: March 31, 2026. Available at: https://www.waterboards.ca.gov/water_issues/programs/cwa401/wrapp.html.

_____. 2021. State Water Resources Control Board Resolution No. 2021-0012: Confirmation that the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State are in Effect as State Policy for Water Quality Control. April 6. Accessed: March 31, 2026. Available at: https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2021/rs2021-0012.pdf.

_____. 2022. NPDES 20220 Construction Stormwater General Permit Reissuance. Accessed: March 31, 2026. Available at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction/general_permit_reissuance.html.

_____. 2025. GeoTracker. Accessed: April 3, 2026. Retrieved from: https://geotracker.waterboards.ca.gov/.

4.11 HYDROLOGY AND WATER QUALITY

This section describes existing conditions and analyzes potential impacts on hydrology and water quality as a result of implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on the review of existing resources, technical data, and applicable laws and regulations. The potential impacts on hydrology and water quality from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.11-1).

Table 4.11-1: CEQA Checklist for Hydrology and Water Quality

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact HYD-1 Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated
Impact HYD-2 Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	No Impact	No Impact	No Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact HYD-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 a substantial erosion or siltation on- or off-site; ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; 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; or iv. impede or redirect flood flows?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Impact HYD-4 In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	No Impact	No Impact	No Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact HYD-5 Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	Significant and Unavoidable	Significant and Unavoidable	Significant and Unavoidable

4.11.1 Environmental Setting

4.11.1.1 Regional Setting and Climate

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public lands administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and United States Bureau of Reclamation (Reclamation) under BLM management.

The San Joaquin River (SJR) watershed has a drainage of approximately 15,880 square miles, from the headwaters of the SJR at the Sierra Nevada crest to its confluence with the Sacramento River at the head of Suisun Bay (PG&E 2023). The 366-mile-long SJR drains the west slope of the Sierra Nevada through Kerckhoff Reservoir to U.S. Bureau of Reclamation's (Reclamation's) Millerton Lake, flows southwest into the agriculturally-rich Central Valley, passing just north of the city of Fresno where it turns northwest through the length of the Central Valley into the Sacramento-San Joaquin Delta, and finally flows into Suisun Bay. The Merced, Tuolumne, Stanislaus, Calaveras, and Mokelumne rivers are the primary tributaries that join the SJR in the Central Valley downstream of the Proposed Project. The SJR

watershed is bordered by the Merced River to the north, the Owens River to the east, and the Kings River to the south.

The upper SJR watershed area encompasses 1,639 square miles from its headwaters at an elevation of 14,000 feet above mean sea level (msl) to Friant Dam on Millerton Lake at an elevation of 300 feet msl in the Sierra Nevada foothills. Additional information about the subbasin drainage areas upstream of Millerton Lake, including Kerckhoff Dam, is available in the Final License Application (FLA) (PG&E 2020a).

Kerckhoff Dam is located downstream of PG&E's Crane Valley Hydroelectric Project (Federal Energy Regulatory Commission [FERC] Project No. 1354) and Southern California Edison's (SCE) Big Creek No. 4 Hydroelectric Project (FERC Project No. 2017) and is approximately 9.8 miles upstream from Millerton Lake (at the upstream extent). The local drainage area to the Kerckhoff Hydroelectric Project downstream from Redinger Lake to Millerton Lake is within the Auberry subbasin. The Auberry subbasin drainage area, which includes the Kerckhoff Hydroelectric Project, is 212.7 square miles.

The Kerckhoff Hydroelectric Project is located within a deeply entrenched section of the SJR. Several unregulated tributaries drain directly into Kerckhoff Reservoir, the largest of which is Fish Creek. Below Kerckhoff Dam, unregulated tributaries including Mike Walker Canyon Creek and Grapevine Canyon Creek flow into the SJR.

The SJR watershed has warm, dry summers and cool, wet winters with moderate to heavy precipitation. The SJR monthly average temperatures are coldest in January and warmest in July. Annual average air temperatures range from 62.5°F downstream near Millerton Lake at 410 feet msl (Friant Government Camp station) to 45°F near Huntington Lake at 7,020 feet msl (WRCC 2020). The majority of precipitation falls from October through May, with very little rainfall during the summer months. Annual average precipitation ranges widely depending on elevation, from 14 inches at Millerton Lake to 37.2 inches at Huntington Lake (PG&E 2023) and 50 inches in the northern portions of the watershed toward the Sierra Nevada crest (PG&E 2023). Precipitation is

predominantly in the form of snow at higher elevations (higher than 5,000 feet msl) and in the form of rain at lower elevations across the basin.

4.11.1.2 Existing Water Uses

Existing water uses at the Kerckhoff Hydroelectric Project include hydropower generation, recreation, and aquatic habitat. The Kerckhoff Hydroelectric Project does not divert water for irrigation, industrial, or municipal uses.

PG&E holds three licensed water rights for diverting and storing flows for hydroelectric power generation and one licensed water right for power and incidental domestic uses (Table 4.11-2). In 2015, Table Mountain Rancheria and Reclamation entered into a contract that allows Table Mountain Rancheria to pump up to 600 acre-feet of groundwater per year (50 acre-feet per month) from two parcels of Table Mountain Rancheria–owned land located southeast of Kerckhoff Reservoir. Under this contract, groundwater is pumped from wells on these parcels to the SJR at Kerckhoff Reservoir and is diverted to Table Mountain Rancheria from Millerton Lake. Reclamation approved a new 25-year Warren Act contract with Table Mountain Rancheria beginning in 2020 (Reclamation 2019).

Table 4.11-2: Summary of PG&E's Existing Water Rights for the Kerckhoff Hydroelectric Project

Application No.	License No.	Permit No.	Priority / First Use	Storage (acre-feet per annum)	Direct Diversion (cfs)	Description (name of works)	Point of Diversion	Place of Use	Type of Use	Water Right Class
1463	340	680	09/25/1919	3,200	900	Kerckhoff Dam	San Joaquin River	K1 and K2 Powerhouses	Power	License
2816	341	1496	04/11/1922	--	175	Kerckhoff Dam	San Joaquin River	K1 and K2 Powerhouses	Power	License
829	339	606	11/14/1917	--	700	Kerckhoff Dam	San Joaquin River	K1 and K2 Powerhouses	Power	License
25512	13352	18503	09/28/1977	--	4,600	Kerckhoff Dam	San Joaquin River	K2 Powerhouse	Power, incidental domestic	License

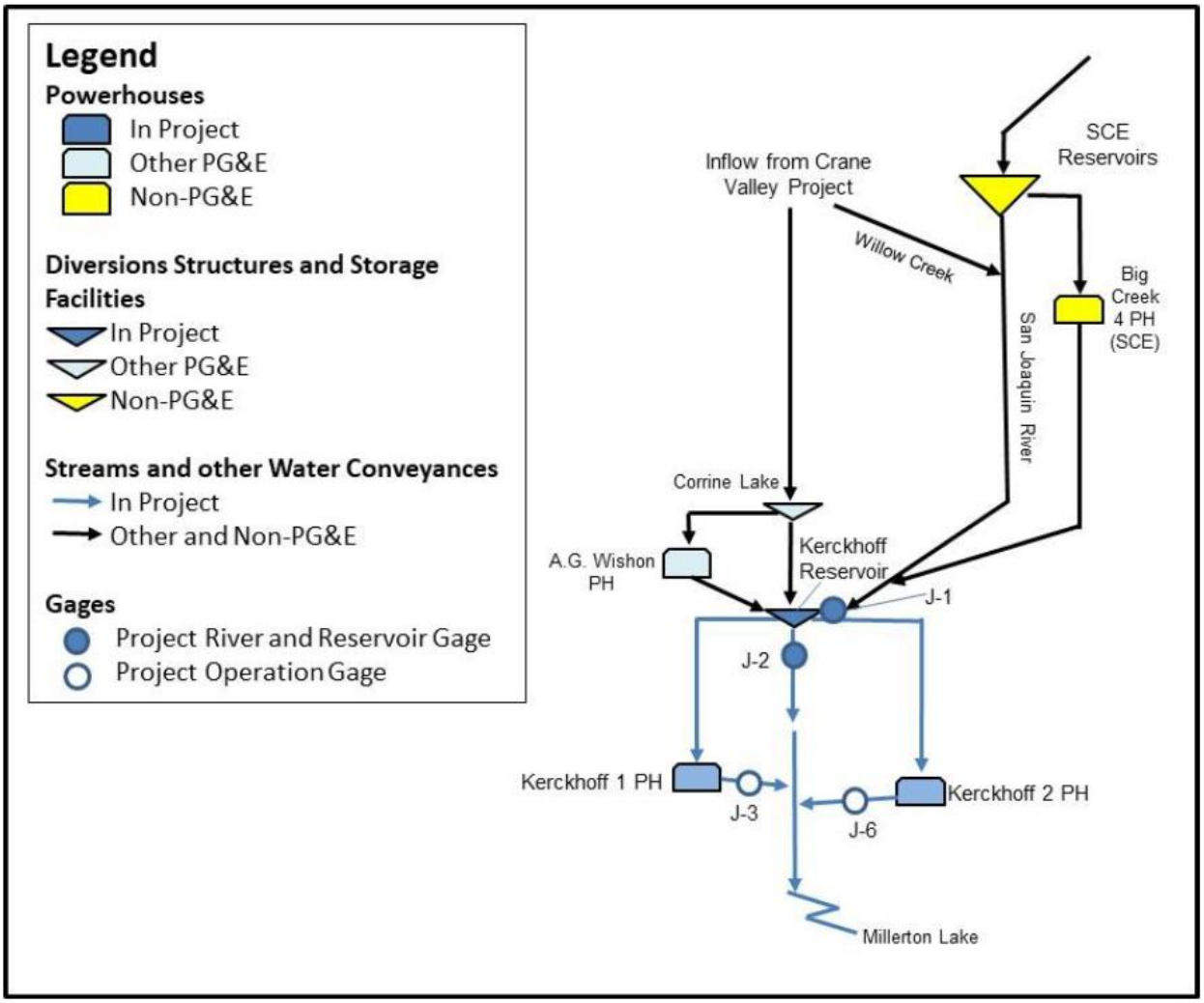
4.11.1.2.1 Existing Gages

PG&E currently maintains a network of stream, powerhouse, and reservoir gaging stations in the watershed to monitor and record the storage and flow of water for the Kerckhoff Hydroelectric Project (Table 4.11-3). This network consists of two stations that measure diversion flows: 1) one station that measures storage by means of water surface elevations in Kerckhoff Reservoir (PG&E Gage J-1), and 2) a second gage that measures river flows in the SJR below Kerckhoff Dam (PG&E Gage J-2). The network also includes two stations that measure powerhouse discharges downstream of the K1 Powerhouse (PG&E Gage J-3) and the K2 Powerhouse (PG&E Gage J-6). PG&E also has one water temperature gage at the K1 Powerhouse for license compliance with the existing FERC license article 45 (PG&E Gage J-7). Figure 4.11-1 shows the schematic locations of the existing stream gages at the Kerckhoff Hydroelectric Project. The gages in Table 4.11-3 are not proposed to be altered or relocated as part of the Proposed Project.

Table 4.11-3: Existing Kerckhoff Hydroelectric Project Gaging

Gage Description	PG&E Designation	USGS Designation
Kerckhoff Reservoir Storage	**J-1**	**11246650**
SJR below Kerckhoff Dam	**J-2**	**11246700**
K1 Powerhouse	**J-3**	**11246950**
K2 Powerhouse	**J-6**	**11247050**

PG&E = Pacific Gas and Electric Company; USGS = U.S. Geological Survey



PG&E = Pacific Gas and Electric Company; PH = Powerhouse; SCE = Southern California Edison

Figure 4.11-1: Kerckhoff Hydroelectric Project Schematic of Regional Flow and Gages (PG&E 2023)

The Kerckhoff Hydroelectric Project has two powerhouses: Kerckhoff 1 (K1) Powerhouse and K2 Powerhouse. PG&E ceased K1 Powerhouse operations in 2018. When both powerhouses operated, the diversion capacity of the Kerckhoff Hydroelectric Project was 6,256 cubic feet per second (cfs). After the K2 Powerhouse began operation in 1983, the K1 Powerhouse infrequently operated near full capacity (PG&E 2023). Water can be diverted from the SJR at two intake structures located in Kerckhoff Reservoir. At the K1 Intake Structure, water was diverted through an approximately

16,916-foot-long tunnel to the K1 Powerhouse, with a maximum flow of 1,156 cfs, and returned water was discharged directly into the SJR approximately 8 miles downstream of Kerckhoff Dam. Water diverted at the K2 Intake Structure flows through an approximately 21,632-foot-long tunnel to the K2 Powerhouse, approximately 9.8 miles downstream from Kerckhoff Dam, or 1.8 miles downstream from the K1 Powerhouse. Maximum flow through the K2 Powerhouse is 5,100 cfs and is discharged directly into the SJR after passing through the powerhouse (PG&E 2017).

4.11.1.3 Baseline Conditions

The baseline hydrology is a function of inflows to Kerckhoff Reservoir, runoff, existing FERC license requirements, available storage in the reservoir, limitations of the powerhouses, and water rights. PG&E operates the Kerckhoff Hydroelectric Project pursuant to the terms of the current license to generate power and to use the available flow from upstream projects. The Kerckhoff Hydroelectric Project is operated in run-of-river mode because of the limited storage available. The water diverted is released into the SJR and flows into Millerton Lake. For the purposes of this CEQA analysis, hydrology under baseline conditions are how the Kerckhoff Hydroelectric Project has operated up to May of 2023 when the California State Water Resource Control Board (State Water Board) released the Notice of Preparation (NOP) on May 30, 2023, for an Environmental Impact Report for the Kerckhoff Hydroelectric Project Relicensing Federal Energy Regulatory Commission Project No. 96. At the time of the NOP, the Kerckhoff Hydroelectric Project operated with the K1 Powerhouse offline, compliance with existing FERC license conditions, and with the modifications in operations since 2018 listed below:

- Improved calibration of release gates
- Improved Kerckhoff Dam gate logic programming to reduce flow fluctuations below Kerckhoff Dam resulting from gate movement while maintaining lake elevation setpoints
- Forgoing opportunities to provide the California Independent System Operator (ISO) ancillary services, including automatic generation control and other services that may increase the frequency or magnitude of spills

- Employment of an internal spill management protocol, which excludes, when feasible, creating spill at the dam due to market economics during energy oversupply conditions. The exact changes under this protocol are unclear at this time and are voluntary[27]

Under baseline conditions, the existing FERC license for the Kerckhoff Hydroelectric Project is operated with two WY types, Dry and Normal. A Dry WY is defined as any twelve-month period beginning May 1 in which the unimpaired runoff of the San Joaquin River at Millerton Lake from April 1 to July 31, as forecast by the California Department of Water Resources (CDWR) on April 1 and as may be adjusted by the State on May 1 or June 1, will be 45 percent or less of the average April–July period. A Normal WY is defined as any WY not classified as Dry. Dry and Normal, which are the only WY types used to inform Kerckhoff Hydroelectric Project operation decisions. For background, between 1985-2017, 21 percent of the WYs are classified as Dry, and 79 percent of the WYs are classified Normal.

Existing FERC license Article 45 affects hydrology under baseline conditions. Article 45 of the existing Kerckhoff Hydroelectric Project license requires minimum instream flows (MIF) to protect American shad (*Alosa sapidissima*) by providing spawning flows and flows to maintain water temperatures for the protection of smallmouth bass (*Micropterus dolomieu*). License Article 45 as amended April 22, 1993, states as follows:

- [The Applicant] shall discharge a minimum flow of 25 cfs downstream of Kerckhoff Dam during normal years and a minimum flow of 15 cfs during dry years, with additional releases as determined necessary in consultation with the California Department of Fish and Wildlife (CDFW (formerly CDFG)) to (1) maintain stream temperatures at or below 27 degrees Celsius (°C) upstream of Kerckhoff No. 2 Powerhouse, and (2) flush sediments that may accumulate in the streambed below Kerckhoff Dam

[27] State Water Board staff requested clarification on the Internal Spill Management Protocol on July 29, 2024, and received a response from PG&E on December 13, 2024 (PG&E 2024). The specific operation changes are unclear.

- Dry and Normal WY type criteria as described above
- If during a designated dry year, the February 1 or later water prediction indicates that dry year conditions no longer prevail, normal year flow releases would resume immediately
- The minimum flow may be modified temporarily: (a) to the extent required by operating emergencies beyond the control of the Applicant; and (b) for fishery management purposes, upon mutual agreement between the Applicant and CDFW

The permanent spawning season flow release regime for American Shad is implemented each year from May 15 through June 30, as shown in Table 4.11-4.

Table 4.11-4: Flow Release Regime during American Shad Spawning Season

Timeframe	Millerton Lake Reservoir Elevation	Time (hours)	Flow (cfs)	Powerhouse
May 15–June 30	Below 545 feet msl	10 p.m. to 2 a.m.	775 cfs	K2 Powerhouse
		Remaining hours	400 cfs	K2 or K1 Powerhouse
	At/above 545 feet msl	10 p.m. to 2 a.m.	1,200 cfs	K2 Powerhouse
		Remaining hours	775 cfs	K2 Powerhouse
		Remaining hours	400 cfs	K1 Powerhouse

cfs = cubic feet per second; msl = above mean sea level

A second component of existing FERC License article 45 is based on an agreement between the CDFW and PG&E,[28] which requires up to an additional 50 cfs may be released downstream of Kerckhoff Dam to maintain stream temperatures at 80.6°F (27°C) or less between Kerckhoff Dam and the K2 Powerhouse for the protection of Smallmouth Bass. The additional releases would be made when the water temperature exceeds 80.6°F (27°C) for a minimum of four hours per day for five consecutive days.

In addition, PG&E operates the Kerckhoff Hydroelectric Project pursuant to the terms of Article 40 (Appendix C *License Articles and Orders*) of the license, which states: "the Applicant shall operate the [Kerckhoff Hydroelectric] Project during flood periods in a manner that will not cause peak river flows below Kerckhoff Dam and powerhouse to exceed the peak flows that would have occurred in the absence of the [Kerckhoff Hydroelectric] Project."

4.11.1.3.1 Baseline Operation and Facility Constraints

The Kerckhoff Hydroelectric Project is operationally constrained by its location, reservoir size, and existing infrastructure. Specifically, the Kerckhoff Hydroelectric Project constraints include operational limitations of the K2 Powerhouse, the limited operational storage in Kerckhoff Reservoir, highly variable sub-daily inflows to Kerckhoff Reservoir, and limitations associated with manual controls (e.g., gates on the dam[29]) in a remote location where Kerckhoff Dam is only accessible by boat or helicopter (PG&E 2023). PG&E diverts inflows greater than the Project Bypass Reach (PBR) flow release

[28] The 1980 Fishery Agreement between the Applicant and CDFW (formerly CDFG) required four years of preoperational studies of striped bass (Morone saxatilis) and American shad to identify the requirements that trigger spawning and the frequency, duration, and location of spawning. Additionally, the 1980 Fishery Agreement included instream flow release and water temperature requirements.

[29] A total of 14 radial gates currently control spill from the dam, 9 of which are manually operated, and 5 of which are automatically operated under existing conditions (as of May 2023).

requirements to the K2 Powerhouse while working within multiple facility limitations described below.

Kerckhoff Reservoir

Originally Kerckhoff Reservoir is believed to have had an estimated usable capacity of approximately 4,252 acre-feet. As described in PG&E's Technical Study Report (TSR) 02, Project-Related Sediment Management Practices in Kerckhoff Reservoir, it is unclear whether the original storage capacity was 4,252 acre-feet (1920 data) or 4,000 acre-feet (1975 documentation). As a result of sediment deposition, comparing the 1920 and 2018 normal maximum water surface elevation capacities and using the 4,252 acre-feet as Kerckhoff Reservoirs baseline storage capacity, the reservoir has lost approximately 1,766 acre-feet of capacity due to sediment deposition since operations began in 1920. PG&E's 2018 bathymetric survey revealed the estimated usable capacity of Kerckhoff Reservoir to be approximately 2,434 acre-feet at the normal maximum water surface elevation (WSL) of 985.0 feet msl (PG&E 2023); however, it has only 692 acre-feet of operational storage.

The normal operational storage range of the reservoir under baseline conditions is 980.0 to 984.5 feet msl as the Kerckhoff 2 (K2) Powerhouse can only operate above 980.0 feet msl (PG&E 2020a). The reservoir is maintained within that 4.5-feet operational elevation range, which translates to roughly 692[30] acre-feet of operational storage. The total storage of Kerckhoff Reservoir is 2,434[31] acre-feet, but water can only be released via the radial gates or the low-level outlets once WSL is below 980 feet msl.

[30] Exhibit B, Section B.1.3 of PG&E Second Supplement to the FLA filed April 3, 2023, Accession Number 20230403-5055.

[31] Exhibit A, sections A.1.2, A.2 and Exhibit B, sections B.1.3 and B.3.1 of PG&E Second Supplement to the FLA filed April 3, 2023, Accession Number 20230403-5055.

Kerckhoff 2 Powerhouse

The K2 Powerhouse has a minimum diversion capacity of 580 cfs, but can divert up to approximately 5,100 cfs. However, the K2 Powerhouse is limited by a rough operating zone (ROZ) between 42 and 92 megawatts (MW) (approximately 1,744 cfs and 3,117 cfs). PG&E will pass through this zone quickly in order to operate above or below it. Operating within the rough operating zone causes excessive cavitation to the runner and substantial vibration that damages equipment, resulting in costly repairs and increased outage durations.

Additionally, the K2 Powerhouse is derated, or the amount of water that can be diverted is decreased due to a backwater effect, when Millerton Lake levels reach an elevation of 545 feet msl or greater. When Millerton Lake levels exceed the K2 Tailrace elevation (approximately 545 feet above msl), there is a reduction of the effective head on the unit, limiting output and reducing efficiency. These high-water surface elevations bring the powerhouse tailwater elevation up to a point that interferes with the operation of the powerhouse at high throughput levels. When Millerton Lake is at its maximum water surface elevation, K2 Powerhouse throughput is reduced by approximately 750 cfs. The K2 Powerhouse is also limited to two stops and restarts per day (PG&E 2023).

Another constraint is the K2 Powerhouse's availability during unexpected outages (PG&E 2023) during which flow can unexpectedly increase significantly in the PBR as result of Kerckhoff Reservoir spilling.

Upstream Hydroelectric Projects

The combined inflows to Kerckhoff Reservoir fluctuate based on runoff conditions and operation of the Big Creek 4 Hydroelectric Project (P-2017) (releases Big Creek 4 Powerhouse and Redinger Dam), as well as operation of the PG&E owned and operated Crane Valley Hydroelectric Project (P-1354) which are both upstream of the Kerckhoff Hydroelectric Project. Compared to Kerckhoff Reservoirs total storage 2,434 acre-feet, and 692 acre-feet of operational storage, Big Creek 4 (35,033-acre-foot reservoir) and Crane Valley (45,410-acre-foot) have more capacity to detain and release larger flows. Regulation of flow releases to the PBR is heavily governed by

inflows into Kerckhoff Reservoir, K2 Powerhouse diversions, K2 Powerhouse limitations, and maintaining reservoir water surface elevation levels within normal operating ranges. Daily and hourly diversions for generation vary based on demand for electricity and grid reliability.

4.11.1.4 Baseline Hydrology Operations Model

The description of baseline hydrology associated with operation at the Kerckhoff Hydroelectric Project is based on a review of the studies and technical reports prepared by PG&E in support of the FLA and Second Supplemental Information Filing (PG&E 2020a, 2023). In addition, baseline data includes reservoir elevations, powerhouse flows, and flows below Kerckhoff Dam for WYs 2018-2023. For the purposes of this CEQA analysis, hydrology under baseline conditions is how the Kerckhoff Hydroelectric Project has operated up to May of 2023, when the State Water Board released the NOP for an Environmental Impact Report for the Kerckhoff Hydroelectric Project Relicensing (May 30, 2023).

The tables and figures shown below establish hydrologic baseline conditions for the Kerckhoff Hydroelectric Project, displaying how it has operated up to May of 2023. Tables displaying data from water years (WYs) 1985-2017 were developed using PG&E's *Current Operations Model*, which includes current facilities and limitations, water rights permits, existing license requirements, and agreements. Gage data from Gages J-1, J-2, and J-6 for the WYs 2018–2023 are also provided below. The gage data from WY's 2018-2023 also include same baseline conditions described for WYs 1985-2017 and implemented in PG&E's current Operations Model. The 2021–2023 gage data also include the Long-Term Operating Rules (LTOR) inflows from the Big Creek 4 Project (P-2017), as Southern California Edison (SCE) began implementing the LTOR for the first time in 2021. Therefore, the baseline hydrology conditions in the EIR for the Kerckhoff Hydroelectric Project are based on how the Kerckhoff Hydroelectric Project operated up to May 2023.

4.11.1.4.1 Development of Inflows

Inflow data was developed using the stream gages displayed in Table 4.11-5.

Table 4.11-5: Stream Gages used in Developing Inflow Hydrology

Stream Gage	USGS ID
SAN JOAQUIN R AB WILLOW C NR AUBERRY CA	11242000
WILLOW C A MOUTH NR AUBERRY CA	11246500
BIG C PH No 4 NR Auberry CA	11246530
SAN JOAQUIN PH NO1 NR AUBERRY (WISHON PH) CA	11246610

Source: PG&E 2023

Figure 4.11-2 shows the monthly average inflow to Kerckhoff Reservoir, flow measured downstream of Kerckhoff Dam (Gage J-2), flow through the K2 Powerhouse (Gage J-6), and reservoir water surface elevations (Gage J-1) for normal and dry years between 1985 – 2017. (PG&E 2023). In dry years, inflow was fairly steady in the fall and winter and increased in the spring. In normal years, inflow steadily increased through the winter followed by a rapid increase in the spring and rapid decrease in summer. Discharge downstream of Kerckhoff Dam (Gage J-2) was low and steady in dry years; in normal years discharge was steady through fall and winter, with a rapid increase in late spring and rapid decrease in summer. Overall, flow through the K2 Powerhouse showed a similar trend in dry and normal years but with higher flow rates in normal years. Storage in Kerckhoff Reservoir was similar in dry and normal years with a minimum in fall and steady values in winter through summer.

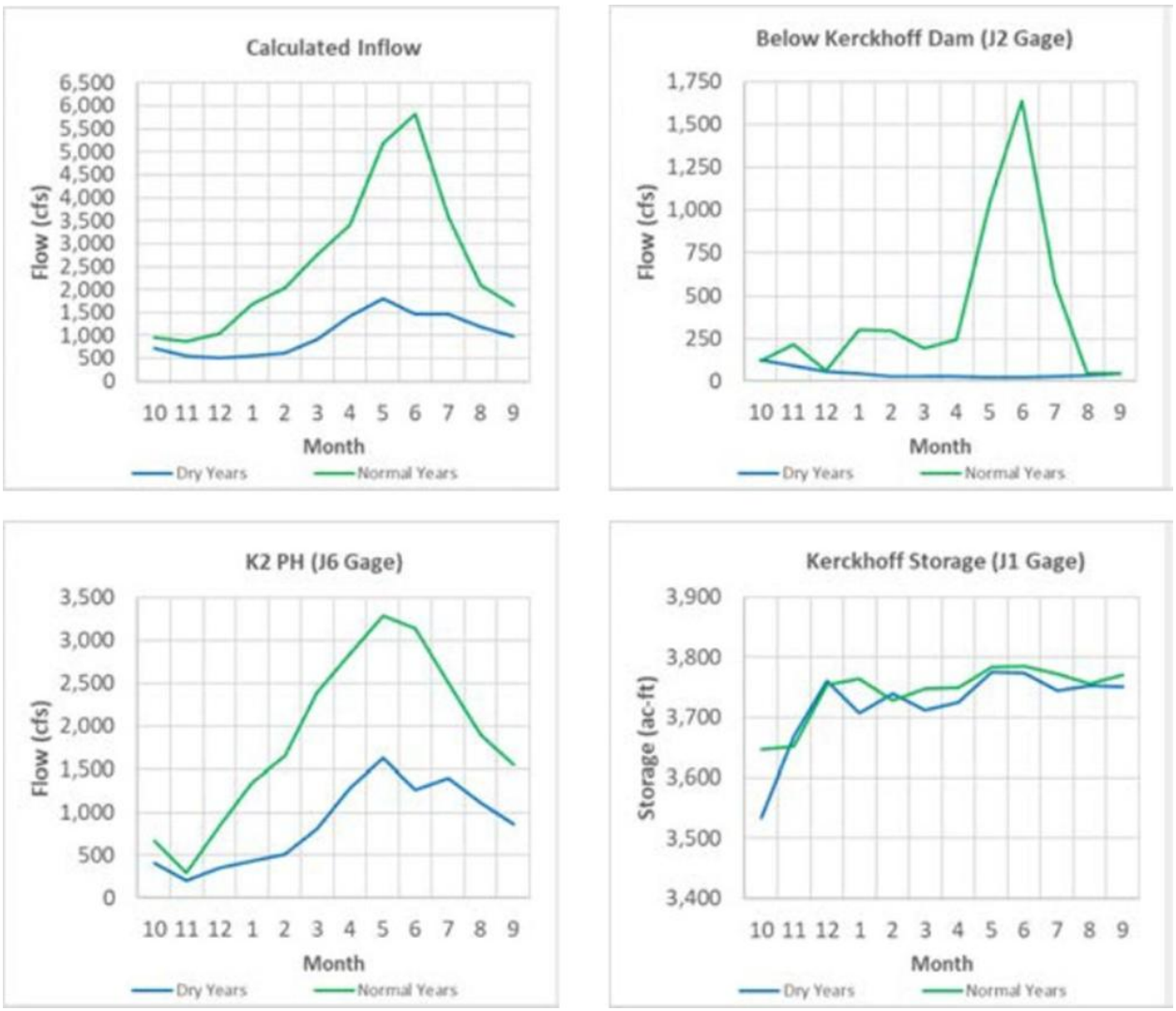
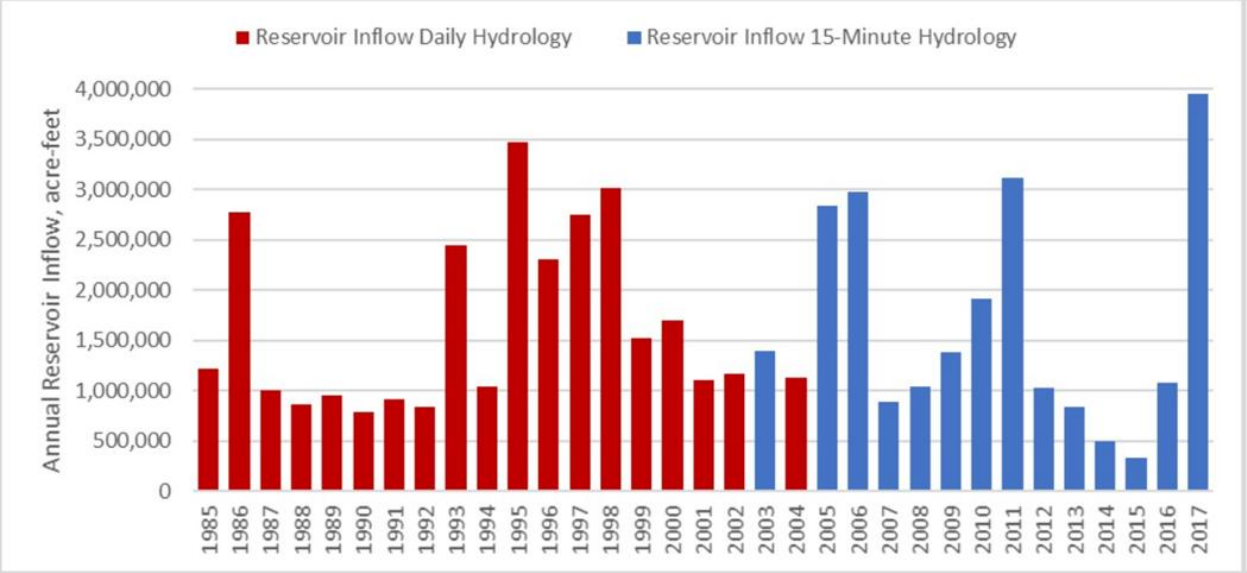


Figure 4.11-2: Monthly Average Flows in the SJR (Water Years 1985-2017) Upstream of Kerckhoff Reservoir (calculated), below Kerckhoff Dam (Gage J-2), K2 Powerhouse (Gage J-6), and Reservoir Water Surface Elevations in Kerckhoff Reservoir (Gage J-1)

4.11.1.4.2 Inflows Under Baseline Conditions

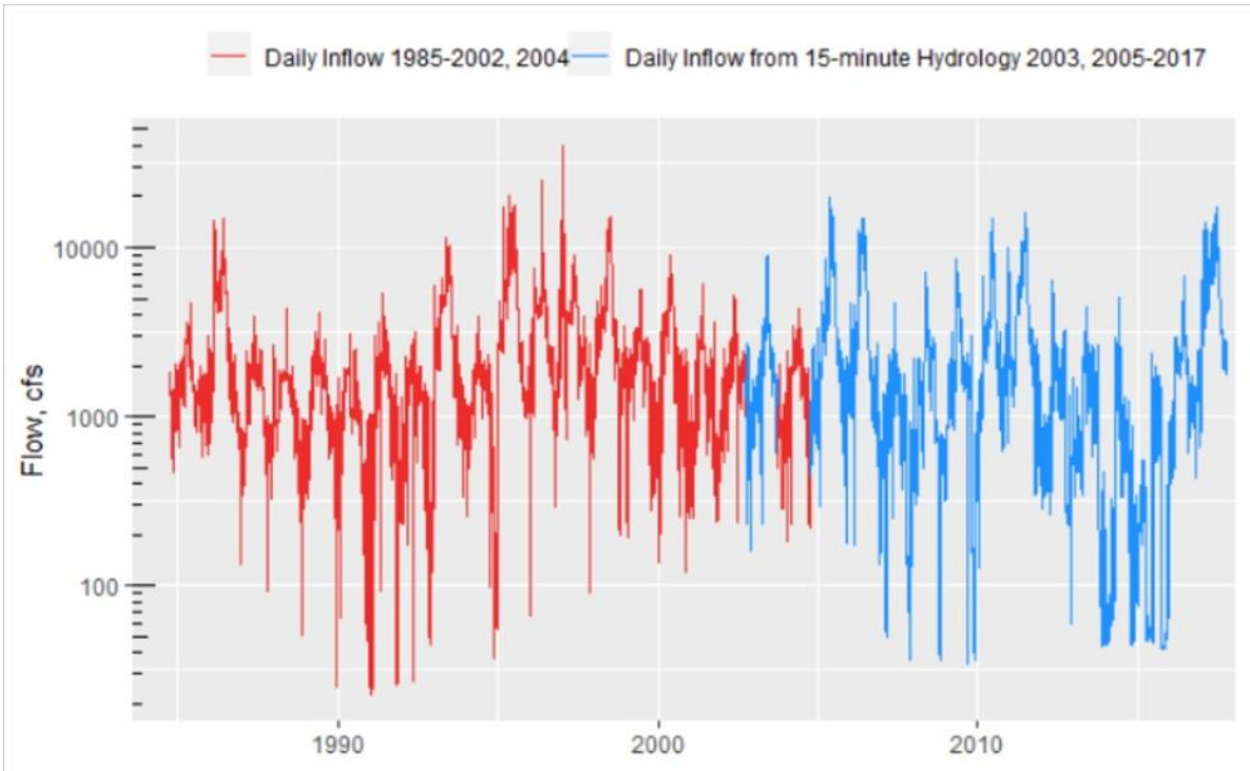
Annual inflow to Kerckhoff Reservoir with estimated LTOR inflows under baseline conditions is shown in Figure 4.11-3. The total annual inflow ranged from a minimum of 337,049 acre-feet (466 cfs) in 2015 to a maximum of 3,953,994 acre-feet (5,462 cfs) in 2017 with an average of 1,646,065 acre-feet (2,274 cfs). Figure 4.11-4 shows a time

series of inflow for 1985 to 2017. Daily inflow ranged from approximately 30 cfs to 13,000 cfs.



Source: PG&E 2023

Figure 4.11-3: Annual Inflow with LTOR to Kerckhoff Reservoir under Baseline Conditions



Source: PG&E 2023

Figure 4.11-4: Time Series of Inflow with LTOR to Kerckhoff Reservoir

4.11.1.4.3 Kerckhoff Reservoir Operations Under Baseline Conditions

Kerckhoff Reservoir is operated as a run-of-the-river facility and has no seasonal storage targets. To achieve release requirements and power generation goals, storage frequently cycles around the normal operating elevation (984.5 feet msl), and within a normal operating range of 4.5 feet in under a 24-hour period (980 – 984.5 ft msl). As discussed previously, the minimum operating reservoir elevation of the Kerckhoff 2 (K2) Powerhouse is 980 feet msl (PG&E 2020a). Under baseline conditions, the Kerckhoff Reservoir daily water surface elevations ranged from 980.0 to 984.5 feet msl.

Table 4.11-6 shows the average monthly storage at Kerckhoff Reservoir by WY type. Under baseline conditions, storage has generally stayed within a range of approximately 2,080 acre-feet to 2,235 acre-feet during all WY types from 1985 to 2017, according to

Gage J-1. During all WYs from 2018 to 2023, the average monthly storage ranged between 1,809 acre-feet and 2,027 acre-feet (Table 4.11-7).

Table 4.11-6: Average Monthly Storage (acre-feet) at Kerckhoff Reservoir from Gage J-1 under Baseline Conditions (Water Years 1985-2017

Month	Dry WY (acre-feet)	Normal WY (acre-feet)	All WYs (acre-feet)
October	2,183.2	2,223.6	2,215.0
November	2,173.5	2,234.7	2,221.7
December	2,101.8	2,211.1	2,187.9
January	2,105.6	2,181.9	2,165.7
February	2,110.9	2,174.7	2,161.2
March	2,085.2	2,162.1	2,145.8
April	2,099.7	2,141.9	2,133.0
May	2,081.9	2,164.5	2,147.0
June	2,165.7	2,210.6	2,201.1
July	2,133.9	2,190.7	2,178.6
August	2,186.0	2,147.4	2,155.6
September	2,203.1	2,141.3	2,154.4

Source: PG&E 2023

Table 4.11-7: Average Monthly Storage (acre-feet) at Kerckhoff Reservoir from Gage J-1 under Baseline Conditions (Water Years 2018-2023)

Month	All WY (acre-feet)
October	1,948
November	1,930
December	1,878
January	1,948
February	1,930
March	1,878

Month	All WY (acre-feet)
April	1,958
May	2,027
June	1,963
July	1,938
August	1,923
September	1,809

Source: USGS 2026a

4.11.1.4.4 K2 Powerhouse Flows Under Baseline Conditions

The monthly average flows through the K2 powerhouse under baseline conditions for WYs 1985-2017 are shown in Table 4.11-8 for Dry, Normal, and all WY types. The flow through the K2 Powerhouse reflects the minimum (580 cfs) and maximum (5,100 cfs) hydraulic capacities of the powerhouse as well as the rough operating zone. Monthly average flows below the minimum hydraulic capacity (580 cfs) are due to scheduled maintenance that typically occurs in the fall. For Normal WYs, monthly average flows are highest in May and June and lowest in the fall. The average monthly flows for WYs 2018 to 2023 are shown in Table 4.11-9.

Table 4.11-8: Average Monthly Flows through K2 Powerhouse Under Baseline Conditions (WY 1985-2017)

Month	Dry WYs (cfs)	Normal WYs (cfs)	All WYs (cfs)
October	328.3	640.6	574.4
November	371.6	508.5	479.5
December	391.6	792.2	707.3
January	499.9	1,374.7	1,189.1
February	581.8	1,693.7	1,458.7
March	894.2	2,456.8	2,125.3
April	1,395.5	3,115.9	2,751.0
May	1,775.4	3,713.1	3,302.0
June	1,439.8	3,536.1	3,091.4
July	1,418.9	2,704.6	2,431.8

Month	Dry WYs (cfs)	Normal WYs (cfs)	All WYs (cfs)
August	1,169.3	2,046.1	1,860.1
September	951.8	1,620.0	1,478.2

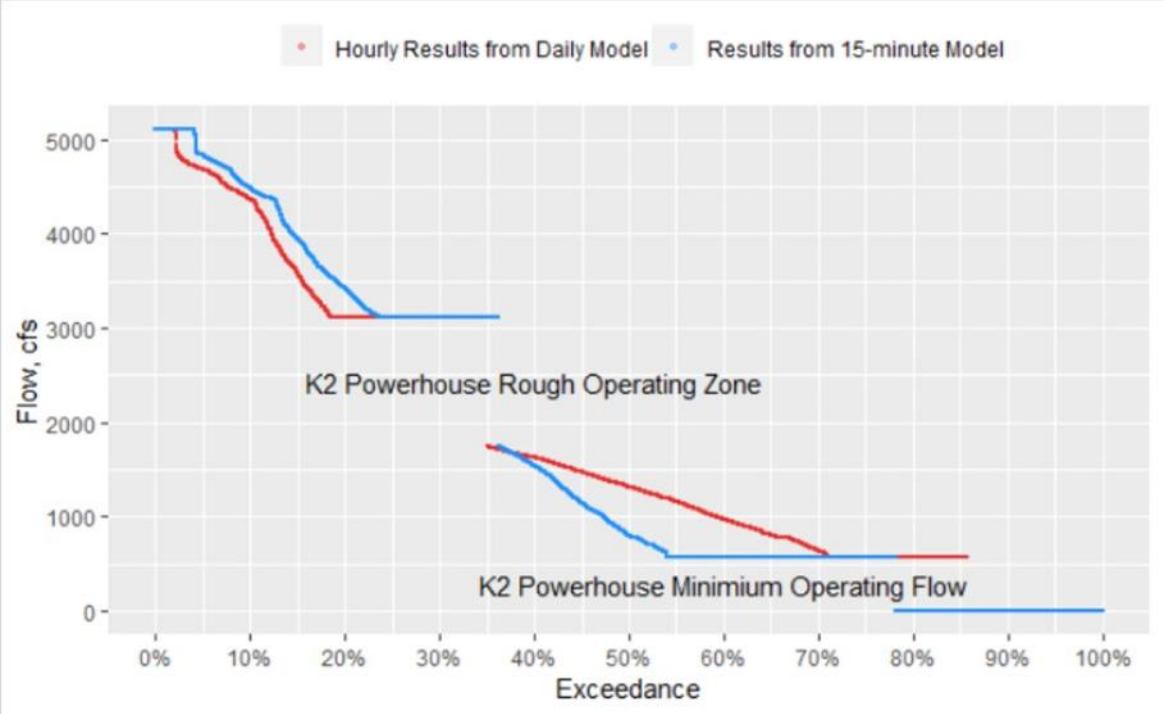
Source: PG&E 2023

Table 4.11-9: Average Monthly Flows through K2 Powerhouse Under Baseline Conditions (WY 2018-2023)

Month	All WYs (cfs)
October	581
November	479
December	877
January	683
February	1,274
March	1,296
April	2,275
May	2,826
June	2,668
July	2,245
August	1,776
September	1,987

Source: USGS 2026b

The annual average flow through the K2 Powerhouse ranged from 310,200 acre-feet (428 cfs) in 2015 to 2,478,086 acre-feet (3,423 cfs) in 2017 with an average of 1,293,122 acre-feet (1,786 cfs). An exceedance curve for flow through the K2 Powerhouse is shown in Figure 4.11-5.



Source: PG&E 2023

* The K2 Powerhouse's Rough Operating Zone is within a flow of 1,744 cfs and 3,117 cfs.

Figure 4.11-5: Exceedance Curves of Modeled K2 Powerhouse Flow (WY 1985-2017)

4.11.1.4.5 Project Bypass Reach Flows Under Baseline Conditions

Large flow fluctuations in the PBR often occur during periods when upstream operations (primarily Big Creek 4) are spilling or fluctuations in power generation occur and the combined spill and discharge from these projects exceed the Kerckhoff Hydroelectric Project diversion capacity. Under those circumstances, the Kerckhoff Hydroelectric Project is essentially run-of-the-river, and generally any flow fluctuation in the PBR would be the result of changes in Kerckhoff Reservoir inflow given the K2 Powerhouse is at full diversion capacity and Kerckhoff Reservoir is the normal maximum water surface elevation (985.0 msl). Kerckhoff Hydroelectric Project operations have historically altered the annual hydrograph shape by reducing flow peaks and stabilizing flows through much of the year in the PBR due to diversions for power generation.

Table 4.11-10 provides the average monthly flows in the SJR below Kerckhoff Dam (1985–2017) by WY type. Table 4.11-11 shows the monthly median, minimum, and maximum flows at Gage J-2. During Dry WYs, average flows in the PBR were highest in the fall and generally uniform the rest of the year. Table 4.11-12 shows the monthly mean, median, minimum, and maximum flows at Gage J-2 downstream of Kerckhoff dam during WY 2018 to 2023.

In Normal WYs and across all WYs, flows followed a typical foothill Sierra seasonal hydrograph with higher spring flows from snowmelt. The median monthly flow at Gage J-2 was approximately 32 cfs reflecting the MIF requirements during Normal WYs. Minimum monthly flows were approximately 20 cfs, which is the amount of flow released to meet MIF requirements during Dry WYs. The maximum monthly flow exceeded the 32.5 MIF, indicating that spill occurred during each month.

Table 4.11-10: Average Monthly Flows in the San Joaquin River below Kerckhoff Dam (Water Years 1985–2017)

Month	Baseline Operations (Gage J-2)		
	Dry WYs (cfs)	Normal WYs (cfs)	All WYs (cfs)
October	384.4	319.3	333.1
November	179.8	360.9	322.5
December	121.7	237.6	213.0
January	51.8	302.6	249.4
February	28.8	348.8	281.2
March	28.8	305.0	246.4
April	23.3	284.2	228.8
May	19.5	1,469.9	1,162.2
June	22.4	2,270.9	1,794.0
July	42.3	883.5	705.0
August	25.6	50.5	45.2
September	19.5	32.5	29.7

Source: PG&E 2023, cfs = cubic feet per second; WY = water year

Table 4.11-11: Monthly Median, Minimum, and Maximum Flow at Gage J-2 in the San Joaquin River below Kerckhoff Dam under Baseline Conditions (Water Years 1985–2017)

Month	Median (cfs)	Minimum (cfs)	Maximum (cfs)
October	32.5	19.5	1,472.0
November	32.5	19.5	1,237.6
December	32.5	19.5	1,287.4
January	32.5	19.5	1,824.7
February	32.5	19.5	1,921.9
March	32.5	19.5	3,137.4
April	32.5	19.5	2,727.6
May	32.5	19.5	7,063.4
June	32.5	19.5	9,170.0
July	32.5	20.2	6,180.7
August	32.5	19.5	46.2
September	32.5	19.5	32.5

Source: PG&E 2023

cfs = cubic feet per second; WY = water year

Table 4.11-12: San Joaquin River below Kerckhoff Dam (Water Years 2018–2023)

Month	Mean (cfs)	Median (cfs)	Minimum (cfs)	Maximum (cfs)
October	455	38	22	1,690
November	242	36	21	1,740
December	363	38	25	3,160
January	783	36	25	11,400
February	178	35	28	1,580

Month	Mean (cfs)	Median (cfs)	Minimum (cfs)	Maximum (cfs)
March	1,426	35	32	22,200
April	1,333	36	32	11,000
May	2,373	973	31	11,400
June	2,981	75	34	12,200
July	1,211	50	27	11,600
August	39	34	21	482
September	51	33	21	765

Source: USGS 2026c

Table 4.11-13 provides the average monthly flows in the SJR below K2 Powerhouse under baseline conditions (1985–2017) by WY type. Table 4.11-14 shows the monthly median, minimum, and maximum flows below K2 Powerhouse under baseline conditions for WY 1985 to 2017. Table 4.11-15 shows the monthly mean, median, minimum, and maximum flows below K2 Powerhouse under baseline conditions for WY 2018 to 2023. The flows in the tables reflect the sum of flow through the PBR and the K2 Powerhouse.

Table 4.11-13: Average Monthly Flows in the San Joaquin River below K2 Powerhouse Under Baseline Conditions (Water Years 1985–2017)

Month	Baseline Operations		
	Dry WYs (cfs)	Normal WYs (cfs)	All WYs (cfs)
October	712.7	959.9	907.5
November	551.5	869.4	802.0
December	513.3	1,029.8	920.3
January	551.7	1,677.2	1,438.5
February	610.6	2,042.5	1,739.8
March	923.0	2,761.7	2,371.7
April	1,418.8	3,400.1	2,979.8

Month	Baseline Operations		
	Dry WYs (cfs)	Normal WYs (cfs)	All WYs (cfs)
May	1,794.9	5,182.9	4,464.2
June	1,462.2	5,807.0	4,885.4
July	1,461.2	3,588.0	3,136.9
August	1,194.9	2,096.6	1,905.4
September	971.3	1,652.5	1,508.0

Source: PG&E 2023

cfs = cubic feet per second; WY = water year

Table 4.11-14: Monthly Median, Minimum, and Maximum Flow in the San Joaquin River below K2 Powerhouse under Baseline Conditions (Water Years 1985–2017)

Month	Median (cfs)	Minimum (cfs)	Maximum (cfs)
October	843.4	19.5	1,591.5
November	674.7	19.5	2,178.0
December	687.4	152.4	2,862.4
January	789.3	19.5	6,549.7
February	1,364.3	19.5	6,664.9
March	1,770.7	43.7	5,146.4
April	2,515.3	19.5	7,827.6
May	3,149.5	19.5	11,988.3
June	2,856.8	366.5	13,921.9
July	2,092.4	723.6	10,595.6
August	1,775.3	747.7	3,596.2
September	1,448.0	499.8	2,834.1

Source: PG&E 2023, cfs = cubic feet per second; WY = water year

Table 4.11-15: Monthly Mean, Median, Minimum, and Maximum Flow in the San Joaquin River below K2 Powerhouse under Baseline Conditions (Water Years 2018-2023)

Month	Mean (cfs)	Median (cfs)	Minimum (cfs)	Maximum (cfs)
October	1,036	1022	48	2,137
November	721	714	35	2,462
December	1,239	782	184	5,060
January	1,467	930	33	11,426
February	1,453	1478	53	4,909
March	2,722	1462	60	22,226
April	3,608	2473	102	14,010
May	5,199	3308	696	16,050
June	5,649	2120	720	1,6840
July	3,456	1376	202	15,110
August	1,815	1752	60	4,102
September	2,037	2206	68	3,683

4.11.1.5 Water Quality

This section describes water quality within the existing FERC Project Boundary, including Kerckhoff Reservoir, the PBR, and downstream of the K2 Tailrace.

Beneficial uses and water quality objectives for the SJR are designated by the *Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin* (SR/SJR Basin Plan) (Central Valley Regional Water Board 2019). This includes temperature, biostimulatory substances (e.g., nitrogen and phosphorous), chemical constituents, dissolved oxygen (DO), mercury, methylmercury, oil and grease, pH, sediment, settleable material, suspended material, turbidity, and bacteria.

The SR/SJR Basin Plan Table 2-1 identifies beneficial uses that apply to the surface waters in the SJR watershed from the source to Millerton Lake, which includes the

Kerckhoff Hydroelectric Project. These beneficial uses are defined in the SR/SJR Basin Plan as follows:

- **Municipal and Domestic Supply (MUN)** – Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply
- **Agricultural Supply (AGR)** – Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation (including leaching of salts), stock watering, or support of vegetation for grange grazing
- **Hydropower Generation (POW)** – Uses of water for hydropower generation
- **Recreation: Water Contact (REC-1)** – Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, waterskiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs
- **Recreation: Canoeing and Rafting (REC-1)** – For streams and rivers only with the implication that certain flows are required for this beneficial use
- **Other Non-Contact Water Recreation (REC-2)** – Uses of water for recreational activities involving proximity to water, but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities
- **Warm Freshwater Habitat (WARM)** – Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates
- **Cold Freshwater Habitat (COLD)** – Uses of water that support cold-water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates
- **Wildlife Habitat (WILD)** – Uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, and invertebrates), or wildlife water and food sources

The SR/SJR Basin Plan also provides a list of water quality objectives (Table 4.11-16) that set limits or levels of water quality constituents or characteristics that are established for the protection of the beneficial uses of surface waters. Water quality standards applicable to surface waters within the Kerckhoff Hydroelectric Project boundary are primary defined in the SR/SJR Basin Plan (Central Valley Regional Water Board 2019) and the California Toxics Rule (40 CFR Section 131.38). Table 4.11-16 summarizes applicable water quality objectives for the SJR.

Table 4.11-16: Water Quality Objectives for San Joaquin River

Constituent	Water Quality
Temperature	Natural receiving water temperatures will not be altered unless it can be demonstrated to the satisfaction of the Regional Water Board that such alteration does not adversely affect beneficial uses. At no time or place will the temperature increase more than 5°F above natural receiving water temperature.
Dissolved oxygen	Monthly median of mean daily dissolved oxygen concentration will not fall below 85 percent of saturation in the main water mass, and the 95th percentile concentration will not fall below 75 percent of saturation. Dissolved oxygen concentrations will not be reduced below the following minimum levels at any time: Waters designated WARM: 5.0 milligrams per liter; waters designated COLD: 7.0 milligrams per liter.
pH	The pH will not be depressed below 6.5 nor raised above 8.5.
Specific Conductivity	No standard upstream of Millerton Lake
Turbidity	Water will be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors will not exceed

Constituent	Water Quality
	increases of 1 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.
E. coli[32]	The bacteria water quality objective for all waters where the salinity is equal to or less than 1 part per thousand (ppth) 95 percent or more of the time during the calendar year is: a six-week rolling geometric mean of Escherichia coli (E. coli) not to exceed 100 colony forming units (cfu) per 100 milliliters (mL), calculated weekly, and a statistical threshold value (STV) of 320 cfu/100 mL not to be exceeded by more than 10 percent of the samples collected in a calendar month, calculated in a static manner
Oil and grease	Waters will 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.
Sediment	The suspended sediment load and suspended sediment discharge rate of surface waters will not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

[32] The *E. coli* water quality objective is established by the 2019 Statewide Bacteria Provisions (State Water Board 2019a), which supersedes the bacterial water quality objective listed in the SR/SJR Basin Plan.

Constituent	Water Quality
Settleable material	Waters will not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.
Suspended material	Waters will not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

Source: Central Valley Regional Water Board 2019, State Water Board 2019a
°F = degrees Fahrenheit; NTU = nephelometric turbidity unit

The state of California adopts water quality standards to protect beneficial uses of state waters, as required by Section 303 of the CWA (33 USC Section 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. None of the waterbodies in the existing FERC Project Boundary or the PBR are listed as impaired by the USEPA under Section 303(d) (State Water Board 2022a). Millerton Lake, downstream of Kerckhoff Dam and both Kerckhoff Hydroelectric Project powerhouses, is listed as impaired for pH and mercury. Willow Creek flows into the SJR upstream of Kerckhoff Reservoir, downstream of Redinger Lake, and is listed as impaired for water temperature.

4.11.1.5.1 Existing Water Quality Information

Water quality data in the Kerckhoff Hydroelectric Project Area, which include surface waters in Kerckhoff Reservoir and the PBR, considered in the EIR include the following:

- California Environmental Data Exchange Network (CEDEN) database queries of available water quality data (CDEC 2024)
- California Department of Water Resources (CDWR) Water Data Library (CDWR 2020)
- Reclamation (2014) Draft Environmental Impact Statement, Upper San Joaquin Basin Storage Investigation

- PG&E's *Fisheries and Stream Temperature Studies of the San Joaquin River Conducted in 1977, Kerckhoff Project, FERC Project No. 96* (PG&E 1978)
- Fisheries studies at Millerton Lake (Ecological Analysts 1982; NES 1986a, 1986b, 1987)
- National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information climate and historical weather data and information
- State Water Board's California Integrated Report Clean Water Act (CWA) Sections 303(d) and 305(d)
- PG&E (2020c) *Technical Study Report 21 (TSR-21): Water Quality Sampling in the Project Bypass Reach and Kerckhoff Reservoir (WQ 2). Kerckhoff Hydroelectric Project, FERC Project No. 96*
- PG&E (2020b) *Technical Study Report 22 (TSR-22): Water Temperature in Project Bypass Reach and Kerckhoff Reservoir (WQ 1)*
- PG&E (2020d) *Technical Study Report 26 (TSR-26): Bioaccumulation in Kerckhoff Reservoir (WQ 3)*; and
- The Central Valley Regional Water Quality Control Board's (Central Valley Regional Water Board) 2019 SR/SJR Basin Plan

PG&E completed water quality monitoring in 2019 to collect baseline information in Kerckhoff Reservoir and the PBR in support of relicensing efforts. Water temperature was monitored for Study WQ 1 in May through October 2019; study results are provided in the Technical Study Report (TSR-22) for Study WQ 1 in Volume III Supporting Document B of the Supplemental FLA (PG&E 2020b). Water temperature was continuously recorded at one site (SJRUK) in the SJR upstream of the Kerckhoff Reservoir and four sites in the Kerckhoff Reservoir. Site KRTR-1 was at upstream end of the Kerckhoff Reservoir in the A. G. Wishon Powerhouse tailrace. Two loggers were installed at station KRTMP-1 (upstream end of reservoir), while three loggers were installed at stations KRTMP-2 (mid-reservoir) and KRTMP-3 (downstream end of reservoir) to continuously record the temperature throughout the water column. In addition, vertical profiles at one-meter intervals for water temperature, DO, and specific conductivity were collected once per month in June, July, August, and September at

KRTMP-1, KRTMP-2, and KRTMP-3. Figure 4.11-6 shows the locations of the monitoring sites and Table 4.11-17 describes the methods at each site.

During the May through October 2019 WQ 1 Study, water temperature was monitored at two permanent temperature gages (Gage J-2 and Gage J-7) and at four additional locations downstream of Kerckhoff Dam (Stations SJT-2, SJT-3, SJT-4, and SJT-5) (Figure 4.11-7). Continuous water temperature data were recorded at each site in 15-minute intervals. Site locations and data availability are listed in Table 4.11-18.

In May 2019, unimpaired San Joaquin River inflow to Millerton Lake was estimated at 1.76 million acre-feet, or 143 percent of the 50-year historical average, which was classified as a Normal WY for the Kerckhoff Hydroelectric Project. Spill from Kerckhoff Dam into the PBR continued into mid-July. The flow in the PBR decreased rapidly in mid-July, and the daily mean flow was approximately 40 cfs to 50 cfs through the end of the study. Some of the data loggers were out of the water during the low flow period (Table 4.11-18). Summer 2019 air temperatures recorded at Gage J-7 frequently exceeded 30°C (86 F) from late July through August.

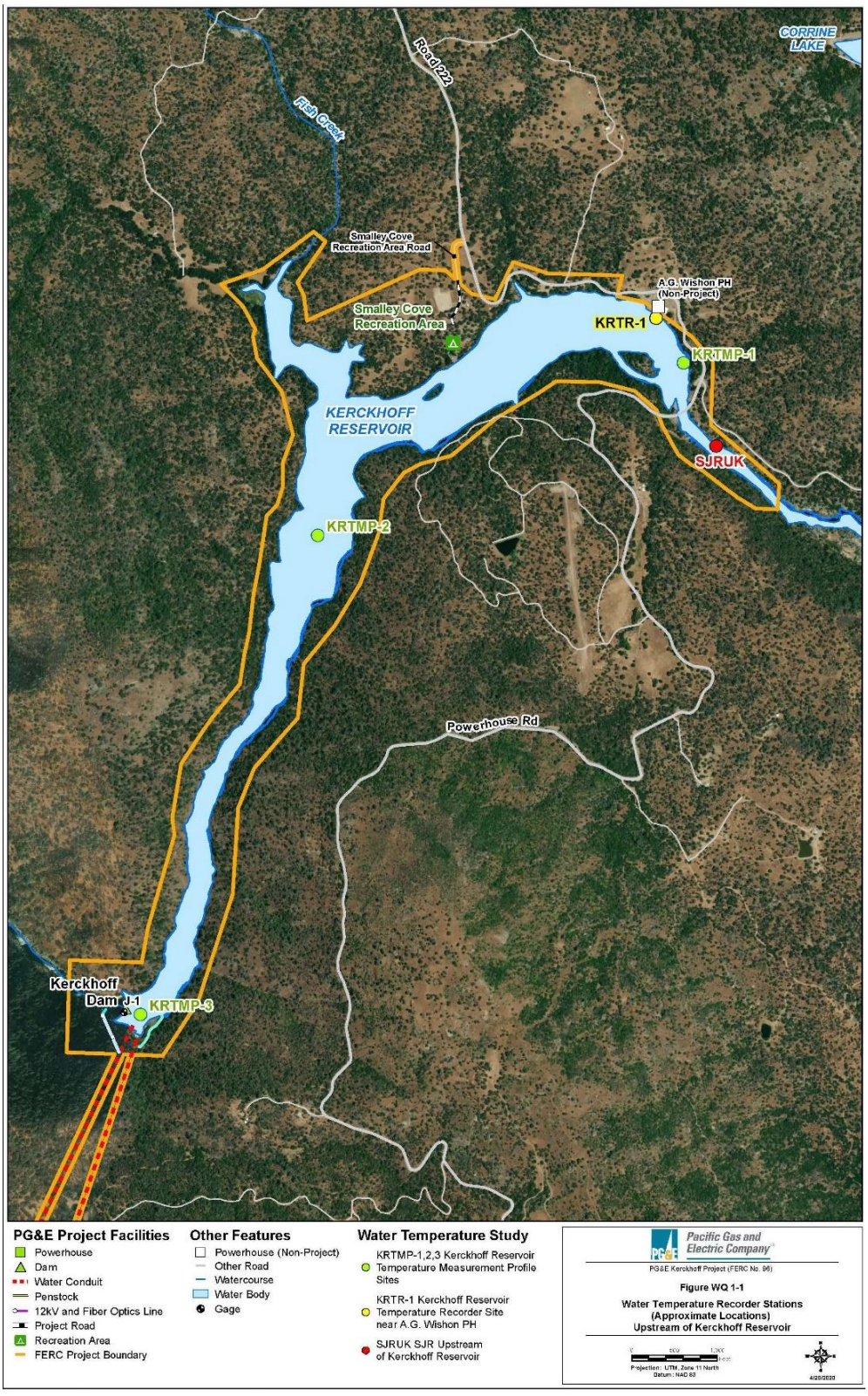


Figure 4.11-6: Study WQ 1 Water Temperature Monitoring Stations in Kerckhoff Reservoir

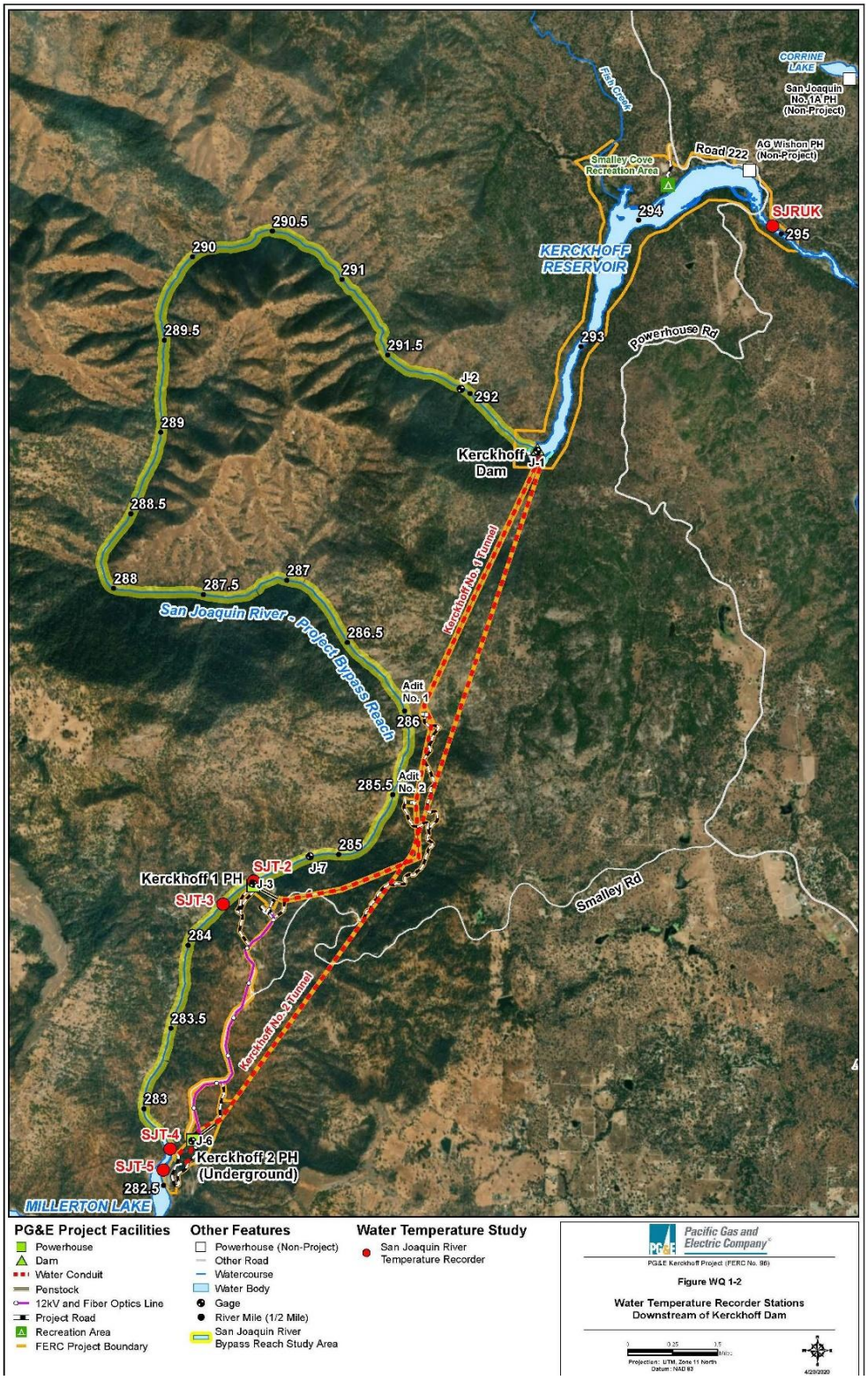


Figure 4.11-7: Study WQ 1 Water Temperature Monitoring Stations in the PBR

Table 4.11-17: Study WQ 1 Monitoring Site Descriptions

Method	Site	Location	Data Availability
Continuous and Vertical Profile	**KRTMP-1**	Upstream end of Kerckhoff Reservoir in a well-mixed area. One logger was installed below the surface (~1 meter) and one near the bottom (~ 4 meters)	Data collected in 15-minute intervals from May 1 to October 31, 2019 Data from the bottom logger was missing from July 11 to September 4
Continuous and Vertical Profile	**KRTMP-2**	Near mid-reservoir in deeper water. Loggers were installed below the surface (~1 meter), at mid-depth (~4 meters), and near the bottom (~8 meters).	Data collected in 15-minute intervals from May 1 to October 31, 2019, except for missing data from July 11 to 23 and October 27 to 29.
Continuous and Vertical Profile	**KRTMP-3**	Lower reservoir near Kerckhoff Dam. Loggers were installed below the surface (~1 meter), at mid-depth (~7 meters), and near the bottom (~14 meters).	Data collected in 15-minute intervals from May 1 to October 31, 2019

Method	Site	Location	Data Availability
Continuous	**KRTR-1**	2 loggers in the A. G. Wishon Powerhouse tailrace	
Continuous	**SJRUK**	2 loggers in the SJR upstream of the Kerckhoff Reservoir.	Upstream logger: May 1, 2019 – September 4, 2019 Downstream logger: May 1, 2019 – October 26, 2019 and October 30, 2019
Continuous	**SJT-2**	2 loggers between Gage J-2 and K1 Powerhouse (near Gage J-7 site).	May 1 to October 31. Data missing from June 23 to August 20
Continuous	**SJT-3**	2 loggers downstream K1 Powerhouse tailrace	May 1 to October 31. Data missing from July 17 to August 20
Continuous	**SJT-4**	2 loggers upstream K2 Powerhouse tailrace	May 1 to October 31. Data missing after August 19
Continuous	**SJT-5**	2 loggers downstream K2 Powerhouse tailrace	May 1 to October 31. Data missing after September 17
Continuous	**Gage J-2**	Just downstream Kerckhoff dam	May 1 to October 31
Continuous	**Gage J-7**	Upstream of K1 Powerhouse	May 1 to October 31

Source: PG&E 2020b, 2020b

Several water quality parameters were monitored in spring and late summer 2019 as part of Study WQ 2 (TSR-21) (PG&E 2020c). Sampling occurred during a period of high flows in the spring (June 5, 2019) and a period of low flows in the summer (September 4, 2019). In Kerckhoff Reservoir, in situ measurements of water temperature, DO, specific conductivity, turbidity, and pH were collected at three sites (KR 1, KR 2, and KR 3) (Figure 4.11-8, Table 4.11-17). Grab samples were also collected for minerals, nutrients, hydrocarbons, and trace metals at KR 1.

Bacterial sampling was conducted at sites KR2 and KR3 only (Figure 4.11-8), which included sampling for the bacteria *E. coli*, fecal Coliform, and total Coliform during high-flow (June-July) and low-flow (September) conditions. In addition, general constituent samples from KR1 were collected for total alkalinity, total organic carbon, dissolved organic carbon, total dissolved solids, hardness, nitrate, and nitrite.

PG&E also conducted in situ water quality sampling within the PBR at two sampling sites: SJBR1 and SJBR3 (Figure 4.11-9). Sampling site SJBR2 was not used due to the planned retirement of the K1 Powerhouse. The same water quality characteristics collected within the Kerckhoff Reservoir were also collected in the PBR below Kerckhoff Dam (PG&E 2020c).

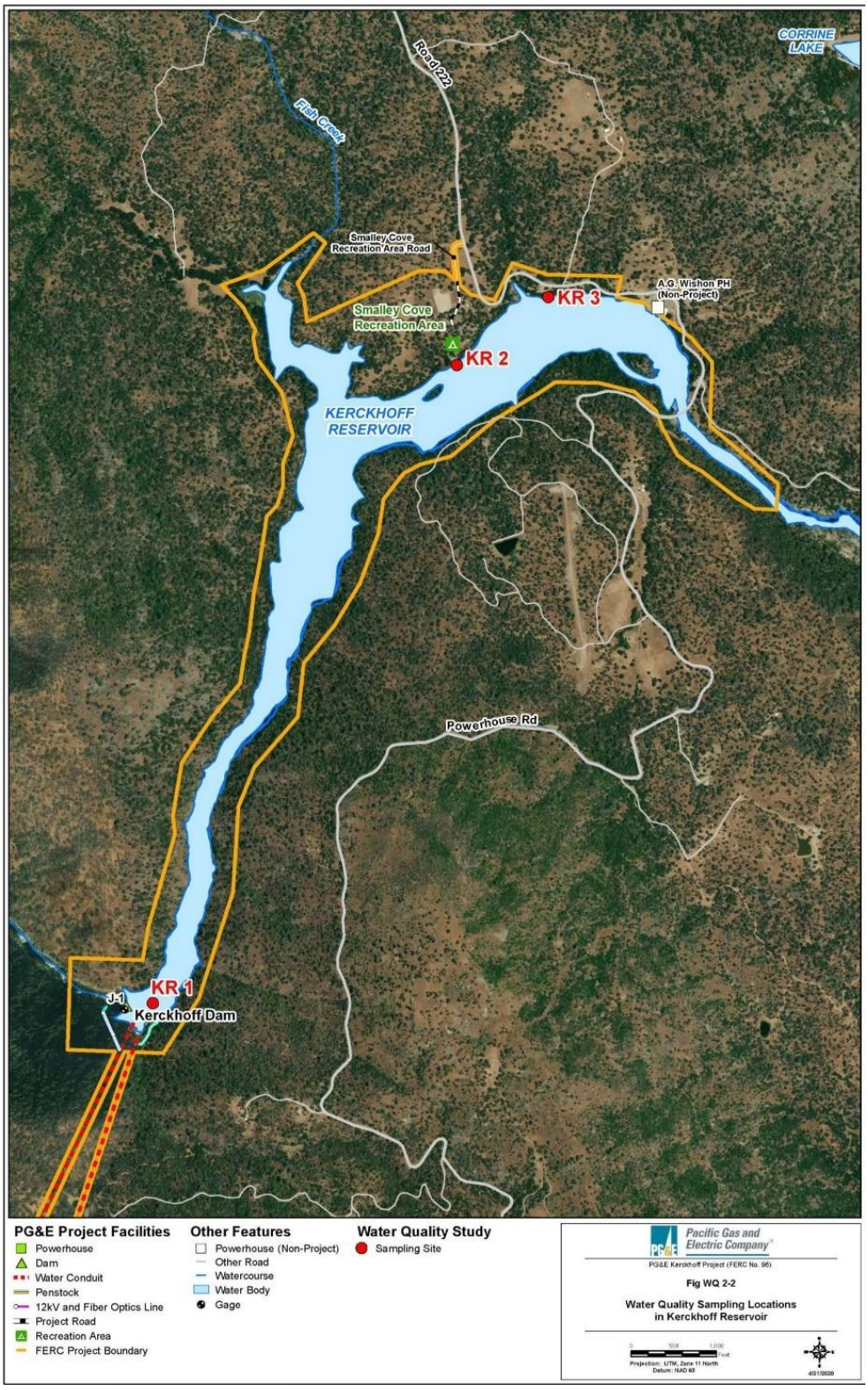


Figure 4.11-8: Study WQ 2 Water Quality Sampling Locations in Kerckhoff Reservoir (PG&E 2020c)

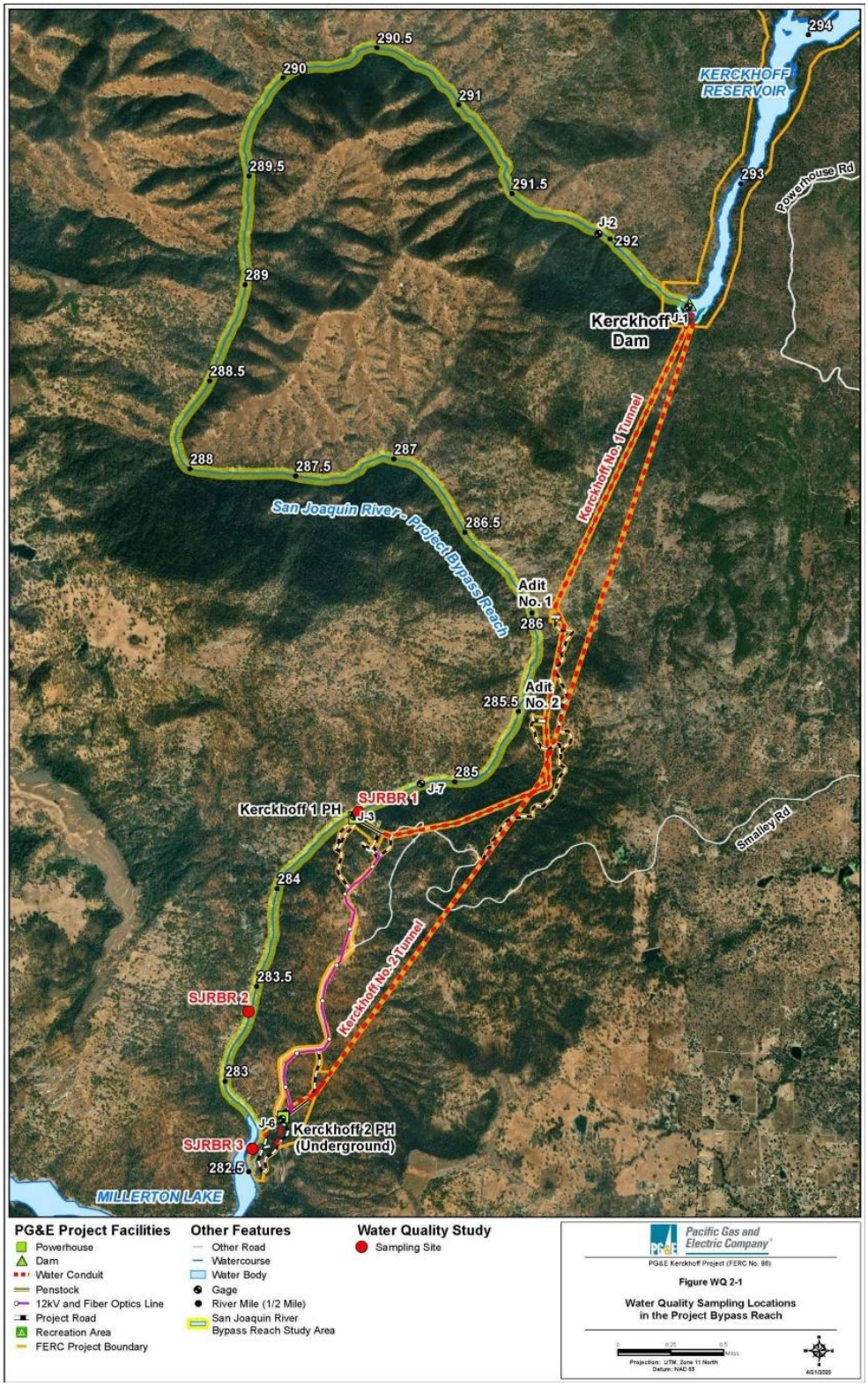


Figure 4.11-9: Study WQ 2 Water Quality Sampling Locations in the PBR (PG&E 2020c)

Table 4.11-18: Study WQ 2 Monitoring Site Descriptions

Method	Site	Location	Data Availability
In situ measurements and grab samples	**KR 1**	Near dam; surface, mid-depth, bottom samples	June 5 and September 4, 2019
In situ measurements and grab samples	**KR 2**	KR 2 near Smalley Cove Recreation Area (bacteria sampling only)	June 5 and September 4, 2019
In situ measurements and grab samples	**KR 3**	Near dispersed recreation site upstream Smalley Cove Recreation Area (bacteria sampling only)	June 5 and September 4, 2019
In situ measurement	**SJRBR 1**	Upstream K1 Powerhouse	June 5 and September 4, 2019
In situ measurement	**SJRBR 2**	Between K1 and K2 Powerhouses	
In situ measurement	**SJRBR 3**	Approximately 100 m downstream K2 Powerhouse (bacteria sampling if Millerton Lake elevation ±545 ft msl)	June 5 and September 4, 2019

Source: PG&E 2020b, 2020c

Water Temperature

Kerckhoff Reservoir

Kerckhoff Reservoir is a relatively narrow waterbody with a usable storage capacity of 2,434 acre-feet; however, the reservoir only has an operational storage capacity of 692 acre-feet.[33] This operational storage is limited to water surface elevations of the reservoir between 980.0 and 984.5 feet msl, which corresponds to operational limitations of the K2 Powerhouse as well as the spill height of the reservoir (984.5 feet msl). Operation of the K2 Powerhouse (5,100 cfs capacity) and the limited storage capacity results in a short residence time for water in the Kerckhoff Reservoir.

At Site KRTMP-1 in the upper reservoir, the water temperatures recorded by the surface and bottom loggers were the same and exhibited the same temporal variations demonstrating that the water column was well mixed. The water temperature ranged from approximately 9°C to 12°C in May, increased to 12°C to 14°C in June, to 14°C to 17°C in July, to 15°C to 17°C in August, and to maximum levels of 17°C to 18°C in September; the water temperature then decreased to approximately 13°C at the end of October.

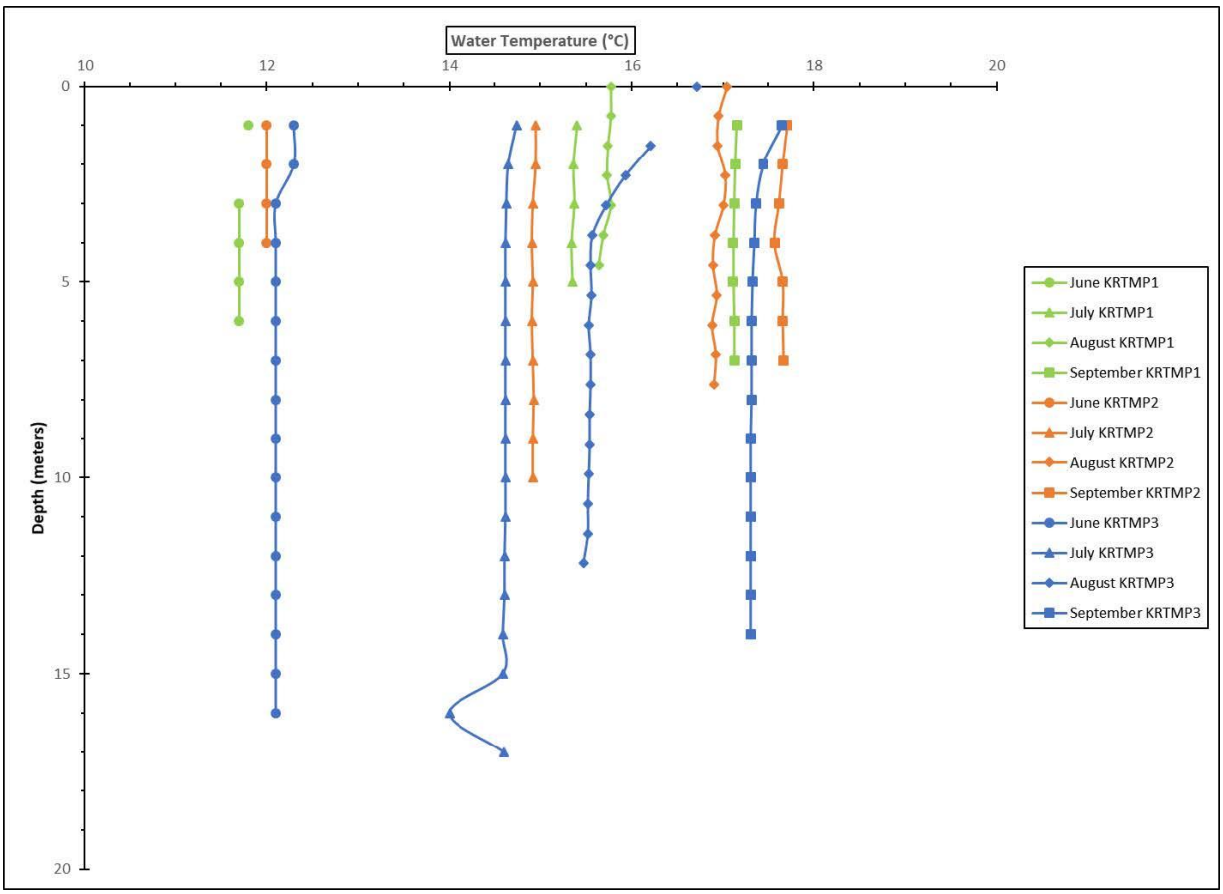
At Site KRTMP-2 in the mid-reservoir, the water temperatures were uniform throughout the water column and exhibited similar temporal variations. Water temperatures increased from 9°C to 12°C in May to 13°C to 14°C at the end of June. The water temperature continued to increase from 13°C to 15°C in early July to the highest values of approximately 16°C to 19.5°C in mid-September before decreasing to 14°C to 15°C in October. The daily mean water temperature at mid-depth was approximately 1°C lower than at the surface and bottom in mid-July. The daily maximum temperature at the surface was approximately 0.2°C to 1°C warmer in August through October than at mid-

[33] The usable storage capacity reflects the amount of water the reservoir can retain, while the operational storage capacity reflects the reservoir elevation needed to operate the K2 Powerhouse.

depth and the bottom; the daily mean temperature remained similar at the three depths over the same time period.

Similar to sites KRTMP-1 and KRTMP-2, the daily mean water temperature throughout the water column at Site KRTMP-3 near the dam was uniform indicating that reservoir was mixed in the upper, middle and lower portions of the Kerckhoff Reservoir. The water temperature values at Site KRTMP-3 were approximately 9°C to 12°C in May, 12°C to 15°C in June, 14°C to 17°C in July, 15°C to 18°C in August, 16°C to 19°C in September, and 13°C to 17 C in September. The daily maximum temperature at the surface of Site KRTMP-3 was approximately 0.5°C to 1°C higher at the surface than at mid-depth and the bottom from August through September.

Figure 4.11-10 shows the water temperature vertical profiles at KRTMP-1, KRTMP-2, and KRTMP-3. The four profiles at each site demonstrated that the water temperature was uniform throughout the water column. This is the same result as the continuous loggers, further corroborating that the Kerckhoff Reservoir did not thermally stratify. The warmest temperatures were observed during the September profile, which ranged from approximately 17°C to 17.7°C throughout the water column.



Source: PG&E 2020b

Figure 4.11-10: Water Temperature Profile Measured Monthly in Kerckhoff Reservoir at Stations KRTMP-1, KRTMP-2, and KRTMP-3 during June through September 2019

At Site KRTR-1 in the A. G. Wishon Powerhouse tailrace, the water temperature ranged from approximately 10°C to 15°C in May, followed by an increase to 15°C to 19°C in mid-June which coincided with higher air temperatures and flows. The water temperature in late June was near 14°C to 16°C and increased throughout July and August to 17°C to 19°C in mid-September. The water temperature ranged between approximately 14°C and 18°C in October 2019.

At Site SJRUK upstream of the Kerckhoff Reservoir, the water temperature increased from approximately 9°C to 11°C in May, to 13°C to 14°C in late June, to 15°C to 16°C in late July, to highest levels in late August through September of approximately 17°C to 18.5°C. Water temperatures remained under 20°C at all sites.

Overall, daily mean temperatures were similar at KRTMP-1, KRTMP-2, KRTMP-3, KRTR-1, and SJRUK (less than approximately 0.5°C difference) except for three periods when the daily mean temperature at KRTR-1 was 1°C to 2°C higher from May 1-9 and approximately 2°C to 3°C higher from May 31-June 21; both periods coincided with increased air temperatures and flow. From September 28 to October 6, the daily mean temperature at KRTR-1 was approximately 0.7°C to 2.6°C lower than the other sites which corresponded with decreasing air temperatures.

During Study WQ 2, water temperature was monitored at KR 1 in Kerckhoff Reservoir. On June 5, the water temperature ranged from 12.1°C to 12.3°C, and on September 4, the temperature ranged from 17.3°C to 17.6°C. The water temperature was uniform on both dates indicating that the water column was mixed.

Project Bypass Reach

The PBR extends downstream from Kerckhoff Dam approximately 9.8 miles downstream to K2 Tailrace (Table 4.11-19). Flow either spills over the dam or is released just downstream of the dam via a minimum instream flow pipe, which originates from the K1 Tunnel. Under baseline conditions, FERC license Article 45 requires PG&E to discharge a minimum instream flow of 25 cfs during Normal WYs and a minimum of 15 cfs during Dry WYs. PG&E must also release additional flows, up to a total of 50 cfs, as determined necessary in consultation with CDFW, to maintain stream temperatures at or below 27°C upstream of the K2 Powerhouse, as monitored at Gage J-7, (approximately 0.3 mile upstream from the K1 Powerhouse[34]). Furthermore, based on the 1980 Fishery Agreement between the CDFW and PG&E (PG&E 1980), PG&E must release up to a total of 50 cfs downstream of Kerckhoff Dam to maintain stream temperatures at 27°C or less. The additional releases are required when the water

[34] In 2020, PG&E, with the concurrence of the CDFW, relocated Gage J-7 temperature gage from its previous location, approximately 0.3 mile upstream of the K1 Powerhouse. With the retirement of the K1 Powerhouse, K1 operation would not affect water temperature.

temperature at Gage J-7 site exceeds 27°C for a minimum of four hours per day for five consecutive days.[35]

At Gage J-2 downstream of Kerckhoff Dam, the water temperature increased from 9°C to 11°C in May to the highest levels ranging from approximately 15°C to 20°C in mid-July through mid-September which corresponds to when the air temperature was highest and there was little to no spill. The water temperature decreased to 13°C to 17°C in October.

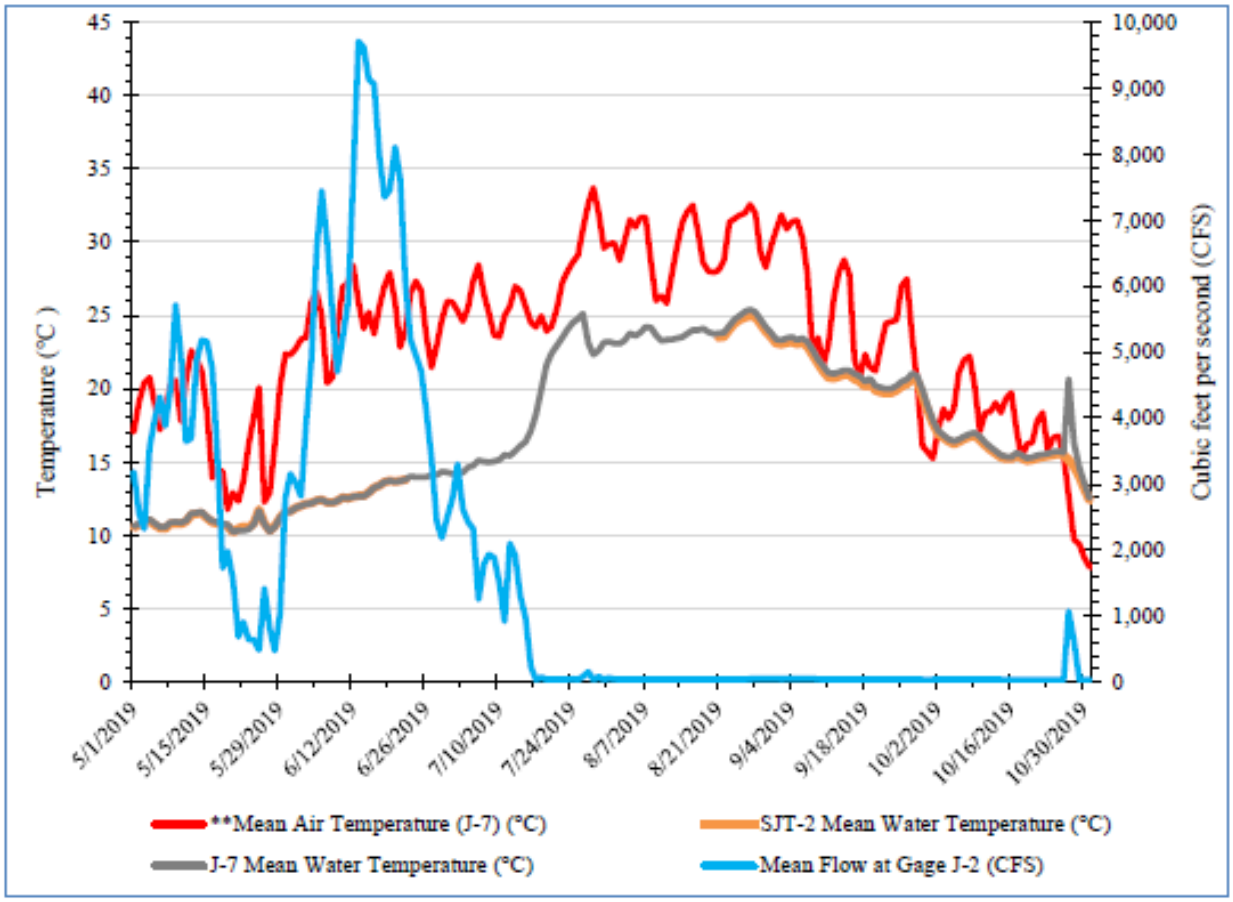
Gage J-7 and Sites SJT-2 and SJT-3 were close to each other near the K1 Powerhouse and water temperatures generally agreed at these locations during times of overlapping data (Figure 4.11-11). Only results from Gage J-7 and SJT-3 are discussed here due to the long period of missing data at Site SJT-2. The daily mean temperature at Gage J-7 was 10°C to 12°C in May and increased to 15°C in early July. The water temperature increased rapidly when spill ceased in mid-July reaching a peak of 25.1°C on July 26; this period also coincided with the warmest air temperatures. The daily mean temperature remained between 22.6°C and 24.2°C before reaching a second peak of 25.4°C on August 27 (Figure 4.11-11). The daily mean water temperatures at Gage J-7 and Site SJT-3 near the K1 Powerhouse were consistently warmer than at Gage J-2 downstream of Kerckhoff Dam (Figure 4.11-12). The water temperature was approximately 0.5°C to 1°C higher during May through mid-July and in October, and approximately 5°C to 8°C warmer in August and September.

Daily mean water temperatures upstream (Station SJT-4) and downstream (Station SJT-5) of the K2 Powerhouse were similar to those at the upstream stations (Station SJT-3 and Gage J-7) during spill through mid-July (Figure 4.11-13, Figure 4.11-14). After the conclusion of spill, the daily mean water temperatures at Station SJT-4 were approximately 5°C to 7.5°C cooler because of its location near the K2 Tailrace and the high Millerton Lake water surface elevation through summer, which caused a backwater

[35] PG&E may release additional flow to modify water temperatures prior to reaching the conditions that would require additional flow releases to comply within the water temperature criterion.

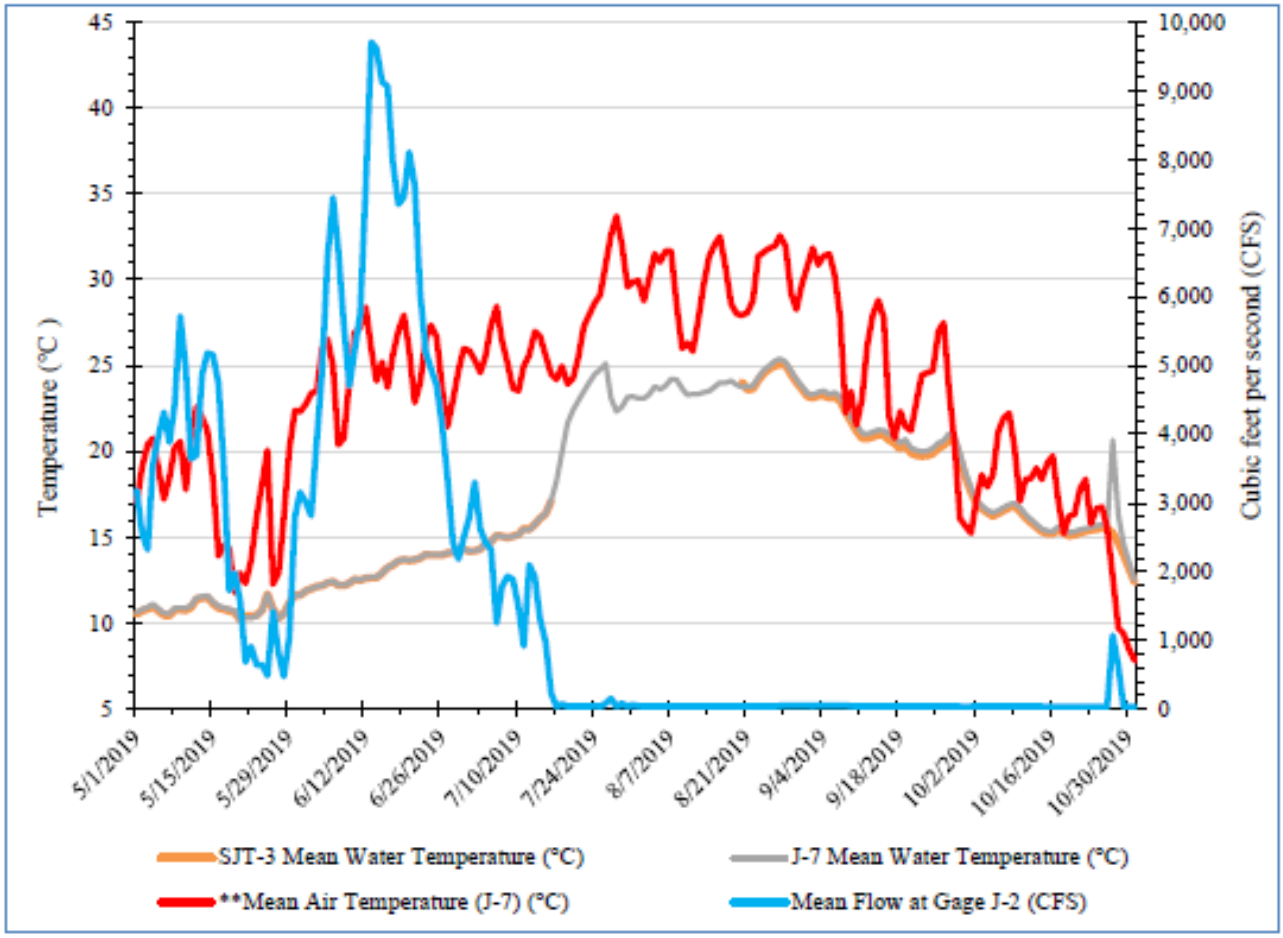
for a considerable distance upstream of this station. The daily mean water temperature at Station SJT-5 was 5°C to 8.5°C cooler than near the K1 Powerhouse (Gage J-7 and Station SJT-3) because of inundation from Millerton Lake and backwater from discharge from the K2 Powerhouse. Station SJT-5 was approximately 0.5°C to 1°C cooler than Station SJT-4.

The daily mean water temperature upstream of Kerckhoff Dam (Site KRTMP-3) and downstream of the K2 Powerhouse (Station SJT-5) were nearly the same (±0.4°C or ±0.7°F) (Figure 4.11-14).



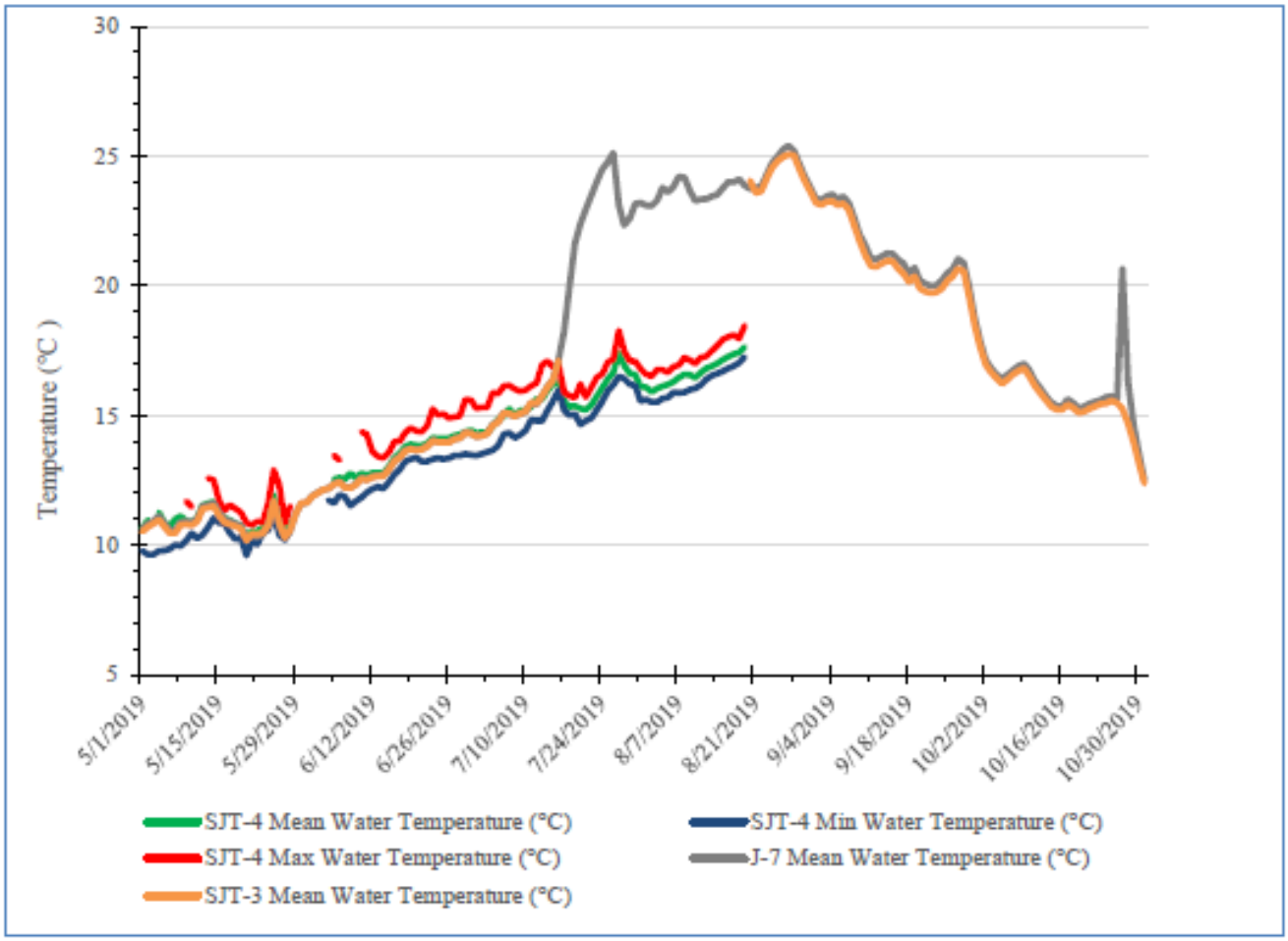
Source: PG&E 2020b

Figure 4.11-11: Mean daily water temperature, in the PBR at Station SJT-2 (just upstream of the K1 Powerhouse), mean daily water temperature at Gage J-7 and mean daily air temperature at Gage J-7, and flow at Gage J-2 during May through October 2019.



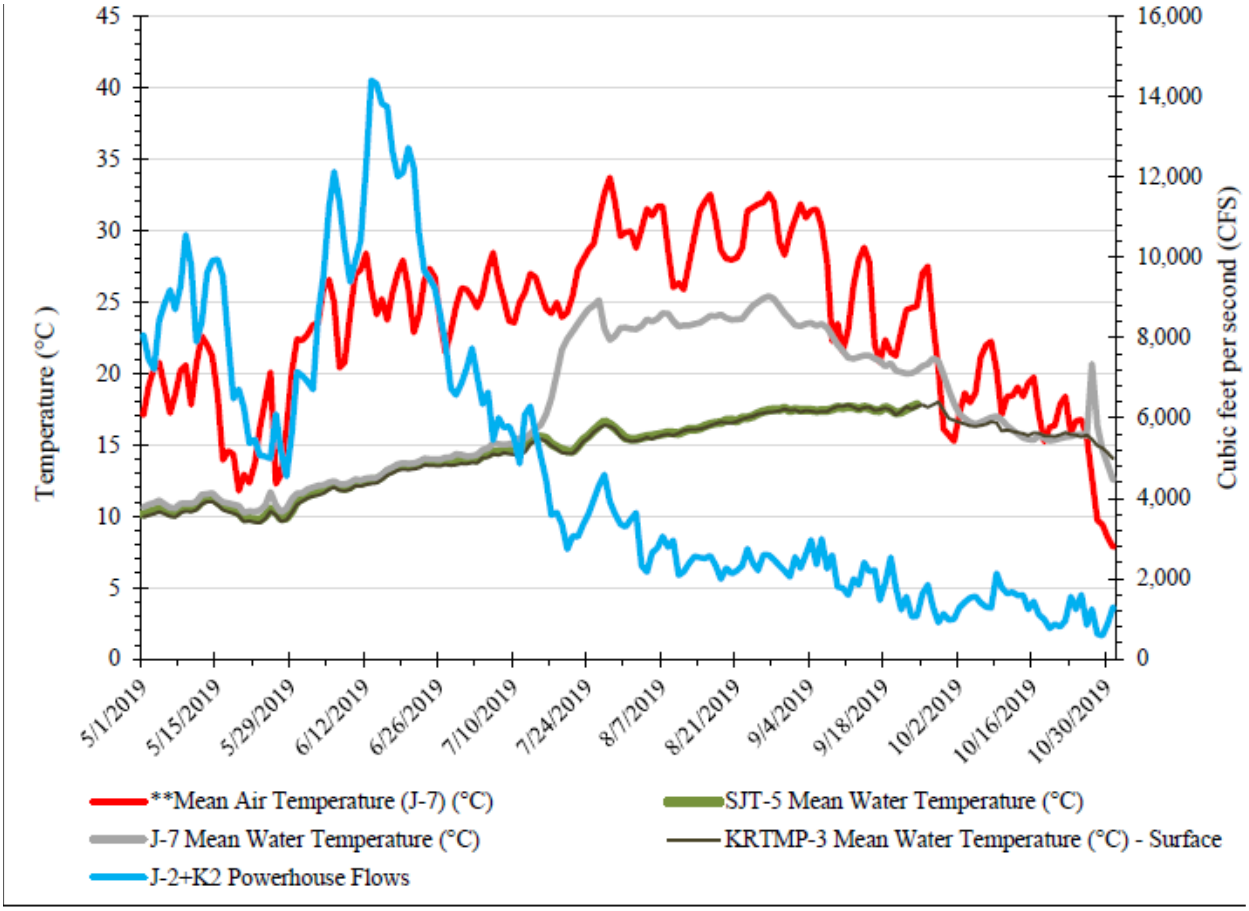
Source: PG&E 2020b

Figure 4.11-12: Mean daily water temperature, in the PBR at Station SJT-3 (downstream of the K1 Powerhouse); mean daily water temperature at Gage J-7; mean, maximum, and minimum daily relative humidity at Gage J-7; and flow at Gage J-2 during May through October 2019.



Source: PG&E 2020b

Figure 4.11-13: Mean, minimum, and maximum daily water temperature in the PBR at Station SJT-4 during May to October 2019. Mean daily water temperature at Gage J-7 and SJT-3 are also included.



Source: PG&E 2020b

Figure 4.11-14: Mean daily water temperature, in the PBR at Station SJT-5, mean daily water temperature at Gage J-7, mean daily water temperature at Station KRTMP-3 in Kerckhoff Reservoir, daily air temperatures at Gage J-7, and Gage J-2 flows plus K2 Powerhouse flows during May through October 2019.

During the WQ 2 study in 2019, additional measurements of water temperature were collected at three sites in the PBR on June 5 and September 4, 2019. On June 5, the water temperature was 13.2°C at SJRBR 1 and 12.5°C at SJRBR 3. On September 4, the water temperature was higher at SJRBR 1 (24°C) than downstream of the K2 Powerhouse at SJRBR 3 (17.9°C). On both dates, the water temperature at SJRBR 3 was similar (±0.3°C to 0.6°C or 0.5°C to 1°C) to the temperature at KR 1 in the reservoir near the dam.

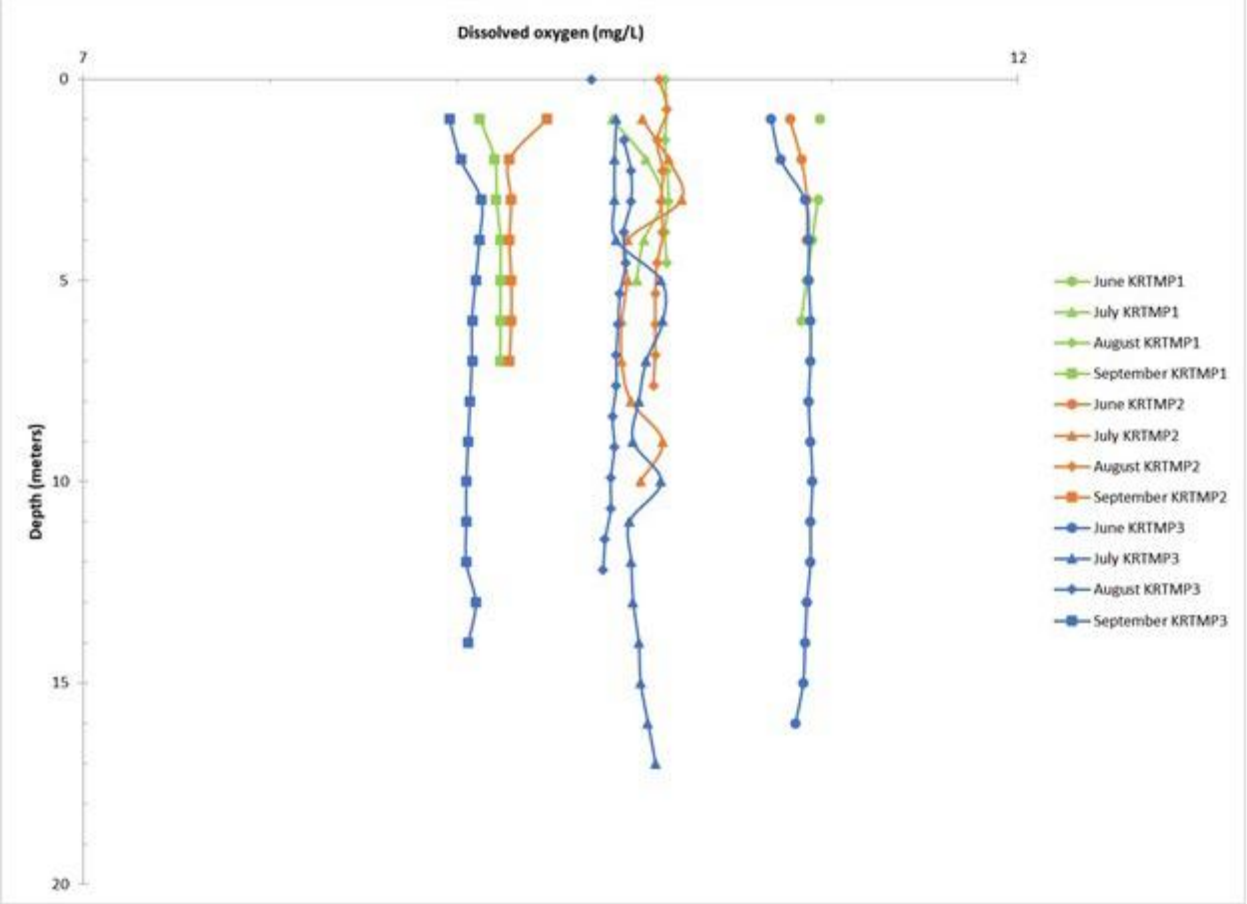
PG&E has conducted long-term monitoring of water temperature and flow from May through October for the following gage locations: Gage J-2 for 1998 to 2016, Gage J-3 (K1 Powerhouse) for 1998 to 2005, Gage J-7 for 2006 to 2015, and Gage J-2 for 2008 to 2009 and 2013 to 2016. Graphs of the daily maximum water temperatures, maximum air temperatures, and daily average flows are provided in FLA Appendix C (PG&E 2020a). At Gage J-7, the maximum water temperature was typically below 25°C, except for short periods (i.e., several days) in 2007, 2008, 2012, and 2013, and for longer periods (approximately two months) in 2014 and 2015 when the maximum temperature reached approximately 27°C. At Gage J-2, the maximum water temperature reached approximately 23°C to 25°C.

Dissolved Oxygen

Kerckhoff Reservoir

The vertical profiles of DO collected once per month in June through September 2019 at Stations KRTMP-1, KRTMP-2, and KRTMP-3 demonstrated that DO was uniform throughout the water column (Figure 4.11-15). The DO concentration was highest at approximately 10.5 mg/L to 11 mg/L in the June profile and lowest at approximately 8.9 mg/L to 9.5 mg/L in the September profile.

The profiles collected at Site KR 1 (directly upstream of Kerckhoff Dam) on June 5 and September 4, 2019, also showed that DO was uniform throughout the water column. On June 5, the DO concentration and DO percent saturation ranged from 10.7 mg/L to 10.9 mg/L and 100 percent to 101 percent, respectively. On September 4, the DO concentration was 9.0 mg/L to 9.2 mg/L, and the DO percent saturation was 94 percent to 96 percent.



Source: PG&E 2020b

Figure 4.11-15: DO Profiles at Stations KRTMP-1, KRTMP-2, and KRTMP-3

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The DO concentration met the SR/SJR Basin Plan standard in the PBR in 2019. At Site SJRBR 1, the DO concentration was 10.3 mg/L and 8.5 mg/L on June 5 and September 4, respectively. The DO percent saturation was 101 percent on both dates. At Site SJRBR 3, the DO concentration was 10.8 mg/L and 9.2 mg/L on June 5 and September 4, respectively. The DO percent saturation was 101 percent on June 5 and 98 percent on September 4.

Specific Conductivity

Kerckhoff Reservoir

Specific conductivity was uniform throughout the water column at Stations KRTMP-1, KRTMP-2, and KRTMP-3 and ranged from 19 µS/cm in September to 26 µS/cm in July. At Site KR 1, the specific conductance was also uniform at 23 µS/cm at the surface, mid-depth, and bottom on June 5 and was 19 µS/cm at all depths on September 4. These levels were consistent with SR/SJR Basin Plan objectives.

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Specific conductivity values were similar at Sites SJRBR 1 and SJRBR 3 and ranged from 20 µS/cm to 36 µS/cm on June 5 and September 4, 2019. These values were consistent with SR/SJR Basin Plan objectives.

Turbidity

Kerckhoff Reservoir

At Site KR 1, turbidity was 0.1 NTU (surface only) on June 5, and 0.3 NTU to 0.4 NTU on September 4, 2019.

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Turbidity was higher on June 5 at both Site SJRBR 1 (4.2 NTU) and Site SJRBR 3 (2.4 NTU) than on September 4, 2019 (0.8 NTU at SJRBR 1 and 0.3 NTU at SJRBR 3) which may be due to the higher flows in spring.

Turbidity in the PBR on June 5 was higher than at Site KR 1 in the single surface measurement which likely reflects the higher spring flows during spill. During the low flow measurements on September 4, turbidity was similar (less 0.5 NTU difference) at

KR 1, SJRBR 1, and SJRBR 3 which is consistent with the SR/SJR Basin Plan objective.[36]

pH

Kerckhoff Reservoir

On June 5, 2019, at Site KR 1 (surface only), pH was 7.2. On September 4, pH ranged from 6.1 at the surface to 6.3 at the bottom of the water column which was below the value of 6.5 specified in the SR/SJR Basin Plan objective.

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At Site SJRBR 1, pH was 7.0 on June 5, 2019 and was 6.8 on September 4; both values were consistent with the SR/SJR Basin Plan objective. At Site SJRBR 3, pH was 7.0 on June 5. pH was 6.0 on September 4 which was below the SR/SJR Basin Plan objective.

Other Physical and Chemical Parameters

Kerckhoff Reservoir

The results for several general constituents, minerals, nutrients, and metals at Site KR 1 on June 5 and September 4, 2019, are provided in Table 4.11-19 and Table 4.11-20 (PG&E 2020c). All parameters were below any relevant Basin Plan water quality objectives and are thus consistent with SR/SJR Basin Plan objectives. Furthermore, the results were similar on both sampling days. In several instances, the concentration of a specific parameter (e.g., total suspended solids, nitrate+nitrate nitrogen, beryllium, cadmium, chromium, cobalt, copper, lead, selenium, silver, thallium, zinc) was too low to be detected by the laboratory method. Arsenic, barium, nickel, and manganese were

[36] KR-1 is the water quality sampling location in Kerckhoff Reservoir closest to Kerckhoff Dam. SJRBR-1 is the PBR water quality sampling location just upstream of the K1 Powerhouse and SJRBR is the PBR water quality sampling location just downstream of the K2 Powerhouse.

below the national water quality criteria. Both the dissolved and total fraction of mercury were above the chronic standard on June 5 in the surface, mid-depth, and bottom samples (except the total fraction in the bottom sample) but were below the acute standard. Mercury was below the acute and chronic standard in the surface, mid-depth, and bottom samples on September 4. Chronic exposure to mercury is likely not an issue because mercury concentrations were not consistently above the standard.

Table 4.11-19: Laboratory Results for General Constituents, Minerals, and Nutrients at KR 1

Date	Position	Total Alkalinity (mg/L)	Total Organic Carbon (mg/L)	Dissolved Organic Carbon (mg/L)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	Hardness (mg/L)	Nitrate + Nitrite – N (mg/L)
Jun 5 (high flow)	Surface	9.7	2.4	2.2	30	ND	7.0	ND
	Mid-depth	9.6	2.2	2.3	31	ND	6.9	ND
	Bottom	9.9	2.2	2.2	32	ND	6.6	ND
Sep 4 (low flow)	Surface	9.0	1.48	ND	39	ND	6.0	0.91
	Mid-depth	10.0	1.47	ND	41	ND	6.0	ND
	Bottom	9.0	1.49	ND	25	1.1	6.0	ND
USEPA water quality standards		20.0[a]	No standard found	No standard found	250[b]	No standard found	No standard found	No standard found
Method detection limit		3.0	0.085	0.095	5.0	5.0	5.0	Nitrate = 0.099 Nitrite = 0.020

Source: PG&E 2020c

Notes: mg/L – milligrams per liter

ND – not detected

a USEPA 2026

b USEPA 1986

Table 4.11-20: Laboratory Results for Metals at KR 1 (µg/L, ng/L for Mercury and Methyl Mercury)

Analyte	National Recommended Water Quality Criteria[a]		Surface				Mid-Depth				Bottom			
			Dissolved Fraction (filtered)		Total Fraction (unfiltered)		Dissolved Fraction (filtered)		Total Fraction (unfiltered)		Dissolved Fraction (filtered)		Total Fraction (unfiltered)	
	Acute	Chronic	Jun 5	Sep 4	Jun 5	Sep 4	Jun 5	Sep 4	Jun 5	Sep 4	Jun 5	Sep 4	Jun 5	Sep 4
Antimony	9,000+	1,600	ND	ND	0.15	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	340	150	0.99	1.41	1.08	1.74	0.97	1.44	1.08	1.72	0.96	1.42	1.09	1.75
Barium	1,000*	NSF	4.49	3.33	5.06	3.59	4.51	3.32	5.12	3.51	4.37	3.32	5.02	3.55
Beryllium	130	5.30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium[b]	0.15	0.10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium (III)[b]	60	8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt	NSF	NSF	DNQ	ND	DNQ	ND	ND	ND	DNQ	ND	ND	ND	DNQ	ND
Copper	NSF	1,300*	DNQ	ND	DNQ	DNQ	ND	ND	ND	ND	ND	ND	DNQ	ND
Iron	NSF	1,000	†	†	ND	ND	†	†	ND	ND	†	†	ND	ND
Lead[b]	3	0.13	ND	ND	DNQ	ND	ND	ND	DNQ	ND	ND	ND	DNQ	ND
Manganese	100*+	NSF	2.62	ND	6.32	ND	^	ND	6.70	ND	^	ND	^	ND
Mercury	1.4	0.77	1.12**	0.29	1.33**	0.63	1.08**	0.30	1.35**	0.61	1.04**	0.28	ND	0.61
Methylmercury[c]	NSF	NSF	†	†	0.038	DNQ	†	†	0.029	DNQ	†	†	0.033	DNQ
Molybdenum	NSF	NSF	0.74	0.76	0.69	0.74	0.73	0.74	0.71	0.74	0.71	0.74	0.70	0.74
Nickel[b]	50	5	DNQ	DNQ	0.12	DNQ	DNQ	DNQ	0.10	DNQ	DNQ	DNQ	0.09	DNQ
Selenium	NSF	1.50	ND	ND	ND	ND	ND	ND	ND	DNQ	ND	ND	ND	ND
Silver[b]	0.03	NSF	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	1400	40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	NSF	NSF	0.32	DNQ	0.43	DNQ	0.31	DNQ	0.44	DNQ	0.31	DNQ	0.42	DNQ
Zinc[b]	12	12	ND	ND	ND	ND	ND	ND	ND	DNQ	ND	ND	ND	ND

Source: PG&E 2020c

Notes:

* – Human Health and Welfare Protection Fish Consumption Only standard.

** – Some surface values exceeded the chronic standard, but not all the time, so chronic exposure may not be present.

*+ – USEPA Health Advisory level is 300 *µg*/L for drinking water.

^ – Result is not available due to laboratory error.

+ – National Recommended Water Quality Criteria for Freshwater Aquatic Life Protection Acute value for antimony. Human Health and Welfare Protection for Water and Fish Consumption value is 5.6 *µg*/L.

µg/L – Micrograms per liter (parts per billion). ng/L – nanograms per liter (parts per trillion).

† – Method used produced only total fraction result.

DNQ – Detected but not quantifiable. The analyte is between the method detection limit and minimum level. ND – Not detected.

NSF – No relevant standard found for comparison.

[a] National recommended water quality criteria.

[b] Calculated with hardness value of 7 mg/L using analyte specific regression equations available at: http://www.waterboards.ca.gov:8080/WaterQualityGoal/index.jsp. Chronic values are based on 4-day average values and acute values are based on 1-hour average values. For cadmium only, the acute regression equation was available for 24-hour averaged values.

[c] No concentration criteria are available for methylmercury, but tissue concentrations are presented in mg/kg.

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The results for several general constituents, minerals, nutrients, and metals at Site KR 1 on June 5 and September 4 are provided in Table 4.11-21 and Table 4.11-22. All parameters were consistent with SR/SJR Basin Plan objectives. The concentration of several parameters (e.g., total suspended solids, dissolved organic carbon on September 4, nitrate+nitrate nitrogen, beryllium, cadmium, chromium, cobalt, copper, lead, selenium, silver, thallium, zinc) were too low to be detected by the laboratory method. Arsenic, barium, nickel, and manganese were below the national water quality criteria. Both the dissolved and total fraction of mercury was above the chronic standard on June 5 at both SJRBR 1 and SJRBR 3 but both fractions were below the acute standard. Mercury was below the acute and chronic criteria at both SJRBR 1 and SJRBR 3 on September 4.

Table 4.11-21: Laboratory Results for SJRBR 1 and SJRBR 3

Date	Total Alkalinity (mg/L)	Total Organic Carbon (mg/L)	Dissolved Organic Carbon (mg/L)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	Hardness (mg/L)	Nitrate + Nitrite – N (mg/L)
	SJRBR 1						
Jun 5 (high flow)	10	2.3	2.3	28.0	ND	7.1	ND
Sep 4 (low flow)	10	1.48	ND	28.0	ND	9.0	ND
	SJRBR 3						
Jun 5 (high flow)	9.9	2.30	2.3	30	ND	6.7	ND
Sep 4 (low flow)	9.0	1.45	ND	22	1.3	6.0	ND
EPA water quality	20.0 a	No standard found	No standard found	250 b	No standard found	No standard found	No standard found

Date	Total Alkalinity (mg/L)	Total Organic Carbon (mg/L)	Dissolved Organic Carbon (mg/L)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	Hardness (mg/L)	Nitrate + Nitrite – N (mg/L)
standards							
Method detection limit	3.0	0.085	0.095	5	5.0	5.0	Nitrate = 0.099 Nitrite = 0.020

Source: PG&E 2020c

Notes: mg/L – milligrams per liter

ND – not detected

a USEPA n.d.

b USEPA 1986

Table 4.11-22: Laboratory Results for Metals at SJRBR 1 and SJRBR 3

Analyte	USEPA Standard[a]		SJRBR 1				SJRBR 3			
			Dissolved Fraction (filtered)		Total Fraction (unfiltered)		Dissolved Fraction (filtered)		Total Fraction (unfiltered)	
	Acute	Chronic	Jun 5	Sep 4	SJ Jun 5	Sep 4	Jun 5	Sep 4	Jun 5	Sep 4
Antimony	9,000+	1,600	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	340	150	0.97	1.23	1.10	1.27	0.97	1.44	1.08	1.75
Barium	1,000*	NSF	4.53	4.63	5.25	4.55	4.44	3.34	5.10	3.53
Beryllium	130	5.30	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium[b]	0.15	0.10	ND	ND	ND	ND	ND	ND	ND	ND
Chromium (III) [b]	60	8	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt	NSF	NSF	ND	ND	DNQ	ND	ND	ND	DNQ	ND
Copper	NSF	1,300*	DNQ	DNQ	DNQ	DNQ	ND	ND	DNQ	DNQ
Iron	NSF	1000	†	†	ND	230	†	†	ND	ND
Lead[b]	3	0.13	ND	ND	DNQ	ND	ND	ND	DNQ	ND
Manganese	100*+	NSF	^	^	7.39	21	^	ND	7.14	ND
Mercury	1.40	0.77	0.97**	0.37	1.32**	0.54	0.99	0.29	1.30	0.64
Methylmercury[c]	NSF	NSF	†	†	0.03	DNQ	†	†	0.033	DNQ
Molybdenum	NSF	NSF	0.72	0.81	0.70	0.80	0.72	0.76	0.71	0.75
Nickel[b]	50	5	DNQ	DNQ	0.10	DNQ	DNQ	DNQ	0.09	DNQ
Selenium	NSF	1.50	ND	ND	ND	ND	ND	DNQ	ND	ND
Silver[b]	0.03	NSF	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	1,400	40	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	NSF	NSF	0.31	0.32	0.46	0.33	0.31	DNQ	0.44	DNQ

Analyte	USEPA Standard[a]		SJRBR 1				SJRBR 3			
			Dissolved Fraction (filtered)		Total Fraction (unfiltered)		Dissolved Fraction (filtered)		Total Fraction (unfiltered)	
	Acute	Chronic	Jun 5	Sep 4	SJ Jun 5	Sep 4	Jun 5	Sep 4	Jun 5	Sep 4
Zinc[b]	12	12	ND	ND	ND	ND	ND	DNQ	ND	DNQ

Source: PG&E 2020c

Notes:

* – Human Health and Welfare Protection Fish Consumption Only standard.

** – Some surface values exceeded the chronic standard, but not all the time, so chronic exposure may not be present.

*+ – USEPA Health Advisory level is 300 *µg*/L for drinking water.

^ – Result is not available due to laboratory error.

+ – National Recommended Water Quality Criteria for Freshwater Aquatic Life Protection Acute value for antimony. Human Health and Welfare Protection for Water and Fish Consumption value is 5.6 *µg*/L.

µg/L – Micrograms per liter (parts per billion). ng/L – nanograms per liter (parts per trillion).

† – Method used produced only total fraction result.

DNQ – Detected but not quantifiable. The analyte is between the method detection limit and minimum level. ND – Not detected.

NSF – No relevant standard found for comparison.

[a] National recommended water quality criteria

[b] Calculated with hardness value of 7 mg/L using analyte specific regression equations available at: http://www.waterboards.ca.gov:8080/WaterQualityGoal/index.jsp. Chronic values are based on 4-day average values and acute values are based on 1-hour average values. For cadmium only, the acute regression equation was available for 24-hour averaged values.

[c] No concentration criteria are available for methylmercury, but tissue concentrations are presented in mg/kg.

Additional Data

In addition to data collected in support of the FLA, historical water quality data were obtained from the following sources to help with characterizing background conditions.

- DO and water temperature data were collected on various dates in May through August 1987 in the SJR and Millerton Lake in support of an American shad study downstream of the PBR (NES 1987). The water temperature ranged from 11.3°C in May to 19.0°C in August. The DO concentration was 9.0 mg/L to 11.3 mg/L in July and August
- Data for general constituents (e.g., total alkalinity, total suspended solids, suspended solids), nutrients, minerals, metals, and specific conductance from the SJR downstream of Kerckhoff dam collected in 1974 to 1990 were all in attainment with available water quality criteria. pH was within the range of the criteria (see Table 7.3-14 in Supplemental FLA) (CDWR 2020, PG&E 2023)
- Data for specific conductance, pH, metals, nutrients, total alkalinity, and total dissolved solids collected in the SJR near the K2 Powerhouse in 1990 and 1991 met water quality criteria and SR/SJR Basin Plan objectives (Table 7.3-15 in Supplemental FLA; CDWR 2020; PG&E 2023)
- In November 2010 and July 2011, Reclamation collected data for water temperature, pH, DO, specific conductance, and turbidity along with some general constituents and metals, in the SJR downstream of the K2 Powerhouse and another site near Auberry; data was also collected in Millerton Lake at the Boat-In Campground (Table 7.3-16 in Supplemental FLA; Reclamation 2014; PG&E 2023). In the SJR, the water temperature was 13.6 C to 15 C, the DO concentration ranged from 10.2 to 12.6 mg/L, specific conductance was 20 to 40 µS/cm, and turbidity ranged from 3.6 NTU to 94 NTU. pH ranged from 4.9 to 5.5 which was below the range (6.5 to 8.5) in the SR/SJR Basin Plan objective. Results for other general constituents and metals met the water quality criteria
- On August 8, 2012, nutrients and metals in Kerckhoff Reservoir (near the mouth of the Fish Creek arm of the reservoir) were measured as part of the Surface Water

Ambient Monitoring Program (Table 7.3-17 in Supplemental FLA; State Water Board 2023; PG&E 2023). All parameters met available water quality criteria

Sediment Management

PG&E currently provides additional releases, as determined necessary, to flush sediments that may accumulate in the streambed below Kerckhoff Dam. According to the 1980 Fishery Agreement between California Department of Fish and Game (CDFG, now CDFW) and PG&E, the flushing flow method and magnitude were to be developed by CDFG; however, the method and magnitude were not developed. Instead, PG&E consults with CDFW if there is a need to flush sediment, as was the case for the 1997 winter storm event, when excessive sediment was deposited against the upstream face of Kerckhoff Dam as a result of a severe storm and heavy runoff in January 1997. In June 1998, the low-level outlets were exercised for the purpose of sluicing sediment. Turbidity, DO, and settleable solids were monitored immediately downstream of Kerckhoff Dam and near the K1 Powerhouse. Grab samples were also collected for metals analysis. Turbidity reached a peak of 25 NTU, DO ranged from 10.1 to 11.6 mg/L, and trace settleable solids were detected. Low levels of barium, molybdenum, zinc, chromium, and nickel were detected in the grab samples; all results were below the California EPA primary drinking water standards. PG&E has not flushed sediment in recent years.

There is no specific sediment management plan for Kerckhoff Reservoir under the current Kerckhoff Hydroelectric Project license. Sediments are removed only in conjunction with accomplishing needed infrastructure repairs, such as around the low-level outlets (LLO) or intakes. Sediment that is deposited in the reservoir and builds up in the vicinity of the dam may pass downstream during once-yearly LLO test operations or during normal operation of the LLOs in high-flow events. The operation of LLOs during high flow events does not occur on a planned basis; this operation is dictated by high flows into the reservoir and the need to pass more water than can be accommodated by the radial gates alone. According to PG&E, the three LLOs at Kerckhoff Dam are not explicitly used to sluice sediment. The LLOs are generally

opened during high-flow events to reduce pressure at the dam and to ensure their functionality.

Bacteriological Sampling

Water samples were collected by PG&E as a component of Study WQ 2 in 2019 and analyzed to assess recreation-related bacterial concentrations, including fecal coliform, total coliform, and *E. coli*. Samples were collected six times within two 30-day periods associated with the peak recreation activity around Memorial Day (May through June) and Labor Day (August through September) during low- and high-flow periods. Bacteria sampling by PG&E at Site SJRBR 3 (below the K2 Powerhouse) was to occur only if the elevation of Millerton Lake reached greater than or equal to 545 feet msl to create a backwater effect at the K2 Powerhouse. Bacteria samples were collected at Site SJRBR 3 downstream of the K2 Powerhouse because Millerton Lake levels exceeded the 545 feet msl during the sampling period, and at two sites in Kerckhoff Reservoir—Site KR 2 (near Smalley Cove) and Site KR 3 (upstream of Smalley Cove) (see Figure 4.11-8 and Figure 4.11-9).

The Statewide Bacterial Provisions objective for *E. coli* is described in Table 4.11-16 and the individual sample results collected at KR 2, KR 3, and SJRBR 3 in 2019 are provided in Table 4.11-23, Table 4.11-24, and Table 4.11-25. For purposes of calculating the geometric mean, not detected (ND) values were replaced with one, and values below the reporting limit (<1.8) were replaced with 1.8. The geometric mean *E. coli* value for the six high flow and six low flow samples at all three sites ranged from 2.4 most probable number (MPN)/100 mL to 13.1 MPN/100 mL which was well below the objective of 100 MPN/100 mL and the statistical threshold value of 320 MPN/100 mL,

Table 4.11-23: Bacteria Concentrations in 2019 at Site KR 2

Sample Date	E. coli	Fecal Coliform	Total Coliform
5/17/2019	23	23	23
5/23/2019	12	12	16.1
5/30/2019	2.2	2.2	6.9
6/5/2019	13	13	22
6/13/2019	17	17	49

Sample Date	E. coli	Fecal Coliform	Total Coliform
6/17/2019	4.5	4.5	79
Geometric Mean	**9.2**	**9.2**	**24.5**
8/20/2019	4.5	4.5	6.8
8/28/2019	2	2	79
9/3/2019	4	4	33
9/11/2019	ND	14	79
9/18/2019	<1.8	<1.8	<1.8
9/25/2019	13	13	33
Geometric Mean	**3.1**	**4.8**	**20.9**

Table 4.11-24: Bacteria Concentration in 2019 at Site KR 3 (MPN/100 mL)

Sample Date	E. coli	Fecal Coliform	Total Coliform
5/17/2019	23	23	23
5/23/2019	5.1	5.1	5.1
5/30/2019	23	23	23
6/5/2019	14	14	33
6/13/2019	17	17	33
6/17/2019	7.8	7.8	79
Geometric Mean	**13.1**	**13.1**	**24.8**
8/20/2019	2	2	4.5
8/28/2019	4	4	70
9/3/2019	4	4	170
9/11/2019	<1.8	31	46
9/18/2019	<1.8	<1.8	<1.8
9/25/2019	2	2	13
Geometric Mean	**2.4**	**3.9**	**19.7**

Table 4.11-25: Bacteria Concentrations in 2019 at Site SJBR 3 (MPN/100 mL)

Sample Date	E. coli	Fecal Coliform	Total Coliform
5/17/2019	16.1	16.1	16.1
5/23/2019	6.9	6.9	6.9
5/30/2019	12	12	16.1
6/5/2019	7.8	7.8	14
6/13/2019	23	23	33

Sample Date	E. coli	Fecal Coliform	Total Coliform
6/17/2019	6.8	6.8	170
Geometric Mean	**10.8**	**10.8**	**22.8**
8/20/2019	7.8	7.8	7.8
8/28/2019	2	2	79
9/3/2019	2	2	13
9/11/2019	<1.8	ND	49
9/25/2019	2	2	23
9/18/2019	2	2	4.5
Geometric Mean	**2.5**	**2.2**	**18.5**

Fish and Crayfish Tissue Contaminants

For Study WQ-3 (PG&E 2020d), implemented to inform the FLA, PG&E collected fish and crayfish tissues for contaminant analysis during the fish population sampling in Kerckhoff Reservoir (*Technical Study Report 24 [TSR-24]: Fish Populations [AQ 2]*; PG&E 2020e) using the California Office of Environmental Health Hazard Assessment's (OEHHA) collection and sample size protocols (OEHHA 2005). PG&E collected tissue samples from nine individual specimens of three species—spotted bass (*Micropterus punctulatus*), signal crayfish (*Pacifastacus leniusculus*), and Sacramento sucker (*Catostomus occidentalis*).[37] Each sample was analyzed for mercury, arsenic, cadmium, copper, selenium, and silver. In addition, one composite sample containing combined fillets of nine spotted bass was analyzed for organic constituents (i.e., organochlorine pesticides, polybrominated diphenyl ethers, and polychlorinated biphenyls). The results of testing for trace metals and mercury in tissues of individual specimens of spotted bass, crayfish, and Sacramento sucker can be found in PG&E's FLA Exhibit E (PG&E 2020a).

[37] The preferential order for tissue samples in the Revised Study Plan was bass, crayfish, rainbow trout, sunfish, suckers, and other fish commonly consumed. However, rainbow trout were excluded at CDFW's request. No sunfish were collected and, therefore, not included.

Fish and crayfish tissue mercury was identified as a potential human health concern based on thresholds developed by USEPA (USEPA 1996, 2018). The mercury concentration in the nine spotted bass samples ranged from 0.2 milligrams per kilogram (mg/kg) to 0.544 mg/kg with an average of 0.38 mg/kg. Two of the nine spotted bass samples exceeded the USEPA limit for mercury in fish for consumption of 0.46 mg/kg (USEPA 2018). The average concentration in spotted bass exceeded the Statewide Mercury Provisions[38] Sport Fish Water Quality Objective[39] under baseline conditions of 0.2 mg/kg within a calendar year in Trophic Level 4 fish. In addition, eight of the nine spotted bass individuals and one of nine Sacramento sucker samples exceeded the USEPA tissue residue criterion of 0.3 mg/kg of methyl mercury (USEPA 2001), which represents the fish tissue mercury concentration that is safe to consume assuming a human body weight of 70 kg, and a fish intake of 0.0038 kg fish/day for trophic level three fish, and 0.0057 kg fish/day for trophic level four fish.

4.11.1.6 Flood Hazards

The Kerckhoff Hydroelectric Project is located in a zone identified by the Federal Emergency Management Agency (FEMA) as Zone A, also known as a Special Flood Hazard Area. Areas within Zone A have a 1 percent annual chance of flood (100-year flood) (FEMA 2009). No base flood elevation has been determined for the area.

4.11.1.7 Groundwater

Under baseline conditions, no groundwater is utilized for the Kerckhoff Hydroelectric Project. Downstream of the Kerckhoff Hydroelectric Project, the 2015 Warren Act contract between Table Mountain Rancheria and Reclamation states that Table

[38] Available at: https://www.waterboards.ca.gov/water_issues/programs/mercury/docs/hg_prov_final.pdf. Last accessed April 2, 2026.

[39] The Statewide Mercury Provisions list spotted bass as a trophic level four fish, and suckers are listed as a trophic level three fish. The water quality objective applies to the fish concentration of whichever is the highest trophic level fish in the water body.

Mountain Rancheria is allowed to pump up to 600 acre-feet of groundwater per year (50 acre-feet per month) from two parcels of Table Mountain Rancheria-owned land located southeast of Kerckhoff Reservoir. Under this contract, groundwater is pumped from wells on these parcels to the SJR at Kerckhoff Reservoir and diverted to Table Mountain Rancheria from Millerton Lake. Reclamation approved a new 25-year Warren Act contract with Table Mountain Rancheria beginning in 2020 (Reclamation 2019). The Kerckhoff Hydroelectric Project is not within any of the Sustainable Groundwater Management Act (SGMA) defined ground water basins.

4.11.2 Regulatory Background

The following sections contain an overview of regulations related to hydrology and water quality.

4.11.2.1 Federal

4.11.2.1.1 Federal Power Act

The Federal Power Act (16 USC Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created FERC and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (18 CFR Part 5), including agencies to be consulted, study plan requirements, tribal consultations, proposals, filing instructions, and amendment processes.

4.11.2.1.2 Federal Energy Regulatory Commission

The existing FERC license, issued in 1979, and subsequent FERC orders and amendments govern the existing operation of the Kerckhoff Hydroelectric Project. FERC is charged with issuing and regulating privately operated hydroelectric projects throughout the United States.

4.11.2.1.3 Clean Water Act

The discharge of pollutants into Waters of the United States, including discharge of sediment to surface water, are regulated by the CWA. Section 404 of the CWA (33 USC Section 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 (e.g., dams and levees), infrastructure development (e.g., 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. Activities exempt under the CWA Section 404(f)(1) include maintenance of structures such as dams, dikes, and levees.

4.11.2.1.4 United States Environmental Protection Agency

On May 18, 2000, the USEPA promulgated numeric water quality criteria for priority toxic pollutants and other provisions for water quality standards to be applied to waters in the state of California. The USEPA promulgated the California Toxics Rule (40 CFR Section 131.38) based on a determination that the numeric criteria are necessary in California to protect human health and the environment and to fill in gaps in California water quality standards that were created in 1994.

4.11.2.1.5 United States Bureau of Land Management

Proposed Project activities that occur on public lands managed by the BLM must be consistent with BLM's *Bakersfield Field Office Record of Decision and Approved Resource Management Plan* (RMP) (BLM 2014). Kerckhoff Dam and the K1 and K2 powerhouses are located within the BLM-managed SJR Gorge Special Recreation Management Area. The RMP identifies comprehensive management direction for all resources and uses. It does not contain any objectives specific to operation of the Proposed Project. The BLM will use the direction contained in the RMP to guide its decisions regarding the relicensing of the Proposed Project and the development of associated license conditions (PG&E 2020a). Relevant goals, objectives, decisions, and standards to hydrology and water quality management include:

- **Goal [WR-G-1]**: Federal actions promulgate the objectives of the CWA, Safe Drinking Water Act, and all other applicable water quality requirements
- **Objective [WR-O-1]**: Manage water resources to meet or exceed the Standards for Rangeland Health (LG-D-5) by maintaining the existing quality and beneficial uses of water, protecting them where they are threatened, and restoring them where they are currently degraded
- **Objective [WR-O-2]:** Manage riparian/wetland vegetation, structure, and diversity and stream channels and floodplains so that they are functional and achieve physical and biological objectives
- **Objective [WR-D-3]:** Implement best management practices (BMPs) for riparian/wetland health for maintenance of vegetation cover and diversity, and the physical stability of stream banks (Appendix 3 of the RMP)
- **Objective [WR-D-4]:** Applications for water developments or diversions on public lands would be approved only if resource objectives including wildlife, riparian, and livestock grazing needs have been met
- **Decision [LR-D-2.6]:** Apply resource-specific BMPs (e.g., BMPs for VRM, air, soil, water, biological resources, etc., see Appendix 3 of the RMP) as terms and conditions to right-of-way authorizations based on site-specific NEPA analysis to minimize environmental impacts
- **Standard: Water Quality** – Surface and groundwater complies with objectives of the CWA and other applicable water quality requirements, including meeting the California State standards

    - Develop and implement BMPs approved by the State Water Board to protect and restore the quality and beneficial uses of water and monitor both implementation and effectiveness of the BMPs. These BMPs will be developed in full consultation, coordination, and cooperation with permittees and other interests

Appendix 3 *Best Management Practices/Standard Operating Procedures* of the RMP provides the following water resources BMPs:

- 6.3.6.1, Water Resources Protection:

- Erosion control measures include mulching, placement of hay bales and other drainage control features, construction of rolling dips, and seasonal limits on operations
- Take measures to prevent the diffuse or point discharge of potential water pollutants onto the ground surface
- Road construction/reconstruction shall be conducted so as to reduce sediment generation and delivery. This can be accomplished by, among other means, following designs for road systems, incorporating adequate drainage structures, properly installing stream crossings, avoiding road construction in streamside management areas, removing debris from streams, and stabilizing areas of disturbed soil such as road fills
- Manage roads to prevent sedimentation, minimize erosion, maintain stability, and reduce the risk that drainage structures and stream crossings will fail or become less effective. Components of this measure include inspections and maintenance actions to prevent erosion of road surfaces and to ensure the effectiveness of stream-crossing structures. This measure also addresses appropriate methods for closing roads that are no longer in use
- Confine runoff onsite to reduce impacts of mechanical site preparation and revegetation operations, particularly in areas that have steep slopes or highly erodible soils, or where the site is located in close proximity to a water body
- Do not apply chemicals within 100 feet of perennial streams or channels with beneficial use(s) recognized by the state
- Do not apply chemicals directly into intermittent streams or channels with beneficial use(s) recognized by the state
- Construction activities that disturb one or more acres of soil or less than one acre but are part of a larger common plan of development or sale having the potential to disturb one or more acres (includes clearing, grading, and ground disturbances such as stockpiling or excavation) are required to obtain coverage under the General Permit for Discharges of Stormwater Associated with Construction Activity (Construction General Permit (CGP]), Order 2009-0009-DWQ) and manage construction in accordance with permit requirements

4.11.2.1.6 United States Forest Service

The United States Forest Service (USFS) uses the direction in the revised Land Management Plan for the Sierra National Forest (USFS 2023), pursuant to the 2012 Forest Service Planning Rule (36 CFR Part 219), to guide its decisions regarding the relicensing of the Proposed Project and the development of associated license conditions. The 2023 Sierra Forest Land Management Plan includes goals, objectives, standards, and guidelines related to watershed conservation and sustainability including to use applicable best management practices to minimize adverse impacts to water resources and to maintain adequate water quantity and timing to support State-designated beneficial uses of water.

4.11.2.2 State

4.11.2.2.1 Porter-Cologne Water Quality Control Act

California's primary statute governing water quality and water pollution issues for both surface waters and groundwater is the Porter-Cologne Water Quality Control Act (Porter-Cologne Act; California Water Code Section 13000 et seq.). The Porter-Cologne Act is the primary means for implementation of California's responsibilities under the CWA. The Porter-Cologne Act grants the State Water Board and each of the nine Regional Water Boards 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 Regional Water Boards jointly administer federal and state laws related to water quality in coordination with the USEPA and USACE (State Water Board 2026)

4.11.2.2.2 Clean Water Act

Section 401 of the CWA (33 USC Section 1341) requires applicants for federal licenses or permits 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 state water quality laws (33 USC

Section 1341(a)(1),(d)). 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. 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 Boards have primary responsibility for the coordination and control of water quality in California. The preparation and adoption of water quality control plans (Basin Plans) is required by the California Water Code (Section 13240) and supported by the federal CWA. Nine water quality control plans, which apply to different areas of California, formally designate existing and potentially beneficial uses and water quality objectives. The water quality control plan applicable to the Proposed Project is the SR/SJR Basin Plan (Central Valley Regional Water Board 2019). The water quality objectives are shown in Table 4.11-16.

The *Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Water Board 2018) establishes provisions for water quality and sediment quality applicable to all inland surface waters including Waters of the United States and Waters of the State. It was adopted by the State Water Board under authority provided by Water Code Sections 13140 and 13170. In accordance with Water Code Section 13170, except where otherwise noted, the provisions contained in the plan supersede any Regional Water Board plans (in this case, the SR/SJR Basin Plan) for the same waters to the extent of any conflict. The plan sets objectives for sediment and chronic and acute aquatic toxicity. In 2018, the State Water Board adopted Part 3 of the *Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries*

of California (State Water Board 2018). Part 3 developed numeric water quality objectives for bacteria to protect REC-1 waters.

4.11.2.2.3 Sustainable Groundwater Management Act

The SGMA was passed in 2014 to protect groundwater resources (CDWR 2026). The SGMA required local agencies to form groundwater sustainability agencies (GSA) in designated high- and medium- priority basins and subbasins. GSAs are encouraged to develop and implement Groundwater Sustainability Plans or alternative plans to avoid undesirable results and mitigate overdraft within 20 years of plan development.

4.11.2.3 Local

4.11.2.3.1 Fresno County

The Fresno County General Plan (Fresno County 2024) is a comprehensive, long-term framework for the protection of the county's agricultural, natural, and cultural resources and for development in the county. Designed to meet state general plan requirements, it outlines policies, standards, and programs and sets out plan proposals to guide day-to-day decisions concerning Fresno County's future.

The Fresno County General Plan includes the following objectives and policies related to hydrology and water quality:

- Goal OS-A: To protect and enhance the water quality and quantity in Fresno County's streams, creeks, and groundwater basins
  - Policy OS-A.1, Water Resources Management Leadership: The County shall provide active leadership in the regional coordination of water resource management efforts affecting Fresno County and shall continue to monitor and participate in, as appropriate, regional activities affecting water resources, groundwater, and water quality
  - Policy OS-A.2, Groundwater Management Leadership: The County shall provide active leadership in efforts to protect, enhance, monitor, and manage groundwater resources within its boundaries

- OS-A.6, Groundwater Recharge Protection: The County shall ensure that new development does not limit the capacity or function of groundwater recharge areas
- OS-A.14, Floodplain Protection: The County shall require the protection of floodplain lands and, where appropriate, acquire public easements for purposes of flood protection, public safety, wildlife preservation, groundwater recharge, access, and recreation
- OS-A.15, San Juaquin River Protection: The County shall support the policies of the San Juaquin River Parkway Master Plan to protect the SJR as an aquatic habitat, recreational amenity, aesthetic resource, and water source
- OS-A.18, Groundwater Quality Protection: The County shall protect groundwater resources from contamination and overdraft
- OS-A.19, Water Discharge Pollution Mitigation: The County shall require new development near rivers, creeks, reservoirs, or substantial aquifer recharge areas to mitigate any potential impacts of release of pollutants in storm waters, flowing river, stream, creek, or reservoir waters
- OS-A. 20, Minimization of Sedimentation and Erosion: The County shall minimize sedimentation and erosion through control of grading, cutting of trees, removal of vegetation, placement of roads and bridges, and use of off-road vehicles. The County shall discourage grading activities during the rainy season unless adequately mitigated to avoid sedimentation of creeks and damage to riparian habitat
- OS-A.21, Best Management Practices: The County shall continue to require the use of feasible and practical BMPs to protect streams from the adverse effects of construction activities and urban runoff
- OS-A.22, Water Quality Monitoring: The County shall support the monitoring of water quality and necessary measures to prevent contamination, including the prevention of hazardous materials from entering the wastewater system

- Goal OS-A: To protect and enhance the water quality and quantity in Fresno County’s streams, creeks, and groundwater basins

- OS-E.7, Pesticide Use Monitoring: The County shall continue to closely monitor pesticide use in areas adjacent to habitats of special-status plants and animals
- OS-E.8, Pest Control: The County shall promote effective methods of pest (e.g., ground squirrel) control on croplands bordering sensitive habitat that do not place special-status species at risk, such as the San Joaquin kit fox

4.11.2.3.2 Madera County

The Madera County General Plan (Madera County 1995) includes information regarding land uses in the vicinity of the Proposed Project and management goals and policies relevant to the Proposed Project Area. The General Plan provides an overall framework for development of the county and protection of its natural and cultural resources.

The Madera County General Plan includes the following objectives and policies related to hydrology and water quality:

- Goal 5.C: To protect and enhance the natural qualities of Madera County's streams, creeks, and groundwater
  - Policy 5.C.1: The County shall protect and preserve areas with groundwater recharge capabilities and minimize placement of potential sources of pollution in such areas
  - Policy 5.C.2: The County shall minimize sedimentation and erosion through control of grading, cutting of trees, removal of vegetation, placement of roads and bridges, and use of off-road vehicles. The County shall discourage grading activities during the rainy season, unless adequately mitigated, to avoid sedimentation of creeks and damage to riparian habitat
  - Policy 5.C.3: The County shall require new development of facilities near rivers, creeks, reservoirs, or substantial groundwater recharge areas to mitigate any potential impacts of release of pollutants in flood waters, flowing river, stream, creek, or reservoir waters
  - Policy 5.C.4: The County shall require the use of feasible and practical BMPs to protect streams from the adverse effects of construction activities and shall encourage storm drainage systems to use BMPs

- Goal 3.C: To ensure the availability of an adequate and safe water supply and the maintenance of high-quality water in water bodies and aquifers used as sources of domestic and agricultural water supply
  - Policy 3.C.4: The County shall require that water supplies serving new development meet state water quality standards

4.11.3 Analysis Methodology

4.11.3.1 Analytical Approach

Analysis of the Proposed Project's potential impacts on hydrology and water quality is based on the review of the Proposed Project design, as well as studies and technical reports prepared by PG&E in support of the FLA and Second Supplemental Information Filing (PG&E 2020a, 2023). A "project" is defined as a "whole action" subject to a public agency's discretionary funding or approval that has the potential to either (1) cause a direct physical change in the environment or (2) cause a reasonably foreseeable indirect physical change in the environment. The Area of Analysis includes the Proposed Project Area. This primarily includes Kerckhoff Reservoir and the PBR between Kerckhoff Dam and Millerton Lake. Potential 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 and operation activities.

The following Proposed Project components are assessed in this section for the potential to affect hydrology and water quality:

- FERC Project Boundary modifications
- Retirement of the K1 Powerhouse and associated facilities
- Modified/new Proposed Project infrastructure:
  - Upgrades to the Kerckhoff Dam radial gates

  - Installation of a new flow gage in the SJR Above Kerckhoff Reservoir Inflow Gage

- Implementation of the Proposed Project's monitoring plans and environmental management measures (PG&E 2023)

4.11.3.2 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on hydrology and water quality if it would:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality (HYD-1);
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin (HYD-2);
- 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 (HYD-3):
  - result in substantial erosion or siltation on- or off-site (HYD-3i);
  - substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site (HYD-3ii);
  - 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 (HYD-3iii); or
  - impede or redirect flood flows (HYD-3iv)
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation (HYD-4); or
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan (HYD-5)

4.11.3.3 Environmental Management Measures and Monitoring Plans

PG&E would implement environmental management measures and monitoring plans designed to protect, maintain, and enhance environmental, recreational, and cultural resources over the term of the new FERC license, which are included in the Second Supplemental FLA and described below. Under the Proposed Project, PG&E would continue to conduct routine maintenance activities at the Kerckhoff Hydroelectric Project facilities; some of which have been incorporated within the monitoring plans. PG&E's proposed environmental measures are documented in the following environmental measures and plans:

- Proposed Retirement Plan for K1 Powerhouse and Associated Facilities
- Minimum Instream Flows
- American Shad Spawning Season Flow Release Regime Measure
- Aquatic Resources Plan
- Water Temperature Measure
- End-of-Spill Flow Recession and Whitewater Flow Releases Measure (EOS Flow Measure)
- Subsequent Spill Ramp Down Measure
- Spill Season Flow Measure
- Planned Outage Measure (POM)
- Flow Notifications Measure
- SJR Above Kerckhoff Reservoir Inflow Gage Measure
- Modification of Infrastructure and Procedures Measure
- Wildlife Management Plan
- Vegetation Management and Pest Control Plan
- Project Road and Trail Maintenance Plan
- Recreation Management Plan
- Whitewater Notification and Access Measure

The plans and measures listed above that have the potential to impact or enhance hydrologic and water quality resources for the Proposed Project, Alternative 1, and Alternative 2 are discussed in further detail below.

4.11.3.3.1 Proposed Retirement Plan for K1 Powerhouse and Associated Facilities

The proposed activities associated with retiring the K1 Powerhouse include depressurizing and plugging the downstream portion of the K1 Tunnel, capping the K1 surge chamber, removing equipment structures at the K1 Headworks, capping the K1 Headworks, sealing the main shutoff and bypass valves of K1 Penstock No. 1 and No. 3, lining the K1 Powerhouse turbine pits with concrete or other suitable material, and sealing electrical connections in the K1 Powerhouse. PG&E will develop a detailed work plan, including BMPs, for retiring the K1 Powerhouse after issuance of the new FERC license. As of the release of this EIR, specific construction plans and BMPs have not been developed, but PG&E has provided general construction activities and general concrete amounts for the retirement activities. PG&E will consult with the State Water Board do develop the plan and appropriate BMPs.

4.11.3.3.2 Minimum Instream Flows

The current license requires PG&E to maintain a MIF of 25 cfs below the dam during normal WY and 15 cfs during dry WYs. The MIFs are provided through an approximately 75-foot-long, 18-inch-diameter instream flow pipe connected to the North Adit that originates from the K1 Tunnel. Water from the instream flow pipe is released into the SJR approximately 150 feet downstream of the dam. The goal of the MIFs is to maintain adequate flows in the PBR, protect aquatic habitat and water quality, and provide recreational opportunities. These MIF requirements would be carried forward in the Proposed Project under the Aquatic Resources Plan. The aquatic resource plan also includes fish monitoring and reporting, which can lead to adaptive management of operations to better protect aquatic species and resources.

4.11.3.3.3 American Shad Spawning Season Flow Release Regime Measure

From May 15 through June 30, under existing conditions, American shad spawning flows are provided through the K2 Powerhouse. Under the Proposed Project, these releases may be made at the K2 Tailrace or at Kerckhoff Dam. If spill flows at Kerckhoff Dam were greater than or equal to the required American shad spawning flow (400 cfs),

no additional releases would be required to be made to the PBR under the Proposed Project. The permanent spawning season flow release regime should be implemented each year as shown in Table 4.11-26.

Table 4.11-26: Flow Release Regime during American Shad Spawning Season

Timeframe	Millerton Lake Elevation	Time (hours)	Flow (cfs)	Release Location
May 15–June 30	Below 545 feet msl	10 p.m. to 2 a.m.	775 cfs	K2 Powerhouse
		Remaining hours	400 cfs	K2 Powerhouse or Kerckhoff Dam
	At/above 545 feet msl	10 p.m. to 2 a.m.	1,200 cfs	K2 Powerhouse
		Remaining hours	775 cfs or 400 cfs [40]	K2 Powerhouse or Kerckhoff Dam

cfs = cubic feet per second; msl = above mean sea level

4.11.3.3.4 Water Temperature Measure

The objective of the Water Temperature Measure is to manage water temperatures to support native species in the PBR and to provide information to support fish monitoring efforts. Implementation of the Water Temperature Measure would require PG&E from May 1 through October 31, to release a maximum flow up to 50 cfs to the PBR below Kerckhoff Dam to maintain a Maximum Weekly Average Temperature (MWAT) of less

[40] When the reservoir elevation is at or above 545 feet msl, the Applicant shall release from the K2 Powerhouse 1,200 cfs from 10 p.m. to 2 a.m. and 775 cfs during the remaining hours, or 400 cfs from the K1 Powerhouse.

than or equal to 25°C and ensure that the daily maximum water temperature remains less than or equal to 30°C, as measured at Gage J-7. Temperature criteria are rounded to the nearest whole degree Celsius. This environmental management measure replaces the water temperature criteria for smallmouth bass included in the 1980 agreement between the CDFW and PG&E.

4.11.3.3.5 End-of-Spill Flow Recession and Whitewater Flow Releases Measure

The EOS Flow Recession would be scheduled to occur between May 1 and August 31 of each year in conjunction with and immediately following the whitewater boating flow releases to the SJR below Kerckhoff Dam. The EOS Flow Recession would be scheduled annually by PG&E for the forecasted final flow recession from spill after flow is forecasted to decrease below 2,500 cfs. In non-spill years, the EOS Flow Recession would be scheduled based on the forecast of water availability. PG&E shall provide notification 10 days in advance of the planned EOS Flow Recession (as required under the Whitewater Notification and Access Measure). PG&E shall release water from Kerckhoff Dam to provide the whitewater boating flows, consisting of 2 days (9:00 a.m. to 6 p.m.) of whitewater boating flows with target flows of 2,500–2,000 cfs on the first day and 2,000–1,600 cfs on the second day, followed by a ramp down to MIF.

- Day 1 (9 a.m.) 2,500–2,000 cfs for minimum 9 hours
- Day 1 (6 p.m.) 2,000–1,600 cfs for minimum 24 hours
- Day 2 (6 p.m.) 1,600–1,200 cfs for minimum 10 hours
- Day 3 (4 a.m.) 1,200–800 cfs for minimum 5 hours
- Day 3 (9 a.m.) 800–600 cfs for minimum 5 hours
- Day 3 (2 p.m.) 600–400 cfs for minimum 5 hours
- Day 3 (7 p.m.) 400–200 cfs for minimum 5 hours
- Day 4 (12 a.m.) 200 cfs–MIF

4.11.3.3.6 Subsequent Spill Ramp Down Measure

PG&E's proposed Subsequent Spill Ramp Down Measure would be implemented each year from the conclusion of the EOS Flow Recession through October 31 in all WY

types, except during K2 Powerhouse outages. PG&E states the Subsequent Spill Ramp Down Measure is designed to reduce potential stranding for spills resulting from unexpected high flows originating upstream of the Proposed Project that may occur following the EOS Flow Recession. After the conclusion of the EOS Flow Recession, for daily average[41] flows exceeding 500 cfs, PG&E shall ramp down the declining limb of spills when daily average flow at PG&Es Gage J-2 declines below 1,600 cfs as shown in **Error! Reference source not found.**.

Step Schedule:

- Step 1: Maintain hourly average flow within a range of 1,600–1,200 cfs for 2 hours
- Step 2: Reduce the hourly average flow within a range of 1,200–800 cfs for 2 hours
- Step 3: Reduce the hourly average flow within a range of 800–600 cfs for 2 hours
- Step 4: Reduce the flow within a range of 600–400 cfs for 2 hours
- Step 5: Reduce the hourly average flow within a range of 400–200 cfs for 2 hours
- Step 6: Reduce the hourly average flow within a range of 200 cfs to minimum instream flow, or as close as feasible based on inflow to Kerckhoff Reservoir

4.11.3.3.7 Spill Season Flow Measure

The Spill Season Flow Measure manages spill recessions from March 1 through August 31 when the Kerckhoff Hydroelectric Project is in operation and not including K2 Powerhouse outages. The Spill Season Flow Measure is designed to provide the public with visual cues of water conditions when there is spill from Kerckhoff Dam. When spill flows measured at Gage J-2 are 500 cfs or more for at least 5 hours and the EOS Flow Recession Measure or the Subsequent Spill Ramp Down do not apply subject to sufficient water availability,[42] the Applicant shall release flows below Kerckhoff Dam as follows:

[41] Daily average flow calculated from midnight-to-midnight.

[42] Sufficient water availability is dependent on combined accessible volume of water from inflow, storage within the normal operating range, or current powerhouse diversions

Step Schedule:

- Step 1: Maintain a 500-cfs target hourly average flow (flow within a range of 600–400 cfs) for a minimum of 5 hours
- Step 2: After a minimum of 5 hours of releasing a target hourly average flow of 500 cfs (flow within a range of 600–400 cfs), reduce the flow to a target hourly average flow of 300 cfs (flow withing a range of 400-200 cfs) for a minimum of 5 hours
- Step 3: After a minimum of 5 hours of releasing the 300-cfs target hourly average flow (flow within a range of 400-200 cfs), reduce flow to the target hourly average flow range of 200 cfs

PG&E's Spill Season Flow Measure includes the following compliance caveats:

- If flow drops below a target flow range during a release under this measure, return the flow to that target flow range as soon as practical and continue the Spill Season Flow Measure until complete
- If average flow exceeds the flow range identified in the schedule, flow shall be returned, as soon as practical, to the original flow range for the step that was being implemented for at least the step duration specified in the schedule, then the ramp down would resume according to the schedule. If inflows continue to exceed the target flow resulting in a pause of the ramp down for more than 10 hours, the ramp down may be terminated and restarted if the triggering conditions are met subsequently

4.11.3.3.8 Planned Outage Measure

PG&E would implement the POM year-round when K2 Powerhouse is required to be taken offline and when flows below Kerckhoff Dam are expected to exceed an daily average of 500 cfs as measured at Gage J-2. PG&E would post signage at least one week prior to releases associated with planned outages and implementation of the three planned outage protocols that affect flow during the outage, based on calendar date. The three protocols—POM Ramp Up, POM Ramp Down, and POM Winter Ramp

Down—would tend to reduce flow fluctuations during the outage, and flows below Kerckhoff Dam would be stepped down to MIF following the outage as follows:

- **Initial Release Protocol**: PG&E would release the initial spill associated with an outage of the K2 Powerhouse prior to 3:30 a.m., subject to sufficient water availability[43]. If the release is not practical at this time, roving Kerckhoff Hydroelectric Project PG&E staff would alert people of the impending high flows in the areas of the trail to the BLM footbridge near the K1 Powerhouse and the trailhead to BLM's River Access Trail during daylight hours.
- **POM Ramp Up Protocol:** During planned outages of the K2 Powerhouse occurring from March 1 to October 31, this protocol would provide a two-step ramp up of flow. The POM Ramp Up would be in conjunction with the sounding of safety horns to signal to recreationalists that flows are increasing below Kerckhoff Dam
- **POM Ramp Down Protocol**: During planned outages from end of spill to October 31, following conclusion of flow releases below Kerckhoff Dam greater than an hourly average of 500 cfs, flows would be ramped down to benefit aquatic biota
- **POM Winter Ramp Down Protocol:** During planned outages from November 1 to February 28/29, following conclusion of flow releases below Kerckhoff Dam greater than an hourly average of 500 cfs, flows would be decreased to an hourly average target flow of 500 cfs for at least five hours, subject to water availability, to deter people from entering the river during intermittent periods of low flow and to benefit aquatic biota. When water availability would be insufficient to sustain a 500-cfs release, the flow below Kerckhoff Dam would ramp down to MIF in 5-hour steps

4.11.3.3.9 Flow Notifications Measure

The Flow Notification Measure provides notification requirements associated with deviations from mandatory condition flow requirements not covered by other requirements. The measure proposal states PG&E may implement planned temporary

[43] The initial spill would begin the previous night or early morning day hours of the next day so that spill arrives downstream near the K1 Powerhouse by approximately 8:30 a.m.

modifications of mandatory condition requirements if required by operating emergencies beyond the control of the Licensee after consultation with Resource Agencies.[44] For any unplanned deviation from MIFs, down ramping, up ramping, managed spills, and the POM requirements that last longer than three hours or results in visible environmental effects such as a fish kill, PG&E must notify the Resource Agencies within 24 hours or following business day, and the Commission within 14 days, and file a report as soon as possible, but no later than 30 days after each such incident. For unplanned deviations lasting three hours or less that do not result in visible environmental effects, PG&E must file an annual report, by March 1, describing each incident that occurred during the prior January 1 through December 31 time period.

4.11.3.3.10 San Joaquin River Above Kerckhoff Reservoir Inflow Gage Measure

As part of the Proposed Project, PG&E would install one new flow gage upstream of Kerckhoff Reservoir and downstream of SCE's Big Creek No. 4 Powerhouse (FERC Project No. 2017) within four years of license issuance. The gage would be operated to the standards of the United States Geological Survey (USGS) and data shall be made publicly available via the internet. Upon completion of installation and calibration of the new stream gage, PG&E would report to FERC that the gage is in operation and will comply with USGS standards. Once in operation, PG&E would submit mean daily flow data to the USGS annually.

4.11.3.3.11 Modification of Infrastructure and Procedures Measure

PG&E's proposed Modification of Infrastructure and Procedures Measure specifies that infrastructure upgrades to release structures and the installation of the new flow gage, as well as experimental testing and adjustment of new infrastructure, shall be completed prior to when PG&E needs to comply with the Proposed Flow Management Measures.[45]

[44] Resource agencies in this measure refer to the State Water Board, BLM, CDFW, and USFWS.

[45] The Flow Management Measures include the EOS Flow Recession Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and POM.

4.11.3.3.12 Wildlife Management Plan

The Proposed Project's Wildlife Management Plan includes protection, mitigation, and enhancement measures to minimize potential impacts on bald eagle, golden eagle, nesting birds, and special status bats during construction and operation of the Proposed Project, including routine and non-routine heavy maintenance activities and construction.

4.11.3.3.13 Vegetation Management and Pest Control Plan

The Vegetation Management and Pest Control Plan defines a framework to implement invasive weed and routine vegetation management, pest control, and fuels management to protect environmental and cultural resources during proposed construction and operation activities and describes measures for the protection of special status plants discovered in the future.

4.11.3.3.14 Project Road and Trail Maintenance Plan

The Project Road and Trail Maintenance Plan describes the management objectives and PM&E measures that would be implemented to maintain Kerckhoff Hydroelectric Project roads and trails to ensure safe access to facilities, to minimize erosion and sedimentation along the Proposed Project roads and trails, and to protect water quality and other resources during routine and non-routine maintenance activities.

4.11.3.3.15 Recreation Management Plan

PG&E's proposed Recreation Management Plan includes provisions for monitoring, performance standards, triggers for consultation, schedule and design criteria for maintaining recreational facilities included in the Proposed Project. The goals of the plan are to provide for public safety and Kerckhoff Hydroelectric Project security, manage recreation use of the Kerckhoff Hydroelectric Project recreation facilities over the term of the new license, and to minimize or eliminate Kerckhoff Hydroelectric Project-related effects on environmental and cultural resources. Proposed PM&E measures included in the plan are to operate and maintain Kerckhoff Hydroelectric Project recreation facilities, develop a day use facility near the K2 Powerhouse (i.e.,

Vista Day Use Area), decommission a trail near the K2 Powerhouse, install signage near the powerhouses, provide educational opportunities near Kerckhoff Hydroelectric Project infrastructure, and monitor recreation use.

4.11.3.3.16 Whitewater Notification and Access Measure

Under the Whitewater Notification and Access Measure, PG&E would provide advanced notification of the upcoming flow releases and escorted access through the Kerckhoff Dam operational footprint to PG&E's J-2 Stream Gage access trail on the two days of the whitewater boating flow releases. Access to the river channel would be at PG&E's J-2 Stream Gage location. Prior to the first scheduled flow release, PG&E would conduct a field assessment of the J-2 Stream Gage access trail to identify potential trail upgrades to improve conditions for whitewater boating access to SJR at Gage J-2, as needed. Trail improvements that could be determined necessary include widening the trail up to three feet, leveling trail cross-slopes, trimming vegetation encroaching on the trail, and installing handrail(s). Before implementing any improvements, PG&E would assess potential impacts on environmental resources, including water quality.

4.11.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, EOS Flow Recession Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and POM, which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were

designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*. As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the LTOR Boating Flows and Down Ramping of Spill Flows, which are implemented upstream of the Kerckhoff Hydroelectric Project by SCE's Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down-ramping operations with specific WY and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the PBR of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cfs for initial or subsequent spills in relation to the LTOR down ramping operation.

A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the PBR cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient[46] storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1

[46] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The State Water Board evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.11.4.1 Potential Impacts Related to Violation of Water Quality Standards or Waste Discharge Requirements or Surface or Groundwater Quality Degradation

Impact HYD-1: Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

4.11.4.1.1 Proposed Project

Construction

Construction activities for the Proposed Project include modifying and retiring the K1 Powerhouse and its associated facilities; installation of an inflow gage upstream of Kerckhoff Reservoir (SJR Above Kerckhoff Reservoir Inflow Gage Measure); upgrades to two manual radial gates on Kerckhoff Dam; construction of the Vista Day Use Area; and improving an existing trail segment, if needed, under the Whitewater Notification and Access Measure. Construction activities would require the mobilization and use of heavy equipment and materials, construction and worker vehicles, and staging materials for clearing, grading, surface preparation, and paving. There would be limited in-water work for the proposed construction activities.

Kerckhoff 1 Retirement and Modification Activities

Construction activities associated with the modifications to and retirement of the K1 Powerhouse include lining the turbine pits with concrete or other suitable material, closing the turbine shutoff valve with a water-tight plug, sealing the openings for electrical connections with foam-type filler or plywood, depressurizing and plugging the downstream portion of the K1 tunnel and north adit, capping the surge chamber, and sealing and securing the K1 Penstock No. 1 and No. 3 main shutoff bypass valves and the K1 Headworks. Any work near the shore of the SJR has the potential to produce erosion and sedimentation into the river. An accidental spill or release of construction materials, fuels, or oils could affect surface or groundwater quality. Construction plans for retiring the K1 Powerhouse and associated K1 facilities would be developed post-license; these plans would include BMPs for minimizing or avoiding effects of erosion, sedimentation, or soil instability on water quality.

PG&E has provided additional detail regarding the plugging of the K1 Tunnel.[47] The plug for the K1 Tunnel would be located downstream of the location of the tap for the minimum instream flow pipe and upstream of Adit 1. The specific location will be determined during preparation of the detailed engineering design. PG&E does not anticipate installing additional permanent infrastructure for the tunnel plug. Temporary infrastructure may be required during construction, but currently is not foreseen, As of July 2025, the maximum estimated volume of concrete required for the plugging is approximately 350 cubic yards. This estimate assumes a plug length of approximately 35 feet and a cross-sectional area of 289 square feet. Concrete work is planned to be performed under dry conditions to avoid release of wet materials. PG&E anticipates transporting wet concrete to the proposed tunnel plug construction site using a helicopter and concrete line pumps. PG&E anticipates the concrete transportation sequence to begin with the extraction of wet concrete from delivery trucks into a helicopter concrete bucket. From the delivery truck laydown area, the wet concrete would be moved by air and released into a concrete pump inlet near the North Adit entrance. The wet concrete would then be pumped and formed into place in the proposed plug location. A combination of helicopter and vessel transportation would be used to mobilize equipment and materials to the site. PG&E anticipates accessing the tunnel at the North Adit during construction.

In addition to water quality protection measures and the full development of detailed engineering design plans for the retirement or modification of K1 facilities, PG&E would obtain all applicable permits and approvals prior to construction. However, PG&E's Proposed Retirement Plan for K1 Powerhouse and Associated Facilities does not include specific construction activities, material or staff amounts, or BMPs for water quality protection. Without having a detailed K1 facility retirement and modification plan, understanding how construction activities could significantly violate any water quality standards or waste discharge requirements is unfeasible. As a result, the retirement and

[47] This additional information was provided in PG&E's July 16, 2025 application for a 401 water quality certification from the California State Water Resources Control Board.

modification activities proposed in PG&E's Retirement Plan for K1 Powerhouse and Associated Facilities have the potential to exceed SR/SJR Basin Plan water quality standards within the Proposed Project Area related to oils and greases, pH, turbidity, sediment, settleable materials, suspended materials.

Gate Upgrades

In order to comply with the proposed flow management measures, several upgrades at Kerckhoff Dam would be necessary including upgrading two manual radial gates to be automated, upgrading electronic communications, calibrating the gates, and adding a generator for backup power. This work would occur within four years of license issuance. These upgrades may require boat operation in Kerckhoff Reservoir and the use of a helicopter to transport personnel, materials, and equipment to the dam which leads to the potential for an accidental spill or release of fuels, lubricants, or oils that could exceed SR/SJR Basin Plan water quality standards within the Proposed Project Area related to oils and greases.

Inflow Gage

The SJR Above Kerckhoff Reservoir Inflow Gage Measure would require PG&E to install, calibrate, and operate a stream gage in the SJR upstream of Kerckhoff Reservoir and downstream of the Big Creek 4 Powerhouse within four years of license issuance. Installation of the flow gage would require limited in-water work that could temporarily disturb the stream bed and increase sediment levels. PG&E has not developed specific details in regard to the construction of the inflow gage and BMPs for this work would be developed post-license. As a result of this lack of detail, this in-water work has the potential to significantly impact SR/SJR Basin Plan water quality within the Proposed Project Area by exceeding water quality standards related to turbidity, oils and greases, sediment, and suspended material.

Vista Day Use Area

Construction of the Vista Day Use Area would involve developing paved road access and a delineated paved parking area for up to 20 vehicles; installing facilities, signage, fencing, gates, and vehicle control barriers; and reconstructing an approximately 470-

foot-long trail segment. This area has been previously disturbed and is greater than 600 feet from the SJR. Development of this area would involve ground disturbance in proximity to the SJR. The construction work would occur during Year four to six after license issuance. There would be no in-water work required for development of the Vista Day Use Area. As described in the Proposed Recreation Management Plan, prior to beginning construction, PG&E would consult with relevant resource agencies and develop a construction plan for the Vista Day Use Area; this would be completed post-license. The construction plan would include a description of the construction methods and equipment, access routes, schedule, measures to protect water quality, permits needed prior to construction, erosion and sediment control measures. Due to the distance of the Vista Day Use Area from the SJR, there would be a less than significant impact from construction activities on water quality within the Proposed Project Area.

Water Quality Objectives Potentially Impacted by Construction

Water Temperature

Under existing conditions, the maximum water temperatures recorded in 2019 in Kerckhoff Reservoir were approximately 18°C to 19.5°C in September. The daily mean temperature differed by less than 5°F (3°C) at the five sites upstream of Kerckhoff Dam monitored during the 2019 study.

At Gage J-2 downstream of Kerckhoff Dam, the water temperature reached its highest levels ranging from approximately 15°C to 20°C in mid-July through mid-September. The daily water temperatures at Gage J-7 and Site SJT-3 near the K1 Powerhouse were consistently warmer than at Gage J-2 downstream of Kerckhoff Dam. The water temperature near the K2 Powerhouse (Station SJT-4 and Station SJT-5) was cooler than near the K1 powerhouse. As stated previously in Table 4.11-16, the water quality standard for water temperature states that at no time or place will the temperature be increased more than 5°F above natural receiving water temperature. The daily mean water temperature upstream of Kerckhoff Dam (Site KRTMP-3) and downstream of the K2 Powerhouse (Station SJT-5) were nearly the same (±0.4°C or ±0.7°F) and differed by less than 5°F (Figure 7.3-7 in Supplemental FLA, PG&E 2023).

Erosion or sedimentation from in-water work related to the construction of the inflow gage has the potential to affect light levels and thus water temperatures, but based on the magnitude of construction required, no significant impacts are anticipated. Construction of the Vista Day Use Area and trail improvements would not impact water temperature as there is no in-water work required for these activities and both facilities are far enough from surface waters that a significant impact on water temperature is not anticipated.

Turbidity

Under existing conditions, turbidity within the reservoir and PBR is typically low at less than 5 NTU. As shown in Table 4.11-16, the SR/SJR Basin Plan states waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses, and that increases in turbidity attributable to controllable water quality factors will not exceed increases of 1 NTU where natural turbidity is 0 to 5 NTU.

Construction activities that have the potential to increase turbidity in the waters within the Proposed Project Area include any shoreline ground disturbance or in-water work such as construction work near Kerckhoff Dam and installation of the stream gage upstream of Kerckhoff Reservoir. The Proposed Project includes development of construction plans post-license issuance that would describe the control measures that would be implemented to protect water quality. Due to the lack of specific construction methods, equipment, materials, work areas, and BMPs, violations of water quality standards for turbidity have the potential to occur and cause a significant impact without mitigation.

Specific Conductivity

Under existing conditions, specific conductivity levels measured in Kerckhoff Reservoir and the PBR were low (less than 30 µS/cm). Similar to turbidity, construction activities that have the potential to temporarily increase specific conductivity would be ground disturbance that produced erosion or sedimentation into the water. Specifically, this

would include construction work near Kerckhoff Dam and installation of the stream gage upstream of Kerckhoff Reservoir.

pH

Under existing conditions, the pH in Kerckhoff Reservoir (KR-1, just upstream of Kerckhoff Dam) was 7.2 on June 5, 2019, and ranged from 6.1 to 6.3 on September 4, 2019. At site SJRBR1 (just upstream of K1 Powerhouse), pH was 7.0 on June 5 and was 6.8 on September 4. At Site SJRBR 3 (just downstream of K2 Powerhouse, pH was 7.0 on June 5. pH was 6.0 on September 4. As shown in Table 4.11-16, the SR/SJR Basin Plan states that pH should not be depressed below 6.5 nor raised above 8.5. Under baseline conditions, pH was occasionally below the SR/SJR Basin Plan objective below the K2 Powerhouse.

Construction activities that could impact pH include plugging the K1 turbine pits or K1 Tunnel with concrete (or other suitable material) which could increase pH if surface waters contact fresh or uncured cement. Further, any in-water work resulting in disturbance to the stream bed (e.g., installation of the stream gage) may increase sedimentation which has the potential to alter pH levels and violate surface water quality standards.

Oil and Grease

The SR/SJR Basin Plan objective for oil and grease states that waters will 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. Construction activities involving work near or in Kerckhoff Reservoir, such as the radial gate upgrades, or in the SJR, such as installing a stream gage and sealing electrical connections, the K1 tunnel, and the K1 penstocks, have the potential to significantly impact surface or groundwater quality through an accidental spill or release of sealants, oils, or grease used for equipment operation. Further, boat operation in Kerckhoff Reservoir is needed to transport workers, equipment, and materials to Kerckhoff Dam which increases the potential risk

of a fuel spill into the water. Alternatively, a helicopter may be used to transport material to the K1 Tunnel. Any spill or release would increase oil and grease levels in the water above existing conditions and potentially result in violations of SR/SJR Basin Plan water quality standards.

E. coli

Under existing conditions, *E. coli* levels in Kerckhoff Reservoir and the SJR in 2019 ranged from a geometric mean of 2.4 MPN/100 mL to 13.1 MPN/100 ML. These levels met the State Water Board 2019 Bacteria Provisions of a geometric mean *E. coli* not to exceed 100 MPN 100 mL, calculated weekly, and a STV of 320 MPN/100 mL not to be exceeded by more than 10 percent of the samples collected in a calendar month. The State Water Board 2019 Bacteria Provisions supersede the bacterial water quality objective listed in the SR/SJR Basin Plan. Construction activities would not have an impact on *E. coli* in Kerckhoff Reservoir or the SJR.

Sediment, Settleable Materials, and Suspended Materials

Under existing conditions, total dissolved solids and total suspended solids are low. The SR/SJR Basin Plan objectives for sediment, settleable material, and suspended material are narrative objectives and state that waters will not contain levels or concentrations of these parameters that cause nuisance or adversely affect beneficial uses.

Construction activities that could cause erosion, sedimentation, or disturbance of the shoreline or stream bed could impact levels of sediment and settleable or suspended materials in Kerckhoff Reservoir or in the SJR. These activities include installation of a stream gage upstream of the reservoir and modifying and retiring the K1 powerhouse. Construction activities, such as clearing and grading (e.g., during site preparation), can cause dust, localized erosion, sedimentation, and increased runoff. As a result, gravel, sediment, and vegetation, could enter the surface water and cause violations of SR/SJR Basin Plan objectives.

Impact Analysis without Mitigation

Potential impacts, as described in potential impact HYD-1, to water quality, specifically, pH, turbidity, oil and grease, sediment, settleable materials, and suspended materials from construction activities under the Proposed Project's would be potentially significant due to the current lack of construction activity details and best management practices (BMPs). Therefore, there would be a **Potentially Significant Impact** as a result of construction activities under the Proposed Project for potential impact HYD-1.

Impact Analysis with Mitigation

To reduce the potentially significant impacts, Mitigation Measures WQ-1 through WQ-3 were developed to mitigate potential impacts to water quality and beneficial uses within the SR/SJR Basin Plan to a less than significant level. Mitigation Measures WQ-1 and WQ-2 require the development of plans for activities associated with retirement or modification activities associated with the K1 Powerhouse, as well as for the construction of the inflow gage. These plans would provide detailed descriptions of construction activities and reduce potentially significant impacts through the development and implementation of BMPs for the protection of water quality during these construction activities. BMPs would address water quality parameters such as turbidity, oil and greases, pH, sediment, settleable and suspended material.

Under Mitigation Measure WQ-3, when applicable, PG&E would comply with the Construction General Permit (CGP) in order to regulate stormwater discharges from construction sites to minimize the potential mobilization and discharge of pollutants into waterbodies or watersheds. If an activity is not covered under the CGP, but has the potential to impact water quality, PG&E would develop a site-specific Water Quality Monitoring and Protection Plan (WQMP) under Mitigation Measure WQ-3. The WQMP would reduce potential impacts to water quality by identifying and implementing control measures for construction, maintenance, or other activities with the potential to cause erosion, stream sedimentation, fugitive dust, soil mass movement, release of hazardous materials, or other water quality impairment.

Mitigation Measure WQ-3 also requires the development of a dewatering plan for activities involving in-water work or a water diversion. Mitigation Measure WQ-3 would reduce potential impacts by requiring the development of measures that would be implemented to maintain compliance with water quality standards in the SR/SJR Basin Plan during dewatering activities (e.g., turbidity, sediment, settleable and suspended materials) and beneficial uses for applicable activities.

Therefore, there would be a **Less than Significant Impact with Mitigation Incorporated** on water quality standards or waste discharge requirements that would otherwise substantially degrade surface or groundwater quality with incorporation of Mitigation Measures WQ-1, WQ-2, and WQ-3 as a result of construction activities under the Proposed Project for potential impact HYD-1.

Operations

Proposed Project operation activities include power generation, implementation of flow management measures and minimum flows, implementation of environmental management measures, routine inspections and maintenance of Kerckhoff Hydroelectric Project facilities, including recreation areas, and planned outages.

Under the Proposed Project less insulating oil would be stored on site due to retirement of the K1 Powerhouse which would reduce the potential of an accidental release into surface waters. The amount of other fuels, lubricating fluids, and hydraulic fluid would be approximately the same under the Proposed Project and of the same quality. These would be transported, stored, used, and disposed of in accordance with relevant regulations and hazardous substance control and emergency response procedures in the current Hazardous Materials Business Plans (HMBP) for the K1 Powerhouse and the K2 Powerhouse.

Implementation of the flow management measures would produce additional flow releases to the PBR for whitewater boating, ramping down of spills to MIFs, and reduce potential fish stranding following unexpected high flow or spill episodes as compared to baseline conditions. The EOS Flow Recession Measure would increase flows in the PBR for two days when whitewater flows are provided and for two days as flows are

ramped down. The release of water may cause an initial impact on water quality (i.e., increase in turbidity or suspended material) in the PBR, however the beginning step of the down ramp is within normal flow ranges seen below Kerckhoff Dam under baseline conditions. The proposed EOS Flow Recession ramp down would provide a gradual ramp down at the end of the projected spill season. Other flow management measures such as the Spill Season Flow Measure, Subsequent Spill Ramp Down Measure, and the POM also contain flow steps that are within normal flow ranges seen below Kerckhoff Dam under baseline conditions.

Routine maintenance activities during operation would include vegetation management, pest control, recreation site management, and road and trial maintenance. Each of these activities would involve vehicle use of roads and trails and equipment which may require the use of fuels, grease, or oils. In order to avoid or minimize impacts on water quality during routine inspections and maintenance, PG&E would implement the following environmental management measures: Wildlife Management Plan, Vegetation Management and Pest Control, Project Road and Trail Maintenance Plan, Recreation Management Plan.

Vegetation management and pest control have the potential to affect water quality. Implementation of the Vegetation Management and Pest Control Plan (VMPCP) would avoid or minimize impacts to water quality. The VMPCP measures include:

- Appropriate application methods would be employed that follow state and federal regulations to avoid effects on water quality. Only aquatic-safe herbicides would be allowed within 50 feet of aquatic habitats to prevent runoff or drift of chemicals into the watershed
- Applications would be infrequent (typically a few times per year) and would target vegetation within defined areas around Proposed Project facilities and select invasive weed populations within the Proposed Project Area
- Herbicides would be applied under the supervision of a certified Pesticide Control Advisor (PCA) and would follow applicable Pesticide Use Permits (PUP) and Pest Control Recommendations (PCR)

- At the Vista Day Use Area, adherence to BLM regulations would require that no chemicals are applied directly into or within 100 feet of perennial streams or channels with beneficial use(s) recognized by the State

Impacts on water quality from implementation of the VMPCP would be less than significant.

A goal of the Recreation Management Plan is to minimize the effects of recreation use at Proposed Project facilities on environmental resources, including water quality. PG&E proposes to operate and maintain the developed Proposed Project recreation facilities, minimize damage to resources, and monitor use to detect and address impacts of recreation use on environmental resources. Potential impacts to surface water or groundwater quality could occur during facility cleaning, amenity repair, or maintaining or repairing the potable water or septic systems if a spill or release of fuels, lubricants, greases, or oil were to occur. PG&E would be responsible for heavy maintenance of the Vista Day Use Area which would include the access road, repairing amenities, replacing broken parts or fixtures, clearing or grading trails and walkways, and repairing pavement. PG&E would not be responsible for routine maintenance (e.g., painting, minor repairs, cleaning, trimming vegetation); this responsibility would be transferred to the BLM.

A component of the Recreation Management Plan is to evaluate and identify potential shoreline boat access areas to Kerckhoff Reservoir and the dispersed day use area. If a suitable shoreline access site to the reservoir is identified, PG&E would conduct vegetation clearing and other necessary work (e.g., install signage) which could have a temporary impact on water quality. Developing shoreline boat access at the dispersed day use area may involve providing one unsurfaced area for launching a boat and installing vehicle control barriers. PG&E would regularly monitor recreation use and has proposed the following measures to address resource impacts of Proposed Project recreation use, including water quality:

- Identify and implement appropriate best management practices and avoidance and minimization measures that may be necessary to protect water quality;

- Manage drainage by installing and maintaining erosion control features such as culverts, drains, ditches, and water bars as needed;
- Manage vegetation, including weed removal, as needed;
- Remove debris, as needed;
- Maintain surfaces by grading and placing aggregate fill in undeveloped areas, as needed;
- Identify necessary permits, as appropriate, in consultation with the resource agencies, with consideration to the type of the work to be completed and the location of the work; and
- Review and incorporate measures contained in other resource management plans (e.g., Historic Properties Management Plan), including new plans that may be developed or existing plans that may be revised during the license term, into any actions taken to address Proposed Project recreation use effects

Implementation of the practices listed above would result in a less than significant impact on water quality during operation and maintenance of Proposed Project recreation facilities.

Goals of the Project Roads and Trails Plan include to minimize erosion and sedimentation along roads and trails and to protect water quality during routine and non-routine maintenance activities. Properly maintained roads and trails reduce the potential for erosion and sedimentation. As described in the Proposed Project's Project Road and Trail Maintenance Plan (PG&E 2023), routine road and trail maintenance would be implemented in accordance with existing PG&E maintenance programs; therefore, ongoing maintenance is not expected to cause new potential impacts on water quality.

The J-2 Stream Gage Trail has the potential to be improved based on a PG&E field assessment under the Whitewater Notification and Access Measure. Water quality impacts from these improvements have the potential to occur via widening, leveling, or clearing the trail if it were to occur near surface waters. However, a majority of the J-2 Stream Gage Trail is over 100 feet from the SJR, and the proposed improvements

would be submitted to BLM for review and comment and to FERC for approval prior to implementation of trail improvement activities.

PG&E would initiate consultation with the appropriate agencies, such as the BLM and USFS Sierra National Forest, and landowners about non-routine maintenance activities having the potential to cause erosion or other potential impacts on soils. Such consultation would include reviewing measures to protect resources and implementing BMPs as required for work on BLM lands. BMPs would include measures to protect against potential soil instability, erosion, and sedimentation as a result of non-routine maintenance activities. In addition, as applicable, resource agency permits and approvals would be obtained prior to implementation of non-routine maintenance activities. Impacts on water quality from implementation of the Project Roads and Trails Plan would be less than significant.

Water Temperature

Under the Proposed Project, water levels in Kerckhoff Reservoir would remain the same, and water residence time in the reservoir is not expected to change. The minimum reservoir operation elevation for the K2 Powerhouse would remain at 980 feet msl, the normal operating range would remain between 980 – 984.5 feet msl, and inflows from upstream hydroelectric projects are not anticipated to vary substantially from existing conditions. As a result, operation of the Proposed Project would not significantly impact water temperatures in the reservoir.

Implementation of the Flow Management measures would provide additional flow releases to the PBR. These releases would be unlikely to cause violations of water temperature objectives because additional flow in the PBR would likely cause temperatures to decrease relative to the baseline condition.

The proposed American Shad Spawning Season Flow Release Regime Measure has been slightly modified from the existing FERC license article 45. The modification allows PG&E to release flows from Kerckhoff Dam if Millerton Lake reservoir elevation levels are above 545 msl. The source of water for the American Shad spawning flows has the potential to affect water temperature. If the spill flows greater than 400 cfs come from

Kerckhoff Dam, then no additional releases would be needed, and there would be little to no change in water temperature. If flows originate from Kerckhoff Dam during a non-spill period, the cooler reservoir water could decrease water temperatures in the PBR. However, the same amount of water under this measure would be released downstream of Kerckhoff Dam under the Proposed Project, reflecting consistency with baseline conditions.

Implementation of the Water Temperature Measure is intended to maintain water temperatures at a suitable level to protect native species in the PBR. If the MWAT were to increase above 25°C or the daily maximum water temperature were to increase above 30°C, additional flow would be provided to reduce the water temperature. These water temperature criteria would replace the existing temperature criteria that were designed to benefit smallmouth bass, which were several degrees C higher. The water temperature criterion for additional releases under the existing license was established in the 1980 Fisheries Agreement between PG&E and CDFG (now CDFW). CDFW indicated that the water temperature criterion to support smallmouth bass was selected, in part, because it was expected to be protective of native fish species as well. However, comments filed by CDFW and USFWS advocated to shift the temperature criterion to be more protective of native species, such as hardhead (CDFW 2025; USFWS 2020). As a result, PG&E developed the new temperature criterion for additional releases in the Water Temperature Measure to be more protective of native species.

Operation of the Proposed Project is not anticipated to have an adverse impact on water temperature in Kerckhoff Reservoir or the PBR as compared with baseline conditions.

Turbidity

Under existing conditions, SR/SJR Basin Plan objectives for turbidity are met. Under operation of the Proposed Project, fluctuations of Kerckhoff Reservoir would remain within the baseline operation band (980.0 feet to 984.5 feet msl); thus, reservoir

fluctuations would not be expected to impact erosion and subsequent turbidity levels in the water beyond current conditions.

Maintenance activities that may impact turbidity in Kerckhoff Reservoir or the PBR include use of existing roads and trails; recreation site maintenance; repairs to structures on the dam, tunnels, or penstocks; maintenance of the instream flow gage; and boat operation to access the dam. Additional flow releases to the PBR during implementation of the Flow Management Measures may cause a temporary increase in turbidity but are not expected to result in significant impacts or exceedances as compared with baseline conditions. Implementation of the Project Road and Trails Plan includes measures to minimize erosion and sedimentation along facility roads and trails and protect water quality and other resources. Further, implementation of the Recreation Management Plan includes measures to develop BMPs prior to maintenance work, such as erosion and sediment control and vegetation management, to protect water quality.

Oil and Grease

Impacts on oil and grease in Kerckhoff Reservoir or the PBR during operation and maintenance activities would occur if there was an accidental spill, leak, or release of fuels, oils, lubricants, or sealants at Proposed Project facilities, along roads or trails, or at recreation sites near the shoreline. PG&E would continue to implement the Hazardous Materials Business Plans for the K1 and K2 Powerhouse under the Proposed Project. These plans specify the hazardous materials on site, the control barriers, the containment and cleanup provisions, notification protocols, and employee training requirements. Implementation of the HBMPs would minimize or avoid a significant impact on water quality, however, there is potential for a impact if a spill or leak were to occur.

E. coli

Operation of Proposed Project recreation sites with vault toilets, such as the Smalley Cove Recreation Area and the Vista Day Use Area, or the septic system at the host site in Smalley Cove campground have the potential to impact *E. coli* levels in water from an

unanticipated malfunction or break in the system or from a leak or spill during routine maintenance. PG&E would conduct routine maintenance at the Smalley Cove Recreation Area which would likely prevent any large leaks or spills into the water; however, the potential for a leak would remain.

Sediment, Settleable Materials, and Suspended Materials

Activities with the potential to cause erosion or sedimentation into Kerckhoff Reservoir or the PBR could impact the levels of sediment, settleable materials, and suspended sediments. These activities include use of roads and trails, boat launching, recreation site maintenance, and sediment management. PG&E infrequently removes sediment from the reservoir or flushes sediment downstream through the use of the LLOs. PG&E would continue to follow the provisions of existing License Article 45 to provide releases, as necessary, to flush sediments downstream, and would continue to consult with the resource agencies prior to any sediment removal or flushing. The flushing of sediments downstream would potentially cause a temporary increase in turbidity or the level of suspended materials in the PBR above the levels specified in the SR/SJR Basin Plan objectives and result in a potentially significant impact.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** as a result of operational activities under the Proposed Project for potential impact HYD-1.

Impact Analysis with Mitigation

To reduce the potentially significant impacts, Mitigation Measure WQ-4 was developed to mitigate impacts to water quality and beneficial uses within the SR/SJR Basin Plan to a less than significant level during operation activities. Mitigation Measure WQ-4 would require PG&E to develop a low level outlet sediment sluicing management plan to reduce the potentially significant impacts related to turbidity levels in the SJR during sediment sluicing activities. This would reduce the impact by requiring PG&E to estimate the amount of sediment passed and to monitor water quality immediately downstream of the Kerckhoff Dam during sediment sluicing operations to ensure compliance with SR/SJR Basin Plan water quality objectives. As a result, there would

be a less than significant impact on turbidity water quality standards with incorporation of Mitigation Measure WQ-4.

Therefore, there would be a **Less than Significant Impact** on water quality standards or waste discharge requirements that would otherwise substantially degrade surface or groundwater quality with incorporation of Mitigation Measure WQ-4 as a result of operational activities under the Proposed Project for potential impact HYD-1.

Mitigation Measures

Mitigation Measure WQ-1: Retirement Plan for Kerckhoff 1 Powerhouse and Associated Facilities

No later than 3 years following license issuance, and at least 12 months in advance of the proposed start of K1 retirement activities, PG&E shall develop and submit a Supplemental K1 Powerhouse Retirement Plan to the Deputy Director for review and consideration for approval. Implementation of the plan will ensure retirement activities, modification activities, and post-site conditions protect water quality and beneficial uses. At a minimum, the Supplemental K1 Powerhouse Retirement Plan shall include the following:

- An overview of the Proposed Project retirement or modification activities, which may include maps, that will be implemented
- Timeframe(s) with specific milestones for retirement and modification activities discussed in the April 2023 supplemental filling in support of the Final License Application of each Proposed Project facility
- Technical specifications for retirement or modification activities for the K1 Powerhouse and its associated facilities. At a minimum, these shall include:
  - Descriptions of site conditions
  - Location (coordinates) of retirement or modification-related activities
  - A plan for the transportation, usage, storage, and production of concrete for K1 retirement or modification activities (e.g., K1 Tunnel plug)
  - If additional infrastructure would be needed to install the K1 Tunnel plug

- Identification of heavy equipment that will be used for retirement or modification activities
- Identification of material amounts for each retirement or modification activity (e.g., concrete, fuels, and lubricants), their storage locations, and containment measures
- BMPs to protect water quality during and following construction activities shall ensure compliance with the Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin (SR/SJR Basin Plan) (Central Valley Regional Water Board 2019) and any amendments hereto, including following water quality objectives below:

    - Where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2
    - Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU
    - For surface waterbodies outside the legal boundaries of the Delta, the monthly median of the mean daily dissolved oxygen (DO) concentration shall not fall below 85 percent of saturation in the main water mass, and the 95th percentile concentration shall not fall below 75 percent of saturation. The DO concentrations shall not be reduced below the following minimum levels at any time:

        - Waters designated WARM 5.0 mg/L
        - Waters designated COLD 7.0 mg/L
        - Waters designated SPWN 7.0 mg/L

    - The pH shall not be depressed below 6.5 nor raised above 8.5
    - 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

- Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses

Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses

Mitigation Measure WQ-2: San Joaquin River Above Kerckhoff Reservoir Inflow Gage Plan

PG&E shall develop and implement a plan in consultation with BLM, USFS, CDFW, USFWS, and other interested parties to implement the SJR Above Kerckhoff Reservoir Inflow Gage Measure with the following additions:

- Descriptions of site conditions
- Location (coordinates) of the new gage and associated activities
- A gage installation schedule and proposed construction activities
- Water quality protection measures, environmental avoidance measures and BMPs to be implemented during construction, installation, operation, and maintenance of the gage shall ensure compliance with the SR/SJR Basin Plan and any amendments hereto, including following water quality objectives below:
  - Turbidity:
    - Where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2
    - Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU
    - Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent
  - pH
    - The pH shall not be depressed below 6.5 nor raised above 8.5
  - Dissolved Oxygen

- For surface waterbodies outside the legal boundaries of the Delta, the monthly median of the mean daily DO concentration shall not fall below 85 percent of saturation in the main water mass, and the 95th percentile concentration shall not fall below 75 percent of saturation. The DO concentrations shall not be reduced below the following minimum levels at any time:
  - Waters designated WARM 5.0 mg/L
  - Waters designated COLD 7.0 mg/L
  - Waters designated SPWN 7.0 mg/L

- Oils and Greases
  - 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

- Sediment
  - The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses

- Suspended Material
  - Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

- Settleable Materials
  - Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses

Mitigation Measure WQ-3: Construction General Permit, WQMP, and Dewatering Plans

When applicable, PG&E shall comply with the State Water Board's National Pollutant Discharge Elimination System (NPDES) *General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit)[48] (State Water Board 2022), *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* (Dredge or Fill Procedures) (State Water Board 2019b, 2021), and amendments thereto the aforementioned documents to protect water quality standards and beneficial uses identified in the SR/SJR Basin Plan (Central Valley Regional Water Board 2019) during construction activities.

For construction and maintenance activities with the potential to impact water quality standards or beneficial uses identified in the SR/SJR Basin Plan that are not subject to the Construction General Permit, or a condition of the Kerckhoff Hydroelectric Project FERC license, PG&E shall prepare and implement site-specific Water Quality Monitoring and Protection Plans (WQMP Plans). At a minimum, the WQMP Plan shall include the following:

- Description of site conditions and the proposed activity
- Detailed descriptions, design drawings, and specific topographic locations of all control measures in relation to the proposed activity
- Measures to address other potential water quality impairments associated with the proposed activity
- A monitoring program to assess Proposed Project impacts to water quality, including quality assurance/quality control measures that will be implemented

[48] State Water Board Order WQ 2022-0057-DWQ and National Pollutant Discharge Elimination System No. CAS000002, and any amendments thereto. Available at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction/general_permit_reissuance.html

- Water quality monitoring locations for each Proposed Project activity, including background monitoring locations as applicable
- A list of parameters that will be monitored, including sampling types and sampling frequency
- A reporting schedule for water quality data and the response and reporting associated with any water quality objective exceedances

Prior to commencing any planned work that requires a water diversion or in-water work, PG&E shall submit a Dewatering and Diversion Plan to the Deputy Director for review and consideration of approval. The Dewatering and Diversion Plan shall be submitted at least 60 days before the anticipated activity is expected to occur. The Deputy Director may require modifications as part of any approval. PG&E shall not implement any activities associated with the Dewatering and Diversion Plan that may impact water quality or beneficial uses until receipt of Deputy Director and any other required approvals. For planned work that involves any instream dewatering, diversion of water, or in-water work, PG&E shall include the following:

- An overview of all in-water work that will require dewatering or diversion of water
- Timeframe(s) for required dewatering or diversion work
- Description of coffer dams or equivalent barriers that will be used to isolate the construction area from instream flows
- Description of measures, if needed, that will be implemented to avoid potential fish stranding and entrainment
- Provisions to maintain required minimum instream flows (MIFs). If temporary modification of MIFs are required, PG&E shall provide a written description of the modification, reason(s) for its necessity, measures that will be implemented to protect water quality and beneficial uses, and the proposed timeline for modification and return to the required MIFs
- Proposed monitoring and reporting related to the dewatering, diversion, and turbidity of water
- Description of how, upon completion of construction activities, flow will resume with the least disturbance to the substrate, water quality, and beneficial uses as practical

Planned activities shall not cause increased turbidity greater than allowable levels identified in the SR/SJR Basin Plan and amendments thereto.

- Where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2
- Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU
- Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent

In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

If turbidity exceedances are expected to result from sediment disturbance related to planned work activities despite implementation of all reasonable best management practices, PG&E shall consult with the State Water Board and Central Valley Regional Water Quality Control Board (Central Valley Regional Water Board) staff to determine an allowable zone of dilution in which turbidity in excess of the limits may be allowed.

Mitigation Measure WQ-4: A Low-Level Outlet (LLO) Sediment Sluicing Management Plan

PG&E shall develop and implement a low-level outlet (LLO) sediment sluicing management plan for those cases for which the LLOs are specifically operated for sediment sluicing. For other cases, the plan shall not apply. The plan shall be developed in consultation with the State Water Board, CDFW, and BLM. The LLO sediment sluicing management plan shall at a minimum include the following to ensure turbidity water quality standards are not violated during sediment sluicing activities:

- Defining and quantifying the terms “excessive sediment deposition” and “need to flush sediment” within Kerckhoff Reservoir within the context of enacting LLO sediment flushing measures

- A plan to estimate the amount of sediment passed through the outlet and monitor water quality immediately downstream of the Kerckhoff Dam, including collecting turbidity and DO during sediment sluicing operations to ensure compliance with the SR/SJR Basin Plan (Central Valley Regional Water Board 2019) and any amendments hereto including the following water quality objectives:
  - Turbidity
    - Where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2
    - Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU
    - Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent
    - In determining compliance with the above limits, as measured at Gage J-2, appropriate averaging periods may be applied provided that beneficial uses will be fully protected
  - Dissolved Oxygen
    - For surface waterbodies outside the legal boundaries of the Delta, the monthly median of the mean daily DO concentration shall not fall below 85 percent of saturation in the main water mass, and the 95th percentile concentration shall not fall below 75 percent of saturation. The DO concentrations shall not be reduced below the following minimum levels at any time:
      - Waters designated WARM 5.0 mg/L
      - Waters designated COLD 7.0 mg/L
      - Waters designated SPWN 7.0 mg/L
  - Sediment

- The suspended sediment load and suspended sediment discharge rate of surface waters 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

    - Identifying the method and magnitude of LLO operations for the purposes of flushing sediment that has accumulated within Kerckhoff Reservoir that will meet water quality objectives as described above

Level of Significance

Less than Significant Impact with Mitigation Incorporated

4.11.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 would not change any construction activities included under the Proposed Project as described in Section 4.11.4.1.1 for potential impact HYD-1.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** as a result of construction activities under Alternative 1 for potential impact HYD-1.

Impact Analysis with Mitigation

To reduce the potentially significant impacts, Mitigation Measures WQ-1 to WQ-3 were developed to mitigate impacts to water quality and beneficial uses within the SR/SJR Basin Plan to a less than significant level. Mitigation Measures WQ-1 and WQ-2 require the development of plans and BMPs for activities associated with retirement or modification activities associated with the K1 Powerhouse, as well as for the construction of the inflow gage. Under Mitigation Measure WQ-3, when applicable, PG&E would comply with the Construction General Permit (CGP) in order to regulate stormwater discharges from construction sites to minimize the potential mobilization and discharge of pollutants into waterbodies or watersheds. Mitigation Measure WQ-3 also requires the development of a dewatering plan for activities involving in-water work or a water diversion. These requirements would ensure protection of water quality and associated beneficial uses.

Therefore, there would be a **Less than Significant Impact** on water quality standards or waste discharge requirements that would otherwise substantially degrade surface or groundwater quality with incorporation of Mitigation Measures WQ-1, WQ-2, and WQ-3 as a result of construction activities under Alternative 1 for potential impact HYD-1**.**

Operation

The only changes to operation under Alternative 1 are the full or partial replacement of flow measures included in the Proposed Project. Potential impacts to water quality associated with facility inspections and maintenance, recreation site management, vegetation management or pest control, or road and trail use would be the same as described in Section 4.11.4.1.1.

As described above and in Section 3.0 *Alternatives Description*, Alternative 1 replaces PG&E's proposed EOS Flow Recession Measure, the Subsequent Spill Ramp Down Measure, and replaces the down ramping components of the proposed Spill Season Flow Measure with LTOR.

Spill Year Schedule Boating Flows and Down Ramping of Spill Flows

Under the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure, PG&E would ramp down flows between May 1 through August 31 in the PBR after SCE has identified when down ramping of spill flows at Big Creek 4's Dam No. 7 will start. Standard down ramping for end of spills are determined by the WY Schedules, A, B (low storage), B (high storage), C, or D.

Based on the alternative modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure was modeled successfully and gradually ramped down flows within the PBR, while keeping the reservoir within the normal operating range (980.0 feet to 984.5 feet msl), However it was only able to do so under infeasible operational practices due to drawing down Kerckhoff Reservoir toward the minimum operating elevation for the K2 Powerhouse in the model (981.5 feet msl.). As the reservoir approaches the K2 Powerhouse's minimum operating reservoir elevation, the K2 Powerhouse cycles above and below the ROZ in an attempt to keep the reservoir high enough to stay above the minimum operating elevation for the K2 Powerhouse. The K2 Powerhouse cycling frequency is anywhere from half an hour to two hours, which represents an unrealistic operating scenario. Based on the documented operational constraints, any operation that requires K2 to dwell in the ROZ is considered infeasible due to excessive cavitation and vibration impacts and the associated maintenance and outage consequences. That means operating strategies that would require repeated short interval oscillations across the ROZ are not considered feasible, because they can increase cycling wear and raise reliability/maintenance risk even if each individual crossing is brief (personal email communication, J. Hartman and C. McCormick, March 5, 2026).

The down ramping operations of the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure A-D Schedules consistently drew down the reservoir toward the minimum operating elevation of the K2 Powerhouse. Reservoir drawdowns have the potential to increase turbidity within the reservoir by exposing saturated sediments along the shoreline and potentially resuspends settled solids from the

lakebed. However, the drawdown would not exceed the minimum level of the normal operating range of the reservoir (980 feet msl) and thus would not be anticipated to cause impacts to turbidity levels within Kerckhoff Reservoir that would exceed those observed under baseline conditions.

Although the modeling described above showed this component of Alternative 1 to be infeasible, implementing the Spill Year Schedule Boating Flows and Down-Ramping of Spill Flows Measure would result in a less than significant impact compared with baseline for potential impact HYD-1. Ultimately, as described in the modeling report (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), implementation of the Spill Year Schedule Boating Flows and Down-Ramping of Spill Flows Measure was deemed as infeasible as a result of over-cycling of the powerhouse through the ROZ and the necessity for rapid operational changes that may not be foreseeable to a reservoir operator not aware of upstream non-project operations. Therefore, if the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure were implemented, there would be a **Less than Significant Impact** for potential impact HYD-1.

Non-Spill Year Boating Flows and Down Ramping

The Non-Spill Year Boating Flows and Down Ramping schedule would be attempted every weekend from May 15 to June 15 of non-spill years. The Non-Spill Year Boating Flows and Down Ramping would be scheduled based on PG&E's forecast of water availability. Modeling of the Non-Spill Year Boating Flows and Ramp Down Measure found that its feasibility was primarily dependent on the volume of inflows coming into Kerckhoff Reservoir during the weekends. Modeling efforts showed that inflow is too low during the summer months in non-spill years to sustain this schedule. Of the 28 modeled times this was implemented in the period of record (over 6 non-spill years), only 28.6 percent of the time did it produce adequate boating flows.

Implementation of these down ramping operations and additional boating flows would provide more scheduled releases into the PBR for limited amounts of time which has the potential to increase turbidity or sediment transport in the PBR. However, gradual

ramp downs generally do not cause additional turbidity and sedimentation related impacts as it provides a smoother transition from high to lows flows compared to baseline conditions. In addition, the SJR in the PBR was dominated by boulder-size material, with frequent bedrock outcroppings exposed along the channel bed. Boulders ranged in size from small boulders (256 millimeters [mm] to 512 mm) to very large boulders (512 mm to 4,096 mm) at any given location. These large boulders are typically less susceptible to erosive forces and likely would not result in significant potential increases in turbidity within the PBR.

Therefore, the Non-Spill Year and Down Ramping Measure would have a **Less than Significant Impact** as a result of operations under Alternative 1 for potential impact HYD-1.

Stranding Protection Down Ramp Measure

The Stranding Protection Down Ramping Measure covers initial and subsequent spills between May 1 and August 31. In other words, the spill year ramp down schedules (AB, BC, D) are reserved for the large spill events in each spill season, while all other spill events are handled by the Stranding Protection Down Ramping Measure. Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), this measure was 100 percent successful in its modeling applications. Encroachment on the K2 Powerhouse minimum operating reservoir elevation occurred 37.5 percent of the time and only induced K2 Powerhouse over-cycling once (WY 2016) in the model. Based on this, this measure is considered to be feasible since powerhouse cycling was minimal. This measure would provide an enhancement similar to the Proposed Project in regard to providing a gradual down ramp of spills. The Stranding Protection Down Ramping Measure would be expected to have impacts similar to the Non-Spill Year Boating Flows and Down Ramping Measure on turbidity and sediment transport.

Therefore, the Stranding Protection Down Ramp Measure would have a **Less than Significant Impact** as a result of operations under Alternative 1 for potential impact HYD-1.

September – October Down Ramp Measure

During the September – October Down Ramp Measure, a ramp down is triggered during declining limb of spills once the average daily flow declines below 1,600 cfs. Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), this measure was successfully implemented 100 percent of the time. The measure has a similar down ramping schedule as the Stranding Protection Down Ramping; however, there is typically less inflow during the months of September and October. While this measure was 100 percent successful in its modeling applications, it draws down the reservoir towards the minimum operating level of the K2 Powerhouse 100 percent of the time, but none of the model runs induced K2 Powerhouse over-cycling. This measure would provide an enhancement similar to the Proposed Project in regard to providing a gradual down ramp of spills during the fall time of year, and this measure is considered feasible. The September – October Down Ramp Measure would be expected to have impacts similar to the Non-Spill Year Boating Flows and Down Ramping Measure on turbidity and sediment transport.

Therefore, the September – October Down Ramp Measure would have a **Less than Significant Impact** as a result of operations under Alternative 1 for potential impact HYD-1.

Alternative 1 Ramp Up Measure

Alternative 1 includes a 1 foot per hour ramp up rate requirement (Alternative 1 Ramp Up Measure) as measured at Gage J-2, which was modeled (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0) and found to be feasible during normal operations if PG&E operators were given advanced notification of incoming flows. The feasibility of this measure is dependent on forecasted inflow information, sufficient storage, and powerhouse capacity. Similar to the down ramping operations discussed above, a gradual ramp up rate would reduce impacts related to turbidity by providing a smooth transition from low to high flows which minimizes the occurrences of sudden high velocity releases that have the potential to erode or uplift fine sediment that would cause increases in turbidity. Therefore, the Alternative 1 Ramp

Up Measure would have a **Less than Significant Impact** as a result of operations under Alternative 1 for potential impact HYD-1.

Impact Analysis without Mitigation

While each flow measure in Alternative 1 had less than significant impacts, non-flow measures included in the Proposed Project are included in Alternative 1. Therefore, there would be a **Potentially Significant Impact** as a result of operation activities under Alternative 1 for potential impact HYD-1.

Impact Analysis with Mitigation

To reduce the potentially significant impacts, Mitigation Measure WQ-4 would require PG&E to develop a low level outlet sediment sluicing management plan to reduce the potentially significant impacts related to turbidity levels in the SJR during sediment sluicing activities. Therefore, there would be a **Less than Significant Impact with Mitigation Incorporated** on water quality standards or waste discharge requirements that would otherwise substantially degrade surface or groundwater quality with incorporation of Mitigation Measure WQ-4 as a result of operational activities under Alternative 1 for potential impact HYD-1.

Mitigation Measures

Mitigation Measure WQ-1: Retirement Plan for Kerckhoff 1 Powerhouse and Associated Facilities

Mitigation Measure WQ-2: San Joaquin River Above Kerckhoff Reservoir Inflow Gage Plan

Mitigation Measure WQ-3: Construction General Permit, WQMP, and Dewatering Plans

Mitigation Measure WQ-4: A Low-Level Outlet (LLO) Sediment Sluicing Management Plan

Level of Significance

Less than Significant Impact with Mitigation Incorporated

4.11.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 would not change any construction activities included in the Proposed Project. Impacts related to construction under Alternative 2 would be the same as for the Proposed Project.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** as a result of construction activities under Alternative 2 for potential impact HYD-1.

Impact Analysis with Mitigation

To reduce the potentially significant impacts, Mitigation Measures WQ-1 through WQ-3 were developed to mitigate impacts to water quality and beneficial uses within the SR/SJR Basin Plan to a less than significant level. Mitigation Measures WQ-1 and WQ-2 require the development of plans and BMPs for activities associated with retirement or modification activities associated with the K1 Powerhouse, as well as for the construction of the inflow gage. Under Mitigation Measure WQ-3, when applicable, PG&E would comply with the Construction General Permit (CGP) in order to regulate stormwater discharges from construction sites to minimize the potential mobilization and discharge of pollutants into waterbodies or watersheds. Mitigation Measure WQ-3 also requires the development of a dewatering plan for activities involving in-water work or a water diversion. These requirements would ensure protection of water quality and associated beneficial uses.

Therefore, there would be a **Less than Significant Impact** on water quality standards or waste discharge requirements that would otherwise substantially degrade surface or groundwater quality with incorporation of Mitigation Measures WQ-1, WQ-2, and WQ-3 as a result of construction activities under Alternative 2 for potential impact HYD-1.

Operation

The only changes to operation under Alternative 2 are the full or partial replacement of flow measures included in the Proposed Project. Potential impacts to water quality associated with facility inspections and maintenance, recreation site maintenance, vegetation management or pest control, or road and trail use would be the same as described in Section 4.11.4.1.1.

Based on the alternative modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), there would be limited impacts on turbidity and suspended sediment from the implemented measures under Alternative 2. The Modified EOS Flow Recession Measure was successful in providing ramp downs in the PBR during modeling runs, but the higher initiation flows and longer durations of the schedule lead to the encroachment toward the K2 Powerhouse minimum operating elevation and K2 Powerhouse over cycling in all cases. However, in practice operators would likely need to extend recession step durations to better match actual inflow recession rates, which is feasible as the measure's flow steps only require minimum amounts of time that a down ramp step must be implemented. While the model showed encroachment and powerhouse cycling, the Modified EOS Flow Recession Measure is still likely feasible with an operator using inflow to manage the ramp downs and prevent powerhouse cycling. If reservoir level fluctuations were to occur under the Modified EOS Flow Recession Measure, they would be contained within the operating band of 980.0 feet to 984.5 feet msl, as shown in the model. Thus, any potential increases in turbidity or sediment levels within Kerckhoff Reservoir are not anticipated to be significant compared to baseline conditions during implementation of the Modified EOS Flow Recession Measure.

The Subsequent Ramp Down Measure, Modified Spill Season Flow Measure, POM Initial Release Protocol, and POM Ramp Down would not have substantial impacts on turbidity or sediment levels. This is due to all measures providing gradual down ramping schedules. Similar to Alternative 1, gradual ramp downs generally reduce impacts related to turbidity by providing a smooth transition between high and lows flows which

minimizes the occurrences of sudden high velocity releases that have the potential to erode or uplift fine sediment that would cause increases in turbidity.

Alternative 2 incorporates the Proposed Project's Spill Season Flow Measure. The measure is designed to provide the recreating public with visual cues as to water conditions when Kerckhoff Dam is spilling and to provide benefit to aquatic life. Similar to the Proposed Project, implementation may cause a temporary increase in turbidity but is not expected to result in significant impacts or exceedances as compared with baseline conditions. Under baseline conditions, flow operations fluctuate in the PBR and no exceedances to turbidity water quality objectives have been recorded. For these reasons, the Spill Season Flow Measure is a **Potentially Significant Impact** as compared with baseline conditions.

Under Alternative 2, the POM does not include the POM Ramp Up Protocol that is included within the Proposed Project. The ramp up during the outage periods was removed, focusing on a higher flow step during AA WYs as a deterrence flow to recreators.

The POM Initial Release Protocol attempts to release initial spills associated with powerhouse outages at 3:30 a.m. so that the initial spill begins prior to recreators entering the PBR and spill flows arrive downstream near the K1 Powerhouse by approximately 8:30 a.m. The modeling effort revealed that if there is not sufficient inflow to hold the spill beginning at 3:30 a.m. for multiple hours, the reservoir level drops and cannot maintain the initial spill level. When higher inflows arrive later, once the reservoir fills, spill begins again. Similar to the Proposed Project, implementation of the POM may cause a temporary increase in turbidity but is not expected to result in significant impacts or exceedances as compared with baseline conditions. Under baseline conditions flow operations fluctuate in the PBR and no exceedances to turbidity water quality objectives have been recorded.

Overall Alternative 2 provides gradual ramp down measures, which are enhancements compared to baseline conditions.

Impact Analysis without Mitigation

Each revised flow measure under Alternative 2 have less than significant impacts, however non-flow operational measures included under the Proposed Project are still included in Alternative 2, which have potentially signficnat impacts. Therefore, there would be a **Potentially Significant Impact** as a result of operational activities under Alternative 2 for potential impact HYD-1.

Impact Analysis with Mitigation

To reduce the potentially significant impacts, Mitigation Measure WQ-4. Mitigation Measure WQ-4 would require PG&E to develop a low level outlet sediment sluicing management plan to reduce the potentially significant impacts related to turbidity levels in the SJR during sediment sluicing activities. Therefore, there would be a **Less than Significant Impact** on water quality standards or waste discharge requirements that would otherwise substantially degrade surface or groundwater quality with incorporation of Mitigation Measure WQ-4 as a result of operational activities under Alternative 2 for potential impact HYD-1.

Mitigation Measures

Mitigation Measure WQ-1: Retirement Plan for Kerckhoff 1 Powerhouse and Associated Facilities

Mitigation Measure WQ-2: San Joaquin River Above Kerckhoff Reservoir Inflow Gage Plan

Mitigation Measure WQ-3: Construction General Permit, WQMP, and Dewatering Plans

Mitigation Measure WQ-4: A Low-Level Outlet (LLO) Sediment Sluicing Management

Level of Significance

Less than Significant Impact with Mitigation Incorporated

4.11.4.2 Potential Impacts Related to Groundwater Supplies, Recharge, or Management

Impact HYD-2: Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

4.11.4.2.1 Proposed Project

Construction and Operation

The Proposed Project is not within a SGMA priority basin. The Proposed Project does not include the construction or operation of any new buildings or housing that would require the expansion or development of new groundwater supplies, such as a groundwater well. The Proposed Project would not use new groundwater supplies during construction and would not include any deep excavation or artificial recharge activities in the Proposed Project Area. Water usage during construction would be limited to potable water that construction staff would bring to the site with them for daily consumption, and construction staff would use portable sanitary systems, as needed. No staff would be permanently located or reside on site during construction or operation that would require water usage.

The Proposed Project would construct an impervious parking area at the Vista Day Use Area. Prior to construction, PG&E would develop construction plans including BMPs for erosion control and drainage and identification of all required permits. The parking area would be developed in consultation with BLM to meet regional direction, regulations, design, and other applicable standards, including drainage patterns and controls. In addition, PG&E would have an on-site meeting with BLM during initial planning and design to collaboratively evaluate details about the site design.

The Proposed Project would operate in run-of-river mode, and as such, the Proposed Project would not store water or divert water for any purpose other than hydropower. Under the Proposed Project, the K2 Powerhouse would bypass approximately 9.8 miles of SJR, respectively. However, all flow would return to the stream and be available for

groundwater recharge at the end of the bypass reaches. The Proposed Project would maintain a MIF below Kerckhoff Dam of 25 cfs during Normal WYs and 15 cfs during Dry WYs as done under baseline conditions.

Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact HYD-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.11.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has similar analysis and impact determination for construction and operation as described in Section 4.11.4.2.1 for potential impact HYD-2. Alternative 1 would not change any construction activities included in the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 1 would not require or result in the relocation of new or expanded groundwater supplies or make any changes to groundwater availability. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact HYD-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.11.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has similar analysis and impact determination as described in Section 4.11.4.2.1 for potential impact HYD-2. Alternative 2 would not change any construction activities included in the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 2 would not require or result in the relocation of new or expanded groundwater supplies or make any changes to groundwater availability. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact HYD-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.11.4.3 Potential Impacts Related to Alteration of the Drainage Pattern or Stream

Impact HYD-3: Would the project 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 erosion or siltation on- or off-site?

4.11.4.3.1 Proposed Project

Construction

Proposed Project construction activities that require ground disturbance have the potential to cause erosion or sedimentation into the SJR or Kerckhoff Reservoir. Specific ground disturbance activities that may be required include clearing, grading, hauling, surface prepping, installing recreation site amenities, paving an existing road,

and upgrading an existing trail. Installation of the new flow gage would involve in-water construction work during the low flow season (between May and October) to minimize erosion and water quality impacts. Disturbance of the stream bed may cause a temporary increase in turbidity or suspended materials.

While specific BMPs to minimize and avoid erosion or siltation during construction have not been developed yet, the Vista Day Use Area would be planned and designed in accordance with BLM guidance and regulations and the Proposed Project's Recreation Management Plan. The Vista Day Use Area does include construction of an impervious parking area but would be approximately 400 feet away from the SJR channel and this parking area would be developed with appropriate drainage patterns. General BMPs specified in the BLM Bakersfield RMP include using erosion control measures, such as mulching and hay bales; incorporating adequate draining structures on roads, properly installing stream crossings, removing debris from streams, stabilizing disturbed soil; and confining runoff onsite to reduce impacts of mechanical site preparation and revegetation operations particularly where the site is in close proximity to a water body. A goal of the Recreation Management Plan is to minimize or eliminate Proposed Project-related effects on environmental and cultural resources.

Construction activities could cause temporary increases in erosion, turbidity, or suspended material. However, the Proposed Project would not alter the existing drainage pattern of the site or area or alter the course of the river. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact HYD-3i.

Operations

The Proposed Project operation would include routine maintenance activities that may involve ground disturbance, including clearing vegetation, maintaining surfaces such as road and trails (e.g., re-paving, sealing), and repairing and replacing minor infrastructure, such as signage. The Proposed Project's Recreation Management Plan, Project Road and Trail Maintenance Plan, and Vegetation Management and Pest Control Plan specify some general measures to minimize or prevent erosion on site,

such as implementing BMPs to minimize erosion and sedimentation; performing regular inspections to identify issues and maintenance needs; manage drainage by installing and maintaining erosion control features, such as culverts, drains, ditches, and water bars; manage vegetation; remove debris; repair and replacement of existing culverts; maintain surfaces through grading and placing aggregate material in undeveloped areas (e.g., ruts, potholes); using certified weed-free hay, mulch, or straw for erosion control; and identifying permitting and reporting requirements.

Operation activities could cause temporary increases in erosion or siltation. However, any temporary increases in erosion would not alter the existing drainage pattern of the site or area or alter the course of the river.

Therefore, there would be a **Less than Significant Impact** as a result operational activities under the Proposed Project for potential impact HYD-3i.

Mitigation Measures

No Mitigation Required

Level of Significance

Less Than Significant Impact

4.11.4.3.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Construction activities during the Proposed Project are not changed under Alternative 1. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 1 for potential impact HYD-3i.

Operation

Fluctuations of Kerckhoff Reservoir and the alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 1 have the potential to cause temporary impacts to turbidity or sediment from erosion or siltation. However these fluctuations would not exceed those seen under baseline conditions as the

reservoir would stay within the normal operating range (980.0 – 984.5 feet msl) and rapid flow fluctuation occurrences downstream of Kerckhoff Dam would be reduced compared to baseline conditions with the implementation of multiple down ramping measures and a ramp up measure subject to sufficient reservoir storage and powerhouse capacity mentioned previously under Alternative 1. Additionally, this would not alter the existing drainage pattern of the site or area or alter the course of the river. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 1 for potential impact HYD-3i.

Mitigation Measures

No Mitigation Required

Level of Significance

Less Than Significant Impact

4.11.4.3.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Construction activities during the Proposed Project are not changed under Alternative 2. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 2 for potential impact HYD-3i.

Operation

Fluctuations of Kerckhoff Reservoir and the alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 2 have the potential to cause temporary impacts on turbidity from erosion or siltation. However these fluctuations would not exceed those seen under baseline conditions as the reservoir would stay within the normal operating range (980.0 – 984.5 feet msl) and rapid flow fluctuation occurrences downstream of Kerckhoff Dam would be reduced compared to baseline conditions with the implementation of multiple down ramping measures mentioned previously under Alternative 2. Therefore, there would be a **Less than**

Significant Impact as a result of operational activities under Alternative 2 for potential impact HYD-3i.

Mitigation Measures

No Mitigation Required

Level of Significance

Less Than Significant Impact

4.11.4.4 Potential Impacts Related to Alteration of the Drainage Pattern or Stream

Impact HYD-3: Would the project 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:

ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

4.11.4.4.1 Proposed Project

Construction

Construction of the Proposed Project does not involve altering the existing drainage pattern, altering the course of a stream or river, or developing new diversion structures. A portion of SJR flow would continue to be diverted through the K2 Powerhouse and released 9.8 miles downstream for the purpose of hydropower generation. Construction vehicles may compact road surfaces and contribute to surface runoff but not to the extent that would cause flooding. Construction and development of the Vista Day Use Area would create impervious areas by paving the approximately 1,000-foot access road between Access Road 6A and the day use area and paving a parking area for up to 20 spaces; however, this would not be anticipated to result in flooding. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact HYD-3ii.

Operation

Operation of the Vista Day Use Area would contribute a small amount of surface runoff from the paved access road and the paved parking area. These areas would be isolated and surrounded by natural, pervious surfaces so runoff impacts would be negligible and absorbed in the perimeter area. The total impervious surface area at the Vista Day Use Area (2.72 acres) would not be large enough to increase the rate or amount of surface runoff in a manner that would result in flooding on or off-site during construction or operation.

The Proposed Project's Recreation Management Plan, Project Road and Trail Maintenance Plan, and Vegetation Management and Pest Control Plan specify some general measures to minimize or prevent polluted runoff such as managing drainage by installing and maintaining erosion control features, such as culverts, drains, ditches, and water bars; removing debris; and repairing and replacing existing culverts.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact HYD-3ii.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.11.4.4.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Construction activities during the Proposed Project are not changed under Alternative 1. Flow release requirements under Alternative 1 modify operations when compared to the Proposed Project, however these modifications would not substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. Therefore, there would be a **Less than Significant Impact** as a result of construction and operational activities under Alternative 1 for potential impact HYD-3ii.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.11.4.4.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Construction activities during the Proposed Project are not changed under Alternative 2. Flow release requirements under Alternative 2 modify operations when compared to the Proposed Project, however these modifications would not substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. Therefore, there would be a **Less than Significant Impact** as a result of construction and operational activities under Alternative 2 for potential impact HYD-3ii.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.11.4.5 Potential Impacts Related to Alteration of the Drainage Pattern or Stream

Impact HYD-3: Would the project 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:

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?

4.11.4.5.1 Proposed Project

Construction

Any existing stormwater drainage systems in the Proposed Project Area are associated with the existing Kerckhoff Hydroelectric Project facilities. No new stormwater drainage systems are proposed or needed as part of the Proposed Project.

Construction would require the use of vehicles and equipment, which could potentially be a source of polluted runoff if a spill occurs during the transportation or use of hazardous materials. Construction activities would not require a substantial number of vehicle trips; however, a spill could occur during the fueling of vehicles or while operating construction equipment and vehicles. Other construction activities may use hydraulic fluid and lubricants that are also hazardous materials. The use of hazardous materials during construction has the potential to have a significant impact on water quality if there were a spill, however, PG&E would continue to implement the HBMPs for the K1 and K2 Powerhouses, which include containment and clean up procedures, which would avoid or minimize significant impacts.

Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact HYD-3iii.

Operation

The Vista Day Use Area would be planned and designed in accordance with BLM guidance and regulations and would implement measures and design features to reduce the creation or contribution of surface runoff during operations. As a non-urban, rustic, and relatively small day-use-only area supporting outdoor recreation, operation of the Vista Day Use Area would not create substantial additional sources of polluted runoff in the Proposed Project and would shift existing recreational uses to an area designed for day use.

Routine maintenance is currently ongoing and would not cause an increase in the creation or contribution of runoff water or provide substantial additional sources of polluted runoff under the Proposed Project. Maintenance activities would continue to

comply with PG&E's existing HMBPs, which governs the handling of hazardous materials that could become sources of polluted runoff. Implementation of the erosion control measures that protect water quality described in the Proposed Project's Recreation Management Plan, Project Road and Trail Maintenance Plan, and Vegetation Management and Pest Control Plan would further reduce the possibility to create or contribute runoff water or provide substantial additional sources of polluted runoff. General erosion control measures in the Proposed Project's environmental plans include performing regular inspections to identify issues and maintenance needs; manage drainage by installing and maintaining erosion control features, such as culverts, drains, ditches, and water bars; manage vegetation; remove debris; repair and replacement of existing culverts; maintain surfaces through grading and placing aggregate material in undeveloped areas (e.g., ruts, potholes); using certified weed-free hay, mulch, or straw for erosion control; and identifying permitting and reporting requirements.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact HYD-3iii.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.11.4.5.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 would not alter construction activities under the Proposed Project, but instead alter the timing, duration, and magnitude of flows downstream of Kerckhoff Dam. The change of flow operations would not have an impact beyond that of the Proposed Project operations. No new stormwater drainage systems are proposed or needed as part of Alternative 1. Therefore, there would be a **Less than Significant**

Impact as a result of construction and operational activities under Alternative 1 for potential impact HYD-3iii.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.11.4.5.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 would not alter construction activities under the Proposed Project, but instead would alter the timing, duration, and magnitude of flows downstream of Kerckhoff Dam. The change of flow operations would not have an impact beyond that of the Proposed Project operations. No new stormwater drainage systems are proposed or needed as part of Alternative 2. Therefore, there would be a **Less than Significant Impact** as a result of construction and operational activities under Alternative 2 for potential impact HYD-3iii.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.11.4.6 Potential Impacts Related to Alteration of the Drainage Pattern or Stream

Impact HYD-3: Would the project 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:

iv. Impede or redirect flood flows?

4.11.4.6.1 Proposed Project

Construction

As discussed in Section 4.11.1.5 *Flood Hazards*, the Proposed Project is located in Flood Hazard Zone A, an area with a 1 percent annual chance of flooding. Construction of the Proposed Project involves limited in water work for the radial gate upgrades at the dam and for installing the stream gage. These activities would not impede or redirect flood flows. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact HYD-3iv.

Operation

PG&E would continue to operate the Proposed Project in compliance with existing License Article 40 which requires the Applicant to operate the Proposed Project during flood periods in a manner that would not cause peak river flows below Kerckhoff Dam and powerhouses to exceed the peak flows that would have occurred in the absence of the Proposed Project. During a flood event this would be accomplished by diverting the maximum flow through the K2 Powerhouse (5,100 cfs) when outages are not occurring. Inflow in excess of 5,100 cfs is spilled at Kerckhoff Dam or through the low-level outlets. Under these circumstances, the Kerckhoff Hydroelectric Project is essentially run-of-the-river, and any flow fluctuation during flood events in the PBR would be the result of changes in Kerckhoff Reservoir inflow.

PG&E would also continue to follow existing operation plans during flood conditions. The Kerckhoff Hydroelectric Project is normally operated remotely. The Fresno Operating Switching Center monitors and controls reservoir levels through the SCADA system which provides low level, high level, and high rate-of-change alarms. Furthermore, the Emergency Operating Plan for the Kings-Crane/Helms Hydro Area, which includes the Kerckhoff Hydroelectric Project, has emergency response flow charts and checklists if a flood were to occur. If the switching center notes any issues, maintenance crews are immediately dispatched to evaluate extent of the problem and to

estimate repair times, if necessary. Furthermore, several gaging stations are located throughout the Kerckhoff Hydroelectric Project which contain alarms that are directed to the PG&E communication system. The alarms are activated and PG&E is immediately informed if any changes in water surface elevation or river stage exceed specified rates.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact HYD-3iv.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.11.4.6.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Construction activities during the Proposed Project are not changed under Alternative 1. Flow release requirements under Alternative 1 modify operations when compared to the Proposed Project. The modification that has the potential to impact flood flow releases is the 1 foot per hour ramp up rate, which includes previously defined exceedances allowances.

In the event that Kerckhoff Reservoir were to receive flood flows, PG&E would attempt to maintain a 1 foot per hour ramp up rate between MIF and 4,000 cfs, as measured at Gage J-2, given that the Project has sufficient storage and powerhouse capacity. Once inflows exceed 4,000 cfs, the K2 Powerhouse is at full capacity, and the reservoir is full. The Project under Alternative 1 would operate as run-of-the-river by releasing flows through the radial gates or the low-level outlets. Under these circumstances, any flow fluctuation during flood events in the PBR would be the result of changes in Kerckhoff Reservoir inflow. In this scenario under Alternative 1, the Kerckhoff Hydroelectric Project would not be anticipated to impede or redirect flood flows. Therefore, there

would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 1 for potential impact HYD-3iv.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.11.4.6.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 would not alter construction activities under the Proposed Project, but instead would alter the timing, duration, and magnitude of flows downstream of Kerckhoff Dam. Similar to the Proposed Project, during a flood event, the maximum flow through the K2 Powerhouse is 5,100 cfs when outages are not occurring. Inflow in excess of 5,100 cfs is spilled at Kerckhoff Dam via the radial gates or the low-level outlets. Under these circumstances for Alternative 2, the Kerckhoff Hydroelectric Project is essentially run-of-the-river, and any flow fluctuation during flood events in the PBR would be the result of changes in Kerckhoff Reservoir inflow. The change of flow operations would not have an impact beyond that of the Proposed Project operations. Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 2 for potential impact HYD-3iv.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.11.4.7 Potential Impacts Related to Pollution due to Inundation

Impact HYD-4: Would the project in flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation?

4.11.4.7.1 Proposed Project

Construction and Operation

The Proposed Project is not located in an area with high flood hazard potential or in a tsunami or seiche zone. As mentioned in Section 4.10 *Hazards and Hazardous Materials*, the Proposed Project is not anticipated to require amounts of hazardous materials on site that are substantially different from existing conditions and the existing HMBPs for both Powerhouses would remain in place under the Proposed Project. Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact HYD-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.11.4.7.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination for construction and operation as described in Section 4.11.4.7.1 for potential impact HYD-4. Alternative 1 would not change any construction activities included in the Proposed Project. Alternative 1 would alter the timing, duration, and magnitude of flows in the PBR. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact HYD-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.11.4.7.3 Alternative 2: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 2 has the same analysis and impact determination for construction and operation as described in Section 4.11.4.7.1 for potential impact HYD-4. Alternative 2 would not change any construction activities included in the Proposed Project. Alternative 2 would alter the timing, duration, and magnitude of flows in the PBR. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact HYD-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.11.4.8 Potential Impacts Related to Regulatory Plans

Impact HYD-5: Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

4.11.4.8.1 Proposed Project

Construction

The Proposed Project would require construction activities both in and adjacent to waterbodies, including Kerckhoff Reservoir and SJR. The Proposed Project includes the construction and maintenance of the Vista Day Use Area, installation of the New SJR

Gage above Kerckhoff Reservoir, upgrades of the Kerckhoff Dam radial gates, and the retirement of the K1 Powerhouse and modification of the associated facilities.

As discussed in Section 4.11.1.5, the Central Valley Regional Water Board adopted the SR/SJR Basin Plan for water quality control in the Proposed Project Area. The SR/SJR Basin Plan designates beneficial uses for waterbodies and provides water quality objectives for protection of those beneficial uses (Table 4.11-16). Similar to potential impact HYD-1, impacts from construction activities under the Proposed Project have the potential to result in significant impacts from pH, turbidity, sediments, and oil and grease, which would conflict with the water quality objectives in applicable water quality control plans. However, construction is not expected to affect fecal coliform levels.

Regarding groundwater, the Proposed Project is not within a SGMA priority basin and thus would not conflict with or obstruct implementation of a sustainable groundwater management plan.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** as a result of construction activities under the Proposed Project for potential impact HYD-5.

Impact Analysis with Mitigation

To reduce the potentially significant impacts, Mitigation Measures WQ-1, WQ -2, and WQ-3 were developed to mitigate impacts to water quality and beneficial uses within the SR/SJR Basin Plan to a less than significant level. Mitigation Measures WQ-1 and WQ-2 require the development of plans for activities associated with retirement or modification activities associated with the K1 Powerhouse, as well as for the construction of the inflow gage. These plans would provide detailed descriptions of construction activities and reduce potentially significant impacts through the development of BMPs for the protection of water quality during these construction activities. BMPs will address water quality parameters such as turbidity, oil and greases, pH, sediment, settleable and suspended material.

Under Mitigation Measure WQ-3, when applicable, PG&E would comply with the Construction General Permit (CGP) in order to regulate stormwater discharges from construction sites to minimize the potential mobilization and discharge of pollutants into waterbodies or watersheds. If an activity is not covered under the CGP, but has the potential to impact water quality, PG&E shall develop a site-specific Water Quality Monitoring and Protection Plan (WQMP) under MMW-WQ-3. The WQMP would reduce potential impacts to water quality by identifying and implementing control measures for construction, maintenance, or other activities with the potential to cause erosion, stream sedimentation, fugitive dust, soil mass movement, release of hazardous materials, or other water quality impairment.

Mitigation Measure WQ-3 also requires the development of a dewatering plan for activities involving in-water work or a water diversion. Mitigation Measure WQ-3 would reduce potential impacts by requiring the development of measures that would be implemented to maintain compliance with water quality standards in the SR/SJR Basin Plan during dewatering activities (e.g., turbidity, sediment, settleable and suspended materials) and beneficial uses for applicable activities (i.e., construction of inflow gage).

Therefore, there would be a **Less than Significant Impact** on the implementation of a water quality control plan and/or sustainable groundwater management plan with the incorporation of Mitigation Measure WQ-1, WQ-2, and WQ-3 as a result of construction activities under the Proposed Project for potential impact HYD-5.

Operation

Operation of the Proposed Project includes multiple environmental measures designed to protect water and aquatic resources. These measures include minimum flows, the Water Temperature Measure, the American Shad Spawning Season Flow Release Regime Measure, and several Flow Management measures. The impact of these measures during operation of the Proposed Project in relation to the water quality standards in the SR/SJR Basin Plan are described in Section 4.11.4.1.1 for HYD-1.

In addition to water quality criteria, recreation is a beneficial use of Kerckhoff Reservoir and the SJR below Kerckhoff Dam. Several measures included in the Proposed Project

are intended to improve recreation access, opportunities, and public safety at the Kerckhoff Hydroelectric Project. For example, the development of the Vista Day Use Area and trail improvements would provide recreation access to the area. In addition, the EOS Flow Recession Measure would provide scheduled whitewater boating opportunities. The Subsequent Spill Ramp Down Measure below would be implemented from the conclusion of the End-of-Spill Flow Recession through October 31 in all WY types, except during K2 Powerhouse outages. This measure would likely be used infrequently (i.e., following spills resulting from unexpected high flows) and would not be expected to affect recreation-related beneficial uses.

The Spill Season Flow Measure would be implemented during the March 1 through August 31 spill season, when the Kerckhoff Hydroelectric Project is in operation (not including K2 Powerhouse outages) and neither the end-of-spill flow recession nor the subsequent spill down is being implemented. It is designed to provide the recreating public with visual cues as to water conditions when Kerckhoff Dam is spilling and to provide benefit to aquatic life. PG&E would hold flows at an hourly average flow of 500 cfs (400-600 cfs) for a minimum of 5 hours below Kerckhoff Dam when sustained spills measured at Gage J-2 are 500 cubic feet per second (cfs) or more for at least 5 hours of continuous duration and neither the end-of-spill flow recession nor the subsequent spill ramp down is being implemented, subject to sufficient water availability[49]. The efficacy of how well recreators will be able to identify that Kerckhoff Dam is spilling based on water conditions is unclear. The Spill Season Flow Measure poses potentially significant impacts to beneficial uses related to contact, non-contact, and canoeing and rafting because it relies heavily on recreators having a nuanced understanding of the river conditions. Holding this visual cue flow (500 cfs for a minimum of 5 hours) has the potential to give recreators who are unfamiliar with the San Joaquin River a false sense of stable flow conditions based on their interpretation of the water conditions. PG&E has not proposed any ramp up related measures for spills below Kerckhoff Dam outside of

[49] Sufficient water availability is dependent on combined accessible volume of water from inflow, storage within the normal operating range, or current powerhouse diversions.

planned outages. Thus, flows much more than 500 cfs could be suddenly released from Kerckhoff Dam due to an increase in inflows, with little or no gradual release approach and result in higher flow velocities and stage changes downstream near recreation facilities. Contact or non-contact recreators still in or near the PBR when higher flows from spill arrive have the potential to experience difficulties exiting the river due to unexpected changes in river velocities. For these reasons, the Spill Season Flow Measure is a Potentially Significant Impacts related to SJ/SR Basin Plan beneficial uses such as contact recreation, non-contact recreation, and canoeing and rafting.

PG&E proposes implementing the POM, which has 3 components: (as defined in Section 4.11.3.3 under Environmental Impacts and Mitigation) (1) POM Ramp Up; (2) POM Ramp Down; and (3) Winter POM. The POM ramp up is a 2 step ramp up and allows any flow over 1,000 cfs to be released from Kerckhoff Dam after a 2 hour ramp up period. This has the potential to allow for sudden large releases during planned outages after the second step of the ramp up has been completed, which can result in large stage change increases downstream closer to designated recreation areas. Boaters and/or equipment on the edge of the channel utilizing the PBR along with recreators swimming in the river can be impacted from large flow increases, such that exiting the river can become difficult due to stronger flow velocities than experienced previously. Non-contact recreators utilizing areas on the edge of the river can also be negatively impacted from sudden large stage increases, such that recreators must leave and relocate to a different area due to changes in river stage. As a result, the POM Ramp Up could result in potentially significant impacts related to SJ/SR Basin Plan beneficial uses such as contact recreation, non-contact recreation, and canoeing and rafting.

The POM also contains an initial release protocol, which would attempt to release initial spill associated with the outage prior to 3:30 a.m. as measured at Gage J-2, subject to sufficient water availability. The initial spill would begin the previous night or early morning day hours of the next day so that spill arrives downstream near the K1 Powerhouse by approximately 8:30 a.m. If this release timing is not practical, a roving Kerckhoff Hydroelectric Project patrol person would alert people of the impending high

flows in the areas of the trail to the BLM footbridge and the trailhead to the K2 Tailrace during daylight hours. POM modeling efforts for Alternative 2, which also contains a similar initial release protocol as the Proposed Project, but with slightly different implementation requirements (i.e., the expected daily average flows flow below Kerckhoff Dam), found attempting to release spill at 3:30 a.m. in anticipation of forecast inflows consistently caused the reservoir to drop toward encroachment toward the K2 Powerhouse's minimum operating reservoir elevation before inflows arrived. Without consistent inflows the goal of the protocol, which was to have initial spill associated with an outage begin the previous night or early morning so that spill arrives downstream near the K1 Powerhouse by 8:30 a.m. could not be completed. This led to secondary spill increases later in the day once the reservoir was at full capacity to match reservoir inflows. These secondary increases produced stage rise rates ranging from approximately 1.2 feet to as much as 11.7 feet at downstream monitoring locations. Therefore, the protocol could not be consistently implemented without stable inflows, and thus would not be able to be consistently implemented in the model to help protect recreation-related beneficial uses.

Measures described in the Proposed Project's Aquatic Resources Plan are designed to protect the fish communities in the PBR, specifically native fish species, and to monitor the aquatic communities. Mussel monitoring would be conducted to observe any long-term trends for the western pearlshell mussel. Periodic monitoring and management objectives in the PBR would be used to assess trends (if any) in the fish community and western pearlshell mussel abundance over the term of the new license in response to any changes in operation. These measures support the Warm and Cold Freshwater Habitat beneficial uses of the Kerckhoff Reservoir and the SJR. Furthermore, the Subsequent Spill Ramp Down Measure would reduce the potential for fish stranding.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** to SJ/SJR Basin Plan recreation-related beneficial uses from proposed flow management measures and water quality objectives during sediment sluicing activities, as discussed in potential impact

HYD-1, as a result of operation activities under the Proposed Project for potential impact HYD-5.

Impact Analysis with Mitigation

To reduce the potentially significant impacts, Mitigation Measure WQ-4 and Recommended Mitigation Measure WQ-5 were developed to mitigate impacts to water quality and beneficial uses within the SR/SJR Basin Plan to a less than significant level. Mitigation Measure WQ-4 would require PG&E to develop a low level outlet sediment sluicing management plan to reduce the potentially significant impacts related to turbidity levels in the SJR during sediment sluicing activities This would reduce the impact by requiring PG&E to estimate the amount of sediment passed and to monitor water quality immediately downstream of the Kerckhoff Dam during sediment sluicing operations to ensure compliance with SR/SJR Basin Plan water quality objectives. As a result, there would be a less than significant impact on turbidity water quality standards with incorporation of Mitigation Measure WQ-4.

Recommended Mitigation Measure WQ-5 would reduce impacts to recreation-related beneficial uses by notifying recreators of spills at Kerckhoff Dam and by prompting recreators to exit the water. Warning sirens are currently installed at the K1 and K2 powerhouses to alert those in the vicinity of flow releases. However, PG&E's FLA (2023) and Public Safety Plan submitted to FERC (PG&E 2021) did not detail how warning sirens at Kerckhoff Hydroelectric Project facilities alert recreators of spill from Kerckhoff Dam. Implementation of Recommended Mitigation Measure WQ-5 would require PG&E to develop protocols for activating the sirens for situations where a larger stage change than one foot per hour, as measured at Gage J-2, is expected and has the potential to impact recreators or whitewater boaters. The protocols would include the times of day that PG&E would activate the sirens and siren activations would be based on estimated flow travel times to downstream river recreation sites as determined in consultation. Recommended Mitigation Measure WQ-5 would require any facility upgrades needed for PG&E to ensure these sirens can be heard at recreation sites throughout the P (from Kerckhoff Dam to the K2 Powerhouse). Implementation of Recommended Mitigation Measure WQ-5 would protect beneficial uses in the SR/SJR

Basin Plan such as contact recreation, non-contact recreation, and canoeing and rafting.

In summary, implementation of Recommended Mitigation Measure WQ-5 would require PG&E to develop and implement an Instream Flow Public Safety Plan. Implementation of Recommended Mitigation Measure WQ-5 would reduce the potentially significant impact associated with the Proposed Project to less than significant with mitigation incorporated.

On March 11, 2026, State Water Board staff provided Recommended Mitigation Measure WQ-5 to PG&E staff and requested that PG&E agree to implement the measure to ensure that Proposed Project impacts remain less-than-significant-with-mitigation. On March 17, 2026, PG&E responded that it does not plan to agree to mitigation measures to reduce Proposed Project impacts to a less-than-significant level without first reviewing the draft EIR upon its circulation. On March 19, 2026, PG&E provided comments and suggested edits to the mitigation measures shared on March 11, 2026 (personal email communication, J. Hartman and C. McCormick, March 19, 2026). Without commitment from PG&E, implementation of Recommended Mitigation Measure WQ-5 is uncertain. Therefore, without implementation of Recommended Measure WQ-5 or comparable action there would be a **Significant and Unavoidable Impact** to implementation of water quality control plans, specifically recreation-related beneficial uses, with Proposed Project operational activities for potential impact HYD-5.

Mitigation Measures

Mitigation Measure WQ-1: Retirement Plan for Kerckhoff 1 Powerhouse and Associated Facilities

Mitigation Measure WQ-2: San Joaquin River Above Kerckhoff Reservoir Inflow Gage Plan

Mitigation Measure WQ-3: Construction General Permit, WQMP and Dewatering Plans

Mitigation Measure WQ-4: A Low-Level Outlet Sediment Sluicing Management Plan

Recommended Mitigation Measure WQ-5: Instream Flow Public Safety Plan

PG&E shall develop and implement a plan in consultation with BLM, USFS, and the State Water Board for situations where a larger stage change than one foot per hour, as measured at Gage J-2, is expected and has the potential to impact recreators or whitewater boaters. The plan at a minimum shall include, unless otherwise determined in consultation, that alternative measures provide equivalent protection:

- Protocols for PG&E to activate sirens within the Proposed FERC Project Boundary for situations that are expected to result in a larger stage change than one foot per hour as measured at Gage J-2
- Protocols for activating sirens, as needed, at recreation sites within the PBR for situations that are expected to result in a stage change greater than one foot per hour as measured at Gage J-2
- Identification of the times of day PG&E shall activate sirens that consider the potential impacts on sensitive receptors or homeowners
- Siren activations being timed based on estimated flow travel times to downstream river recreation sites as determined in consultation
- Any facility upgrades needed for PG&E to ensure these sirens can be heard at recreation sites throughout the PBR (from Kerckhoff Dam to the K2 Powerhouse)
- PG&E shall ensure proper signage will be posted at or near recreation areas to educate recreators of the meaning of sirens and warn recreators of the possibility of sudden flow changes and the associated dangers with those changes in the PBR (sudden increases and decreases in flow)
- The same signage will communicate items above in the most common non-English language in the vicinity

Level of Significance

Significant and Unavoidable

4.11.4.8.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 would not change any construction activities included in the Proposed Project. Alternative 1 has the same construction analysis and impact determination as described in Section 4.11.4.8.1, potential impact HYD-5.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** as a result of construction activities under Alternative 1 for potential impact HYD-5.

Impact Analysis With Mitigation

To reduce the potentially significant impacts, Mitigation Measures WQ-1 to WQ-3 were developed to mitigate impacts to water quality and beneficial uses within the SR/SJR Basin Plan to a less than significant level. Mitigation Measures WQ-1 and WQ-2 require the development of plans for activities associated with retirement or modification activities associated with the K1 Powerhouse, as well as for the construction of the inflow gage. These plans would provide detailed descriptions of construction activities and reduce potentially significant impacts through the development of BMPs for the protection of water quality during these construction activities. BMPs will address water quality parameters such as turbidity, oil and greases, pH, sediment, settleable and suspended material.

Under Mitigation Measure WQ-3, when applicable, PG&E would comply with the Construction General Permit (CGP) in order to regulate stormwater discharges from construction sites to minimize the potential mobilization and discharge of pollutants into waterbodies or watersheds. If an activity is not covered under the CGP, but has the potential to impact water quality, PG&E shall develop a site-specific Water Quality Monitoring and Protection Plan (WQMP) under MMW-WQ-3. The WQMP would reduce potential impacts to water quality by identifying and implementing control measures for construction, maintenance, or other activities with the potential to cause erosion, stream

sedimentation, fugitive dust, soil mass movement, release of hazardous materials, or other water quality impairment.

Mitigation Measure WQ-3 also requires the development of a dewatering plan for activities involving in-water work or a water diversion. Mitigation Measure WQ-3 would reduce potential impacts by requiring the development of measures that would be implemented to maintain compliance with water quality standards in the SR/SJR Basin Plan during dewatering activities (e.g., turbidity, sediment, settleable and suspended materials) and beneficial uses for applicable activities (i.e., construction of inflow gage).

Therefore, there would be a **Less than Significant Impact** on the implementation of a water quality control plan and/or sustainable groundwater management plan with the incorporation of Mitigation Measure WQ-1, WQ-2, and WQ-3 as a result of construction activities under Alternative 1 for potential impact HYD-5.

Operation

The only changes to operation under Alternative 1 are the full or partial replacement of flow measures included in the Proposed Project. Potential impacts of the full or partial replacement of flow measures included in the Proposed Project, facility inspections and maintenance, and the implementation of the proposed environmental measures (i.e., recreation site management, vegetation management or pest control, or road and trail use) would be the same as described for operations in Section 4.11.4.8.1.

Spill Year Schedule Boating flows and Down Ramping of Spill Flows

Under the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure, PG&E would ramp down flows between May 1 through August 31 in the PBR after SCE has identified when down ramping of spill flows at Big Creek 4's Dam No. 7 will start. Standard down ramping for end of spills are determined by the WY Schedules, A, B (low storage), B (high storage), C, or D.

Based on the alternative modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure was shown to be successful in gradually ramping down

flows within the PBR. While the reservoir stayed within the normal operating range (980.0 feet to 984.5 feet msl.), the implementation of the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure also resulted in Kerckhoff Reservoir being drawn down toward the minimum operating elevation for the K2 Powerhouse in the model (981.5 feet msl.). The K2 Powerhouse then cycles above and below the ROZ in an attempt to keep the reservoir high enough to stay above the minimum operating elevation for the K2 Powerhouse. Based on the documented operational constraints, any operation that requires K2 to dwell in the ROZ is considered infeasible due to excessive cavitation and vibration impacts and the associated maintenance and outage consequences (personal email communication, J. Hartman and C. McCormick, March 5, 2026).

Reservoir drawdowns have the potential to increase turbidity within the reservoir by exposing saturated sediments along the shoreline and potentially resuspends settled solids from the lakebed. However, the drawdown would not exceed the minimum level of the normal operating range of the reservoir (980 feet msl), and thus would not be anticipated to cause impacts to turbidity levels within Kerckhoff Reservoir that would exceed those observed under baseline conditions.

Although the modeling described above showed this component of Alternative 1 to be infeasible, implementing the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure would result in a less than significant impact compared with baseline for Impact HYD-5. Ultimately, as described in the alternative modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), implementation of the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure was deemed as infeasible as a result of over cycling of the powerhouse through the ROZ and the necessity for rapid operational changes that may not be foreseeable to a reservoir operator not aware of upstream non-project operations. Therefore, if the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure were implemented, there would be a **Less than Significant Impact** for potential impact HYD-5.

Non-Spill Year Boating Flows and Down Ramping

The Non-Spill Year Boating Flows and Down Ramping schedule would be attempted every weekend from May 15 to June 15 of non-spill years. The Non-Spill Year Boating Flows and Down Ramping would be scheduled based on the PG&E's forecast of water availability. Modeling of the Non-Spill Year Boating Flows and Down Ramping Measure found that its feasibility was primarily dependent on the volume of inflows coming into Kerckhoff Reservoir during the weekends. Modeling efforts showed that inflow is too low during the summer months in non-spill years to sustain this schedule. Of the 28 modeled times this was implemented in the period of record (over 6 non-spill years), only 28.6 percent of the time did it produce adequate boating flows. Determining if this measure is feasible is completely dependent on inflows from SCE's Big Creek 4 Project, which implements the same LTOR Non-Spill Year Boating Flows as a part of their FERC Project License. Therefore, this could be an enhancement to contact recreation and canoeing and rafting SR/SJR Basin Plan beneficial uses for Sources to Millerton Lake, but it is dependent on the Big Creek 4 Project providing the augmented flows into Kerckhoff Reservoir.

Implementation of these down ramping operations and additional boating flows would provide more scheduled releases into the PBR for limited amounts of time which has the potential to increase turbidity or sediment transportation in the PBR. However, gradual ramp downs generally do not cause additional turbidity and sedimentation related impacts as it provides a smoother transition from high to lows flows compared to baseline conditions. In addition, the SJR in the PBR was dominated by boulder-size material, with frequent bedrock outcroppings exposed along the channel bed. Boulders ranged in size from small boulders (256 millimeters [mm] to 512 mm) to very large boulders (512 mm to 4,096 mm) at any given location. These large boulders are typically less susceptible to erosive forces and likely would not result in significant potential increases in turbidity within the PBR.

Therefore, the Non-Spill Year and Down Ramping Measure would have a **Less than Significant Impact** as a result of operations under Alternative 1 for potential impact HYD-5.

Stranding Protection Down Ramping Measure

The Stranding Protection Down Ramping Measure covers initial and subsequent spills between May 1 and August 31. In other words, the spill year ramp down schedules (AB, BC, D) are reserved for the large spill events in each spill season, while all other spill events are handled by the Stranding Protection Down Ramping Measure. Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), this measure was 100 percent successful in its modeling applications. Encroachment on the K2 Powerhouse minimum operating reservoir elevation occurred 37.5 percent of the time and only induced K2 Powerhouse over-cycling once (WY 2016) in the model. Based on this, this measure is considered to be feasible since powerhouse cycling was minimal. This measure would provide an enhancement similar to the Proposed Project in regard to providing a gradual down ramp of spills.

Therefore, the Stranding Protection Down Ramping Measure would have a **Less than Significant Impact** as a result of operations under Alternative 1 for potential impact HYD-5.

September – October Down Ramp Measure

During the September – October Ramp Down Measure, a ramp down is triggered during declining limb of spills once the average daily flow declines below 1,600 cfs. Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), this measure was successfully implemented 100 percent of the time. The measure has a similar down ramping schedule as the Stranding Protection Down Ramping; however, there is typically less inflow during the months of September and October. While this measure was 100 percent successful in its modeling applications, it draws down the reservoir towards the minimum operating level of the K2 Powerhouse 100 percent of the time, but none of the model runs induced K2 Powerhouse over-cycling. This measure would provide an enhancement similar to the Proposed Project in regard to providing a gradual down ramp of spills during the fall time of year, and this measure is considered feasible.

Therefore, the September – October Down Ramp Measure would have a **Less than Significant Impact** as a result of operations under Alternative 1 for potential impact HYD-5.

Alternative 1 Ramp Up Measure

Alternative 1 includes a 1 foot per hour ramp up rate requirement (Alternative 1 Ramp Up Measure) as measured at Gage J-2, which was modeled (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0) and found to be feasible during normal operations if PG&E operators were given advanced notification of incoming flows. The feasibility of this measure is dependent on forecasted inflow information, sufficient storage, and powerhouse capacity. Similar to the down ramping operations discussed above, a gradual ramp up rate would reduce impacts related to turbidity by providing a smooth transition from low to high flows which minimizes the occurrences of sudden high velocity releases that have the potential to erode or uplift fine sediment that would cause increases in turbidity. Implementation of the ramp up would also protect recreation-related beneficial uses within the PBR. Generally, a gradual increase in flows is the best way to communicate to recreators that flows are increasing, prompting recreators to exit the water. However, the measure is dependent on forecasted inflow information, sufficient storage, and powerhouse capacity. The PBR would still be susceptible to sudden large releases from Kerckhoff Dam due to large inflows from upstream projects that have the potential to impact recreation-related beneficial uses in the PBR. Therefore, the Alternative 1 Ramp Up Measure would have a **Potentially Significant Impact** as a result of operations under Alternative 1 for potential impact HYD-5.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** as a result of operational activities under Alternative 1 for potential impact HYD-5.

Impact Analysis with Mitigation

To reduce the potentially significant impacts, Mitigation Measure WQ-4 and Recommended Mitigation Measure WQ-5 were developed to mitigate impacts to water

quality and beneficial uses within the SR/SJR Basin Plan to a less than significant level. Mitigation Measure WQ-4 would require PG&E to develop a low level outlet sediment sluicing management plan to reduce the potentially significant impacts related to turbidity levels in the SJR during sediment sluicing activities. This would reduce the impact by requiring PG&E to estimate the amount of sediment passed and to monitor water quality immediately downstream of the Kerckhoff Dam during sediment sluicing operations to ensure compliance with SR/SJR Basin Plan water quality objectives. As a result, there would be a less than significant impact on turbidity water quality standards with incorporation of Mitigation Measure WQ-4.

Recommended Mitigation Measure WQ-5 would reduce impacts to recreation-related beneficial uses by notifying recreators of spills at Kerckhoff Dam and by prompting recreators to exit the water or water's edge. Warning sirens are currently installed at the K1 and K2 powerhouses to alert those in the vicinity of flow releases. However, PG&E's FLA (2023) and Public Safety Plan submitted to FERC (PG&E 2021) did not detail how warning sirens at the Kerckhoff Hydroelectric Project facilities alert recreators of spill from Kerckhoff Dam. Implementation of Recommended Mitigation Measure WQ-5 would require PG&E to develop protocols for activating the sirens for situations where a larger stage change than one foot per hour, as measured at Gage J-2 is expected and has the potential to impact recreators or whitewater boaters. The protocols would include the times of day that PG&E would activate the sirens and siren activations would be based on estimated flow travel times to downstream river recreation sites as determined in consultation. Recommended Mitigation Measure WQ-5 would require any facility upgrades needed for PG&E to ensure these sirens can be heard at recreation sites throughout the PBR (from Kerckhoff Dam to the K2 Powerhouse). In addition, PG&E would ensure these sirens can be heard at recreation sites throughout the PBR (from Kerckhoff Dam to the K2 Powerhouse). Implementation of Recommended Mitigation Measure WQ-5 would protect beneficial uses in the SR/SJR Basin Plan such as contact recreation, non-contact recreation, and canoeing and rafting.

In summary, implementation of Recommended Mitigation Measure WQ-5 would require PG&E to develop and implement an Instream Flow Public Safety Plan.

Implementation of Recommended Mitigation Measure WQ-5 that would reduce the potentially significant impact associated with Alternative 1 to less than significant with mitigation incorporated.

On March 11, 2026, State Water Board staff provided Recommended Mitigation Measure WQ-5 to PG&E staff and requested that PG&E agree to implement the measure to ensure that Proposed Project impacts remain less than significant with mitigation. On March 17, 2026, PG&E responded that it does not plan to agree to mitigation measures to reduce Proposed Project impacts to a less-than-significant level without first reviewing the draft EIR upon its circulation. On March 19, 2026, PG&E provided comments and suggested edits to the mitigation measures shared on March 11, 2026 (personal email communication, J. Hartman and C. McCormick, March 19, 2026). Without commitment from PG&E, implementation of Recommended Mitigation Measure WQ-5 is uncertain.

Without implementation of Recommended Mitigation Measure WQ-5 or comparable action, Alternative 1's impacts to water quality standards, such as recreation-related beneficial uses, are **Significant and Unavoidable**.

Mitigation Measures

Mitigation Measure WQ-1: Retirement Plan for Kerckhoff 1 Powerhouse and Associated Facilities

Mitigation Measure WQ-2: San Joaquin River Above Kerckhoff Reservoir Inflow Gage Plan

Mitigation Measure WQ-3: Construction General Permit, WQMP and Dewatering Plans

Mitigation Measure WQ-4: A Low-Level Outlet Sediment Sluicing Management Plan

Recommended Mitigation Measure WQ-5: Instream Flow Public Safety Plan

Level of Significance

Significant and Unavoidable

4.11.4.8.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 would not change any construction activities included in the Proposed Project. Alternative 2 has the same analysis and impact determination as described in Section 4.11.4.8.1, potential impact HYD-5.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** as a result of construction activities under Alternative 2 for potential impact HYD-5.

Impact Analysis with Mitigation

To reduce the potentially significant impacts, Mitigation Measures WQ-1, WQ-2, and WQ-3 were developed to mitigate impacts to water quality and beneficial uses within the SR/SJR Basin Plan to a less than significant level. Mitigation Measure WQ-1 and Mitigation Measure WQ-2 require the development of plans and BMPs for activities associated with retirement or modification activities associated with the K1 Powerhouse, as well as for the construction of the inflow gage. Under Mitigation Measure WQ-3, when applicable, PG&E would comply with the Construction General Permit (CGP) in order to regulate stormwater discharges from construction sites to minimize the potential mobilization and discharge of pollutants into waterbodies or watersheds. Mitigation Measure WQ-3 also requires the development of a dewatering plan for activities involving in-water work or a water diversion. These requirements would ensure protection of water quality and associated beneficial uses.

Therefore, there would be a **Less than Significant Impact Mitigation Incorporated** on the implementation of a water quality control plan and/or sustainable groundwater management plan with the incorporation of Mitigation Measure WQ-1, WQ-2, and WQ-3 as a result of construction activities under Alternative 2 for potential impact HYD-5.

Operation

The only changes to operation under Alternative 2 are the full or partial replacement of flow measures included in the Proposed Project. Potential impacts to water quality associated with facility inspections and maintenance, recreation site maintenance, vegetation management or pest control, or road and trail use would be the same as described in Section 4.11.4.1.1.

The POM Initial Release Protocol attempts to release initial spills associated with powerhouse outages at 3:30 a.m. so that the initial spill begins prior to recreators entering the PBR and spill flows arrive downstream near the K1 Powerhouse by approximately 8:30 a.m. Based on the alternative modeling of Alternative 2's POM Initial Release Protocol (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), attempting to release spill at 3:30 a.m. in anticipation of forecast inflows consistently caused the reservoir to encroach toward the K2 Powerhouse's minimum operating reservoir elevation before inflows arrived. Without consistent inflows the initial spill associated with an outage begin the previous night or early morning so that spill arrives downstream near the K1 Powerhouse by 8:30 a.m. could not be completed. This led to secondary spill increases later in the day once the reservoir was at full capacity to match reservoir inflows. These secondary increases produced stage rise rates ranging from approximately 1.2 feet to as much as 11.7 feet at downstream monitoring locations. These secondary spikes in the PBR during the day could potentially significantly impact recreation-related beneficial uses identified in the SR/SJR Basin Plan through sudden flow releases from Kerckhoff Dam that increase stage and flow velocity in the PBR.

Alternative 2 also does not contain any gradual ramp up related measures for flows spilled from Kerckhoff Dam. Similar to the Proposed Project and discussed in Section 4.11.4.8.1, this allows for sudden large flow releases from Kerckhoff Dam due to large inflows and can result in potentially significant impacts to recreation-related beneficial uses in the PBR.

Impact Analysis without Mitigation

Therefore, there would be a **Potentially Significant Impact** as a result of operation activities under Alternative 2 for potential impact HYD-5.

Impact Analysis with Mitigation

To reduce the potentially significant impacts, Mitigation Measure WQ-4 and Recommended Mitigation Measure WQ-5 were developed. Mitigation Measure WQ-4 would require PG&E to develop a low level outlet sediment sluicing management plan to reduce the potentially significant impacts related to turbidity levels in the SJR during sediment sluicing activities. Recommended Mitigation Measure WQ-5 would reduce impacts to recreation-related beneficial uses by notifying recreators of spills at Kerckhoff Dam and by prompting recreators to exit the water or water's edge through the use of warning sirens and signage. These requirements would ensure protection of water quality and associated beneficial uses. With implementation of MM WQ-4 and Recommended Mitigation Measure WQ-5 during operation, Alternative 2 would result in a Less than Significant Impact with Mitigation Incorporated.

Recommended Mitigation Measure WQ-5 would reduce impacts to recreation-related beneficial uses in the SR/SJR Basin Plan by notifying recreators of spills at Kerckhoff Dam and by prompting recreators to exit the water.. Warning sirens are currently installed at the K1 and K2 powerhouses to alert those in the vicinity of flow releases. However, PG&E's FLA (2023) and Public Safety Plan submitted to FERC (PG&E 2021) did not detail how warning sirens at the Kerckhoff Hydroelectric Project facilities alert recreators of spill from Kerckhoff Dam.

Implementation of Recommended Mitigation Measure WQ-5 would require PG&E to develop and implement a plan in consultation with BLM, USFS, and the State Water Board, for situations where a larger stage change than one foot per hour, as measured at Gage J-2 is expected and has the potential to impact recreators or whitewater boaters. The protocols would include the times of day that PG&E would activate the sirens and would be based on the estimated flow travel times to downstream recreation sites. Recommended Mitigation Measure WQ-5 would require any facility upgrades

needed to ensure the sirens can be heard at recreation sites throughout the PBR (from Kerckhoff Dam to the K2 Powerhouse). In addition, PG&E would ensure proper signage will be posted at or near recreation areas to educate recreators of the meaning of sirens and warn recreators of the possibility of sudden flow changes and the associated dangers with those changes in the PBR (sudden increases and decreases in flow).

In summary, implementation of Recommended Mitigation Measure WQ-5 would require PG&E to develop and implement an Instream Flow Public Safety Plan. Implementation of Recommended Mitigation Measure WQ-5 would reduce the potentially significant impact associated with the Proposed Project to Less than Significant with Mitigation Incorporated.

On March 11, 2026, State Water Board staff provided Recommended Mitigation Measure WQ-5 to PG&E staff and requested that PG&E agree to implement the measure to ensure that Proposed Project impacts remain less than significant with mitigation. On March 17, 2026, PG&E responded that it does not plan to agree to mitigation measures to reduce Proposed Project impacts to a less-than-significant level without first reviewing the draft EIR upon its circulation. On March 19, 2026 PG&E provided comments and suggested edits to the mitigation measures shared on March 11, 2026 (personal email communication, J. Hartman and C. McCormick, March 19, 2026). Without commitment from PG&E, implementation of Recommended Mitigation Measure WQ-5 is uncertain.

Without implementation of Recommended Mitigation Measure WQ-5 or comparable action, the Proposed Project's impacts to the implementation of a water quality control plan, such as recreation-related beneficial uses in the SR/SJR Basin Plan, are **Significant and Unavoidable.**

Mitigation Measures

Mitigation Measure WQ-1: Retirement Plan for Kerckhoff 1 Powerhouse and Associated Facilities

Mitigation Measure WQ-2: San Joaquin River Above Kerckhoff Reservoir Inflow Gage Plan

Mitigation Measure WQ-3: Construction General Permit, WQMP and Dewatering Plans

Mitigation Measure WQ-4: A Low-Level Outlet Sediment Sluicing Management Plan

Recommendation Mitigation Measure WQ-5: Instream Flow Public Safety Plan

Level of Significance

Significant and Unavoidable

4.11.5 Literature Cited

BLM (United States Bureau of Land Management). 2014. *Bakersfield Field Office Record of Decision and Approved Resource Management Plan*. United States Department of the Interior, Bureau of Land Management. December. Accessed: April 3, 2026. Retrieved from: https://www.govinfo.gov/content/pkg/GOVPUB-I53-PURL-gpo83734/pdf/GOVPUB-I53-PURL-gpo83734.pdf.

CDFW (California Department of Fish and Wildlife). 2025. Comments on Draft License Application for Kerckhoff Hydroelectric Project (P-96). Accessed April 6, 2026. Available online: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20201006-5012v.

CDWR (California Department of Water Resources). 2020. Water data library: Accessed April 6, 2026. Available at: https://wdl.water.ca.gov/waterdatalibrary/Map.aspx.

_____. 2026. Sustainable Groundwater Management Act (SGMA). Accessed April 6, 2026. Retrieved from:https://water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management.

CDEC (California Data Exchange Center). 2024. Database queries of available water quality data for 2012. Accessed April 6, 2026. Available at: https://ceden.waterboards.ca.gov/AdvancedQueryTool.

Central Valley Regional Water Board (Central Valley Regional Water Quality Control Board). 2019. *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region*. Fifth Edition, Revised February 2019 (with Approved Amendments). The Sacramento River Basin and San Joaquin River Basin. Accessed: April 3, 2026. Retrieved from: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201902.pdf.

Ecological Analysts. 1982. *Fisheries studies at Millerton Lake, 1979–1982*. Prepared for Pacific Gas and Electric Company. Department of Engineering Research, San Ramon, CA. 82 pp.

FEMA (Federal Emergency Management Administration). 2009. Map Number 06019C0400H; Flood Insurance Map (FIRM). Accessed: April 6, 2026. Retrieved from: https://msc.fema.gov/portal/search?AddressQuery=Kerckhoff%20Dam%2C%20CA%2C%20US.

Fresno County. 2024. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

Madera County. 1995. *Madera County General Plan Policy Document.* Adopted October 24. Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/40825/638615574804870000.

NES (National Environmental Services, Inc.). 1986a. *Fisheries studies at Millerton Lake, 1984, 1985*. Prepared by National Environmental Services, Inc. for Pacific Gas and Electric Company Department of Engineering Research, San Ramon, CA.

———. 1986b. *Fisheries studies at Millerton Lake, 1986*. Prepared for Pacific Gas and Electric Company, Department of Engineering Research, San Ramon, CA.

———. 1987. *Fisheries studies at Millerton Lake.* Prepared for Pacific Gas and Electric Company, Department of Engineering Research, San Ramon, CA.

OEHHA (Office of Environmental Health Hazard Assessment). 2005. *General Protocol for Sport Fish Sampling and Analysis*. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Pesticide and Environmental Toxicology Branch. December. Accessed: April 6, 2026. Retrieved from: https://www.waterboards.ca.gov/water_issues/programs/tmdl/records/state_board/2008/ref2661.pdf.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding "Kerckhoff: Prefilling Meeting & CEQA Discussion," on January 13, 2026.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas & Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding "Kerckhoff: Ramping Follow-Up," on March 5, 2026.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas & Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding "Kerckhoff CEQA Mitigation Measures" on March 19, 2026.

PG&E (Pacific Gas and Electric Company). 1978. *Fisheries and Stream Temperature Studies of the SJR, Kerckhoff Project FERC Project No. 96*.

_____. 1980. *Pacific Gas and Electric Company and State of California Agreement Relating to FERC Project No. 96 Kerckhoff Project*.

_____. 2017. *Pre-Application Document (PAD), Kerckhoff Hydroelectric Project, FERC Project No. 96*. San Francisco, CA. November.

_____. 2019. *Technical Study Report (TSR-02), Project-Related Sediment Management Practices in Kerckhoff Reservoir (Study GEO-2)*.

_____. 2020a. *Final Application for New License for the Kerckhoff Hydroelectric Project, FERC No. 96*. November 20.

_____. 2020b. *Technical Study Report 22 (TSR-22): Water Temperature in Project Bypass Reach and Kerckhoff Reservoir (WQ-1)*.

_____. 2020c. *Technical Study Report 21 (TSR-21): Water Quality Sampling in the Project Bypass Reach and Kerckhoff Reservoir (WQ-2). Kerckhoff Hydroelectric Project, FERC Project No. 96*.

_____. 2020d. *Technical Study Report 26 (TSR-26): Bioaccumulation in Kerckhoff Reservoir (WQ-3)*.

_____. 2020e. *Technical Study Report 24 (TSR-24): Fish Populations (AQ-2)*.

_____. 2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

_____. 2024. *Kerckhoff Hydroelectric Project, FERC Project No. 96 Reply Comments*. November 12.

Reclamation (United States Bureau of Reclamation). 2014. *Reclamation Managing Water in the West, Upper SJR Basin Storage Investigation, Draft Environmental Impact Statement*. U.S. Department of the Interior, Bureau of Reclamation. Accessed: April 6, 2026. Retrieved from: https://www.usbr.gov/mp/nepa/includes/documentShow.php?Doc_ID=19081.

_____. 2019. Table Mountain Rancheria 25-year Warren Act Contract. Final Environmental Assessment (EA-18-021). October 2019.

State Water Board (State Water Resources Control Board). 2018. Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California. October 19, 2018.

_____. 2019a. Bacteria Provisions and a Water Quality Standards Variance Policy. Accessed April 6, 2026. Retrieved from: https://www.waterboards.ca.gov/bacterialobjectives/docs/bacteria.pdf.

_____. 2019b. Wetland and Riparian Area Protection Policy (WRAPP): Clean Water Act Section 401 Certification and Wetlands Program. Accessed: March 31, 2026. Available at: https://www.waterboards.ca.gov/water_issues/programs/cwa401/wrapp.html.

_____. 2021. State Water Resources Control Board Resolution No. 2021-0012: Confirmation that the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State are in Effect as State Policy for Water Quality Control. April 6. Accessed: March 31, 2026. Available at:

https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2021/rs2021-0012.pdf.

_____. 2022a. *2020-2022 California Integrated Report Map*. May 11. Accessed: April 6, 2026. Retrieved from: https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2020_2022_integrated_report.html.

_____. 2022b. NPDES 20220 Construction Stormwater General Permit Reissuance. Accessed: March 31, 2026. Available at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction/general_permit_reissuance.html.

_____. 2023. Surface Water Ambient Monitoring Program (SWAMP). Accessed: April 6, 2026. Retrieved from: https://www.waterboards.ca.gov/water_issues/programs/swamp/. .

_____. 2026. *Porter-Cologne Water Quality Control Act*. January. Accessed: April 6, 2026. Retrieved from: https://www.waterboards.ca.gov/laws_regulations/docs/portercologne.pdf.

USEPA (U.S. Environmental Protection Agency). 1986. Quality Criteria for Water. Accessed: April 6, 2026. Retrieved from: https://www.epa.gov/sites/default/files/2018-10/documents/quality-criteria-water-1986.pdf.

_____. 1996. *Determination of trace elements in ambient waters by inductively coupled plasma-mass spectrometry, Method 1638*. July.

_____. 2001. Water Quality Criterion for the Protection of Human Health: Methylmercury. Accessed April 6, 2026. Retrieved from:https://www.epa.gov/sites/default/files/2020-01/documents/methylmercury-criterion-2001.pdf.

_____. 2018. EPA-FDA Fish Advice: Technical Information. Accessed: November 2023. Retrieved from https://www.epa.gov/fish-tech.

_____. 2026. National Recommended Water Quality Criteria – Aquatic Life Criteria Table. Accessed April 7, 2027. Retrieved from:

https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table.

USGS (United States Geological Survey). 2026a. Kerckhoff Reservoir near Auberry, CA. Gage Number 11246650. Accessed April 6, 2026. Retrieved from: https://waterdata.usgs.gov/monitoring-location/USGS-11246650/#dataTypeId=daily-00054-0&period=P1Y&showFieldMeasurements=true.

_____. 2026b. Kerckhoff Powerhouse No. 2 at Millerton Lake near Auberry, CA. Gage Number 11247050. Accessed April 6, 2026. Retrieved from: https://waterdata.usgs.gov/monitoring-location/USGS-11247050/#dataTypeId=daily-00060-0&period=P1Y&showFieldMeasurements=true.

_____. 2026c. San Joaquin River near Auberry, CA. Gage Number 11246700. Accessed April 6, 2026. Retrieved from: https://waterdata.usgs.gov/monitoring-location/USGS-11246700/#dataTypeId=daily-00060-0&period=P1Y&showFieldMeasurements=true.

USFS (United States Forest Service). 2023. *Land Management Plan for the Sierra National Forest: Fresno, Madera, and Mariposa Counties, California*. Accessed: April 3, 2026. Retrieved from: https://acconsensus.org/wp-content/uploads/2024/08/05-SNF_LMP_final_20230504_Web.pdf.

USFWS (United States Fish and Wildlife Service). 2020. Comments on Draft License Application Kerckhoff Hydroelectric Project (P-96). Accessed April 6, 2026. Available online: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20200929-5012&optimized=false.

WRCC (Western Regional Climate Center). 2020. [Online database] Climate data for the vicinity of the Project. Accessed: April 6, 2026. Retrieved from: https://wrcc.dri.edu/.

4.12 LAND USE AND PLANNING

This section describes existing conditions and analyzes potential impacts on land use and planning from implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts on land use and planning from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.12-1).

Table 4.12-1: CEQA Checklist for Land Use and Planning

Would the Project:	**Proposed Project**	**Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping**	**Alternative 2: Proposed Project with BLM Revised 4(e) Conditions**
Impact LAND-1: Physically divide an established community?	No Impact	No Impact	No Impact
Impact LAND-2: Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	No Impact	No Impact	No Impact

4.12.1 Environmental Setting

4.12.1.1 Regional Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located in the foothills of the western slope of the Sierra Nevada on the San Joaquin River (SJR) in sparsely populated areas of Fresno and Madera counties. The upper SJR drainage basin is highly developed for hydroelectric generation, flood control, and irrigation storage. In general, development in the vicinity of the Proposed Project is constrained by steep terrain, limited road access, and the presence of public lands, and only a few scattered rural residences are present.

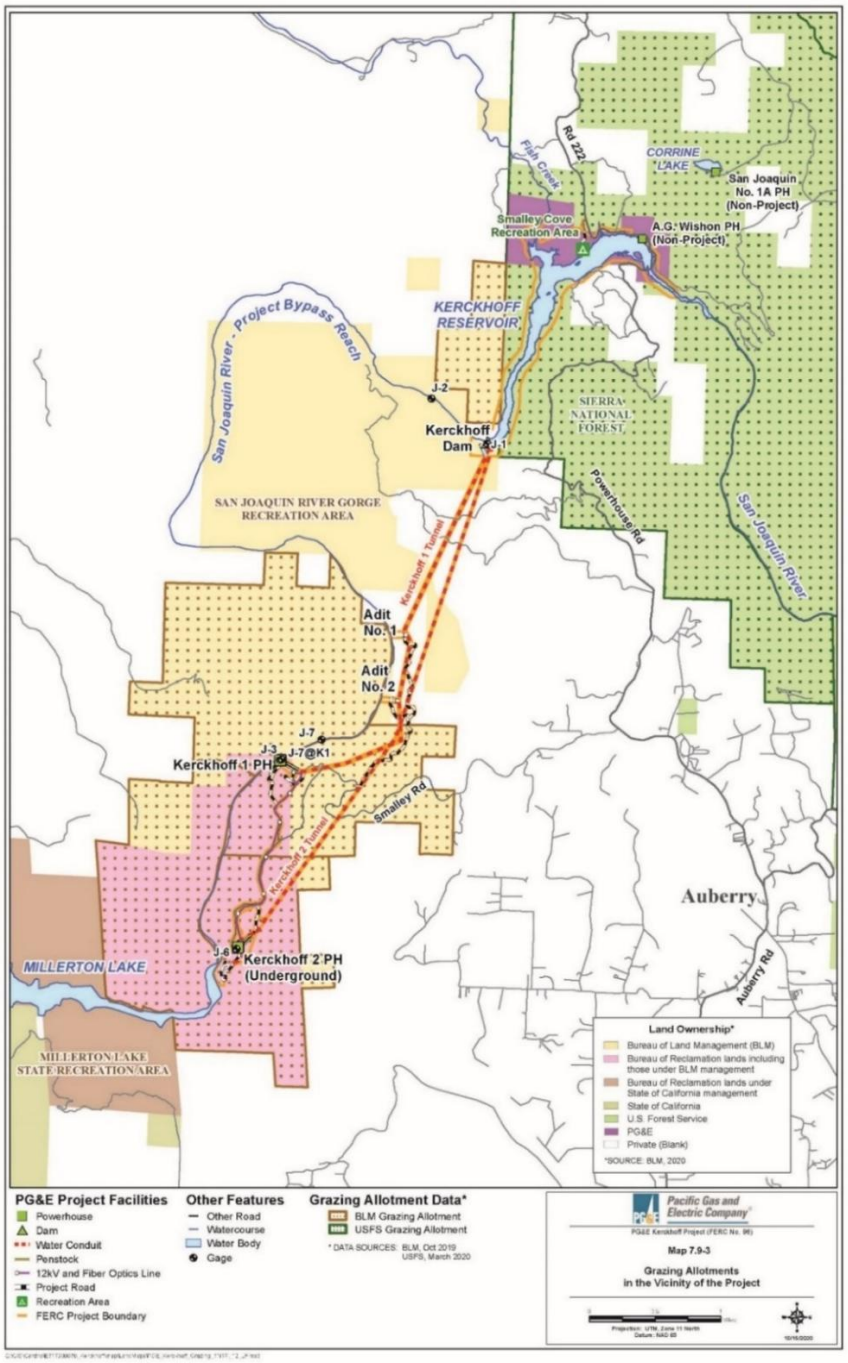
The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public lands administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and United States Bureau of Reclamation (Reclamation) under BLM management.

Private lands, which are crossed by both the Kerckhoff 1 (K1) and Kerckhoff 2 (K2) tunnels, include land within the Kerckhoff Lake Planning Unit of the Pacific Forest and Watershed Lands Stewardship Council, a private, non-profit foundation that was established in 2004 as part of a PG&E bankruptcy settlement. The Kerckhoff Lake Planning Unit of the Pacific Forest and Watershed Lands Stewardship Council lands, under a conservation easement approved by Federal Energy Regulatory Commission (FERC or Commission) and held by the Sierra Foothill Conservancy, is located at the northern end of Kerckhoff Reservoir and managed to protect habitat for native fish, wildlife, and plants; forest resources; scenic views; and outdoor recreation, pursuant to the terms of the FERC license (PG&E 2020).

The USFS-SNF manages most of the lands underlying and surrounding the southern half of Kerckhoff Reservoir and also the area on the north side of the reservoir near Smalley Cove Recreation Area. No other facilities are located on USFS-SNF lands. BLM manages the SJR Gorge Recreation Area, which is located on the south side of the reservoir, about eight miles downstream of Kerckhoff Dam.

Land use within the Proposed FERC Project Boundary that surrounds the K1 Powerhouse primarily consists of activities associated with hydropower generation, except where the Proposed FERC Project Boundary follows the K1 Tunnel, which is entirely underground, and, therefore, does not affect land use at the surface. Outside the Proposed FERC Project Boundary and along the K1 Tunnel alignment, land use primarily consists of recreation and grazing, both managed by BLM, and private land uses where the K1 Tunnel and existing Proposed Project facility road segments cross private land. Land ownership and land use in the vicinity of the Proposed Project are shown on Figure 4.12-1.

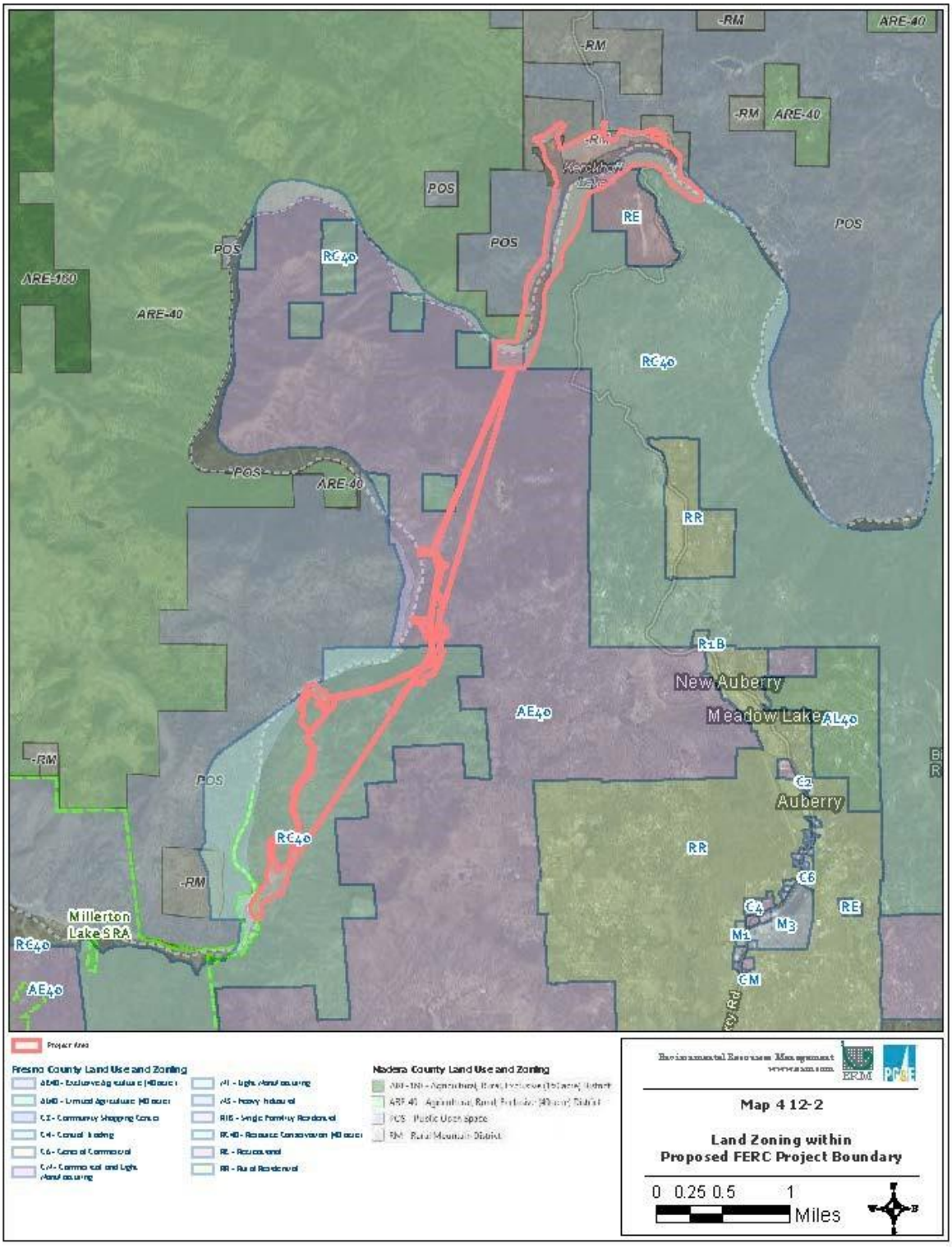
Land use and zoning within the Proposed FERC Project Boundary and in the vicinity of the Proposed Project are shown on Figure 4.12-2. The Proposed FERC Project Boundary runs through Rural Mountain District and Public Open Space zones in Madera County and Recreational, Exclusive Agricultural, and Resource Conservation zones in Fresno County.



Source: PG&E 2020

BLM = United States Bureau of Land Management; FERC = Federal Energy Regulatory Commission; kV = kilovolt; PG&E = Pacific Gas and Electric Company; USFS = United States Forest Service

Figure 4.12-1: Land Ownership and Land Use in Proposed Project Vicinity



Source: Fresno County n.d.; Madera County n.d.

Figure 4.12-2: Land Use and Zoning in the Proposed Project Vicinity

4.12.2 Regulatory Background

The following subsections contain an overview of regulations related to land use and planning.

4.12.2.1 Federal

4.12.2.1.1 Federal Power Act

The Federal Power Act (Title 16 United States Code [USC] Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created FERC and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations [CFR] Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.12.2.1.2 United States Forest Service

Sierra National Forest Land Management Plan

The United States Forest Service (USFS) uses the direction in the revised *Land Management Plan for the Sierra National Forest*, pursuant to the 2012 Forest Service Planning Rule (36 CFR Part 219), to guide its decisions regarding the relicensing of the Proposed Project and the development of associated license conditions (USFS 2023). The revised plan aims to help sustain forest and watershed health and productivity by addressing tree mortality, restoring forest conditions, facilitating use of fire to achieve desired conditions, and providing for sustainable recreation. According to the plan, Kerckhoff Reservoir is located in the San Joaquin Conservation Watershed, which contains much of the middle and upper SJR watershed area in the USFS-SNF (USFS 2023). The plan provides general guidance for the management of conservation watersheds.

4.12.2.1.3 United States Bureau of Land Management

Bakersfield Field Office Resource Management Plan

Proposed Project activities that occur on public lands managed by BLM must be consistent with BLM's *Bakersfield Field Office Record of Decision and Approved Resource Management Plan* (RMP) (BLM 2014). Kerckhoff Dam and the K1 and K2 Powerhouses are located within the BLM-managed SJR Gorge Special Recreation Management Area, which also is identified as a special recreation management area. The RMP identifies comprehensive management direction for all resources and uses. Although it does not contain any objectives specific to operation of the Proposed Project, it identifies three special recreational management zones (RMZ) within the SJR Gorge Recreation Area: Pa'san RMZ, Wuh-ki'o RMZ, and Tahoot RMZ. BLM will use the direction contained in the RMP for these three RMZs to guide its decisions regarding the relicensing of the Proposed Project and the development of associated license conditions (PG&E 2020).

4.12.2.2 State

No state regulations related to land use and planning are applicable to the Proposed Project.

4.12.2.3 Local

Review of the Fresno County General Plan (Fresno County 2024) and Madera County General Plan (Madera County 1995) did not yield any land use policies or programs specific to the Proposed Project. However, both plans include policies that encourage the protection and enhancement of water quality, aquatic and wildlife habitat, recreation resources, and cultural resources throughout the counties, including along the SJR corridor (Fresno County 2024; Madera County 1995).

4.12.3 Analysis Methodology

4.12.3.1 Analytical Approach

For this analysis, construction and operation of the Proposed Project was reviewed for conformance with applicable federal and local land use designations, policies, and implementation measures, and county zoning designations and code. The Proposed Project Area for assessing potential impacts on land use and planning is the Proposed FERC Project Boundary.

4.12.3.2 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on land use and planning if it would:

- Physically divide an established community (LAND-1); or
- Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect (LAND-2)

4.12.3.3 Environmental Management Measures and Monitoring Plans

The following Proposed Project monitoring plans designed to protect, maintain, or enhance resources are pertinent to land use and planning.

4.12.3.3.1 Project Road and Trail Maintenance Plan

The Proposed Project's Project Road and Trail Maintenance Plan includes regularly inspecting and maintaining the Proposed Project roads and trails to ensure safe access to Proposed Project facilities. The maintenance performed under the Proposed Project's Project Road and Trail Maintenance Plan would be coordinated with activities conducted under the Proposed Project's Vegetation Management and Pest Control Plan for appropriate vegetation maintenance and in accordance with the Proposed Project's Historic Properties Management Plan (HPMP). The environmental management measures in the monitoring plan, such as best management practices (BMP), would ensure compliance with relevant plans, policies, and regulations.

4.12.3.3.2 Recreation Management Plan

The Proposed Project's Recreation Management Plan includes guidance on construction, maintenance, and operation of existing and Proposed Project recreation facilities, managing Kerckhoff Reservoir shoreline access, and minimizing resource damage from recreation use. The environmental management measures in the monitoring plan, such as BMPs, would ensure compliance with relevant plans, policies, and regulations.

4.12.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project*

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff

Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Proposed Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner than simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cubic feet per second (cfs) for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured

at Gage J-2. The ramp up in the Project Bypass Reach cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage

ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.12.4.1 Potential Impacts Related to Established Communities

Impact LAND-1: Would the Project physically divide an established community?

4.12.4.1.1 Proposed Project

Construction and Operation

The Proposed Project is not located in an established community, and thus, would not physically divide an established community.

Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact LAND-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.12.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as described in Section 4.12.4.1.1. Alternative 1 would not physically divide an established community. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact LAND-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.12.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as described in Section 4.12.4.1.1. Alternative 2 would not physically divide an established community. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact LAND-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.12.4.2 Potential Impacts Related to Land Use Plans, Policies, and Regulations

Impact LAND-2: Would the Project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

4.12.4.2.1 Proposed Project

Construction and Operation

The Proposed Project does not conflict with identified county general plans, BLM's (2014) Bakersfield RMP, or USFS's (2023) *Land Management Plan for the Sierra National Forest*. Land use designations would not change as a result of modifications to the existing FERC Project Boundary or retirement of the K1 Powerhouse; all lands would continue to maintain the existing land use designations identified in Fresno County (2024) and Madera County (1995) general plans. Additionally, Proposed Project facilities located in the SJR Gorge Recreation Area would continue to be operated and maintained in a manner that is consistent with the goals and objectives established, and boundary modifications would not affect the SJR's eligibility or suitability as a Wild and Scenic River.

Proposed Project operation would not conflict with any existing or planned land uses outlined in county general plans, BLM's Bakersfield RMP, or USFS's *Land Management Plan for the Sierra National Forest*. The Proposed Project's Project Road and Trail Maintenance Plan, HPMP, and Recreation Management Plan identified environmental management measures to protect environmental, recreational, and cultural resources, as well as BMPs to minimize erosion and runoff and protect water quality that would ensure compliance with county general plans, BLM's Bakersfield RMP, and USFS *Land Management Plan for the Sierra National Forest* (PG&E 2023). PG&E would continue to operate and maintain the Proposed Project to conform to the goals, objectives, policies, and measures outlined in Fresno County (2024) and Madera County (1995) general plans, BLM's Bakersfield RMP (BLM 2014), and the USFS *Land Management Plan for the Sierra National Forest* (USFS 2023).

Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact LAND-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.12.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as described in Section 4.12.4.2.1. Alternative 1 would not cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact LAND-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.12.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as described in Section 4.12.4.2.1. Alternative 2 would not cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact LAND-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.12.5 Literature Cited

BLM (United States Bureau of Land Management). 2014. *Bakersfield Field Office Record of Decision and Approved Resource Management Plan*. United States Department of the Interior, Bureau of Land Management. December. Accessed: April 3, 2026. Retrieved from: https://www.govinfo.gov/content/pkg/GOVPUB-I53-PURL-gpo83734/pdf/GOVPUB-I53-PURL-gpo83734.pdf.

Fresno County. n.d. GIS Shapefiles. Accessed: March 30, 2026. Retrieved from: https://datasharing-cofgisonline.hub.arcgis.com/search?collection=dataset.

_____. 2024. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

Madera County. n.d. Madera County Land Use. Accessed: October 2023. Retrieved from: https://gis.maderacounty.com/portal/apps/instant/basic/index.html?appid=df564f893e1945a88543a76040b8a297.

_____. 1995. *Madera County General Plan Policy Document*. Adopted October 24. Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/40825/638615574804870000.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

PG&E (Pacific Gas and Electric Company). 2020. *Final Application for New License for the Kerckhoff Hydroelectric Project, FERC Project No. 96.* November 20.

_____. 2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

USFS (United States Forest Service). 2023. *Land Management Plan for the Sierra National Forest*: *Fresno, Madera, and Mariposa Counties, California*. Accessed:

April 3, 2026. Retrieved from: https://acconsensus.org/wp-content/uploads/2024/08/05-SNF_LMP_final_20230504_Web.pdf.

4.13 MINERAL RESOURCES

This section describes existing conditions and analyzes potential impacts on mineral resources from implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts on mineral resources from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.13-1).

Table 4.13-1: CEQA Checklist for Mineral Resources

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact MIN-1: 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?	No Impact	No Impact	No Impact
Impact MIN-2: Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	No Impact	No Impact	No Impact

4.13.1 Environmental Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located in the foothills of the western slope of the Sierra Nevada on the San Joaquin River (SJR) in a sparsely populated area of Fresno and Madera counties, California. The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public lands administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and United States Bureau of Reclamation (Reclamation) under BLM management.

The Kerckhoff Hydroelectric Project Area is defined as all areas within the existing Federal Energy Regulatory Commission (FERC or Commission) Project Boundary. Generally, the Kerckhoff Hydroelectric Project Area is characterized by complex geologic formations and historically significant mineral occurrences. The regional geology consists primarily of Mesozoic granitic rocks of the Sierra Nevada batholith, including granodiorite, quartz diorite, and tonalite, with lesser areas of metamorphic roof pendants and metavolcanic rocks. These formations are generally resistant to erosion and provide the structural foundation for the Kerckhoff Hydroelectric Project facilities. The bedrock in the vicinity of Kerckhoff Reservoir and the SJR corridor is dominated by granitic lithologies, which have historically supported limited mineral development, primarily for construction materials rather than metallic ores.

Mineral resources; including feldspar, sand and gravel, and tungsten; are present approximately two miles from the Proposed FERC Project Boundary; however, no mineral resources of regional or statewide value are known to occur therein. According to the Fresno County General Plan Mineral Resource Locations Map and the Madera County General Plan Mineral Resource Zones (MRZ) Map, no locally important mineral resource recovery sites have been designated within the Proposed FERC Project Boundary (Fresno County 2024; Madera County 1995b). The United States Geological Survey (USGS) Mineral Resources Data System (MRDS) has not identified any MRZs or active/permitted mining or aggregate resources of regional significance within the

Proposed FERC Project Boundary (USGS 2023). The MRDS maps identify two closed former placer mines (Oversight Placer Gold Mine and Clyde Mine) immediately adjacent to the Proposed FERC Project Boundary, located along Smalley Road near the Kerckhoff 2 (K2) Tunnel and along Road 222 near the northwest side of the Kerckhoff Reservoir, respectively. The MRDS map identifies these mines as former operating mines that have closed. As such, the mining equipment or structures may have been removed or abandoned.

4.13.2 Regulatory Background

The following subsections contain an overview of regulations related to Kerckhoff Hydroelectric Project mineral resources.

4.13.2.1 Federal

4.13.2.1.1 Federal Power Act

The Federal Power Act (Title 16 United States Code [USC] Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created FERC and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations [CFR] Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.13.2.1.2 United States Bureau of Land Management

Bakersfield Field Office Resource Management Plan

Proposed Project activities that occur on public lands managed by the BLM must be consistent with BLM's *Bakersfield Field Office Record of Decision and Approved Resource Management Plan* (RMP) (BLM 2014). The Bakersfield RMP identifies comprehensive management direction for all resources and uses and provides broad-scale guidance on project implementation for renewable energy, fluid mineral, livestock

grazing, and recreation management. The Kerckhoff Dam, Kerckhoff 1 (K1) Powerhouse, and K2 Powerhouse are located within the BLM-managed SJR Gorge Special Recreation Management Area, which is also identified as a special recreation management area in BLM's Bakersfield RMP.

4.13.2.1.3 United States Forest Service

Sierra National Forest Land Management Plan

The United States Forest Service (USFS) uses guidance in the revised *Land Management Plan for the Sierra National Forest* (USFS 2023), pursuant to the 2012 Forest Service Planning Rule (36 CFR Part 219), for decision-making regarding the relicensing of the Proposed Project and the development of associated license conditions. According to the revised Land Management Plan, mineral extraction and development are limited in the USFS-SNF; although historically, mining played an important role in the area. Policies relevant to mineral resources in the Proposed Project include Goal (GEO-FW-GOAL) 03, which seeks to return disturbed areas to former vegetated condition and address potential water quality issues on abandoned mine lands (USFS 2023).

4.13.2.2 State

The California Surface Mining and Reclamation Act of 1975 requires that the State Geologist classify land into MRZs according to the known or inferred mineral potential of the land (Public Resources Code Sections 2710 to 2796).

4.13.2.3 Local

The Fresno County General Plan (Fresno County 2024) and Madera County General Plan (Madera County 1995b) recognize state-designated MRZs. In addition, the Open Space and Conservation Element of the Fresno County General Plan and the Agriculture and Natural Resources section of the Madera County General Plan provide goals and policies for mineral resources to protect the current and future extraction of mineral resources important to the economies of Fresno and Madera counties while minimizing potential impacts on the public and the environment (Fresno County 2024;

Madera County 1995b). The *Fresno County General Plan, Background Report* (Fresno County 2023) and *Madera County General Plan, Background Report* (Madera County 1995a) do not designate any locally important mineral resources within the Proposed FERC Project Boundary.

4.13.3 Analysis Methodology

4.13.3.1 Analytical Approach

For this analysis, the potential Proposed Project impacts related to mineral resources were evaluated against applicable regulations (described above) and the CEQA significance criteria. The Area of Analysis for addressing mineral resources is the Kerckhoff Hydroelectric Project Area, which is within Fresno and Madera counties.

Mineral resource data were obtained from the *Fresno County General Plan, Background Report* (Fresno County 2023); the *Madera County General Plan, Background Report* (Madera County 1995a); and the USGS Mineral Resources Online Spatial Data website (USGS 2023), which incorporates MRDS information.

4.13.3.2 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on mineral resources if it would:

- 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 (MIN-1); or
- 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 (MIN-2)

4.13.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir,

upgrading two manual radial gates on the dam to be automated, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down-ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating

benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cubic feet per second (cfs) for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the Project Bypass Reach cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient[1] storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill

[1] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this

modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.13.4.1 Potential Impacts Related to Loss of a Known Mineral Resource

Impact MIN-1: Would the Project 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?

4.13.4.1.1 Proposed Project

Construction and Operation

No known mineral resources of regional or statewide value have been identified in the Proposed Project's Area of Analysis. The USGS MRDS and PG&E's geologic studies confirm there are no active mining claims or designated MRZs within the Area of Analysis. Fresno and Madera County planning documents also identify no designated MRZs or active mineral operations within the Area of Analysis. No mineral extraction would occur under the Proposed Project. Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact MIN-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.13.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project, discussed above in Section 4.13.4.1.1. Alternative 1 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, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact MIN-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.13.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project, discussed above in Section 4.13.4.1.1. Alternative 2 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, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact MIN-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.13.4.2 Potential Impacts Related to the Loss of Locally-Important Mineral Resource Recovery Site

Impact MIN-2: Would the Project 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?

4.13.4.2.1 Proposed Project

Construction and Operation

No known locally important mineral resource recovery sites are delineated within the Proposed Project's Area of Analysis in the Fresno County General Plan (Fresno County 2024) and Madera County General Plan (Madera County 1995b), nor in other specific or land use plans within Fresno and Madera counties. Fresno County planning documents identify policies for mineral resource protection but do not map any MRZs or recovery sites in the Area of Analysis. Similarly, the Madera County planning documents include mineral resource policies but do not designate any locally important mineral resource recovery sites within the Area of Analysis. Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact MIN-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.13.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project, discussed above in Section 4.13.4.2.1. Alternative 1 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. Therefore, there would be **No Impact**

as a result of construction or operational activities under Alternative 1 for potential impact MIN-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.13.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project, discussed above in Section 4.13.4.2.1. Alternative 2 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. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact MIN-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.13.5 Literature Cited

BLM (United States Bureau of Land Management). 2014. *Bakersfield Field Office Record of Decision and Approved Resource Management Plan*. United States Department of the Interior, Bureau of Land Management. December. Accessed April 3, 2026. Retrieved from: https://www.govinfo.gov/content/pkg/GOVPUB-I53-PURL-gpo83734/pdf/GOVPUB-I53-PURL-gpo83734.pdf.

Fresno County. 2023. *Fresno County General Plan Background Report.* General Plan Review and Revision, Public Review Draft. April. Accessed: April 3, 2026.

Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/2/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr-background-report-2023-05-10.pdf.

_____. 2024. *Fresno County General Plan Policy Document.* Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

Madera County. 1995a. *Madera County General Plan Background Report*. Adopted October 24. Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/2852/636480653566630000.

_____. 1995b. *Madera County General Plan Policy Document*. Adopted October 24. Accessed: April 3, 2026. Retrieved from:https://www.maderacounty.com/home/showpublisheddocument/40825/638615574804870000.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

USFS (United States Forest Service). 2023. *Land Management Plan for the Sierra National Forest: Fresno, Madera, and Mariposa Counties, California*. Accessed: April 3, 2026. Retrieved from: https://acconsensus.org/wp-content/uploads/2024/08/05-SNF_LMP_final_20230504_Web.pdf.

USGS (United States Geological Survey). 2023. Mineral Resources Online Spatial Data. Accessed: April 3, 2026. Retrieved from: https://mrdata.usgs.gov/.

4.14 NOISE

This section describes existing conditions and analyzes potential impacts on noise as a result of implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts on noise from the Proposed Project, Alternative 1, and Alternatives 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.14-1).

Table 4.14-1: CEQA Checklist for Noise

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact NOI-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 applicable standards of other agencies?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact NOI-2: Generation of excessive ground-borne vibration or ground-borne noise levels?	No Impact	No Impact	No Impact
Impact NOI-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?	No Impact	No Impact	No Impact

4.14.1 Environmental Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located in the foothills of the western slope of the Sierra Nevada on the San Joaquin River (SJR) in a sparsely populated area of Fresno and Madera counties, California. Land use near the Kerckhoff Hydroelectric Project primarily consists of hydroelectric and water resources development, recreation use, and a few scattered rural residences. The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public land administered by the United States Forest Service, Sierra National Forest (USFS-SNF);

BLM; and United States Bureau of Reclamation (Reclamation) under BLM management.

Certain land uses are considered to be more sensitive to noise levels than others, such as schools, recreation sites (e.g., trails, playgrounds), day care facilities, nursing homes, hospitals, and residences (Valley Air District 2015). Excessive noise levels could disrupt activities or cause adverse health effects at these locations. Sensitive land uses near the Kerckhoff Hydroelectric Project include recreation areas and residences. Recreation areas near Kerckhoff Reservoir include the Smalley Cove Recreation Area located approximately 1.7 miles from Kerckhoff Dam. BLM's SJR Gorge Special Recreation Management Area is in the vicinity of the existing Kerckhoff 2 (K2) Powerhouse, straddling the SJR along Smalley Road. The Ya-Gub-Weh-Tuh Trailhead and the Wuh-ki'o Trailhead are within approximately 0.6 mile (3,000 feet) of the Kerckhoff 1 (K1) Powerhouse and adjacent to Smalley Road. The Horseshoe Bend Trailhead is approximately two miles from the dam. The nearest residences along Powerhouse Road are located greater than 1,000 feet from the existing Federal Energy Regulatory Commission (FERC or Commission) Project Boundary; most residences in the community of New Auberry, California, are more than one mile from the Kerckhoff Hydroelectric Project.

Existing sources of noise within the existing FERC Project Boundary and the Smalley Cove Recreation area include environmental sources (i.e., wind and water), equipment used for routine operation and maintenance activities, transportation sources, and recreational activities. Additionally, PG&E utilizes public safety warnings when flow increases are expected in the Project Bypass Reach (PBR), which includes the sounding of warning sirens. The warning siren activation accounts for the travel time of water along the river corridor allowing warning sirens to be activated in advance of higher flows reaching BLM recreation areas near the BLM footbridge (PG&E 2026). Noise levels are presumably higher closer to transportation and recreation sources.

4.14.2 Regulatory Background

The following sections contain an overview of regulations related to noise.

4.14.2.1 Federal

4.14.2.1.1 Federal Power Act

The Federal Power Act (16 United States Code [USC] Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created FERC and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (18 Code of Federal Regulations [CFR] Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.14.2.2 State

No state regulations related to noise are applicable to the Proposed Project.

4.14.2.3 Local

The Madera County General Plan (*Noise* section; Madera County 1995b) outlines allowable noise exposure for non-transportation sources in terms of hourly equivalent continuous sound level (hourly L_{eq}) and as a maximum level. According to the Madera County General Plan, typical noise levels in noise sensitive areas in unincorporated areas of Madera County are in the range of 41 to 63 decibel (dB) as a day-night average (Madera County 1995a). Therefore, a range of approximately 40 to 60 dB was used as the background ambient noise level when evaluating potential Proposed Project impacts due to noise (Section 4.14.4). The development of new noise-sensitive land uses, such as a recreation area, are not permitted where the noise level from existing non-transportation sources exceeds the levels specified in Table 4.14-2.

Table 4.14-2: Maximum Allowable Noise Exposure for Non-Transportation Sources

Level	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly L_{eq} (dB)	50	45
Maximum level (dB)	70	65

Source: Madera County 1995a

The Fresno County General Plan (*Health and Safety Element*; Fresno County 2024a) outlines land use compatibility with community noise. The compatibility guidelines define the acceptable outdoor noise exposure levels for a variety of proposed land use categories. The Proposed Project is included in the compatibility guidelines for the utility category. The development of new sensitive land uses, such as a recreation site, are only allowed in areas where existing noise levels are acceptable (Fresno County 2024a). The guidelines identify a normally acceptable noise exposure level for proposed utility projects of 50 to 75 dBA as a day–night average sound level. As the existing noise levels in the area are below this level, the Proposed Project would be within the normally acceptable category. Fresno County also maintains interior and exterior residential noise limits in its code of ordinances (Table 4.14-3 and Table 4.14-4). Construction noise thresholds are not separately specified. Construction activities, as well as utility maintenance and modification work, on weekdays between 6 a.m. and 9 p.m. and weekends between 7 a.m. and 5 p.m., are exempt from these standards (Fresno County 2024b). The Proposed Project may not cause noise levels in excess of the interior or exterior noise limits at the nearby properties, except for noise produced by exempt construction activities.

Table 4.14-3: Fresno County Interior Noise Standards

Category	Cumulative Number of Minutes in any 1-Hour Period	Noise Level Standards (dBA)	
		Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
1	5	45	35
2	1	50	40
3	0	55	45

dBA = A-weighted decibel

Table 4.14-4: Fresno County Exterior Noise Standards

Category	Cumulative Number of Minutes in any 1-hour Period	Noise Level Standards (dBA)	
		Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
1	30	50	45
2	15	55	50
3	5	60	55
4	1	65	60
5	0	70	65

dBA = A-weighted decibel

4.14.3 Analysis Methodology

The following section outlines the methodology used to assess potential impacts of noise associated with the Proposed Project, Alternative 1, and Alternative 2 on nearby sensitive receptors, as well as any assumptions included in the analysis. The Proposed Project's Area of Analysis for noise is defined as the area within two miles of Proposed Project-related construction activities.

4.14.3.1 Construction Noise

An analysis was performed to estimate the potential noise impacts from construction activities at the locations of sensitive land uses. As provided in Section 2 *Proposed Project Description*, construction would occur at four distinct areas. However, only one facility would be under construction at a time. There are very few residential receptors in proximity to any of the facilities where construction would take place. Based on the anticipated construction equipment list, the predicted noise levels at the nearest residences to the dam, the Smalley Cove Recreation Area, and the Vista Day Use Area were estimated using the Federal Highway Administration (FHWA) Roadway Construction Noise Model (FHWA 2006). The modeled sound levels are for equipment operating at full load. Noise transmitted from each construction site would be attenuated by a variety of mechanisms. The most significant of these mechanisms is the divergence of the sound waves with distance (attenuation by divergence). In general, this mechanism would result in a six dBA decrease in the sound level with every doubling of distance from the source. Additional reductions in noise are achieved through absorption by the atmosphere. Table 4.14-5 provides a list of the equipment that may be used during construction at any of the facilities and the estimated sound levels at nearby residences, Smalley Cove Recreation Area, and the Vista Day Use Area taking into account distance and atmospheric absorption.

Table 4.14-5: Construction Noise Assessment [a]

Noise Source	Sound Level at 50 Feet (dBA)	Sound Level at Nearest Residence to Upgrade Gates on Dam (0.4 mile) (dBA)	Sound Level at Nearest Residence to Smalley Cove Improvements [b] (0.5 mile) (dBA)	Sound Level at Nearest Residence to Retirement of K1 and Construction of Vista Day Use Area [c] (1.3 miles) (dBA)
Concrete mixer	79	42	39	24
Grader	85	48	45	30

Noise Source	Sound Level at 50 Feet (dBA)	Sound Level at Nearest Residence to Upgrade Gates on Dam (0.4 mile) (dBA)	Sound Level at Nearest Residence to Smalley Cove Improvements [b] (0.5 mile) (dBA)	Sound Level at Nearest Residence to Retirement of K1 and Construction of Vista Day Use Area [c] (1.3 miles) (dBA)
Backhoe	78	41	38	23
Skid-steer	81	44	41	26
Compactor	83	46	43	28
Dump truck	77	40	37	22
Pickup truck	55	18	15	0
Chainsaw	84	47	44	29
Paver	77	40	37	22
Roller	80	43	40	25
Crane	81	44	41	26
Boat	58	21	18	3
Helicopter (light/medium duty)	90	52	49	—
Black Hawk helicopter (heavy lift; maximum at takeoff)	96	58	55	—

Sources: FHWA 2006; Bernardini et al. 2019; PG&E 2015; FAA 1981
dB = decibel; dBA = A-weighted decibel

[a] dB are a logarithmic unit, thus the total sound level from multiple noise sources is not equal to the sum of the individual dB values.

[b] Smalley Cove is in Madera County.

[c] K1 Powerhouse and Vista Day Use Area are in Fresno County.

4.14.3.2 Vibration

Ground vibration is measured in terms of peak particle velocity (PPV) and refers to the movement within the ground of molecular particles and not surface movement. The California Department of Transportation (Caltrans) has developed guidance on addressing vibration issues associated with construction, operation, and maintenance of transportation projects (Caltrans 2020). Based on this guidance, continuous/frequent intermittent vibration sources are significant when their PPV exceeds 0.1 inch per second. Table 4.14-6 provides specific criteria for human annoyance due to vibration.

Table 4.14-6: Human Response to Transient Vibration

Human Response	PPV (Inches/Second)
Severe	2.0
Strongly Perceptible	0.9
Distinctly Perceptible	0.24
Barely Perceptible	0.035

Source: Caltrans 2020

PPV = peak particle velocity

Construction activities and truck traffic may generate localized ground-borne vibration. The human response thresholds for vibration presented above indicate that vibration is barely perceptible with a PPV of 0.035. Table 4.14-7 provides vibration source levels for some construction equipment that is expected to be used at any of the facilities. The source levels have been normalized to a reference distance of 50 feet.

Table 4.14-7: Vibration Source Levels for Construction Equipment

Equipment	PPV at 50 Feet
Loaded truck	0.027
Large bulldozer	0.031
Small bulldozer	0.001

Sources: Caltrans 2020; FTA 2018

PPV = peak particle velocity

4.14.3.3 Operation

Upgrading the gates on Kerckhoff Dam would include the installation of an emergency generator. The generator would be rated at a maximum of 20 kilowatts (kW), similar to a residential generator. Generator use would only occur during grid outages and during routine testing. The noise emissions for a typical 20 kW Kohler Model 20RCA generator were used to provide an estimate of noise levels that may be experienced at the nearest residence. Based on Kohler data, a unit this size generates a sound level of 66 dBA at 23 feet while being tested and 70 dBA at 23 feet under load. Using the same calculation methodology discussed in Section 4.14.3.1 *Construction Noise*, and the 0.4-mile distance to the nearest residence, the emergency generator would result in sound levels of 22 dBA while testing and 26 dBA under load at the nearest residence.

4.14.3.4 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on noise if it would:

- 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 applicable standards of other agencies (NOI-1);
- Generation of excessive ground-borne vibration or ground-borne noise levels (NOI-2); 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, would the Project expose people residing or working in the Project area to excessive noise levels (NOI-3)

4.14.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and

Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down-ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the PBR of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cfs for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the PBR cannot exceed a maximum of 1 foot per hour (or

less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient[1] storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability.

[1] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.14.4.1 Potential Impacts Related to Ambient Noise

Impact NOI-1: Would the project 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 applicable standards of other agencies?

4.14.4.1.1 Proposed Project

Construction

The Proposed Project would generate temporary noise from equipment used during construction activities and from the transport of workers and equipment to and from the work areas. Construction is only anticipated to occur for short periods of time (generally one to two weeks) at each facility, except for updating the manually operated gates, where construction would occur over a period of 12 weeks, and developing the Vista Day Use Area, which is anticipated to require approximately 1 month to complete. Each

type of equipment would only be used during specific phases of construction. Further, the equipment used is not generally operated continuously, nor is the equipment operated simultaneously or operated at full load. Actual noise levels experienced at any one location would fluctuate depending on the equipment in use. Construction activities are only scheduled to be conducted during daytime hours.

A boat and helicopter would be used for upgrading two manual radial gates on the dam; the nearest residential receptor is approximately 0.4 mile from Kerckhoff Dam. Based on the noise assessment (Table 4.14-5), motorboat noise levels would be low (21 dBA) at the nearest residence; this noise level is below existing ambient noise levels. A heavy lift (Black Hawk) helicopter would be used to transport equipment to the dam, which would generate higher noise levels (58 dBA), but this would only occur for an estimated two days during construction, with only two roundtrips per day. A light/medium duty helicopter would be used for approximately two of the 12 weeks and would generate noise levels of approximately 52 dBA at the nearest residence. Helicopter flights would occur from the helicopter landing zone across the river to the dam, and no helicopter flights are anticipated to occur over residences. The noise levels from helicopter use are within the range of daytime exterior noise standards with exposures ranging from 5 to 30 minutes (Table 4.14-4). Helicopter noise would be within the range of ambient background noise levels (40-60 dBA) for short periods of time during exempt construction times, as outlined in Fresno County's Code of Ordinances.

Construction activities at the Vista Day Use Area, Smalley Cove Recreation Area, and the K1 Powerhouse are only scheduled to occur for one to five weeks. Equipment-related noise levels provided in Table 4.14-5 at these sites are 45 dBA or lower, which are within the range of existing ambient conditions.

Construction noise in both Fresno and Madera counties is not regulated by any local noise ordinances, provided it occurs during allowable daytime hours. Further, the analysis demonstrated that, with the exception of helicopter use which would occur during allowable daytime hours, construction noise at the closest residences would generally be below or in the range of existing conditions, and construction would be

short in duration. As a result, there would not be an increase in ambient noise levels during construction in the Area of Analysis in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact NOI-1.

Operation

The Proposed Project would result in no increases to permanent noise levels associated with the operation of the existing facilities. The retirement of the K1 Powerhouse would result in a permanent decrease in operational noise level in the vicinity of the K1 Powerhouse. There would be no new source of noise associated with the installation of one new operational flow gage. The upgrading of two manually operated gates on Kerckhoff Dam includes the installation of an emergency generator to provide backup power. The emergency generator would result in low sound levels of 22 dBA and 26 dBA (well below the existing condition and applicable noise limits) during routine testing and under load, respectively, at the nearest residence. The emergency generator would only operate during periods when there is grid power interruption and only when gate operation is required. The nearest residential receptor to the proposed Vista Day Use Area is approximately 1.3 miles away. Any operational noise at the Vista Day Use Area, such as vehicle noise or recreational activities, would be well below existing conditions at this distance. PG&E would continue to operate the public safety warning sirens located at the K1 and K2 powerhouses to warn recreationists in the PBR of flow increases.

The State Water Board recommends implementation of the Hydrology and Water Quality Recommended Mitigation Measure WQ-5: Instream Flow Public Safety Plan (See Section 4.11.4.8.1 *Mitigation Measures* for full description) . PG&E would develop and implement, in consultation with BLM, USFS, and the State Water Board, protocols (e.g., times of day) to activate sirens during situations that are expected to result in a larger stage change than one foot per hour as measured at Gage J-2 and that have the potential to impact recreators or whitewater boaters. Although sirens are currently used under baseline conditions, the Recommended Mitigation Measure WQ-5 would

define the thresholds and circumstances when sirens would be used. Additionally, Recommended Mitigation Measure WQ-5 requires the Instream Flow Public Safety Plan to consider sensitive receptors and homeowners who could hear the sirens. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact NOI-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.14.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction activities as described in Section 4.14.4.1.1. Alternative 1 would not change any construction activities included in the Proposed Project. Under Alternative 1, construction activities would not generate a temporary or permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standard or other agencies. In addition, Alternative 1 does not require relocation of the Proposed Project closer to any sensitive receptors. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 1 for potential impact NOI-1.

Operation

Alternative 1 has the same analysis and impact determination for operation activities as described in Section 4.14.4.1.1 for potential impact NOI-1. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 1 would not create an increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standard or other agencies.

Similar to the Proposed Project, the State Water Board recommends implementation of the Hydrology and Water Quality Recommended Mitigation Measure WQ-5: Instream Flow Public Safety Plan. PG&E would develop and implement, in consultation with BLM, USFS, and the State Water Board, protocols (e.g., times of day) to activate sirens during situations that are expected to result in a larger stage change than one foot per hour as measured at Gage J-2 and that have the potential to impact recreators or whitewater boaters. Although sirens are currently used under baseline conditions, the Recommended Mitigation Measure WQ-5 would define the thresholds and circumstances when sirens would be used. Additionally, Recommended Mitigation Measure WQ-5 requires the Instream Flow Public Safety Plan to consider sensitive receptors and homeowners who could hear the sirens. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 1 for potential impact NOI-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.14.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction activities as described in Section 4.14.4.1.1. Alternative 2 would not change any construction activities included in the Proposed Project. Under Alternative 2, construction activities would not generate a temporary or permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standard or other agencies. In addition, Alternative 2 does not require relocation of the Proposed Project closer to any sensitive receptors. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 2 for potential impact NOI-1.

Operation

Alternative 2 has the same analysis and impact determination for operation activities as described in Section 4.14.4.1.1 for potential impact NOI-1. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 2 would not create an increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standard or other agencies.

Similar to the Proposed Project and Alternative 1, the State Water Board recommends implementation of the Hydrology and Water Quality Recommended Mitigation Measure WQ-5: Instream Flow Public Safety Plan. PG&E would develop and implement, in consultation with BLM, USFS, and the State Water Board, protocols (e.g., times of day) to activate sirens during situations that are expected to result in a larger stage change than one foot per hour as measured at Gage J-2 and that have the potential to impact recreators or whitewater boaters. Although sirens are currently used under baseline conditions, the Recommended Mitigation Measure WQ-5 would define the thresholds and circumstances when sirens would be used. Additionally, Recommended Mitigation Measure WQ-5 requires the Instream Flow Public Safety Plan to consider sensitive receptors and homeowners who could hear the sirens. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 2 for potential impact NOI-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.14.4.2 Potential Impacts Related to Ground-borne Vibration and Noise

Impact NOI-2: Would the project result in generation of excessive ground-borne vibration or ground-borne noise levels?

4.14.4.2.1 Proposed Project

Construction and Operation

Construction activities would have the potential to result in very localized ground-borne vibration. As provided in Table 4.14-6 and Table 4.14-7, any ground-borne vibration during construction would attenuate to barely perceptible levels within 50 feet of the equipment in use. As residential receptors are at least 0.4 mile (over 2,000 feet) from any construction activity, no excessive ground-borne vibration is expected at any sensitive receptor locations. Therefore, the Proposed Project would not result in generation of excessive ground-borne vibration or ground-borne noise levels during construction.

The Proposed Project would not generate excessive ground-borne vibration or noise levels associated with the operation of the existing facilities or the operation of the new Vista Day Use Area, a new operational flow gage, and two upgraded gates on Kerckhoff Dam, including a backup generator.

Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact NOI-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.14.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination for construction and operation activities as described in Section 4.14.4.2.1. Alternative 1 would not change any construction activities included in the Proposed Project. Further, the alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam would not change potential ground-borne vibration or noise levels. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact NOI-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.14.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination for construction and operation activities as described in Section 4.14.4.2.1. Alternative 2 would not change any construction activities included in the Proposed Project. Further, the alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam would not change potential ground-borne vibration or noise levels. In addition, Alternative 2 does not require relocation of the Proposed Project closer to any sensitive receptors. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact NOI-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.14.4.3 Potential Impacts Related to Noise Exposure from Public Airports

Impact NOI-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?

4.14.4.3.1 Proposed Project

Construction and Operation

The Proposed Project is not located within two miles of a public airport or public use airport; however, Johnston Field, a private active airstrip, is located approximately 0.5 mile south of the existing FERC Project Boundary directly south of Smalley Cove Recreation Area. Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact NOI-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.14.4.3.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination for construction and operation activities as described in Section 4.14.4.3.1. Alternative 1 would not change any construction activities included in the Proposed Project. Further, the alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam would not expose people within two miles of a public airport or public use airport to excessive noise levels. In addition, Alternative 1 does not require relocation of the Proposed

Project within two miles of a public airport. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact NOI-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.14.4.3.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination for construction and operation activities as described in Section 4.14.4.3.1. Alternative 2 would not change any construction activities included in the Proposed Project. Further, the alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam would not expose people within two miles of a public airport or public use airport to excessive noise levels. In addition, Alternative 2 does not require relocation of the Proposed Project within two miles of a public airport. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact NOI-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.14.5 Literature Cited

Bernardini, M., L. Fredianelli, F. Fidecaro, P. Gagliardi, M. Nastasi, and G. Licitra. 2019. "Noise Assessment of Small Vessels for Action Planning in Canal Cities."

Environments, Vol. 6, No. 3. Accessed: April 5, 2026. Retrieved from: https://www.mdpi.com/2076-3298/6/3/31.

Caltrans (California Department of Transportation). 2020. *Transportation and Construction Vibration Guidance Manual*. Accessed: April 5, 2026. Retrieved from: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf.

FAA (Federal Aviation Administration). 1981. *Helicopter Noise Definition Report*. Report No. FAA-EE-81-16.

FHWA (Federal Highway Administration). 2006. *FHWA Roadway Construction Noise Model User's Guide*.

FTA (Federal Transit Administration). 2018. *Transit Noise and Vibration Impact Assessment Manual*. Accessed: April 5, 2026. Retrieved from: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf.

Fresno County. 2024a. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

_____. 2024b. An Ordinance Amending Chapter 8.40 of the Fresno County Ordinance Code pertaining to Noise Control. Accessed: April 5, 2026. Retrieved from:https://www.fresnocountyca.gov/files/assets/county/v/1/public-health/environmental-health/noise-control-ordinance-no.-24-021.pdf

Madera County. 1995a. *Madera County General Plan Background Report*. Adopted October 24. Accessed: April 5, 2026. Retrieved from:https://www.maderacounty.com/home/showpublisheddocument/2852/636480653566630000

_____. 1995b. *Madera County General Plan Policy Document*. Adopted October 24. Accessed: April 5, 2026. Retrieved from:

https://www.maderacounty.com/home/showpublisheddocument/40825/638615574804870000.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding "Kerckhoff: Prefilling Meeting & CEQA Discussion," on January 13, 2026.

PG&E (Pacific Gas and Electric Company). 2015. *Proponents Environmental Assessment*. Fulton-Fitch Mountain Reconductoring Project.

_____. 2026. Response to American Whitewater, the California Sportfishing Protection Alliance, and Friends of the River Comments on FERC's Environmental Assessment for Hydropower License. Accessed: April 5, 2026. Retrieved from: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20260304-5015.

Valley Air District (San Joaquin Valley Air Pollution Control District). 2015. *Guidance for Assessing and Mitigating Air Quality Impacts*. Accessed: April 5, 2026. Retrieved from: https://www.valleyair.org/media/g4nl3p0g/gamaqi.pdf.

4.15 POPULATION AND HOUSING

This section describes existing conditions and analyzes potential impacts on population and housing from implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts on population and housing from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.15-1).

Table 4.15-1: CEQA Checklist for Population and Housing

Would the Project:	**Proposed Project**	**Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping**	**Alternative 2: Proposed Project with BLM Revised 4(e) Conditions**
Impact PH-1: Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	No Impact	No Impact	No Impact
Impact PH-2: Displace substantial numbers of existing people or housing,	No Impact	No Impact	No Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
necessitating the construction of replacement housing elsewhere?			

4.15.1 Environmental Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located in the foothills of the western slope of the Sierra Nevada on the San Joaquin River (SJR) in a sparsely populated, mostly undeveloped area of Fresno and Madera counties, California. The land use near the Kerckhoff Hydroelectric Project, and in turn the Proposed Project Area and both Alternatives, primarily consists of hydroelectric and water resources development, recreation use, grazing, and a few scattered rural residences. The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public land administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and United States Bureau of Reclamation (Reclamation) under BLM management.

The Kerckhoff Hydroelectric Project is in a rural area that is not densely populated. According to the California Department of Finance, the population of the County of Fresno's unincorporated areas in January 2025 was 160,204 (California Department of Finance 2025). The small town of Auberry, which is approximately 7.5 road miles south of the Kerckhoff 1 (K1) Powerhouse, is the closest community to the Proposed Project and in 2023 had an estimated population of 3,043 (Census Reporter 2023a). The largest community in Fresno County is the City of Fresno, which is located

approximately 44 road miles from the K1 Powerhouse and in 2023 had a population of 545,717 (Census Reporter 2023b).

4.15.2 Regulatory Background

The following subsections contain an overview of regulations related to population and housing.

4.15.2.1 Federal

4.15.2.1.1 Federal Power Act

The Federal Power Act (Title 16 United States Code [USC] Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created the Federal Energy Regulatory Commission (FERC or Commission) and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations [CFR] Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.15.2.2 State

No state regulations related to population and housing are applicable to the Proposed Project.

4.15.2.3 Local

No local regulations related to population and housing are applicable to the Proposed Project.

4.15.3 Analysis Methodology

4.15.3.1 Analytical Approach

Population and housing is considered an economic or social resource. CEQA requires an analysis of physical changes to the environment, where environment refers to the physical conditions within the area potentially affected by a proposed project. These physical conditions include effects to air, land, water, flora, fauna, noise, minerals, and objects with aesthetic or historic significance (Public Resources Code [PRC] Section 21060.5). Economic or social changes, on their own, are not considered a significant effect on the environment under CEQA guidelines because they do not directly result in a physical change to the environment. They can, however, result in indirect changes, such as an increase in population resulting in the need to build additional homes. Therefore, population and housing changes are not considered as having environmental impacts unless the economic or social effects of a project result in a physical change to the environment (PRC Section 15131).

4.15.3.2 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project, Alternative 1, or Alternative 2 would have a significant impact on population and housing if it would:

- Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure) (PH-1); or
- Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere (PH-2)

4.15.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day

Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the LTOR Boating Flows and Down Ramping of Spill Flows replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTORs are a series of down-ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Proposed Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner than simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach (PBR) of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cubic feet per second (cfs) for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the PBR cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient[1] storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures.

[1] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned Kerckhoff 2 (K2) Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic

Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.15.4.1 Potential Impacts Related to Unplanned Population Growth

Impact PH-1: Would the project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

4.15.4.1.1 Proposed Project

Construction and Operation

The Proposed Project would continue operation and maintenance of the existing Kerckhoff Hydroelectric Project facilities and would not involve an increase of employees at the facilities. The Proposed Project would not encourage population growth in or near the Proposed FERC Project Boundary, and no new residential facilities are proposed or reasonably foreseeable as a result. Construction personnel are expected to stay in nearby communities during Proposed Project construction activities, and not within the Proposed Project site. The Proposed Project involves paving an existing access road between Access Road 6A and the Vista Day Use Area. However, no new roads, water supply, utilities infrastructure, or changes to land uses are proposed that would contribute to indirect population growth.

The Proposed Project involves retirement of the K1 Powerhouse and modification of associated facilities, construction of the Vista Day Use Area, installation of one new operational flow gage, and the upgrade of two manually operated gates. The Proposed Project construction activities are temporary and would not constitute substantial construction or new structures that would induce substantial unplanned population growth in an area, either directly or indirectly. The retirement of the K1 Powerhouse and

other construction activities proposed could result in a short-term increase in employees, but the permanent workforce associated with the Proposed Project is not expected to change (PG&E 2020). The Proposed Project would not include any new facilities, modifications to existing facilities, or operational changes that would result in either a workforce reduction or the need for additional full-time personnel. The workforce needed for temporary construction would not be considered a substantial increase and would not occur numbers significant enough to qualify as unplanned population growth in the area.

Under the Proposed Project, total annual average generation of electric power would decrease by approximately 3.5 percent, with annual generation being highly variable based on the magnitude and duration of inflow to Kerckhoff Reservoir (PG&E 2023). This decrease in power generation to nearby communities is not growth inducing and does not encourage substantial unplanned growth in the area. Additionally, decreases in power generation under the Proposed Project do not differ from baseline conditions, as the K1 Powerhouse is not currently in operation.

Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact PH-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.15.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Construction activities under Alternative 1 would not change when compared to the Proposed Project construction activities as described in in Section 4.15.4.1.1. Operational changes under Alternative 1 would be limited to down ramping and up ramping requirements, and providing whitewater boating flows in the PBR, and would

not result in an effect to population growth. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact PH-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.15.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Construction activities under Alternative 2 would not change when compared Proposed Project construction activities as described in in Section 4.15.4.1.1. Operational changes under Alternative 2 would be limited to down ramping and up ramping requirements, and provisions for whitewater boating opportunities in the PBR and would not result in an effect to population growth. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact PH-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.15.4.2 Potential Impacts Related to Housing Displacement

Impact PH-2: Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

4.15.4.2.1 Proposed Project

Construction and Operation

There are no permanent residences within the Proposed FERC Project Boundary. The Proposed Project would not convert any residential lands to non-residential lands. Limited short-term construction, possibly requiring workers from nearby communities, would be required, but the permanent workforce associated with the Proposed Project would not change and would not affect any existing housing in the surrounding communities.

Under the Proposed Project, operations would not include any new facilities or modifications to existing facilities that would result in either a workforce reduction or the need for additional full-time personnel that could result in a need for housing. Any reductions in daily operation and maintenance of the K1 facility associated with K1 retirement would not influence the size of the PG&E workforce and would have a negligible impact on contractor work at the K1 facility because there has been little or no K1 generation in recent years. PG&E's current workforce would not change as a result of the Proposed Project. Additionally, there would be no increase in staffing or a need for housing as a result of the Vista Day Use Area, which would require regular maintenance visits, but would otherwise not be fully staffed.

Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact PH-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.15.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 would not change Proposed Project construction activities as described in in Section 4.15.4.2.1. Alternative 1 would not change any land designations within the FERC Project Boundary. Limited, short-term construction, possibly requiring workers from nearby communities, would still be required under Alternative 1, however, the permanent workforce associated with Alternative 1 would not change and would not affect any existing housing in the surrounding communities.

Alternative 1 would only change the Proposed Projects down ramping and up ramping operations, including additional whitewater boating flows in the PBR, compared to the Proposed Project. This would enhance recreational opportunities within the FERC Project Boundary. However, these operational requirements under Alternative 1 would not require additional facilities or personnel, and thus, would not result in the displacement of nearby communities or people.

Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact PH-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.15.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 would not change Proposed Project construction activities as described in in Section 4.15.4.2.1. Alternative 2 would not change any land designations within the FERC Project Boundary. Limited, short-term construction, possibly requiring workers from nearby communities, would still be required under Alternative 2, however, the

permanent workforce associated with Alternative 2 would not change and would not affect any existing housing in the surrounding communities.

Alternative 2 would only change the Proposed Project's down ramping and up ramping operations compared to the Proposed Project, including additional whitewater boating flows in the PBR, resulting in enhanced recreational opportunities within the FERC Project Boundary. However, these operational requirements under Alternative 2 would not require additional facilities or personnel, and thus, would not result in the displacement of nearby communities or people.

Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact PH-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.15.5 Literature Cited

California Code, Public Resources Code – Title 14, § 15131. Accessed April 3, 2026. Retrieved from: https://www.law.cornell.edu/regulations/california/14-CCR-15131.

California Code, Public Resources Code – Title 14, § 21060.5. Accessed April 3, 2026. Retrieved from: https://codes.findlaw.com/ca/public-resources-code/prc-sect-21060-5/.

California Department of Finance. 2025. E-1 Population and Housing Estimates for Cities, Counties, and the State—January 1, 2024 and 2025. Accessed: April 3, 2026. Retrieved from: https://dof.ca.gov/forecasting/demographics/estimates-e1/.

Census Reporter. 2023a. Auberry, CA. Accessed April 3, 2026. Retrieved from: https://censusreporter.org/profiles/16000US0603190-auberry-ca/.

Census Reporter. 2023b. Fresno, CA. Accessed April 3, 2026. Retrieved from: https://censusreporter.org/profiles/16000US0627000-fresno-ca/.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding "Kerckhoff: Prefilling Meeting & CEQA Discussion," on January 13, 2026.

PG&E (Pacific Gas and Electric Company). 2020. *Final Application for New License for the Kerckhoff Hydroelectric Project, FERC Project No. 96*. November 20.

_____. 2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

4.16 PUBLIC SERVICES

This section describes existing conditions and analyzes potential impacts on public services from implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts on public services from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.16-1).

Table 4.16-1: CEQA Checklist for Public Services

Would the Project:	**Proposed Project**	**Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping**	**Alternative 2: Proposed Project with BLM Revised 4(e) Conditions**
Impact PS-X: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:			
Impact PS-1: Fire protection?	No Impact	No Impact	No Impact
Impact PS-2: Police protection?	No Impact	No Impact	No Impact
Impact PS-3: Schools?	No Impact	No Impact	No Impact
Impact PS-4: Parks?	No Impact	No Impact	No Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact PS-5: Other public facilities?	No Impact	No Impact	No Impact

4.16.1 Environmental Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located in the foothills of the western slope of the Sierra Nevada on the San Joaquin River (SJR) in a sparsely populated, mostly undeveloped area of Fresno and Madera counties, California. The land use near Kerckhoff Reservoir and the Proposed Project primarily consists of hydroelectric and water resources development, recreation use, grazing, and a few scattered rural residences. The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public lands administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and United States Bureau of Reclamation (Reclamation) under BLM management

The Proposed Project involves the continued operation and maintenance of an existing hydroelectric facility with temporary construction activities to retire the Kerckhoff 1 (K1) Powerhouse, construct the Vista Day Use Area, install one new operational flow gage, and upgrade two manually operated gates on Kerckhoff Dam. As such, the Proposed Project would not involve the construction of new housing or other land uses that could increase the local population and demand for governmental facilities and services, such as fire protection, police protection, schools, parks, or other public facilities.

4.16.1.1 Fire Protection Services

The Proposed Project is located in areas with fire protection services provided by the United States Forest Service (USFS) within designated Federal Responsibility Areas (FRA), or California Department of Forestry and Fire Protection (CAL FIRE) in designated State Responsibility Areas (SRA) (Figure 4.21-1 in Section 4.21 *Wildfire*). The Proposed Project is also within areas mapped by the California Public Utilities Commission (CPUC) as high fire threat districts (HFTD) (Figure 4.21-2 in Section 4.21 *Wildfire*). The USFS manages wildfire response in FRAs (USFS 2023). The nearest USFS district office to the Proposed Project is the Bass Lake Ranger District, approximately seven road miles along Highway 222 to the north. There is an additional USFS-SNF district office, High Sierra Ranger District, approximately nine road miles to the south. Fire protection in SRAs is shared through the cooperative fire protection agreements between CAL FIRE and Fresno County Fire Department. Closest to the Proposed Project is the CAL FIRE Fresno King Unit 73 in Millerton, California. In addition, the Auberry Volunteer Fire Department is located in Auberry, California, and provides fire protection and emergency response services to the Auberry community (Fresno County n.d.).

4.16.1.2 Police Protection Services

The Fresno County Sheriff's Department provides law enforcement services to the unincorporated areas of Fresno County and several incorporated cities by contract. Services are divided into four patrol areas, each commanded by a lieutenant who supervises field services from a substation located in each of the areas.

The Madera County Sherriff's Office provides law enforcement services to the unincorporated areas of Madera County in four patrol areas, addressing agricultural and civil crime and emergency services. The Madera County Sherriff's Office also provides search and rescue operation throughout the county with the support of volunteers, including diving team emergencies and services.

The USFS provides law enforcement services related to natural and cultural resource protection.

4.16.1.3 Schools

Fresno County is served by 32 school districts (Fresno County Superintendent of Schools n.d.), and Madera County is served by nine school districts (Madera County Superintendent of Schools n.d.). The nearest school is in the unincorporated community of Auberry, approximately seven road miles south of the Proposed Project.

4.16.1.4 Parks

Fresno County has a variety of regional recreational facilities that include 12 parks (Fresno County 2023). Madera County has no parks other than city parks and school sites; it currently does not have a parks and recreation system (Madera County 1995).

4.16.1.5 Other Public Facilities

There are no relevant other public facilities in the vicinity of the Kerckhoff Hydroelectric Project.

4.16.2 Regulatory Background

The following sections contain an overview of regulations related to public services.

4.16.2.1 Federal

4.16.2.1.1 Federal Power Act

The Federal Power Act (Title 16 United States Code [USC] Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created the Federal Energy Regulatory Commission (FERC or Commission) and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations [CFR] Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.16.2.2 State

No state regulations related to public services are applicable to the Proposed Project.

4.16.2.3 Local

The Public Facilities and Services Element of the Fresno County General Plan contains goals, policies, and implementation program measures to ensure the timely development of public facilities and maintain an adequate level of service to meet the needs of existing and future development (Fresno County 2024).

The Community and Economic Development Department of Madera County was established to protect the county's natural resources; ensure quality and sustainable community development and affordable housing; and protect the public health, safety, and welfare of its constituents (Madera County n.d.).

4.16.3 Analysis Methodology

4.16.3.1 Analytical Approach

Public services are considered economic or social resources. CEQA requires an analysis of physical changes to the environment, where environment refers to the physical conditions within the area potentially affected by a proposed project. Therefore, the Area of Analysis for this recourse is the Proposed Project Vicinity, which includes the San Joaquin Valley and the Madera and Fresno counties. The physical conditions include effects to air, land, water, flora, fauna, noise, minerals, and objects with aesthetic or historic significance (Public Resources Code Section 21060.5). Economic or social changes, on their own, are not considered a significant effect on the environment under CEQA Guidelines, because they do not directly result in a physical change to the environment. They can, however, result in indirect changes, such as the need for new or physically altered governmental facilities to handle increased capacity caused by a project. Therefore, public services changes are not considered as having environmental impacts unless the economic or social effects of a project related to public services result in a physical change to the environment (Public Resources Code Section 15131), which could include provisions of new or physically altered

governmental facilities, or the need for new or physically altered governmental facilities to maintain acceptable service ratios, response times, or other performance objectives for any of the public services.

4.16.3.2 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on public services if it would:

- Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:
  - Fire protection (PS-1);
  - Police protection (PS-2);
  - Schools (PS-3);
  - Parks (PS-4); or
  - Other public facilities (PS-5)

4.16.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow

Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach (PBR) of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating

days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cubic feet per second (cfs) for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the PBR cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient[1] storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for

[1] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned Kerckhoff 2 (K2) Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.16.4.1 Potential Impacts Related to Fire Protection

Impact PS-1: Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services: Fire protection?

4.16.4.1.1 Proposed Project

Construction

Temporary construction activities associated with the retirement of the K1 Powerhouse, construction of the Vista Day Use Area, installation of one new operational flow gage, and upgrade of two manually operated gates would increase the number of workers in the Proposed Project Area for a limited time, but the Proposed Project would not result in any permanent increase in the number of workers associated with Kerckhoff Hydroelectric Project facilities, nor effect government facilities near the Proposed Project. Materials needed for construction activities would likely be hauled into the Proposed Project Area. PG&E would implement their Proposed Project Road and Trail Maintenance Plan, which includes regularly inspecting and maintaining the Kerckhoff Hydroelectric Project roads and trails, to ensure safe access to Kerckhoff Hydroelectric Project facilities.

In the event of an emergency incident that blocks road/trail access to a Kerckhoff Hydroelectric Project facility and/or threatens public safety, PG&E would notify the appropriate land management agency (i.e., BLM or USFS) or property owner to coordinate repair work. These proposed measures would reduce the potential for any significant impact to response times related to fire protection. Therefore, there would be **No Impact** as a result of construction activities under the Proposed Project for potential impact PS-1.

Operation

During operation, PG&E would implement the Recreation Management Plan. This includes operation of the Vista Day Use Area, which would be used to discourage visitor use and trespass near K2 Powerhouse by providing a recreation facility where the river access area is accessible from BLM's SJR Trail and in an appropriate location within the Proposed Project Area (PG&E 2023). Within two years of license issuance, PG&E would evaluate the shoreline to identify up to three suitable areas on public or PG&E land, in consultation with the USFS and Tribes, along the shoreline of Kerckhoff Reservoir where boat-in access could be provided for day use by removing or trimming vegetation.

Under the Proposed Project's EOS Flow Recession Measure, PG&E would release water from Kerckhoff Dam to provide two days of whitewater boating flows. Compared to baseline conditions, this would be an increase in established whitewater flow days that the recreating public could use within the PBR. The recreational enhancements as part of the Proposed Project's operation discussed above could lead to an increase in recreation levels within the Proposed Project Area. It is not expected that these increases would be substantial enough to interfere with fire protection facilities, response times, service ratio's, or other performance objectives.

The Proposed Project would not require additional fire personnel or the construction of new or significantly altered fire protection facilities in order to maintain acceptable service ratios, fire response times, or other performance objectives. Therefore, there would be **No Impact** as a result of operation activities under the Proposed Project for potential impact PS-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.16.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction activities as described in Section 4.16.4.1.1. Alternative 1 would not require additional fire personnel or the construction of new or significantly altered fire protection facilities in order to maintain acceptable service ratios, fire response times, or other performance objectives. Therefore, there would be **No Impact** as a result of construction activities under Alternative 1 for potential impact PS-1.

Operation

Alternative 1 has many of the same operational requirements as compared to the Proposed Project, with the addition of more whitewater boating days and a longer flow ramping schedule that is dependent on WY classifications. These recreational enhancements as part of Alternative 1 operation could lead to an increase in recreation levels within the Proposed Project Area. However, these increases are not expected to be substantial enough to interfere with fire protection facilities, response times, service ratios, or other performance objectives. Alternative 1 would not require additional fire personnel or the construction of new or significantly altered fire protection facilities in order to maintain acceptable service ratios, fire response times, or other performance objectives. Therefore, there would be **No Impact** as a result of operation activities under Alternative 1 for potential impact PS-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.16.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction activities as described in Section 4.16.4.1.1. Alternative 2 would not require additional fire personnel or the construction of new or significantly altered fire protection facilities in order to maintain acceptable service ratios, fire response times, or other performance objectives. Therefore, there would be **No Impact** as a result of construction activities under Alternative 2 for potential impact PS-1.

Operation

Alternative 2 has the same analysis and impact determination for construction activities as described in Section 4.16.4.1.1. Alternative 2 would not require additional fire personnel or the construction of new or significantly altered fire protection facilities in order to maintain acceptable service ratios, fire response times, or other performance objectives. Therefore, there would be **No Impact** as a result of operational activities under Alternative 2 for potential impact PS-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.16.4.2 Potential Impacts Related to Police Protection

Impact PS-2: Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services: Police protection?

4.16.4.2.1 Proposed Project

Construction

Temporary construction activities associated with the retirement of the K1 Powerhouse, construction of the Vista Day Use Area, installation of one new operational flow gage, and upgrade of two manually operated gates would increase the number of workers in the Proposed Project's FERC Boundary Area for a limited time, but the Proposed Project would not result in any permanent increase in the number of workers associated with Kerckhoff Hydroelectric Project facilities, nor effect government facilities near the Proposed Project. Materials needed for construction activities would likely be hauled into the Proposed Project Area. PG&E would implement their Proposed Project Road and Trail Maintenance Plan, which includes regularly inspecting and maintaining the Kerckhoff Hydroelectric Project roads and trails, to ensure safe access to Kerckhoff Hydroelectric Project facilities.

In the event of an emergency incident that blocks road/trail access to a Kerckhoff Hydroelectric Project facility and/or threatens public safety, PG&E would notify the appropriate land management agency (i.e., BLM or USFS) or property owner to coordinate repair work. These proposed measures would reduce the potential for any significant impact to response times related to police protection. Therefore, there would be **No Impact** as a result of construction activities under the Proposed Project for potential impact PS-2.

Operation

During operation, PG&E would implement the Recreation Management Plan. This includes operation of the Vista Day Use Area to discourage visitor use and trespassing near K2 Powerhouse by providing a recreation facility where the river access area is accessible from BLM's SJR Trail and in an appropriate location within the Proposed Project Area (PG&E 2023). Within two years of license issuance, PG&E would evaluate the shoreline to identify up to three suitable areas on public or PG&E land, in consultation with the USFS and Tribes, along the shoreline of Kerckhoff Reservoir

where boat-in access could be provided for day use by removing or trimming vegetation.

Under the Proposed Project's EOS Flow Recession Measure, PG&E would release water from Kerckhoff Dam to provide the whitewater boating flows, consisting of two days of whitewater boating flows. Compared to baseline conditions, this would be an increase in established whitewater flow days that the recreating public can utilize within the PBR. The recreational enhancements that are part of the Proposed Project's operation discussed above could lead to an increase in recreation levels within the Proposed Project Area. However, these increases are not expected to be substantial enough to interfere with facilities, response times, service ratios, or other performance objectives related to police protection services. The Proposed Project would not require additional police personnel or the construction of new or significantly altered police protection facilities in order to maintain acceptable service ratios, response times, or other performance objectives.

Therefore, there would be **No Impact** as a result of operation activities under the Proposed Project for potential impact PS-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.16.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction activities as described in Section 4.16.4.2.1. Alternative 1 would not require additional police personnel or the construction of new or significantly altered police protection facilities in order to maintain acceptable service ratios, response times, or other performance

objectives. Therefore, there would be **No Impact** as a result of construction activities under Alternative 1 for potential impact PS-2.

Operation

Alternative 1 has many of the same operational requirements as compared to the Proposed Project, with the addition of more whitewater boating days and a longer flow ramping schedule that is dependent on WY classifications. These recreational enhancements as part of Alternative 1 operation could lead to an increase in recreation levels within the Proposed Project Area. However, these increases are not expected to be substantial enough to interfere with police protection facilities, response times, service ratios, or other performance objectives. Alternative 1 would not require additional police personnel or the construction of new or significantly altered police protection facilities in order to maintain acceptable service ratios, response times, or other performance objectives.

Therefore, there would be **No Impact** as a result of operation activities under Alternative 1 for potential impact PS-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.16.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction activities as described in Section 4.16.4.2.1. Alternative 2 would not require additional police personnel or the construction of new or significantly altered police protection facilities in order to maintain acceptable service ratios, response times, or other performance objectives. Therefore, there would be **No Impact** as a result of construction activities under Alternative 2 for potential impact PS-2.

Operation

Alternative 2 has the same analysis and impact determination for operational activities as described in Section 4.16.4.2.1. Alternative 2 would not require additional police personnel or the construction of new or significantly altered police protection facilities in order to maintain acceptable service ratios, response times, or other performance objectives. Therefore, there would be **No Impact** as a result of operation activities under Alternative 2 for potential impact PS-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.16.4.3 Potential Impacts Related to Schools

Impact PS-3: Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services: Schools?

4.16.4.3.1 Proposed Project

Construction and Operation

The Proposed Project would not include or require the expansion of existing schools or construction of new schools. The nearest schools to the Kerckhoff Hydroelectric Dam are approximately five miles away. Temporary construction activities associated with the retirement of the K1 Powerhouse, construction of the Vista Day Use Area, installation of one new operational flow gage, and upgrade of two manually operated gates would increase the number of workers in the area for a limited time, but the Proposed Project would not result in any permanent staff increases requiring the addition of school

resources. Operational activities under the Proposed Project would also not result in any permanent staff increases within or surrounding the Proposed Project Area.

Therefore, there would be **No Impact** as a result of construction or operation activities under the Proposed Project for potential impact PS-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.16.4.3.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination for construction and operation activities as described in Section 4.16.4.3.1. Alternative 1 would not include or require the expansion of existing schools or construction of new schools. Therefore, there would be **No Impact** as a result of construction or operation activities under Alternative 1 for potential impact PS-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.16.4.3.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination for construction and operation activities as described in Section 4.16.4.3.1. Alternative 2 would not include or require the expansion of existing schools or construction of new schools. Therefore,

there would be **No Impact** as a result of construction or operation activities under Alternative 2 for potential impact PS-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.16.4.4 Potential Impacts Related to Parks

Impact PS-4: Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services: Parks?

4.16.4.4.1 Proposed Project

Construction

The Proposed Project would not increase the number of residents in the Area of Analysis but could result in an increase of recreational users within the Proposed Project Area. Temporary construction activities would increase the number of workers in the area, but only for a limited time. The Proposed Project includes construction of a new recreational facility (Vista Day Use Area), accessible to the public, and that would provide enhanced recreational opportunities in the Proposed Project's Area of Analysis. This enhancement is proposed to discourage visitor use and trespass near K2 Powerhouse by providing a recreation facility where the river access area is accessible from BLM's SJR Trail and in an appropriate location within the Proposed Project Area (PG&E 2023). It is expected that the enhancement would redirect recreationalist, but it could also lead to a moderate increase of recreational visitors at the Proposed Project. However, this increase of recreationalist would not require construction of additional parks or expansion of parks as described in potential impact PS-4. Therefore, there

would be **No Impact** as a result of construction activities under the Proposed Project for potential impact PS-4.

Operation

The development of new recreational facilities is intended to minimize the effects of Proposed Project recreation use on environmental and cultural resources and discourage the unauthorized exploration of Proposed Project facilities by the recreating public. During operation, the location of recreation use near the K2 Powerhouse and the SJR would, ideally, shift to the Vista Day Use Area and the river area that is accessible from BLM's SJR Trail (PG&E 2023). However, it is anticipated that the improvements to access and safety at the existing recreation facilities, increased whitewater boating opportunities, as well as the addition of the Vista Day Use Area would have a moderate increase in the level of recreation use in the Proposed Project. The increase in recreation levels at the Proposed Project, due to added capacity from the Vista Day Use Area and additional development of reservoir shoreline access, and better accessibility at the Smalley Cove Recreation Area may have the added benefit of reducing pressure on surrounding park infrastructure.

Therefore, there would be **No Impact** as a result of operation activities under the Proposed Project for potential impact PS-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.16.4.4.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction activities as described in Section 4.16.4.4.1. Alternative 1 would not increase pressure on surrounding park infrastructure or require construction of additional parks or expansion

of parks. Therefore, there would be **No Impact** as a result of construction activities under Alternative 1 for potential impact PS-4.

Operation

Alternative 1 has the same impact determination for operational activities as described in Section 4.16.4.4.1 for potential impact PS-4; however, operational activities under Alternative 1 would differ slightly from the Proposed Project. Under Alternative 1, there would be more whitewater boating opportunities than the Proposed Project would offer because the ramp down procedures would be scheduled for a longer period, offering more days within the whitewater boatable flow range. The effect of this increase in whitewater opportunities is consistent with the effects under the Proposed Project, whereby pressure on surrounding parks would be reduced due to an increase in the recreational use of the recreation facilities under Alternative 1.

Therefore, there would be **No Impact** as a result of operation activities under Alternative 1 for potential impact PS-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.16.4.4.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination for construction and operational activities as described in Section 4.16.4.4.1. Alternative 2 would not increase pressure on surrounding park infrastructure or require construction of additional parks or expansion of parks. Therefore, there would be **No Impact** as a result of construction or operation activities under Alternative 2 for potential impact PS-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.16.4.5 Potential Impacts Related to Other Public Facilities

Impact PS-5: Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services: Other public facilities?

4.16.4.5.1 Proposed Project

Public facilities are generally defined as public buildings, structures, or systems, including flood control facilities, navigation, irrigation, reclamation, sewage treatment and collection, water supply and distribution, airport, public power, and watershed development facilities, parks, non-federal-aid streets, roads, or highways, or other public buildings or systems used for educational, recreational, or cultural purposes (42 USC Section 5122).

Construction

As identified in prior sections, construction activities would be temporary in nature, and although there would be a minor increase in the number of workers in the area for the duration of construction, this would be temporary, and not result in the need for new or altered capacity for public facilities. The Proposed Project would not generate an increase in population that would create a need for new or physically altered public facilities, such as educational facilities, hospitals, places of worship, or first responder facilities. Therefore, there would be **No Impact** as a result of construction activities under the Proposed Project for potential impact PS-5.

Operation

PG&E is expected to perform the ongoing maintenance of existing facilities, as well as any maintenance and operation of the newly created recreation facilities. The Proposed Project is not expected to result in a significant increase in the operational workforce and therefore would not result in the need for new or altered capacity for public facilities. The Proposed Project would not generate an increase in population that would create a need for new or physically altered public facilities, such as educational facilities, hospitals, places of worship, or first responder facilities.

Therefore, there would be **No Impact** as a result of operation activities under the Proposed Project for potential impact PS-5.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.16.4.5.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination for construction activities as described in Section 4.16.4.5.1. Alternative 1 would not generate an increase in population that would create a need for new or physically altered public facilities, such as educational facilities, hospitals, places of worship, or first responder facilities. Therefore, there would be **No Impact** as a result of construction activities under Alternative 1 for potential impact PS-5.

Operation

Alternative 1 has many of the same operational requirements as compared to the Proposed Project, with the addition of more whitewater boating days and a longer flow ramping schedule that is dependent on WY classifications. These recreational enhancements as part of Alternative 1 operation would likely lead to an increase in

recreation levels within the Proposed Project Area. However, these increases are not expected to be substantial enough to require additional or altered public facility capacity. Alternative 1 would not necessitate the construction of new or significantly altered public facilities to maintain acceptable service ratios, response times, or other performance objectives.

Therefore, there would be **No Impact** as a result of operation activities under Alternative 1 for potential impact PS-5.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.16.4.5.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination for construction and operation activities as described in Section 4.16.4.5.1. Alternative 2 would not generate an increase in population that would create a need for new or physically altered public facilities, such as educational facilities, hospitals, places of worship, or first responder facilities. Therefore, there would be **No Impact** as a result of construction or operation activities under Alternative 2 for potential impact PS-5.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.16.5 Literature Cited

California Code, Public Resources Code – Title 14, § 15131. Accessed April 3, 2026. Retrieved from: https://www.law.cornell.edu/regulations/california/14-CCR-15131.

California Code, Public Resources Code – Title 14, § 21060.5. Accessed April 3, 2026. Retrieved from: https://codes.findlaw.com/ca/public-resources-code/prc-sect-21060-5/.

Fresno County. n.d. CSA 50 - Auberry Fire. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/vision-files/files/9410-vicinity-map.pdf.

_____. 2023. Parks. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/Departments/Public-Works-and-Planning/divisions-of-public-works-and-planning/resources-and-parks-division/parks#:~:text=Welcome%20to%20Fresno%20County%20Parks&text=Regional%20recreational%20facilities%20include%2012,parking%20facility%20at%20Shaver%20Lake.

_____. 2024. *Fresno County General Plan Policy Document.* Comprehensive General Plan Review and Revision. February 2024. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

Fresno County Superintendent of Schools. n.d. Districts. Accessed: April 3, 2026. Retrieved from: https://www.fcoe.org/districts.

Madera County. n.d. Community & Economic Development Department. Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/government/community-economic-development-department.

_____. 1995. *Madera County General Plan Background Report*. Adopted October 24. Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/2852/636480653566630000.

Madera County Superintendent of Schools. n.d. Madera County Superintendent of Schools Homepage. Accessed: April 3, 2026. Retrieved from: https://www.mcsos.org/.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

PG&E (Pacific Gas and Electric Company). 2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

USFS (United States Forest Service). 2023. *Land Management Plan for the Sierra National Forest: Fresno, Madera, and Mariposa Counties, California*. Accessed: April 3, 2026. Retrieved from: https://acconsensus.org/wp-content/uploads/2024/08/05-SNF_LMP_final_20230504_Web.pdf.

4 ENVIRONMENTAL ANALYSIS

4.17 RECREATION

This section provides a description of existing recreation opportunities and recreational use in the Proposed Project Area, which includes all lands, waters, and facilities within the revised FERC Project Boundary and analyzes potential impacts on recreation as a result of implementing the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The Proposed Project, Alternative 1, and Alternative 2 potential impacts were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.17-1).

Table 4.17-1: CEQA Checklist for Recreation

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact REC-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?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact REC-2: Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

4.17.1 Environmental Setting

4.17.1.1 Regional Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located in the foothills of the western slope of the Sierra Nevada on the San Joaquin River (SJR) in a sparsely populated area of Fresno and Madera counties, California. The Kerckhoff Hydroelectric Project is in the San Joaquin Hydrologic Region of central California (Central Valley Regional Water Board 2019) and in the upper SJR drainage basin, which is highly developed for hydroelectric generation, flood control, and irrigation storage. Within the Central Valley region (generally the area along and between Interstate 5 and the western slope of the Sierra Nevada mountains), there are 10 large reservoirs (greater than 1,000 acres), including Millerton Lake, that offer a variety of recreation opportunities. The other large, regional reservoirs include H.V. Eastman Lake, Hensley Lake, Pine Flat Lake, Shaver Lake, Huntington Lake, Mammoth Pool Reservoir, Bass Lake, Redinger Lake, and San Luis Reservoir. Regional recreational opportunities available at these other large reservoirs include developed campgrounds with a range of amenities for families and large groups with tents or recreational vehicles. Undeveloped, dispersed camping opportunities are also available

at some of the reservoirs stated above. Day use recreation activities at these regional reservoirs include swimming, boating, watersports (e.g., water skiing and wakeboarding), fishing, picnicking, hiking, equestrian use, and bicycling (PG&E 2017).

There are several trails in the region that provide opportunities for pedestrian, bicycle, and equestrian uses. The SJR Trail is the longest regional trail, and the closest to the Proposed Project. It is a multi-use trail that links Highway 99 in Fresno with Friant Dam within the Millerton Lake State Recreation Area and continues east to the Pacific Crest Trail near Devils Postpile National Monument in the Sierra Nevada. There are also several shorter trails within the region that provide pedestrian and multi-use opportunities along the SJR (e.g., Horseshoe Bend Trail, San Joaquin Cave Trail, Ya-Gub-Weh-Tuh Trail).

Rivers and streams in the region include Fresno River, Dinkey Creek, and Willow Creek, which support a variety of recreational activities ranging from dispersed shoreline recreation to whitewater boating. The main river in the Proposed Project Area is the SJR; however, numerous other tributaries to the SJR also provide recreational opportunities.

4.17.1.2 Recreation at and Near the Proposed Project

The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public land administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and United States Bureau of Reclamation (Reclamation) under BLM management. Land ownership within the existing Federal Energy Regulatory Commission (FERC) Project Boundary is summarized below:

- Federal land: 328.1 acres
- PG&E-owned land: 162.5 acres
- Other privately owned land: 41.1 acres
- Total acres: 531.7

Recreational activities primarily occur in two areas, the Kerckhoff Reservoir and in the Kerckhoff Hydroelectric Project Bypass Reach (PBR) in the vicinity of the Kerckhoff 1 (K1) and Kerckhoff 2 (K2) powerhouses. Kerckhoff Reservoir is located in the foothills along the SJR in Fresno and Madera counties, approximately 30 miles northeast of Fresno. The K1 and K2 powerhouses are located just upstream of Millerton Lake in the BLM San Joaquin River Gorge Special Recreation Management Area (SJR Gorge Recreation Area), approximately 20 miles northeast of Fresno. The Kerckhoff Hydroelectric Project includes one developed recreation facility, Smalley Cove Recreation Area, located on the northeast end of Kerckhoff Reservoir. Additionally, there are whitewater boating opportunities within the PBR below Kerckhoff Dam, which flows downstream into Millerton Lake. Recreational activities in the Proposed Project Area primarily occur from early spring to late fall. Although land-based recreation activities, such as hiking, may decline in popularity in the summer when temperatures can exceed 100 degrees Fahrenheit (°F), water-based recreation activities at Kerckhoff Reservoir and the PBR are most popular during the summer (PG&E 2023).

4.17.1.2.1 Kerckhoff Reservoir

Kerckhoff Reservoir is operated near full pool (normal operating elevation of 984.5 feet above mean sea level [msl]; PG&E 2023) and has no seasonal storage, while daily water level fluctuations of about 5 feet are common. Kerckhoff Reservoir is periodically drawn down in October or November for scheduled maintenance (drawdowns during this timeframe have occurred eight times between 1985 and 2017; PG&E 2017). Personal watercraft (e.g., jet skis), non-motorized boats (e.g., kayaks and canoes), and small trailered or hand-launched watercraft are typically used on Kerckhoff Reservoir because of its relatively shallow nature and elevation fluctuations. Kerckhoff Reservoir is available for recreational use throughout the year (PG&E 2023).

Road access to Kerckhoff Reservoir only exists at the eastern end of the reservoir near the Smalley Cove Recreation Area. Public access to the reservoir is limited to the Smalley Cove Recreation Area because of steep slopes, abundance of dense

vegetation, and scarcity of privately owned land along the reservoir shoreline,[39] as well as a section of PG&E-owned land between Powerhouse Road and the Kerckhoff Reservoir shoreline (**Error! Reference source not found.**).

[39] Of the Kerckhoff Reservoir shoreline, 95 percent is either public land or PG&E-owned land.

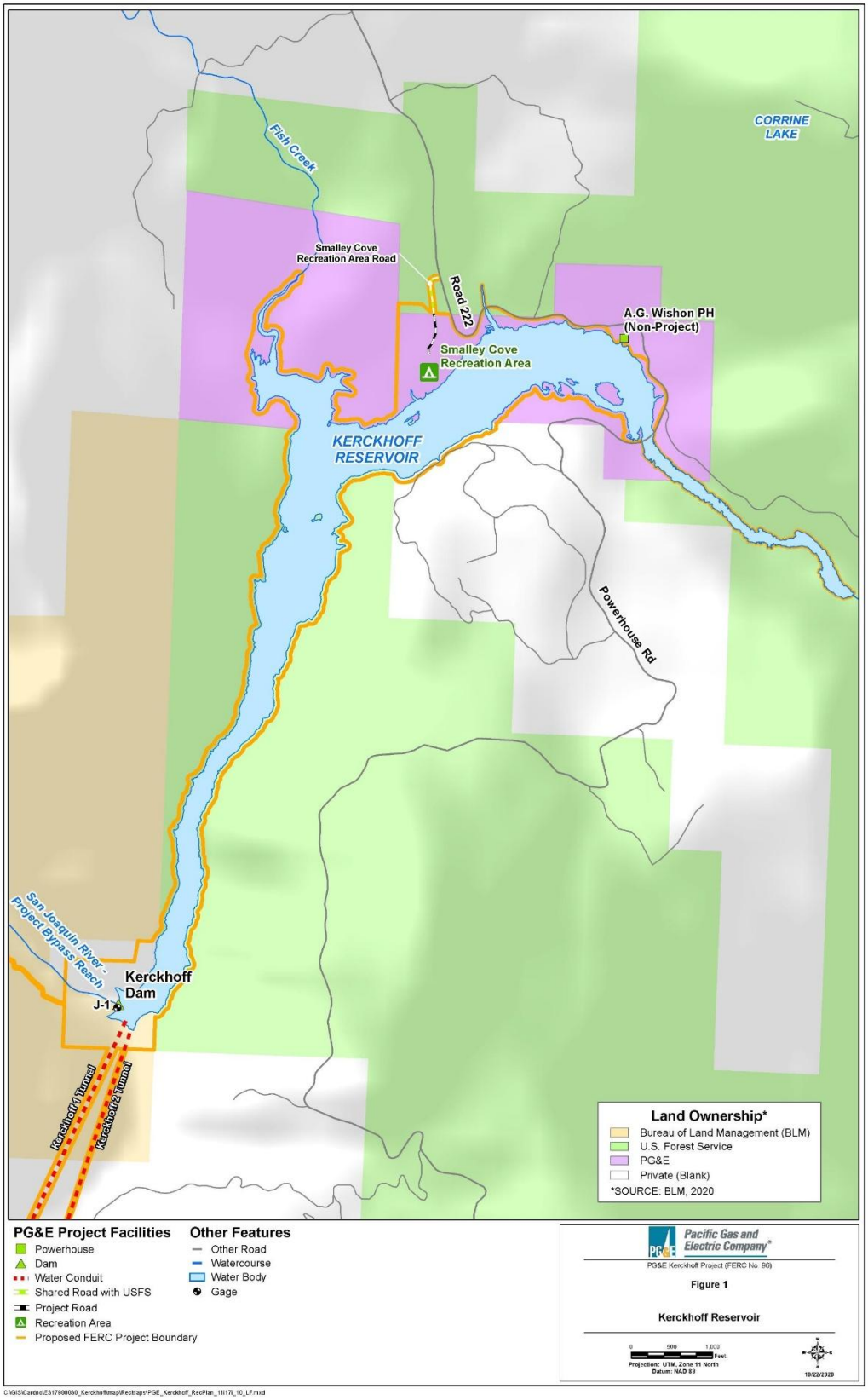


Figure 4.17-1: Kerckhoff Reservoir

4.17.1.2.2 Smalley Cove Recreation Area

Facilities

Smalley Cove Recreation Area, constructed in 1983, has a campground with group and single day use sites, potable water, and an open shoreline where visitors may hand launch watercrafts. In 2002, PG&E added a host site with a pad for a recreational vehicle and utilities to provide on-site management of this facility. Table 4.17-2 presents an inventory of the amenities provided at this facility. A Recreation Facility Assessment determined the facilities at Smalley Cove Recreation Area are generally in good condition, but some are in need of repair (PG&E 2019). Specifically, the interior access road and day use parking area have cracked or missing road edges, cracked pavement, broken curbs, and faded striping, and should be repaired or replaced.

The facilities at Smalley Cove Recreation Area were built to comply with the accessibility standards at the time of construction (1983). As such, there is a lack of accessible facilities and amenities that meet modern standards at the site. The Smalley Cove Recreation Area does not include designated accessible parking spots, picnic tables, campsites, or restrooms. There is also a lack of accessible connections between site features; surfaces that are not level, stable, or have insufficient dimensions and clearance; and lack of operating devices (e.g., water spigot handles). Although the recreation area has numerous facilities that do not comply with current accessibility guidelines, compliance with the current accessibility guidelines is not required until the facility is reconstructed.

Table 4.17-2: Smalley Cove Recreation Area Facility Inventory Information

Facility Component	No. of Sites	Site Amenities	Parking	Comments
Site amenities shared among the campground and day use areas	NA	• Two-stall vault restroom • Entrance sign, information boards, and fee station • Asphalt concrete-surfaced interior access road lined with wooden vehicle control barriers and gate • Trash receptacle	—	The host site has potable water, septic system, power, and telephone.
Smalley Cove Campground	5	• Numbered campsite sign • Table • Fire ring	Shoulder parking along the asphalt concrete-surfaced internal access road; sufficient space for two vehicles or one vehicle with trailer per campsite	The campground is designed for tent camping and does not have individual parking spurs. Recreation vehicles and trailers may be parked in the shoulder parking spaces adjacent to campsites. Two potable water faucets serve the campground.

Facility Component	No. of Sites	Site Amenities	Parking	Comments
				User-created shoreline access trails originate from Campsite Nos. 2 and 3.
Smalley Cove Day Use Area	4	• Numbered site sign • Table • Pedestal fire grill (picnic site Nos. 1–3 only) • Open shoreline area to hand launch boats	Seven single-vehicle parking areas with asphalt concrete surface and striped spaces	Picnic Site No. 4 is accessed via native-surfaced trail. Shoreline access trail extends from west side of parking area to shoreline.
Smalley Cove Group Day Use Area	1	• One food preparation table • Two group-sized picnic tables • One group-sized fire pedestal • One potable water faucet • One trash receptacle	A 185-foot × 175-foot gravel-surfaced area[a]	Estimated capacity is 40 people.[b]

Source: PG&E 2019

HLZ = helicopter landing zone

[a] This may also be used as a laydown area for operations and maintenance equipment and an HLZ. This large area can accommodate more than 40 single vehicles.

[b] Capacity is estimated based on the size of the two group-sized picnic tables.

Facility Occupancy

Table 4.17-3 presents the Smalley Cove Recreation Area campground occupancy rates for 2019 based on the records of the Smalley Cove Recreation Area operator. The results for the survey period (March 1 through October 31) are categorized by weekends, weekdays, and holidays. Holiday occupancy, as assessed in 2019, included the month of August because Labor Day weekend fell on Saturday, August 31. The highest monthly average non-holiday weekend occupancy of 47 percent occurred in May. Of the 245 days during the survey period, occupancy reached 100 percent on 8 days, 80 percent on 12 days, 60 percent on 5 days, and 0 to 40 percent on the remaining 220 days. Occupancy data are provided in *Technical Study Report 16: Recreation Visitor Use (Study REC 3), Kerckhoff Hydroelectric Project, FERC Project No. 96* (PG&E 2020a).

Table 4.17-3: Smalley Cove Recreation Area Campground Occupancy from March 1 to October 31, 2019

Month	Weekday Occupancy (%)	Weekend Occupancy (%)	Holiday Weekend Occupancy (%)	Average Monthly Occupancy (%)
March	0	0	—	0
April	8	20	—	11
May	17	47	67	28
June	17	30	—	21
July	10	27	60	19
August	8	25	100	15
September	7	15	50	12
October	3	13	—	6
Average March through October	9	19	69	14

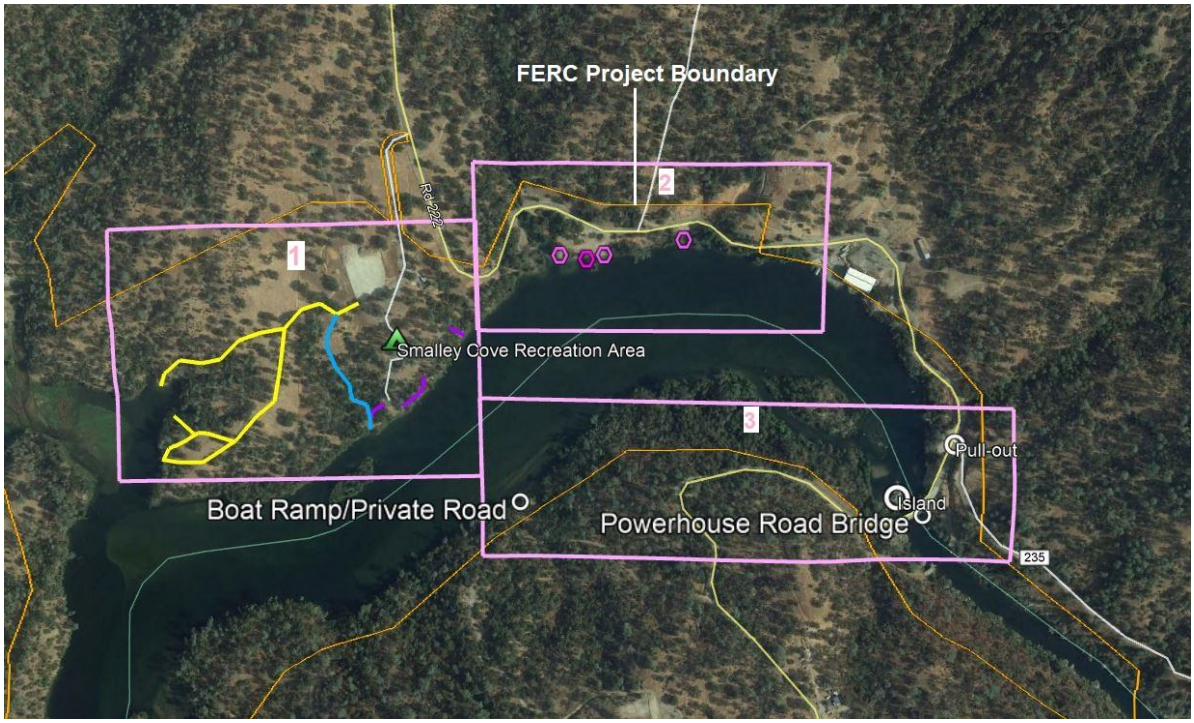
Source: PG&E 2020a

4.17.1.2.3 Dispersed Recreation Use

In general, the shoreline in the upper one-third of the Kerckhoff Reservoir supports some dispersed recreational use, but access to the shoreline is difficult because of dense vegetation, including blackberry shrubs. The lower two-thirds of the reservoir is riverine, and the shoreline is characterized by very steep and rocky shores, making most of this shoreline inaccessible or unsuitable for recreation use.

PG&E identified three general areas with repeated dispersed recreational use in the upper third of Kerckhoff Reservoir (Figure 4.17-2). A general description of the areas with repeated dispersed recreational use is provided below, but these areas are described in more detail in Study REC 3 (PG&E 2020a), which is provided in the Final License Application (FLA).

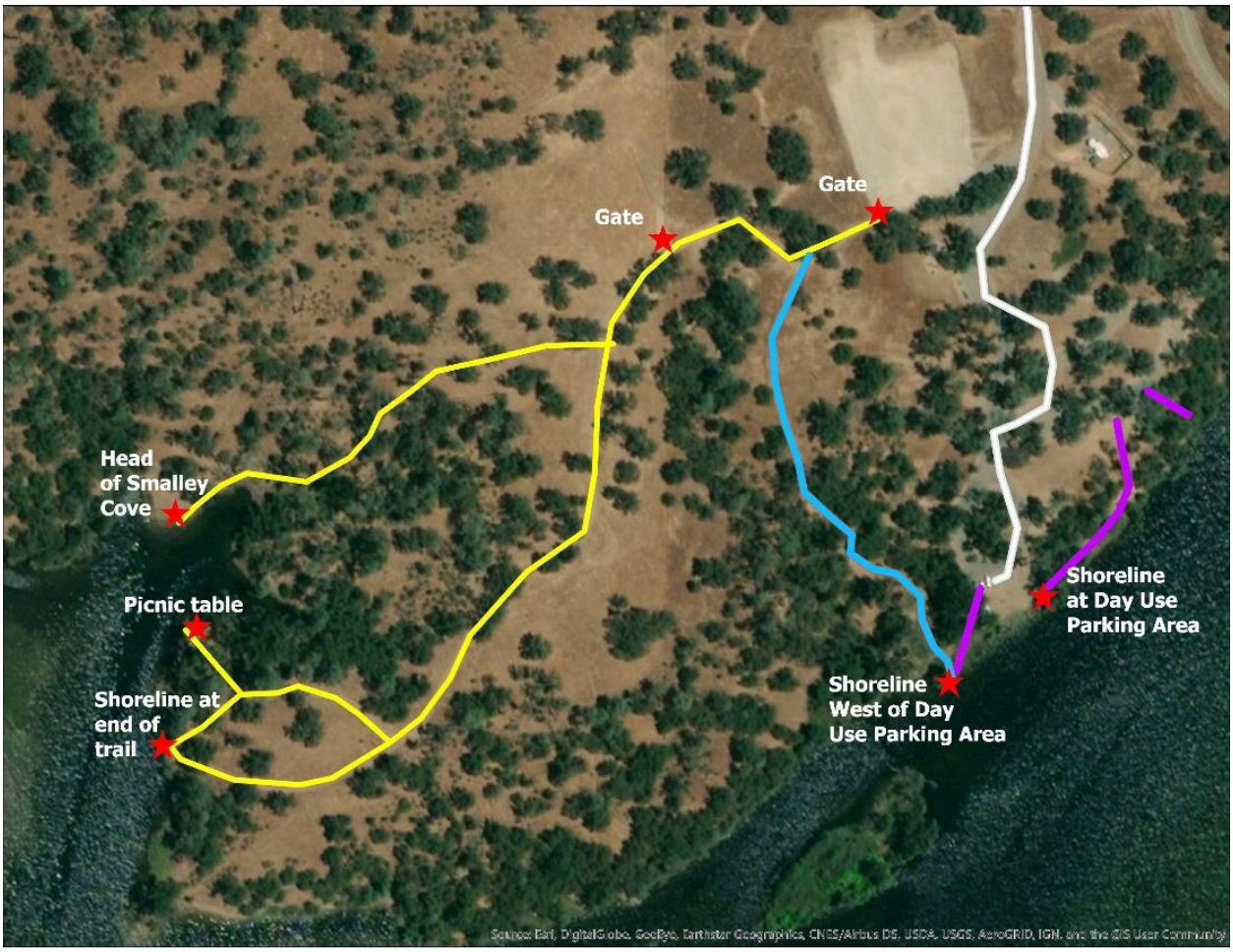
The area west of Smalley Cove Recreation Area, situated between Smalley Cove Group Day Use Area and Smalley Cove (Area 1 on Figure 4.17-2), has informal trails that visitors can use to access the Smalley Cove Recreation Area and the reservoir shoreline (PG&E 2023). This area has gated roads that serve as trails leading to Smalley Cove. One such road, indicated by bold yellow on Figure 4.17-2, splits into two segments that each lead to the shoreline of Smalley Cove. The segment going southward has a loop route that connects to the Smalley Cove shoreline. The segment going westerly is an out-and-back route to the shoreline at the head of Smalley Cove. Some of the apparent trail use is also attributed to cattle. The trail shown in blue on Figure 4.17-2 does not appear to have a constructed tread and has dual vehicle tracks with compacted soil from regular vehicular use. The trails shown in purple on Figure 4.17-2 provide pedestrian access to the shoreline from the parking area and campsites. Existing recreation-related impacts in this area consist of incidental amounts of litter, compacted soil, and unauthorized fire rings. A more detailed view of Area 1 is available on Figure 4.17-3.



Source: PG&E 2023

Note: Areas 1, 2, and 3 are identified by small numbered boxes located near the top center of each of the three lavender rectangles. Pink hexagons in Box 2 indicate areas of dispersed recreational use. White circles in Box 3 indicate areas of informal recreational use.

Figure 4.17-2: Dispersed Recreation Sites on the Upstream End of Kerckhoff Reservoir



Source: PG&E 2020a

Figure 4.17-3: Dispersed Recreation Use Locations Adjacent to Smalley Cove Recreation Area (Detail of Area 1)

Area 2 is located on the northern shoreline of the reservoir, extending east from the unnamed creek inlet east of the Smalley Cove Recreation Area to the A.G. Wishon Powerhouse (Area 2 on Figure 4.17-2). This area currently receives abundant and frequent dispersed use. Most of the dispersed use takes place at two areas on PG&E-owned land (pink hexagons in Box 2 of Figure 4.17-2). Both areas are open, unsurfaced

areas where visitors pull off Road 222[40] and park between the road and shoreline, including at and below the maximum water surface elevation. Visitors use the shoreline of this area to engage in day use activities and launch watercraft by hand or from trailers. PG&E currently allows only day use at these areas and prohibits campfires. Signs are posted to inform visitors of these restrictions, which the host at Smalley Cove Recreation Area enforces. PG&E also patrols this existing use area to enforce rules and remove litter.

Area 3 is located at the most upstream part of the reservoir near the Powerhouse Road bridge over the SJR (Area 3 on Figure 4.17-2). This area has four locations that are frequently used for informal recreational use (white circles in Box 3 of Figure 4.17-2), one on private land and three on PG&E-owned land. Existing use in this area consists of two shoreline access trails with compacted soil and erosion; a parking area with litter, compacted soil, and an eroded, steep drop off from Powerhouse Road; and an unauthorized fire ring. The site on private land has an old concrete boat launch that extends below the maximum water surface elevation and does not appear to have been recently used.

4.17.1.2.4 Water Surface Use of Kerckhoff Reservoir

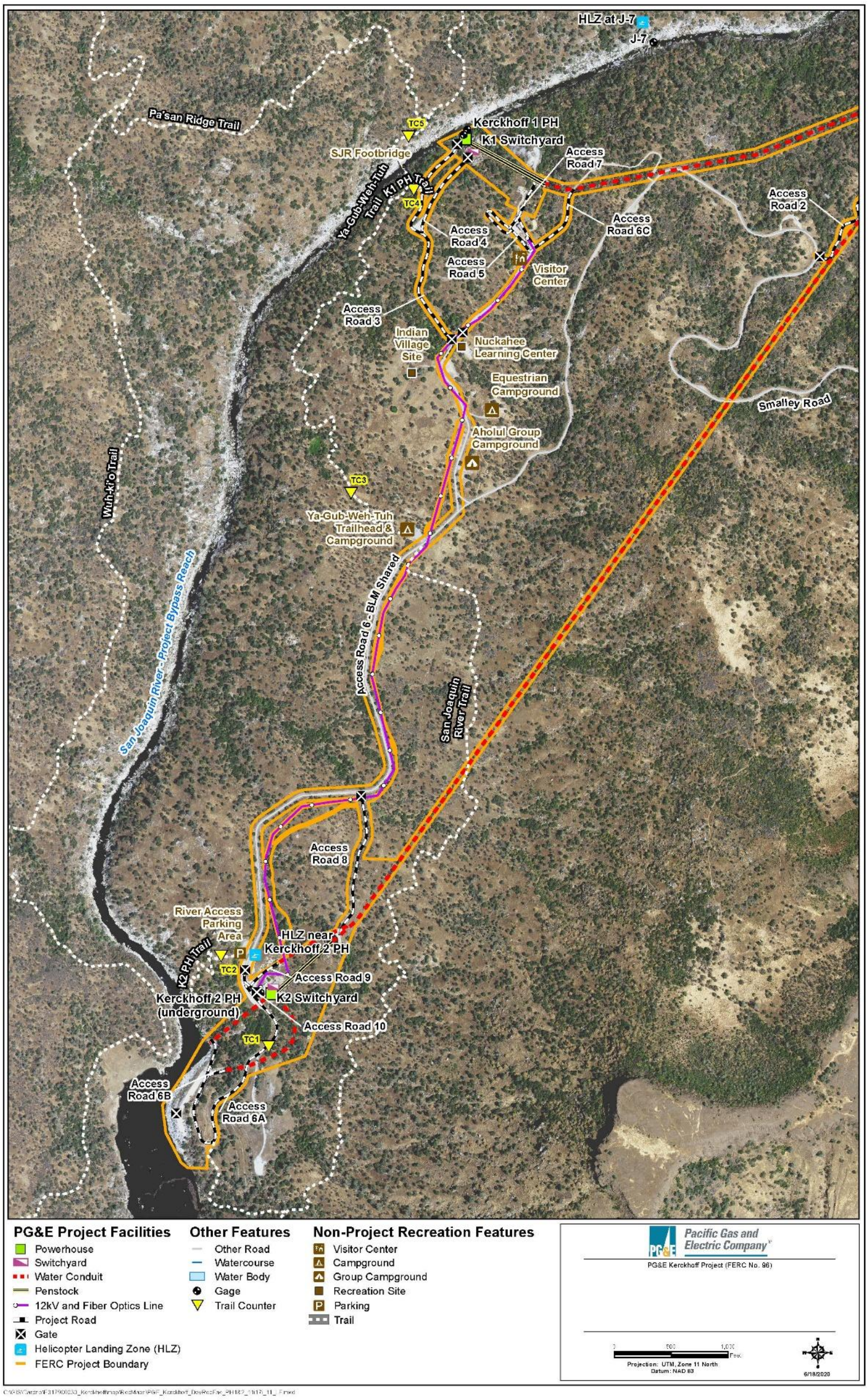
PG&E analyzed the water surface use observation data collected as part of Study REC 3 (PG&E 2020a) to characterize water surface use of Kerckhoff Reservoir. At Kerckhoff Reservoir, the study area included land extending 100 feet from the boundary of Smalley Cove Recreation Area and the maximum water surface elevation around the reservoir. The normal maximum water surface elevation of Kerckhoff Reservoir is 985.0feet msl. The analysis determined an average of 3.4 boats at one time were in use in the Kerckhoff Reservoir during study observations, or an average of approximately one boat at one time observed during weekdays and 4.5 boats at one time observed during weekends and holidays. The number of boats observed were evenly distributed

[40] The portion of this road located in Madera County is called Road 222, and the portion located in Fresno County is called Powerhouse Road. These road names are commonly used interchangeably.

between motorized and non-motorized watercraft. Most motorized boat use consisted of personal watercraft (e.g., jet skis); however, a few higher horsepower (hp) motorized boats were also observed (usually jet boats that could navigate the shallow water depth). The few people observed using the lower hp boats were fishing. Most of the non-motorized watercraft observed on the reservoir were kayaks.

4.17.1.3 Recreation in the Vicinity of the K1 and K2 Powerhouses

The K1 and K2 powerhouses are located in the SJR Gorge Recreation Area, which is managed by BLM. This management unit has over 35 miles of trails, parking areas, day use areas, campgrounds, a cultural heritage learning center, and a visitor center (Figure **4.17-4**). BLM's river access day use area, located at the end of Smalley Road across from the K2 Switchyard, has a picnic table, parking area, dumpster, and a vault restroom. A trail originating from BLM's river access day use area leads west to the SJR shoreline upstream of the K2 Tailrace. Visitors can also walk south from this facility on Access Road 6A to connect with the SJR Trail, which continues downstream to the Millerton Lake State Recreation Area.



Source: PG&E 2023

Notes: Vicinity of the K1 (left) and K2 (right) powerhouses; "TC" indicates trail counter locations (Study REC 3); brown symbols show locations of BLM recreation facilities; and orange lines depict the existing FERC Project Boundary.

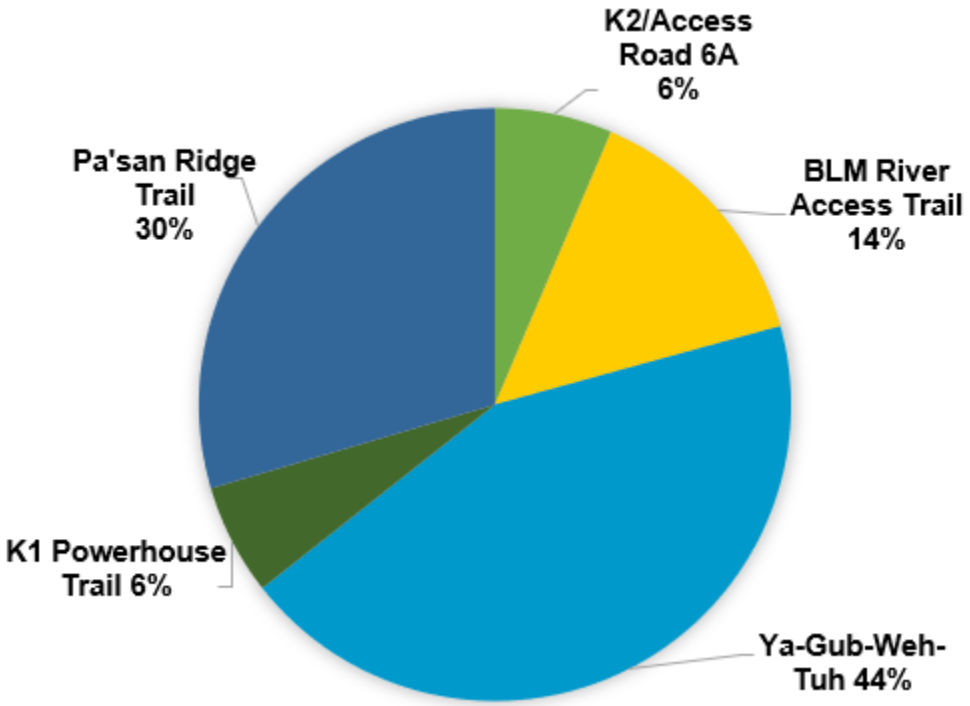
Figure 4.17-4**: San Joaquin River Gorge Recreation Area in the Vicinity of the K1 and K2 Powerhouses**

PG&E identified one trail near the K1 Powerhouse and five locations near the K2 Powerhouse showing evidence of repeated recreational use within and adjacent to the existing FERC Project Boundary.

Open flat areas along Access Road 6 in the vicinity of the K2 Switchyard are sometimes used for visitor parking. The road edges have eroded, creating abrupt and rough transition points between the road and parking areas. Similar erosion was identified where the SJR Trail meets Access Road 6A.

PG&E installed trail counters and analyzed the collected data to characterize trail use in the SJR Gorge Recreation Area (Figure **4.17-4**). Four counters were installed on trails, and one counter was installed on Access Road 6A, which is gated to prohibit public vehicular access but provides non-motorized visitor access to BLM's SJR Trail and SJR downstream of K2 Tailrace. PG&E collected data during the entire study period (March 13, 2019, through October 31, 2019) with some exceptions, as explained in Study REC 3 (PG&E 2020a), provided in the FLA. Although these exceptions do not allow the data to be used to identify the number of BLM trail users, the data can be used to assess the relative amount of use and the seasonality and time-of-day use patterns. Trail counters near the Ya-Gub-Weh-Tuh trailhead and campground and north of the SJR on Pa'san Ridge Trail showed the highest daily counts ranging from 400 to 600 visitors. The trail counter near the K1 Powerhouse showed the lowest use compared to the other recreation sites, with the highest daily counts ranging from 50 to 75 visitors during the study period. Figure 4.17-5 shows the percentage of trail use for all the trail counters from March through June.[41]

[41] One trail counter was stolen during the study period, and the last complete dataset for all five counters ended on June 28, 2019.



Source: PG&E 2020a

Figure 4.17-5: Percent Trail Use (March – June 2019)

The total daily counts recorded by the counter near Ya-Gub-Weh-Tuh trailhead and campground, the trail segment with the highest proportional use, show that the highest trail use occurs during the spring months of March, April, and May when daily total counts were 664, 468, and 385, respectively. This high-use period coincides with study observations of the wildflower blooming season and precedes the period when seasonally high temperatures occur in the Proposed Project Area. After the lowest use period of July and August, when daily counts ranged from 2 to 153, the level of use gradually increased in September and October when daily counts ranged from 0 to 275. Analysis of the trail counter data showed that the highest hourly trail use occurs around noon each day.

4.17.1.4 Whitewater Boating

Within the Central Valley region (primarily along the western slope of the Sierra Nevada mountains where river gradients facilitate whitewater boating opportunities), numerous

sections of rivers and streams support whitewater boating activities. Under the current FERC license, no formal boating flows exist in the PBR, and whitewater boaters use flows when opportune. These whitewater boaters currently do not coordinate with PG&E to access boating flows below Kerckhoff Dam. These are informal opportunities and are not associated with planned or advanced notification of upcoming whitewater boating flow releases or escorted access to specific locations. Whitewater boating typically takes place in the spring and/or early summer when snowpack runoff provides sufficient flow to support whitewater boating activities. The amount of flow needed to support these activities is highly variable and depends on numerous factors, including the size of the river, streambed gradient, and difficulty of the whitewater run. In PG&E's supplemental Whitewater Boating Assessment (REC 1), it was determined that the ideal flows for whitewater users is approximately 2,500 cfs to 1,600 cfs in the PBR (PG&E 2022).

Numerous whitewater boating runs are in the Proposed Project Vicinity, which encompasses the surrounding area in which the Proposed Project is located; including the San Joaquin Valley and Madera and Fresno counties. Major tributaries to the SJR that offer whitewater boating opportunities include the Merced, Tuolumne, and Stanislaus rivers. In addition, five whitewater runs are on the SJR upstream of Kerckhoff Reservoir. Table 4.17-4 indicates by whitewater boating run the length, location, class (which is a rating scale to help determine the size and technicality of the whitewater that may be encountered on a run), boatable flow range, and average gradient of whitewater boating runs on the SJR upstream of Kerckhoff Reservoir.

Table 4.17-4: Whitewater Boating Runs on the San Joaquin River Upstream of Kerckhoff Reservoir

Run	Length (miles)	Location	Class	Boatable Flow Range (cfs)	Average Gradient (feet per mile)
Horseshoe Bend Run	7.0	SCE's Redinger Dam to Kerckhoff Reservoir	III/IV	700–10,000	33
Chawanakee Gorge Run	8.0	SCE's Dam 6 to Redinger Lake	V	280–1,000	137
Tied for First Run	8.3	SCE's Mammoth Pool Dam to Mammoth Pool Powerhouse	IV/V	500–3,000	93
Mono Hot Spring to Mammoth Pool Run	31.0	Mono Hot Springs to SCE's Mammoth Pool Reservoir	V+	500	136 (maximum of 320)
Florence Lake to Mono Hot Springs Run	6.9	SCE's Florence Lake to Mono Hot Springs	IV/V	350–1,500	91

Source: American Whitewater 2022

cfs = cubic feet per second; SCE = Southern California Edison

Whitewater Rating Scale:

Class I: Beginner

Class II: Novice

Class III: Intermediate

Class IV: Advanced

Class V: Expert

Class VI: Expert +

4.17.1.4.1 Whitewater Boating Runs in the Kerckhoff Hydroelectric PBR

American Whitewater (PG&E 2019) identified three whitewater runs located on the SJR potentially affected by Kerckhoff Hydroelectric Project operation. For the purposes of this Environmental Impact Report (EIR), they are referred to as Runs 1, 2, and 3. Table 4.17-5 indicates by whitewater boating run the length, location, class, boatable flow range, and average gradient of whitewater boating runs in the Kerckhoff Hydroelectric PBR. The PBR is the SJR between Kerckhoff Dam and the K2 Powerhouse reaches.

Table 4.17-5: Whitewater Boating Runs in the Kerckhoff Hydroelectric Project Reaches

Run	Length (miles)	Location	Class	Boatable Flow Range (cfs)	Average Gradient (feet per mile)
Run 1	9.8	Kerckhoff Dam to K1 Powerhouse	III–V IV–V	700–6,000* 700–4,000**	33
Run 2	1.8	K1 Powerhouse to K2 Powerhouse	IV+ IV–V	700–6,000* 700–4,000**	55
Run 3	Up to 3.0	K2 Powerhouse to Millerton Lake	III	Up to 5,000*	20

Source: *American Whitewater 2020a, 2020b, 2021, **A Wet State 2019a, 2019b

Whitewater Rating Scale:

Class I: Beginner

Class II: Novice

Class III: Intermediate

Class IV: Advanced

Class V: Expert

Class VI: Expert +

For public safety reasons, PG&E discourages public access across or in the immediate vicinity of its operating facilities. Although developed access to the channel for Run 1 and Run 2 is not available, boaters have used existing PG&E facility infrastructure (e.g., dock, intake structure, stairways, and temporary ramps) to access Run 1 to walk around Kerckhoff Dam and access the river channel below the dam. Public access is not available at the dam or powerhouses. BLM provides access to the Run 2 take-out (i.e., the endpoint of the trip) / Run 3 put-in (i.e., location of launch) via BLM's river access parking lot and trail.

Based on interviews conducted by PG&E with users who have boated the runs in the study area, the study area includes access and egress routes and locations at the three whitewater boating runs located on the SJR between Kerckhoff Dam and Millerton Lake (*Technical Study Report 05: Whitewater Boating Assessment [Study REC 1], Kerckhoff Hydroelectric Project, FERC Project No. 96*; PG&E 2020c). Based on word-of-mouth information from interviews with whitewater boaters and land owners, conducted as part of Study REC 1 (PG&E 2020c), actual whitewater boating use appears to be very low compared to other regional rivers such as the Merced, Kings, and Tuolumne rivers (Study REC 3 and *Technical Study Report 17: Recreation Visitor Use Surveys [Study REC 4], Kerckhoff Hydroelectric Project, FERC Project No. 96*; PG&E 2020a, 2020b).

An assessment of boating-day opportunities was completed for the Kerckhoff Hydroelectric Project as a part of Study REC 1 (PG&E 2020c). This assessment was completed using the boating flow ranges, timeframe, and flow variation criteria with flow conditions from the Kerckhoff Hydroelectric Project in operation. Boatable days at the Kerckhoff Hydroelectric Project ranged from 0 to 12 boatable days a year between 2001 and 2017, with the majority of boatable days between 0 and 5 (Table 4.17-6). From 2001 to 2017, the K1 Powerhouse was still operational, and no boating days were planned by PG&E (PG&E 2020c).

It should be noted that the study was subject to inherent dataset limitations. Additional factors that likely contribute to the low level of recreational use in the Kerckhoff Hydroelectric Project Area include limited access, safety concerns, the need for expert-

level paddling skills in portions of the Kerckhoff Hydroelectric PBR, and constrained flow availability under existing operations.

Table 4.17-6: Boatable Days per Month with Kerckhoff Hydroelectric Project: 1,500–4,000 cfs Flow Range

Water-Year Type	D	D	BN	D	W	W	CD	CD	BN	AN	W	D	CD	CD	CD	D	W
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Jan	ND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb	ND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mar	ND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Apr	ND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May	ND	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
Jun	ND	0	0	0	0	1	0	0	0	3	1	0	0	0	0	0	0
Jul	ND	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	3
Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sept	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Nov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0
Dec	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	1	3	0	0	1	3	5	0	0	0	0	12	5

Source: California Department of Water Resources 2020

Notes:

cfs = cubic feet per second

ND = No Data

Water Years: AN = Above Normal; BN = Below Normal; CD = Critically Dry; D = Dry; W = Wet

As stated above, the Merced, Kings, and Tuolumne rivers have more boatable days compared to boatable days within the Proposed Project Area. Based on the interviews, factors contributing to more boating days in these rivers include developed access points and flows of sufficient magnitude, predictability, and consistency to better support whitewater boating. In addition, there are public safety issues and concerns associated with the Run 1 put-in at the Kerckhoff Hydroelectric Project, including the potential for unexpected and sudden spill at Kerckhoff Dam that could result from unplanned

powerhouse shutdowns, large volumes of water from upstream operation in excess of the K2 Powerhouse capacity.

The hydrology in the Kerckhoff Hydroelectric PBR varies throughout the day with rapid up-ramping and down-ramping of flows, as well as throughout the year depending on the amount of forecasted water in the system via WY types provided by the California Department of Water Resources. This variable hydrology affects the number of boating days that are potentially available on the reaches. For the two primary whitewater boating flow ranges (as identified in the whitewater boating literature and Study REC 1; PG&E 2020c), potential annual boating opportunity days have ranged from 0 to 42 days for 1,650 to 3,000 cubic feet per second (cfs) flows and 0 to 24 days for 2,000 to 3,000 cfs flows during the period of time from 2003 to 2017 (PG&E 2023). While these ranges acknowledge the number of days when whitewater boating flows were available on the reaches, they are not indicative of actual whitewater boating use on the river. Due to the informal nature of the three boating runs associated with the Kerckhoff Hydroelectric Project, in addition to safety concerns, use is limited, and data for actual baseline whitewater boating use is not available.

Run 1: Kerckhoff Dam to the K1 Powerhouse

Run 1, a 9.8-mile-run from Kerckhoff Dam to the K1 Powerhouse, has an average gradient of 33 feet per mile (American Whitewater 2020a). The Run 1 put-in is at the Smalley Cove Recreation Area. From here, boaters must paddle approximately two miles across Kerckhoff Reservoir to Kerckhoff Dam. Boaters typically exit the reservoir at the PG&E dock near the Kerckhoff Dam and walk across the K2 Intake Structure, under the trash rack, and around the dam via a PG&E path and stairway. Using another PG&E stairway and temporary metal ramps, boaters reach the river in the plunge pool at the base of Kerckhoff Dam. This area is posted with a sign that reads: “Danger Keep Out: Water May Be Discharged At Any Instant. Extremely Dangerous.” PG&E has a locked gate and fencing between the dock and intake structure to prevent public access across operating facilities.

Run 1 is boatable at a wide range of flows, from 700 cfs to 6,000 cfs (American Whitewater 2020a). Approximately 2,000 cfs is an optimal flow for the rapids of Run 1. A slightly lower flow would make boating easier in this run, but too much lower could decrease the level of enjoyment for boaters. Typically, 1,700 cfs would be an optimal flow for boaters looking for less challenge (A Wet State 2019a).

Run 2: K1 Powerhouse to the K2 Powerhouse

Run 2 is a short, approximately 1.8-mile run, from the K1 Powerhouse to the K2 Powerhouse (American Whitewater 2020b). This run is rated as a Class IV+ with an average gradient of 55 feet per mile (American Whitewater 2020b) and is typically boated in conjunction with Run 1. Boaters put in near the K1 Powerhouse, which is accessed via Smalley Road. There is a graded area that boaters use for parking upstream of the K1 Powerhouse. From this point, boaters carry equipment approximately 500 feet, descending about 200 feet overland (no trail) to the river, and put-in on the south bank upstream of the K1 Powerhouse. Boaters take out at the upstream end of the K2 Tailrace. Using BLM's river access trail on the river's south bank, boaters hike approximately 1,500 feet, ascending about 230 feet to BLM's river access parking lot, which has an information board and restroom facility.

The boatable flow range for Run 2 is typically the same as for Run 1 (700 cfs to 6,000 cfs) (American Whitewater 2020b). Typically, flows of about 2,000 cfs offer good boating and portage conditions; when flows peak to an estimated 3,000 cfs, portaging may become more difficult, although the boating conditions may be easier.

Run 3: K2 Powerhouse to Millerton Lake

This Class III run is approximately 3 miles long and has an average gradient of 20 feet per mile (American Whitewater 2021), extending from the K2 Powerhouse to Millerton Lake. Run 3 is described as "a deep and relatively narrow channel, and big powerful drops" (American Whitewater 2021).

Boaters access the put-in from the same parking lot and trail as the take-out for Run 2—using Smalley Road to BLM's river access parking lot and then hiking approximately 1,500 feet and descending about 230 feet on BLM's river access trail to the south bank,

just upstream of the K2 Tailrace. Boaters then have three take-out options: 1) boat to the upper extent of Millerton Lake, get out, and carry the boat back upstream to the put-in; 2) leave a car at Sky Harbor Road and paddle an additional nine miles across the reservoir (or request a ride from a powerboat); and 3) obtain vehicle access to Temperance Flat, which is two miles downstream of the put-in (American Whitewater 2021). This access is on private property, not open to the public, and requires permission from the property owner.

Run 3 can be boated at flows up to 5,000 cfs (American Whitewater 2021). Because Run 3 is located downstream from the K2 Powerhouse, the flow in Run 3 could be either primarily from the K2 Powerhouse discharge or from a combination of the K2 Powerhouse (and the K1 Powerhouse if operating) and spill/releases from Kerckhoff Reservoir. In most cases, Run 3 is inundated by Millerton Lake during spill event periods that typically occur during the spring and early summer.

4.17.1.5 PG&E Public Safety Plan

PG&E currently operates the Kerckhoff Hydroelectric Project consistent with the *Public Safety Plan for Kerckhoff Hydroelectric Project* (PG&E 2021). This plan contains detailed maps showing the locations of safety fencing, gates, signs, and existing facility infrastructure. PG&E reviews the plan annually to ensure that it represents existing recreation and public safety features at the Kerckhoff Hydroelectric Project and evaluate whether plan revisions are necessary to further define locations and content of public safety signage and restrictive access measures. In 2019, PG&E updated the content of the safety sign it posts at the locations designated in the plan, including at trailheads used to access the river. The safety sign informs visitors about potentially rapid water level changes in the SJR. As part of PG&E's continued public safety efforts, public safety alert sirens have been installed at Kerckhoff Dam, K1 Powerhouse, and K2 Powerhouse to alert those in the vicinity of releases (PG&E 2023).

4.17.2 Regulatory Background

The following subsections contain an overview of regulations related to recreational use.

4.17.2.1 Federal

4.17.2.1.1 Federal Power Act

The Federal Power Act (Title 16 United States Code Chapter [USC] 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created FERC and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations [CFR] Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.17.2.1.2 United States Forest Service

Sierra National Forest Land Management Plan

The USFS-SNF uses the direction in its updated *Land Management Plan for the Sierra National Forest* (USFS 2023) to guide its decisions regarding the relicensing of the Proposed Project and the development of associated license conditions.

The *Land Management Plan for the Sierra National Forest* assigns a Rural Recreation Opportunity Spectrum classification[42] to public lands managed by the United States

[42] The USFS uses the Recreation Opportunity Spectrum to define, classify, inventory, and monitor recreation settings and categorize them into six distinct classes: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural, and urban; these have not changed since originally determined (USFS 2023). The rural classification is described as a setting in a substantially modified natural environment where the sights and sounds of man are readily evident, and interaction between users is often moderate to high.

Forest Service (USFS) in the Proposed Project Vicinity. This classification provides for the protection of resources and supports sustainable recreation on USFS-managed lands. The plan does not provide specific management direction for lands in the vicinity of the Proposed Project, but it lists proposed and probable management practices that may take place in the future. Recreation-related practices listed in this plan include the following:

- Manage hydroelectric generation under FERC licenses and provide recreation for forest visitors
- Develop trail systems for bikes, equestrians, and motorized recreation users
- Complete updates and changes to the motor vehicle use map to achieve forest plan desired conditions
- Naturalize or decommission unauthorized tracks
- Improve and protect riparian areas by establishing effective setbacks for activities that have impacted or have the potential to impact resources
- Continue to implement strategies focusing on high-use areas to reduce human recreational use impacts such as reducing litter, soil compaction, erosion, and vegetation removal; and improving sanitation
- Maintain trails according to development level and managed use
- Develop education and outreach programs, including signage, to help reduce user conflicts like those between motorized and non-motorized users
- Protect and enhance natural resources and amenities by engaging the public and recreationists in responsible recreation use and natural resource stewardship activities
- Implement management actions to discourage illegal activity, including creation of unauthorized tracks
- Develop interpretive sites as opportunities become available and in conjunction with partners
- Maintain interpretive signs and exhibits
- Cooperate with other entities, such as PG&E and SCE, for the rehabilitation of recreation sites through settlement agreements

- Implement vegetation management activities in developed recreation sites, including periodic reviews of vegetation health and opportunities for vegetation to provide screening or manage recreation site concerns—following the protocol for removing hazard trees, where needed
- Improve facilities' operating efficiency and sustainability through new construction and repairs. Consider energy efficiency through the implementation of recycled or renewable resources, which produce a smaller carbon footprint
- Complete regular patrols at developed facilities to check for public safety, and facility and resource protection

4.17.2.1.3 United States Bureau of Land Management

Bakersfield Field Office Resource Management Plan

Proposed Project activities that occur on public lands managed by BLM must be consistent with BLM's *Bakersfield Field Office Record of Decision and Approved Resource Management Plan* (RMP) (BLM 2014). The RMP identifies comprehensive management direction for all resources and uses. Kerckhoff Dam and the K1 and K2 powerhouses are located in BLM's SJR Gorge Special Recreation Management Area (SRMA). The RMP does not contain any objectives specific to operation of the Proposed Project. Goals, objectives, decisions, and standards relevant to recreation management in the Proposed Project Area include the following:

Goal [RVS-G-1]: Support growing demand for recreation access to public lands and maintain a diversity of recreation opportunities promoting a multiple use philosophy.

Objective [RVS-O-1]: Coordinate recreation management activities through an ecosystem-based management style that considers the landscape setting and patterns of land ownership to fully realize program goals.

Decision [RVS-D-2]: Designate 6,520 acres (BLM 2014, Map 2.28) as the SJR Gorge SRMA, established with a "community" market strategy for local communities, nearby rural areas, and the population centers of Fresno-Clovis and Madera. The SRMA is subdivided into three Recreational Management Zones, each with the recreation

objectives, targeted activities, experiences, benefits, Natural Resource Recreation Settings, and management activities.

RVS Administration Action: Incorporate federal accessibility standards in the design and construction of new and renovated facilities, appropriate trails, and signs, including the Uniform Federal Accessibility Standards and the Americans with Disabilities Act Accessibility guidelines.

San Joaquin River Gorge Special Recreation Area

BLM's SJR Gorge is identified as an SRMA in the RMP (BLM 2014). Special Recreation Management Zones (RMZs) within the SJR Gorge Recreation Area include Pa'san, Tahoot, and Wuh-ki'o. The BLM uses the direction contained in the RMP for these three RMZs to guide its decisions regarding the relicensing of the Proposed Project and the development of associated license conditions (PG&E 2020a).

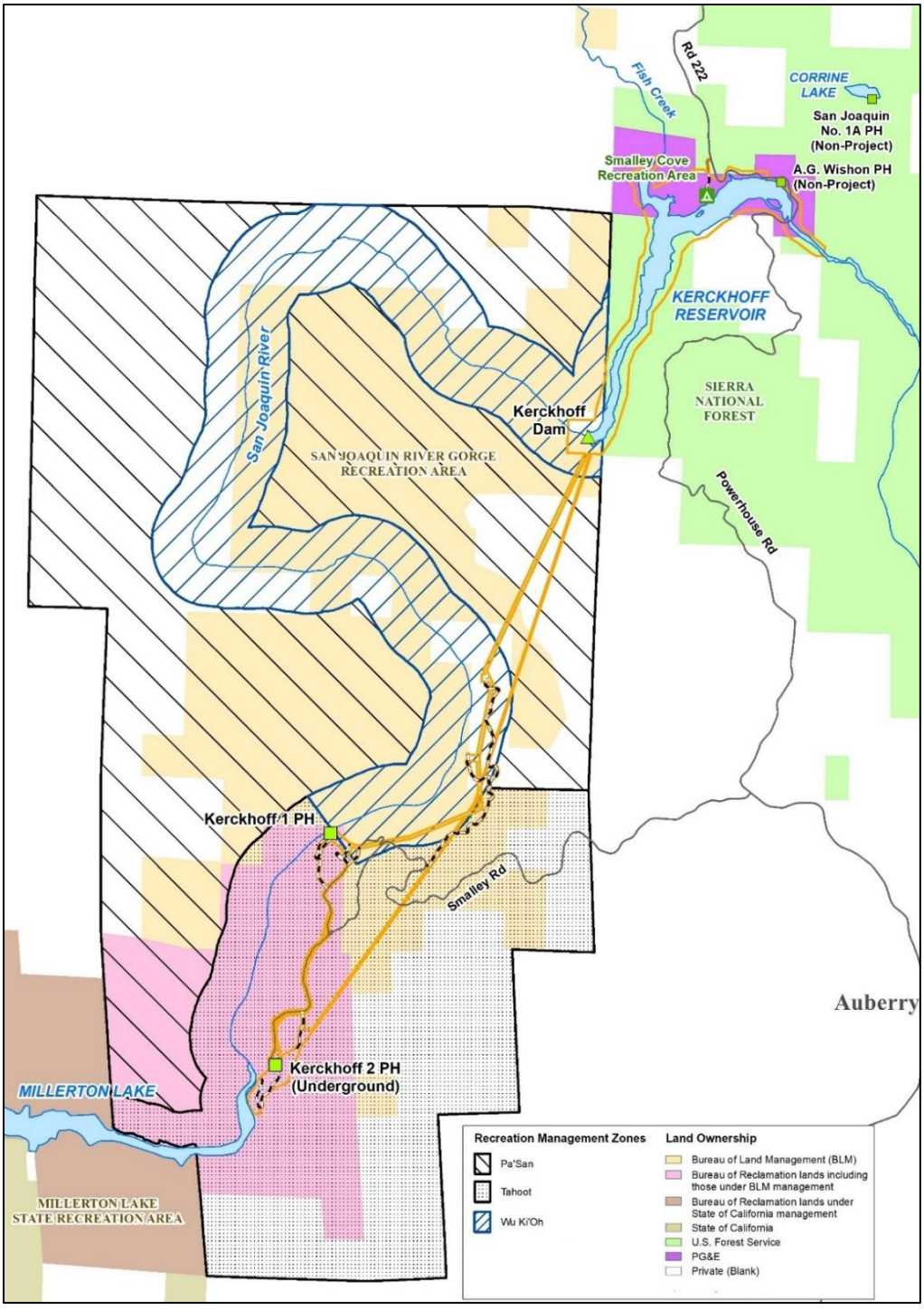
The SJR Gorge SRMA is located near the rural town of Auberry and spans the SJR between Millerton Lake and Kerckhoff Reservoir and the USFS-SNF in eastern Fresno and Madera counties. The predominant features of the 6,520-acre area are the SJR canyon and Squaw Leap (elevation 2,370 feet msl), a mesa for which the SJR Gorge SRMA was originally named. The three RMZs each involve individual management objectives and targeted recreation activities (Table 4.17-7 and Figure 4.17-6). The BLM's recreation use estimates show this area is increasing in popularity each year with an estimated 30,833 and 60,253 people visiting the area in 2010 and 2016, respectively (PG&E 2017).

Table 4.17-7: Recreation Management Objectives and Activities in Recreation Management Zones of the San Joaquin River Gorge Special Recreation Management Area

Recreation Management Zones of the San Joaquin River Gorge Special Recreation Management Area	Recreation Management Objectives	Recreation Activities
Pa'san (all land outside of the 0.5-mile-wide river in the SJR Gorge SRMA corridor, except for land within the Tahoot zone)	Provide opportunities for visitors to engage in a remote, isolated recreational experience; provide opportunities for community residents and regional visitors who use the area seasonally to engage in sustainable, primarily primitive day use opportunities and gain appreciation of the natural setting of the SJR corridor through self-discovery and exploration	Hiking, mountain biking, and horseback riding
Tahoot (lower one-third of the 0.5-mile river-wide corridor in the SJR Gorge SRMA and land extending to southwest of this corridor)	Provide opportunities for community residents and visitors to engage in sustainable personal discovery, interpretive programs, and educational opportunities while protecting critical resources	Interpretation, environmental education, hiking, horseback riding, mountain biking, and camping
Wuh-ki'o (upper two-thirds of the 0.5-mile-wide river corridor in the SJR Gorge SRMA)	Provide opportunities for community residents and regional visitors to engage in sustainable, primarily primitive day use opportunities and gain appreciation of the natural setting of the	Fishing, water play, gold panning, and kayaking

Recreation Management Zones of the San Joaquin River Gorge Special Recreation Management Area	Recreation Management Objectives	Recreation Activities
	San Joaquin River through self-discovery and exploration	

Source: BLM 2014



Source: BLM 2014

Note: The existing FERC Project Boundary is depicted by orange lines.

Figure 4.17-6: Recreation Management Zones of the San Joaquin River Gorge Special Recreation Management Area

4.17.2.1.4 San Joaquin River Wild and Scenic River Status

The SJR is not a federally designated Wild and Scenic River. However, BLM conducted Wild and Scenic River studies on two segments of the SJR between Kerckhoff Dam and Millerton Lake. Segment 1 was defined by BLM as the 7.25-mile-long section of the SJR from the Kerckhoff Dam to the K1 Powerhouse. Segment 2 was defined as the section of the SJR from the K1 Powerhouse to the start of Millerton Lake. Segment 1 was subsequently found to be suitable for inclusion in the Wild and Scenic River System. At this time, neither segment has been designated a National Wild and Scenic River by United States Congress.

4.17.2.2 State

4.17.2.2.1 California Department of Parks and Recreation

California 2021–2025 Statewide Comprehensive Outdoor Recreation Plan

According to the California Department of Parks and Recreation, the *California 2021–2025 Statewide Comprehensive Outdoor Recreation Plan* (SCORP) serves as a statewide master plan for state and local parks and outdoor recreational open space areas. The SCORP also offers policy guidance to all outdoor recreation providers, including federal, state, local, and special district agencies throughout California (California Department of Parks and Recreation 2021). The 2021–2025 SCORP does not contain specific information regarding recreation use or trends in the Proposed Project Vicinity, but it provides overarching guidelines for the management of recreation resources and opportunities in the state. The focus of the 2021–2025 SCORP is on communities and wellness, though there are some broader actions for increasing access and opportunities to public resources throughout the state for conservation and recreation purposes.

4.17.2.3 Local

4.17.2.3.1 Fresno County

Fresno County General Plan

The Fresno County General Plan (Fresno County 2024) contains several goals and policies related to the protection and development of recreational resources. The following goals and policies apply to areas within Fresno County and are aimed at protecting, developing, and expanding recreational resources specific to the Proposed Project:

Goal OS-H: To designate land for and promote the development and expansion of public and private recreational facilities to serve the needs of residents and visitors.

- **Policy OS-H.1 Meeting Recreational Demand:** The County shall promote the continued and expanded use of national forest, national park, and other recreational areas to meet the recreational needs of county residents
- **Policy OS-H.5 Recreation Service Levels:** The County shall encourage federal, state, and local agencies currently providing recreation facilities to maintain, at a minimum, and improve, if possible, their current levels of service
- **Policy OS-H.6 Centrally located Parks:** The County shall encourage the development of parks near public facilities such as schools, community halls, libraries, museums, prehistoric sites, and open space areas and shall encourage joint-use agreements whenever possible
- **Policy OS-H.7 Campgrounds and Vehicle Parks:** The County shall encourage the development of public and private campgrounds and recreational vehicle parks where environmentally appropriate. The intensity of such development should not exceed the environmental carrying capacity of the site and its surroundings
- **Policy OS-H.10 San Joaquin River Parkway Master Plan:** The County shall support the policies of the San Joaquin River Parkway Master Plan to protect the SJR as an aquatic habitat, recreational amenity, aesthetic resource, and water source

- **Policy OS-H.11 San Joaquin River Recreation:** The County shall in conjunction with the San Joaquin River Conservancy rehabilitate and improve existing recreation areas and facilities along the SJR at the earliest possible time, particularly Lost Lake and Skaggs Bridge Regional Parks

Goal OS-I: To develop a system of hiking, riding, and bicycling trails and paths suitable for active recreation and transportation and circulation.

- **OS-I.9 Recreational Trails Master Plan:** The County shall review development proposals for consistency with, and accessibility to, the trails in the Fresno County Regional Bicycle and Recreational Trails Master Plan
- **Policy OS-I.15 Trail Partnerships:** The County shall encourage public/private partnerships to implement and maintain trails

4.17.2.3.2 Madera County

Madera County General Plan

The Madera County General Plan (Madera County 1995) contains several goals and policies related to the protection of recreational resources throughout the county. The following goals and policies apply to the unincorporated areas of Madera County and are aimed at protecting recreational resources:

Goal 4.A: To designate land for and promote the development and expansion of public and private recreational facilities to serve the needs of residents and visitors.

- **Policy 4.A.1:** The County shall ensure that a mechanism is in place to assure the development of new recreational facilities as new residential development occurs
- **Policy 4.A.2:** The County shall promote the continued and expanded use of national forest, national park, and wilderness areas to meet the recreational needs of Madera County residents
- **Policy 4.A.3:** The County shall support and participate in the development of the SJR Parkway
- **Policy 4.A.4:** The County shall strive to achieve and maintain a standard of 3 acres of improved parkland per 1,000 population

- **Policy 4.A.5:** The County shall require the dedication of land and/or payment of fees, in accordance with local authority and state law (e.g., Quimby Act) to ensure funding for the acquisition and development of public recreation facilities. The fees are to be set and adjusted as necessary to provide for a level of funding that meets the actual cost to provide for all of the public parkland and park development needs generated by new development
- **Policy 4.A.7:** The County shall encourage federal, state, and local agencies currently providing recreation facilities to maintain, at a minimum, and improve, if possible, their current levels of service
- **Policy 4.A.8:** The County shall encourage the development of parks near public facilities such as schools, community halls, libraries, museums, prehistoric or historic sites, and open space areas and shall encourage joint-use agreements whenever possible
- **Policy 4.A.9:** The County shall encourage the development of public and private campgrounds and recreational vehicle parks where environmentally appropriate. The intensity of such development should not exceed the environmental carrying capacity of the site and its surroundings

Goal 4.C: To develop a system of interconnected hiking, riding, and bicycling trails and paths suitable for active recreation and transportation and circulation.

- **Policy 4.C.2:** The County shall encourage the preservation of linear open space along rail corridors and other public easements for future use as trails

- **Policy 4.C.3:** The County shall promote the development of a public trail system in connection with development of the SJR Parkway

4.17.3 Analysis Methodology

4.17.3.1 Analytical Approach

This assessment focuses on physical changes to the environment from the Proposed Project that may affect recreation, including recreational opportunities and visitor experience. Potential impacts were evaluated qualitatively, based on CEQA significance

criteria (see below) and professional judgment considering the nature of the Proposed Project, Alternative 1, and Alternative 2. Impacts are generally defined in terms of the Proposed Project, Alternative 1, and Alternative 2 construction activities, operational changes, and physical developments that would alter recreational resources, opportunities, and experiences, as well as create environmental impacts such as habitat degradation and impacts to existing vegetation in the Proposed Project Area.

4.17.3.2 Criteria for Determining Significance

Criteria for determining significance on recreational opportunities are based on Appendix G of the CEQA Guidelines (Title 14 California Code of Regulations, Section 15000 et seq.) and professional judgment. The Proposed Project and both Alternatives would have a significant impact on recreation if it would do 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 (REC-1); or
- Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment (REC-2)

4.17.3.3 Environmental Management Measures and Monitoring Plans

Under FERC requirements, projects require the description of proposed environmental management measures and monitoring plans to protect, mitigate, and enhance environmental resources that are to be included in the new license. PG&E would implement these monitoring plans and environmental management measures designed to protect, maintain, and enhance resources associated with the Proposed Project over the term of the new license. The following monitoring plans and environmental management measures are pertinent to recreation, are included in the Proposed Project, while most are included in Alternative 1 and Alternative 2. These plans and measures address some of the key issues raised during the public involvement and scoping processes:

- End-of-Spill Flow Recession and Whitewater Flow Releases Measure (EOS Flow Measure)

- Subsequent Spill Ramp Down Measure
- Spill Season Flow Measure
- Planned Outage Measure (POM)
- Flow Notifications Measure
- Wildlife Management Plan
- Vegetation and Management and Pest Control Plan
- Recreation Management Plan
- Road and Trail Maintenance Plan
- Whitewater Notification and Access Measure
- Historic Properties Management Plan (HPMP)

These measures and plans are discussed in more detail below. Additionally, the Proposed Project and both Alternatives include the upgrade of two existing, manually operated gates (that are currently only accessible by boat or helicopter) to be automatically and remotely operated, as well as a generator to provide back-up power to the station to support installation of a remote terminal unit to connect to the supervisory control and data acquisition (or SCADA) system, which would include upgrading the electronic communications, programming automatic control of the K2 Powerhouse, and calibrating the upgraded gates (PG&E 2023).

4.17.3.3.1 End-of-Spill Flow Recession and Whitewater Flow Releases Measure

The EOS Flow Recession would be scheduled to occur between May 1 and August 31 each year in conjunction with and immediately following the whitewater boating flow releases to the SJR below Kerckhoff Dam. The EOS Flow Recession would be scheduled annually by PG&E for the forecasted final flow recession from spill after flow is forecasted to decrease below 2,500 cfs. In non-spill years, the EOS Flow Recession would be scheduled based on the forecast of water availability. PG&E shall provide notification 10 days in advance of the planned EOS Flow Recession (as required under the Whitewater Notification and Access Measure). PG&E shall release water from Kerckhoff Dam to provide the whitewater boating flows, consisting of 2 days (9:00 a.m. to 6 p.m.) of whitewater boating flows with target flows of 2,500–2,000 cfs on

the first day and 2,000–1,600 cfs on the second day, followed by a ramp down to minimum inflow (MIF).

- Day 1 (9 a.m.) 2,500–2,000 cfs for minimum 9 hours
- Day 1 (6 p.m.) 2,000–1,600 cfs for minimum 24 hours
- Day 2 (6 p.m.) 1,600–1,200 cfs for minimum 10 hours
- Day 3 (4 a.m.) 1,200–800 cfs for minimum 5 hours
- Day 3 (9 a.m.) 800–600 cfs for minimum 5 hours
- Day 3 (2 p.m.) 600–400 cfs for minimum 5 hours
- Day 3 (7 p.m.) 400–200 cfs for minimum 5 hours
- Day 4 (12 a.m.) 200 cfs–MIF

4.17.3.3.2 Subsequent Spill Ramp Down Measure

PG&E's proposed Subsequent Spill Ramp Down Measure would be implemented each year from the conclusion of the EOS Flow Recession through October 31 in all WY types, except during K2 Powerhouse outages. PG&E states the Subsequent Spill Ramp Down Measure is designed to reduce potential stranding for spills resulting from unexpected high flows originating upstream of the Proposed Project that may occur following the EOS Flow Recession. After the conclusion of the EOS Flow Recession, for daily average[43] flows exceeding 500 cfs, PG&E shall ramp down the declining limb of spills when daily average flow at PG&E's Gage J-2 declines below 1,600 cfs as follows:

Step Schedule:

- Step 1: Maintain hourly average flow within a range of 1,600–1,200 cfs for 2 hours
- Step 2: Reduce the hourly average flow within a range of 1,200–800 cfs for 2 hours
- Step 3: Reduce the hourly average flow within a range of 800–600 cfs for 2 hours
- Step 4: Reduce the flow within a range of 600–400 cfs for 2 hours
- Step 5: Reduce the hourly average flow within a range of 400–200 cfs for 2 hours

[43] Daily average flow calculated from midnight-to-midnight.

- Step 6: Reduce the hourly average flow within a range of 200 cfs to minimum instream flow, or as close as feasible based on inflow to Kerckhoff Reservoir

4.17.3.3.3 Spill Season Flow Measure

The Spill Season Flow Measure manages spill recessions from March 1 through August 31 when the Kerckhoff Hydroelectric Project is in operation and not including K2 Powerhouse outages. The Spill Season Flow Measure is designed to provide the public with visual cues of water conditions when there is spill from Kerckhoff Dam. When spill flows measured at Gage J-2 are 500 cfs or more for at least 5 hours and the EOS Flow Recession Measure or the Subsequent Spill Ramp Down do not apply subject to sufficient water availability,[44] the Applicant shall release flows below Kerckhoff Dam as follows:

Step Schedule:

- Step 1: Maintain a 500-cfs target hourly average flow (flow within a range of 600–400 cfs) for a minimum of 5 hours
- Step 2: After a minimum of 5 hours of releasing a target hourly average flow of 500 cfs (flow within a range of 600–400 cfs), reduce the flow to a target hourly average flow of 300 cfs (flow withing a range of 400-200 cfs) for a minimum of 5 hours
- Step 3: After a minimum of 5 hours of releasing the 300-cfs target hourly average flow (flow within a range of 400-200 cfs), reduce flow to the target hourly average flow range of 200 cfs

PG&E's Spill Season Flow Measure includes the following compliance caveats:

- If flow drops below a target flow range during a release under this measure, return the flow to that target flow range as soon as practical and continue the Spill Season Flow Measure until complete

[44] Sufficient water availability is dependent on combined accessible volume of water from inflow, storage within the normal operating range, or current powerhouse diversions

- If average flow exceeds the flow range identified in the schedule, flow shall be returned, as soon as practical, to the original flow range for the step that was being implemented for at least the step duration specified in the schedule, then the ramp down would resume according to the schedule. If inflows continue to exceed the target flow resulting in a pause of the ramp down for more than 10 hours, the ramp down may be terminated and restarted if the triggering conditions are met subsequently

4.17.3.3.4 Planned Outage Measure

PG&E would implement the POM year-round when the K2 Powerhouse is required to be taken offline and when flows below Kerckhoff Dam are expected to exceed an daily average of 500 cfs as measured at Gage J-2. PG&E would post signage at least one week prior to releases associated with planned outages and implementation of the three planned outage protocols that affect flow during the outage, based on calendar date. The three protocols—POM Ramp Up, POM Ramp Down, and POM Winter Ramp Down—would tend to reduce flow fluctuations during the outage, and flows below Kerckhoff Dam would be stepped down to MIF following the outage as follows:

- **Initial Release Protocol:** PG&E would release the initial spill associated with an outage of the K2 Powerhouse prior to 3:30 a.m., subject to sufficient water availability.[45] If the release is not practical at this time, Proposed Project PG&E staff would alert people of the impending high flows in the areas of the trail to the BLM footbridge near the K1 Powerhouse and the trailhead to BLM's River Access Trail during daylight hours
- **POM Ramp Up Protocol:** During planned outages of the K2 Powerhouse occurring from March 1 to October 31, this protocol would provide a two-step ramp up of flow. The Planned Outage Ramp Up would be in conjunction with the sounding of safety sirens to signal to recreationalists that flows are increasing below Kerckhoff Dam

[45] The initial spill would begin the previous night or early morning day hours of the next day so that spill arrives downstream near the K1 Powerhouse by approximately 8:30 a.m.

- **POM Ramp Down Protocol:** During planned outages from end of spill to October 31, following conclusion of flow releases below Kerckhoff Dam greater than an hourly average of 500 cfs, flows would be ramped down to benefit aquatic biota

- **POM Winter Ramp Down Protocol:** During planned outages from November 1 to February 28/29, following conclusion of flow releases below Kerckhoff Dam greater than an hourly average of 500 cfs, flows would be decreased to an hourly average target flow of 500 cfs for at least 5 hours, subject to water availability, to deter people from entering the river during intermittent periods of low flow and to benefit aquatic biota. When water availability would be insufficient to sustain a 500-cfs release, the flow below Kerckhoff Dam would ramp down to MIF in 5-hour steps

4.17.3.3.5 Flow Notifications Measure

The Flow Notification Measure provides notification requirements associated with deviations from mandatory condition flow requirements not covered by other requirements. The measure proposal states PG&E may implement planned temporary modifications of mandatory condition requirements if required by operating emergencies beyond the control of the Licensee after consultation with resource agencies.[46] For any unplanned deviation from MIFs, down ramping, up ramping, managed spills, and the POM requirements that last longer than three hours or result in visible environmental effects such as a fish kill, PG&E must notify the resource agencies within 24 hours or following business day, and the Commission within 14 days, and file a report as soon as possible, but no later than 30 days after each such incident. For unplanned deviations lasting three hours or less that do not result in visible environmental effects, PG&E must file an annual report, by March 1, describing each incident that occurred during the prior January 1 through December 31 time period.

4.17.3.3.6 Wildlife Management Plan

The Proposed Project's Wildlife Management Plan includes protection, mitigation, and enhancement measures to minimize potential impacts on bald eagle, golden eagle,

[46] Resource agencies in this measure refer to the State Water Board, BLM, California Department of Fish and Wildlife, and United States Fish and Wildlife Service

nesting birds, and special status bats during construction and operation of the Proposed Project, including routine and non-routine heavy maintenance activities and construction.

4.17.3.3.7 Vegetation Management and Pest Control Plan

This plan defines a framework to implement invasive weed and routine vegetation management, pest control, and fuels management to protect environmental and cultural resources during proposed construction and operation activities and describes measures for the protection of special status plants discovered in the future.

4.17.3.3.8 Recreation Management Plan

PG&E's proposed Recreation Management Plan includes provisions for monitoring, performance standards, triggers for consultation, schedule, and design criteria for maintaining recreational facilities included in the Proposed Project. The goals of the plan are to provide for public safety and Kerckhoff Hydroelectric Project security, manage recreation use of the Kerckhoff Hydroelectric Project recreation facilities over the term of the new license, and minimize or eliminate Kerckhoff Hydroelectric Project-related effects on environmental and cultural resources. Proposed protection, mitigation, and enhancement (PM&E) measures included in the plan are to operate and maintain Kerckhoff Hydroelectric Project recreation facilities, develop a day use facility near the K2 Powerhouse (i.e., Vista Day Use Area; **Error! Reference source not found.**), decommission a trail near the K2 Powerhouse, install signage near the powerhouses, provide educational opportunities near Kerckhoff Hydroelectric Project infrastructure, and monitor recreation use.

4.17.3.3.9 Project Road and Trail Maintenance Plan

The Project Road and Trail Maintenance Plan describes the management objectives and PM&E measures that would be implemented to maintain Kerckhoff Hydroelectric Project roads and trails to ensure safe access to facilities, to minimize erosion and sedimentation along the Proposed Project roads and trails, and to protect water quality and other resources during routine and non-routine maintenance activities.

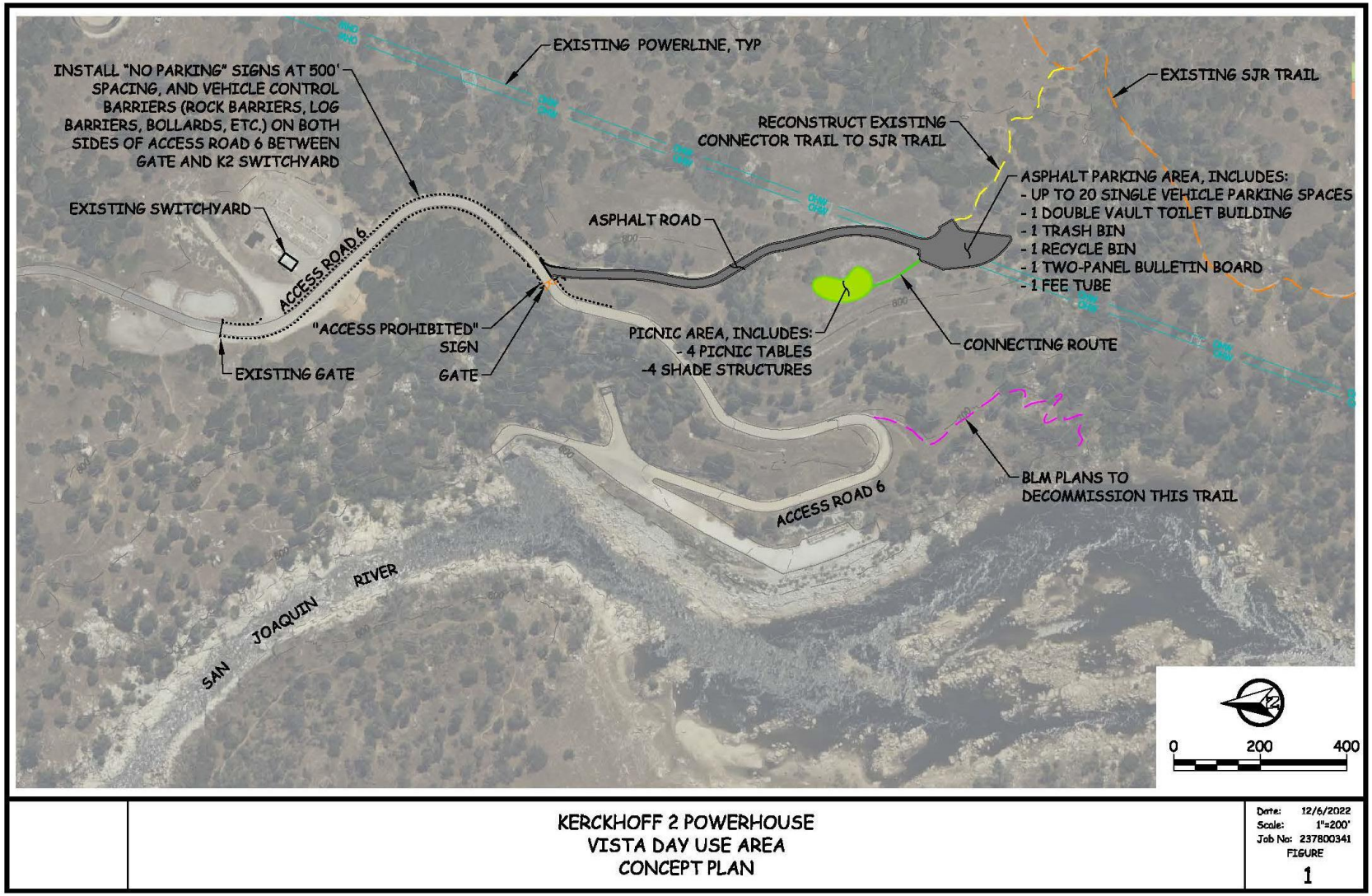
4.17.3.3.10 Whitewater Notification and Access Measure

Under the Whitewater Notification and Access Measure, PG&E would provide advanced notification of the upcoming flow releases and escorted access through the Kerckhoff Dam operational footprint to PG&E's J-2 Stream Gage access trail on the two days of the whitewater boating flow releases. Access to the river channel would be at PG&E's J-2 Stream Gage location. Prior to the first scheduled flow release, PG&E would conduct a field assessment of the J-2 Stream Gage access trail to identify potential trail upgrades to improve conditions for whitewater boating access to SJR at Gage J-2, as needed. Trail improvements that could be determined necessary include widening the trail up to three feet, leveling trail cross-slopes, trimming vegetation encroaching on the trail, and installing handrail(s). Before implementing any improvements, PG&E would assess potential impacts on environmental resources, including water quality.

4.17.3.3.11 Historic Properties Management Plan

Activities associated with the Proposed Project have the potential to impact known and unknown cultural resources (e.g., unrecorded resources that could be discovered during the term of the proposed new license) within the Proposed FERC Project Boundary that are potentially eligible for inclusion in the California Register of Historical Resources (CRHR). To mitigate potential adverse effects on cultural resources, PG&E developed the Proposed Project's HPMP (West et al. 2021) as part of the relicensing effort to guide the management of prehistorical and historic-period properties that are listed in, eligible for listing in, or unevaluated for listing in the National Register of Historic Places (NRHP) during the term of the proposed new license. The Proposed Project's HPMP provides the procedures required to comply with federal and state laws and regulations and conduct consultation with Tribes, agencies, and the State Historic Preservation Office (SHPO) for the continued management of historical properties under the proposed new license pursuant to section 106 of the National Historic Preservation Act. These measures include avoidance, protection, monitoring, and mitigation measures. Furthermore, the HPMP identifies the goals for preserving historic properties, establishes guidelines for routine maintenance and operation; and establishes procedures for consulting with SHPOs, Tribal Historic Preservation Offices (THPOs),

Indian Tribes, historic preservation experts, and the public concerning effects to historic properties. Properties that have not been evaluated for listing on the NRHP are to be managed as if they are eligible in the same manner as listed or eligible properties that have been formally evaluated. PG&E developed the Proposed Project's HPMP in consultation with the Cultural Resources Working Group. The Proposed Project's HPMP is required to be implemented and provides actions that are required to avoid potential impacts on historical resources and cultural resources that have yet to be evaluated for inclusion in the NRHP or CRHR. Avoidance is the preferred action for all historical properties. The required actions in the Proposed Project's HPMP are summarized below (West et al. 2021).



Source: PG&E 2023

Figure 4.17-7: Conceptual Drawing for Planned Vista Day Use Area

4.17.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, EOS Flow Recession Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and POM, which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down-ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Proposed Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed

in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the PBR of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cfs for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the PBR cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill

Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this

modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.17.4.1 Potential Impacts Related to Existing Regional Parks or Other Recreational Facilities

Impact REC-1: Would the project 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?

4.17.4.1.1 Proposed Project

Construction

Visitors travel to the Proposed Project Vicinity, which includes the USFS-SNF and BLM-managed lands (SJR Gorge Recreation Area), for recreation activities such as hiking, horseback riding, boating, bicycling, hunting of game species, picnicking, and fishing. During Proposed Project construction, specifically the construction of the Vista Day Use Area, travelers accessing nearby recreation sites may experience temporary delays due to minor traffic controls or heavy equipment entering, exiting and operating within the Proposed Project Area (refer to Section 4.18 *Transportation*). Additionally, construction activities may temporarily discourage recreators from using lands within the Proposed Project area. However, because construction would be of limited duration, any construction-related effects on recreation and regional recreational facilities would be temporary and less than significant. Installation of the remotely operated gates and back-up generator on Kerckhoff Dam and the upstream gaging station may temporarily affect boaters near these work locations, as watercraft would be diverted away from construction activity, which includes the use of boat and helicopter. No closure of neighborhood or regional parks, or other recreational facilities would be required, and

the Proposed Project Area would remain largely available to recreationists during construction.

There would not be a significant increase in new employees in the Proposed Project during construction activities. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact REC-1.

Operation

The Proposed Project does not include any existing neighborhood or regional parks; however, land surrounding the Proposed Project includes USFS-SNF and BLM-managed lands that host recreation activities. During operation, the location of recreation use near the K2 Powerhouse and the SJR would shift to the Vista Day Use Area and the river area that is accessible from BLM's SJR Trail (PG&E 2023). However, the overall day use recreation levels in the Proposed Project are not expected to increase substantially because the recreational area is shifting but not increasing. Adherence to the Proposed Project's Recreation Management Plan and Project Road and Trail Maintenance Plan would enable the Proposed Project to properly manage existing and Proposed Project recreation facilities, which would (1) maintain the condition of the infrastructure, (2) address public health and safety needs, and (3) meet visitor needs and expectations. These management actions are summarized below.

Maintaining the Condition of Infrastructure

Under operation of the Proposed Project, PG&E would implement the Recreation Management Plan and the Project Road and Trail Maintenance Plan to accomplish routine and non-routine heavy maintenance of the existing Smalley Cove Recreation Area and maintain the Proposed Vista Day Use Area throughout the term of a new license. Under the Proposed Project, PG&E intends to transfer ownership of the Vista Day Use Area to BLM and split the maintenance responsibilities after Year 1. Following Year 1, when BLM takes over the Vista Day Use Area, PG&E would be responsible for heavy maintenance activities, while BLM would be responsible for the ongoing routine maintenance of the site. By performing maintenance as specified in the monitoring

plans, recreation facilities would remain clean, safe, operational, and broken or outdated infrastructure would continue to be replaced in a timely manner. Continuance of an on-site host at Smalley Cove Recreation Area would provide visitors with a point of contact for information and emergencies, contributing to visitors' sense of safety. PG&E would continue to ensure that safe public facilities are provided, and visitor needs are met over the license term by implementing the Proposed Project's Recreation Management Plan and the Proposed Project's Project Road and Trail Maintenance Plan.

Addressing Public Health and Safety

The Proposed Project includes implementation of Flow Management Measures that would help to protect public health and safety regarding recreation in the Proposed Project. These measures include the Proposed Project's EOS Flow Recession Measure, Spill Season Flow Measure, POM, and Whitewater Notification and Access Measure, which are discussed above. These environmental management measures would require extra notifications; have the potential to reduce flow fluctuations, and maintain water levels so as to deter the recreating public from entering the water in the PBR during fluctuating flow conditions; require the installation of river safety, directional, and interpretive signs about the Proposed Project in the vicinity of K1 and K2 powerhouses; require scheduled whitewater boating releases; and install dam safety mechanisms to aid reaction time and control during spills (e.g., upgrade of radial gates). Also, the Proposed Project would continue to adhere to PG&E's Public Safety Plan (PG&E 2021) for the Kerckhoff Hydroelectric Project. In combination, implementation of the Proposed Project's monitoring plans and environmental management measures, as well as PG&E's Public Safety Plan, would contribute to the overall health and safety of visitors and benefit the recreation experience in the Proposed Project.

Meeting Visitor Needs and Expectations

Implementing the Proposed Project's Recreation Management Plan would increase overall access to recreational opportunities for persons with disabilities, group users, and individuals, when compared to current baseline conditions. Construction of the Proposed Vista Day Use Area, and updating Smalley Cove Recreation Area, as

needed, would comply with current applicable accessibility guidelines and would improve access.

Allowing overnight use of the existing group site at Smalley Cove Recreation Area, a change under the Proposed Project, would enable increased capacity of the site and reduce potential for family camper displacement for campers without reservations. The Proposed Vista Day Use Area would increase recreational capacity in the Proposed Project by providing a new day use area, associated amenities, and reconstruction of an existing pedestrian trail. At the state level, the California Department of Parks and Recreation reports that Californians will continue to engage in a wide array of outdoor recreation activities, with population growth likely being the factor with the most influence in forecasting future recreation levels and needs.

It is expected that Fresno and Madera counties will experience growth over the coming decades, potentially resulting in an increased demand for recreation opportunities in the Proposed Project Area (PG&E 2020a). Within the Proposed Project Area, recreation activities that are expected to increase in demand align with recreational opportunities that are already available; therefore, shifting some recreation use to the Vista Day Use Area, and improvements to allow increased use of Smalley Cove Recreation Area, would proactively help meet the potential increase in demand for recreation access and opportunity, thereby reducing the potential for inadvertent adverse impacts to the environment from recreational use in unauthorized or sensitive locations. Additionally, as described in the Recreation Management Plan, PG&E would implement best management practices (BMPs) and avoidance measures and would make repairs and take actions, such as installing vehicle access control features, controlling erosion, and removing debris, to reduce or eliminate harmful effects of unmanaged recreation use. As compared to the baseline conditions, the Proposed Project would ensure resources such as soil and vegetation are protected, thereby providing a greater level of protection for environmental resources than baseline conditions.

The Proposed Project would improve visitors' safety by smoothing the transition points from the public road used to enter the dispersed day use area and trimming vegetation

to increase sight distance along Powerhouse Road, as specified in the Proposed Project's Vegetation Management and Pest Control Plan. The Proposed Project would also provide increased boat-in reservoir shoreline access, as described in the Proposed Project's Recreation Management Plan. The Proposed Project's Whitewater Notification and Access Measure would require a trail assessment to develop a plan to improve the safety of trail conditions along the J-2 Stream Gage access trail for whitewater boating access to the SJR at the Gage J-2 location, if needed.

Under the current FERC license and baseline conditions, no formal boating flows exist in the PBR, and whitewater boaters use flows when opportune. Whitewater boaters currently do not coordinate with PG&E to access boating flows below Kerckhoff Dam. These are informal opportunities and are not associated with planned or advanced notification of upcoming whitewater boating flow releases or escorted access to specific locations. Whitewater boating typically takes place in the spring and/or early summer when snowpack runoff provides sufficient flow to support whitewater boating activities. The amount of flow needed to support these activities is highly variable and depends on numerous factors, including the size of the river, streambed gradient, and difficulty of the whitewater run. In PG&E's supplemental Whitewater Boating Assessment (REC 1), it was determined that the ideal flows for whitewater users is approximately 2,500 cfs to 1,600 cfs in the PBR (PG&E 2022). An analysis of baseline boating day opportunities, considering the period of record from 2001 to 2017, was performed by PG&E as part of Study REC 1; however boating day opportunities did not directly correlate to the WY type classification since inflows in wet WYs may exceed the target flow range, reducing the number of boating day opportunities compared to "drier" years (PG&E 2020c). Additionally, the REC 1 study identified access below the Kerckhoff Dam (Run 1) unsafe for public access without escorted access, as provided under the Proposed Project and Alternatives. Therefore, for the purposes of this EIR, baseline conditions assume the absence of dedicated boating flows.

Under the Proposed Project EOS Flow Recession Measure, PG&E would provide two sequential boating days annually. The public would be notified 10 days in advance of the planned EOS Flow Recession, as required under the Whitewater Notification and

Access Measure. Flows would be released from the Kerckhoff Dam to provide the whitewater boating flows, consisting of 2 days annually (9:00 a.m. to 6:00 p.m.) of whitewater boating flows with target flows of 2,500–2,000 cfs on the first day and 2,000–1,600 cfs on the second day, followed by a ramp down to MIF, or as close as feasible based on inflow to Kerckhoff Reservoir. Compared to the baseline whitewater boating conditions, the Proposed Project represents an increase in safe and controlled whitewater boating opportunities during Proposed Project operation.

The Spill Season Flow Measure has the potential to impact recreation within the Proposed Project Area. It is designed to provide the recreating public with visual cues as to water conditions when Kerckhoff Dam is spilling. The visual cue flows would act as a deterrent to recreators from entering the water in the PBR. This measure works by maintaining a 500-cfs target hourly average flow (flow within a range of 600–400 cfs) for a minimum of 5 hours when sustained spills measured at Gage J-2 are 500 cfs or more for at least 5 hours of continuous duration and neither the EOS Flow Recession nor the Subsequent Spill Ramp Down is being implemented.

The ability for recreators entering the Proposed Project Area to visually understand that Kerckhoff Dam is spilling by seeing 500 cfs in the PBR is unknown because it is based on the recreators' knowledge of Proposed Project operations and the river itself. Compared to baseline conditions, where there are no down ramping or up ramping operations, a steady visual cue flow could be an enhancement in regulating spill from Kerckhoff Dam, which under baseline conditions can rapidly increase. Further discussion on spill operations and changes in stage are included in Section 4.11 *Hydrology and Water Quality*.

Under the Proposed Project's Recreation Management Plan, as part of the Vista Day Use Area, a yet-to-be-determined portion of the existing trail beginning at Access Road 6 would be decommissioned in consultation with the BLM to deter visitor use near K2 Powerhouse, out of consideration for public safety (refer to Study REC 1; PG&E 2020c) and protection of existing infrastructure. To compensate for this change in trail access, and to discourage visitor use and trespass near K2 Powerhouse, the

Proposed Project includes refurbishing an existing connecting trail from the Proposed Vista Day Use Area to BLM's SJR Trail. This would essentially relocate a recreation trail to a more appropriate location. Therefore, the Proposed Project's Recreation Management Plan would help ensure that the Proposed Project properly manages existing and proposed recreation facilities so that the Proposed Project would not result in a significant potential impact on recreational resources.

Considering all operational activities together, the Proposed Project would not involve changes in the existing environment that could result in the substantial physical deterioration of existing neighborhood and regional parks or other recreational facilities. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact REC-1.

Impact Summary

Under baseline conditions, access to recreation areas within the SJR Gorge Recreation Area is limited in part by existing Kerckhoff Hydroelectric Project infrastructure, including gates and fencing installed for public safety. The Proposed Project would modify access patterns by opening a gate on Access Road 6 and directing visitors to the new Vista Day Use Area, thereby reducing unauthorized use near the K2 Powerhouse and shifting recreation to designated, maintained facilities.

Overall, the Proposed Project would enhance recreational opportunities by improving access to river areas for boaters, providing comparable or improved hiking opportunities, and developing the new Vista Day Use Area. Implementation of environmental management measures and monitoring plans would further support safe recreation. Although these improvements may modestly increase recreational use within the Proposed Project Area, the increase is not expected to be substantial enough to place additional strain on neighborhood or regional parks outside the project boundaries or cause accelerated wear on existing facilities.

The Proposed Project would also provide more whitewater boating days than baseline conditions, resulting in a beneficial impact without generating significant additional demand on surrounding recreational facilities. Relocating recreation away from the K2

Powerhouse to a formal day-use area with amenities and maintenance would support safe, sustainable public use without contributing to physical deterioration of existing parks or facilities.

Therefore, there would be a **Less than Significant Impact** as a result of construction and operational activities under the Proposed Project for potential impact REC-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.17.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same construction analysis and impact determination as described in Section 4.17.4.1.1. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 1 for potential impact REC-1.

Operation

The boating flows and down ramping of spill flows requirements under Alternative 1 differ significantly from the Proposed Project and from the baseline conditions. Under the current FERC license (baseline conditions), no formal boating flows exist in the PBR, and whitewater boaters use flows when available. These whitewater boaters currently do not coordinate with PG&E to access boating flows below Kerckhoff Dam. These are informal opportunities and are not associated with planned or advanced notification of upcoming whitewater boating flow releases or escorted access to specific locations.

Alternative 1 would increase the number of boating days compared to the baseline conditions. Under Alternative 1 during the Spill Year Schedule Boating Flows and Down Ramping of Flows, boating flows would be provided following a declining limb of spill

between May 1 and August 31. The down ramping spill schedule varies based on WY type (schedule), such that wetter WYs have a longer down ramping schedule than drier WYs. A minimum of 2 boating days would be provided per year (Spill Year Schedule A or B [Low Storage] Boating Flows and Down Ramping of Spill Flows) but could be up to 8 days a year under Schedule D with flows ranging from 3,500 cfs (maximum for whitewater flows) to 1,600 cfs (minimum boating flow). Additionally, under the Non-Spill Year Boating Flows and Down Ramping Measure, two days (9 a.m. to 6 p.m.) of whitewater boating flows would be provided on weekends between May 15 to June 15. The feasibility of Spill Year Schedule Down Ramping Flows (which include Boating Flows) and Non-Spill Year Boating Flows are dependent on inflows from SCE's Big Creek 4 Project. This is a result of the intended goal for down ramping operations and boating flows under Alternative 1. The Proposed Project under Alternative 1 would in essence pass recreational benefits of boating flows from SCE's Big Creek 4 Project below Kerckhoff Dam and into the PBR.

PG&E would coordinate with boaters to provide safe access to boating locations and provide notification before boating flows are implemented. When implementing the ramp down, boating flows cannot drop below the minimum flow within each flow step between 9 a.m. and 6 p.m. If the spill down ramp does not provide a minimum of 2 boating days ≥2,000 cfs, then the PG&E would increase flows to provide 2 days of boating flows (i.e., ≥2,000 cfs) and down ramp according to the schedule associated with the WY type for that year. Under Alternative 1, PG&E would make a good faith effort to provide the boating flow at the beginning of the spill down ramp.

Spill Year Schedule Boating Flows and Down Ramping of Spill Flows

Under the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure, PG&E would ramp down flows between May 1 through August 31 in the PBR after SCE has identified when down ramping of spill flows at Big Creek 4's Dam No. 7 will start. Standard down ramping for end of spills are determined by the WY Schedules, A, B (low storage), B (high storage), C, or D.

Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), each schedule was successfully implemented and provided the desired boating flows and days. As such, recreationalists would have, at minimum, two formal boating days each year during the spill years and up to eight days during Schedule D WY years. This is not expected to 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. While recreationalists would have scheduled days to utilize boatable flows at the Project, it is not expected to result in degradation of surrounding parks or facilities. As discussed in Section 4.17.1.4.1 *Whitewater Boating Runs in the Kerckhoff Hydroelectric PBR*, baseline conditions show that there were 0 to 12 boatable days per year between 2011 to 2017, with most years being 0 to 5 boatable days. The Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure ensures two scheduled boating days a year, or potentially up to eight days during certain years, which is an enhancement compared to baseline conditions. These boatable days would be planned, so there is likely going to be more use of boatable flows compared to baseline conditions. However, it is not expected this measure would put significant pressure on surrounding parks or facilities to the point of degradation. Additionally. the Vista Day Use Area would likely support the potential increase of visitors to the Proposed Project Area.

While the model showed the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure was technically successful 100 percent of the time, the measure in practice would be infeasible. As shown in the model, the reservoir elevation drops very close to the K2 Powerhouses minimum operating reservoir elevation.[47] As the reservoir approaches the K2 Powerhouse's minimum operating reservoir elevation, the K2 Powerhouse cycles above and below the rough operating zone (ROZ) in an attempt to keep the reservoir high enough to stay above the minimum operating elevation for the K2 Powerhouse. The K2 Powerhouse cycling frequency is anywhere from half an hour to two hours, which represents an unrealistic operating scenario. Based on the documented operational constraints, any operation that requires K2 to dwell in the ROZ

[47] The minimum operating elevation for the K2 Powerhouse is 980 feet (PG&E 2020g).

is considered infeasible due to excessive cavitation and vibration impacts and the associated maintenance and outage consequences. That means operating strategies that would require repeated short interval oscillations across the ROZ are not considered feasible, because they can increase cycling wear and raise reliability/maintenance risk even if each individual crossing is brief (personal email communication, J. Hartman and C. McCormick, March 5, 2026).

Implementation of Alternative 1 flow measures would not substantially increase regional recreation and contribute to physical deterioration of existing parks or facilities. Therefore, if the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure were implemented, there would be a **Less than Significant Impact** for potential impact REC-1.

Non-Spill Year Boating Flows and Down Ramping

The Non-Spill Year Boating Flows and Down Ramping schedule would be attempted every weekend from May 15 to June 15 of non-spill years. The Non-Spill Year Boating Flows and Down Ramping will be scheduled based on the PG&E's forecast of water availability. Modeling of the Non-Spill Year Boating Flows and Down Ramping Measure found that its feasibility was primarily dependent on the volume of inflows coming into Kerckhoff Reservoir during the weekends. Modeling efforts showed that inflow is too low during the summer months in non-spill years to sustain this schedule. Of the 28 modeled times this was implemented in the period of record (over 6 non-spill years), adequate boating flows were produced only 28.6 percent of the time. The measure was only fully feasible when natural flows were high enough to support 2 days of 2,500 cfs to 1,600 cfs. While unsuccessful in the model, the attempt would still result in more boating days when compared to the baseline conditions and the same amount of Proposed Project boating days if inflows were sufficient.

Table 4.17-8 presents a summary of success or failure of the modeled Non-Spill Year Boating Flows and Down Ramping schedules. In the table, "S" with the green shade represents a successful completion and two full boating days. "PS" with the orange shade represents a partial successful completion; this means it was able to achieve

boating flows for some duration but not for the full scheduled duration. “F” with the red shade represents failure to reach boating flows for any substantial duration. In years 2013, 2014, and 2015, there were five weekends that fell within the May 15 – June 15 period for boating flows. In years 2007 and 2012, there were only four weekends that met the criteria for boating flows. Based on this model, the rate of success is highly dependent on water availability of that year. While some years failed to provide any boating days, other years were capable of providing just one day a weekend or a few weekends of successful flows.

As discussed above, there would be more planned boatable days under this measure compared to baseline conditions. These boatable days would be planned, so there is likely going to be more use of boatable flows compared to baseline conditions. However, it is not expected this measure would put significant pressure on surrounding parks or facilities to the point of degradation. Additionally, the Vista Day Use Area would likely support any potential increase of visitors to the Proposed Project Area. Therefore, if the Non-Spill Year Boating Flows and Down Ramping Measure were implemented, there would be a **Less than Significant Impact** for potential impact REC-1.

Table 4.17-8: Non-Spill Year Boating Flows Success and Failure Based on the Alternative Modeling

	Weekend				
WY	**1**	**2**	**3**	**4**	**5**
2007	S	S	F	F	
2012	PS	F	PS	PS	
2013	S	PS	F	PS	PS
2014	S	S	S	F	PS
2015	F	F	F	F	F

Notes: S = Success, PS = Partial Success, F= Failure

Source: Appendix G Project Operations Model – CEQA Alternatives 1 and 2, Section 4.0

Stranding Protection Down Ramp Measure

The Stranding Protection Down Ramping Measure covers initial and subsequent spills between May 1 and August 31. In other words, the spill year ramp down schedules (AB,

BC, D) are reserved for the large spill events in each spill season, while all other spill events are handled by the Stranding Protection Down Ramping Measure. Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), the Stranding Protection Down Ramping ramp down was successful 100 percent of the time applied in the model. Encroachment on the K2 Powerhouse minimum operating reservoir elevation occurred 37.5 percent of the time and only induced K2 Powerhouse over-cycling once (WY 2016) in the model. Based on this, this measure is considered to be feasible since powerhouse cycling was minimal. Since the Stranding Protection Down Ramping ramp down better matches the inflow reductions over the same period, the pool elevation drops are minimal and avoid the K2 Powerhouse over-cycling. The Stranding Protection Down Ramping Measure would not have an impact on recreational activities in the Proposed Project Area, and subsequently the surrounding facilities and parks would not be affected. Therefore, the Stranding Protection Down Ramping Measure would have **No Impact** for potential impact REC-1.

September – October Down Ramp Measure

During the September – October Ramp Down Measure, a ramp down is triggered during declining limb of spills once the average daily flow declines below 1,600 cfs. Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), this measure was successfully implemented 100 percent of the time but did encroach on the K2 Powerhouses minimum operating reservoir elevation every time. This is due to the low inflows typically seen during the September and October months at the Kerckhoff Hydroelectric Project. However, no powerhouse cycling was seen in the model, and therefore this measure is considered feasible.

The September – October Ramp Down Measure would not have an impact on recreational activities in the Proposed Project Area, and subsequently the surrounding facilities and parks would not be affected either. Therefore, the September – October Ramp Down Measure would have **No Impact** for potential impact REC-1.

Alternative 1 Ramp Up Measure

The Alternative 1 Ramp Up Measure imposes a one foot per hour limit on the rate increase of stage as measured at Gage J-2, for spill events starting between MIF and 4,000 cfs, regardless of time of year. To model this measure, the alternatives modeling report (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0) analyzed if a one foot per hour ramp rate in general would be feasible, subject to sufficient storage and powerhouse capacity regardless of the inflow recorded at the gage above of the reservoir. Based on the modeling, this measure was successful 97.6 percent of the time and caused no encroachment toward Kerckhoff Dam's minimum operating elevation or K2 Powerhouse over-cycling. The success of the application of this measure depends heavily on advanced notification of the magnitude and timing of forecasted inflows from upstream projects, as well as the skill of the operator to predict the time, in advance of an increase in inflows, at which initiation of the ramp up protocol should begin. It would be better for the operator to initiate the protocol earlier than later, as an earlier start would allow the operator to back off spill if the reservoir were draining too fast and still maintain a rate of stage increase at Gage J-2 of less than one foot per hour. A late start would require the operator to spill more than the protocol allows to prevent the reservoir from rising above guide curve (984.5 feet msl).

The Alternative 1 Ramp Up Measure would not have an impact on recreational activities at the Proposed Project, and subsequently the surrounding facilities and parks would not be affected either. Therefore, the Alternative 1 Ramp Up Measure would have **No Impact** for potential impact REC-1.

Considering all operational activities together, Alternative 1 would not involve changes in the existing environment that could result in the substantial physical deterioration of existing neighborhood and regional parks or other recreational facilities. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 1 for potential impact REC-1.

Impact Summary

Overall, Alternative 1 attempts to provide more consistent boating conditions and access when compared to the baseline conditions, and a sometimes an increase of boating days when compared to the Proposed Project. While there would potentially be an increase of recreationists in the areas due to the increased opportunities of formal boating days, it is not expected this would result in a significant impact on the use of existing neighborhood and regional parks since the activities are contained within the PBR. The Vista Day Use area would also be constructed under Alternative 1, which would provide additional recreational resources within the Proposed Project Area and is located at the end of Run 2 of the boating runs within the PBR.

Based on this analysis, it is not expected that Alternative 1 would result in an increase of use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. Therefore, there would be a **Less than Significant Impact** as a result of construction and operational activities under Alternative 1 for potential impact REC-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.17.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same construction analysis and impact determination as described in Section 4.17.4.1.1. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 2 for potential impact REC-1.

Operation

Alternative 2 has a similar operation analysis and impact determination as described in Section 4.17.4.1.1 for potential impact REC-1. Alternative 2 would provide safer boating

conditions and improved access compared to baseline conditions (see Section 4.11.4.8 in *Hydrology and Water Quality*), and in some years may increase the number of available boating days relative to the Proposed Project. Although the increased availability of formal boating days could result in additional recreational use within the PBR, this increase is not expected to result in a significant impact on the use of existing neighborhood or regional parks because boating activities would remain contained within the PBR. Alternative 2 would also include construction of the Vista Day Use Area, which would add recreational amenities within the Analysis Area and is located at the terminus of Run 2 within the PBR.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 2 for potential impact REC-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.17.4.2 Potential Impacts Related to Physical Environmental Effects

Impact REC-2: Does the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

4.17.4.2.1 Proposed Project

Construction

As part of Proposed Project construction, the K1 Powerhouse and some other existing facilities and features in the vicinity of the K1 Powerhouse would be retired, retaining the K1 Switchyard as an existing facility. Access Roads 3 and 4, including the gate across Access Road 3 at Access Road 6 that prevents public vehicular access to the K1 Powerhouse, would also remain in the Proposed FERC Project Boundary.

The Proposed Project includes the construction and expansion of formal recreational facilities to deter recreationists from areas that are less safe for their use. This includes the construction of the Vista Day Use Area, in a previously disturbed area near the K2 Powerhouse. This would include construction of a day use area with amenities such as picnic tables, a double-vault restroom, signage, and a parking lot; reconstructing an existing foot-only BLM trail that connects the day use area with the existing BLM SJR Trail (Vista Connector Trail); and paving the existing gravel road between Access Road 6A and the day use area to provide access to the day use area. The specific locations of these features would be determined after FERC license issuance with the objective to discourage visitor use and trespassing near K2 Powerhouse by providing recreation facilities in appropriate locations. The day use area would be designed to comply with applicable accessibility guidelines.

To minimize potential impacts, the Vista Day Use Area would be planned and designed in accordance with the BLM RMP and in coordination with the BLM. All development located on BLM-managed lands would meet BLM's regional direction, regulations, design, and other applicable standards in place at the time of design.

Since visitor use observations did not detect any recreation use near the K1 Powerhouse, retirement of the K1 Powerhouse would not likely affect visitors. Although Access Road 3 would remain gated, visitors would still be able to use the access road for the informal trail that connects to BLM's Ya-Gub-Weh-Tuh Trail. Since the K1 Switchyard would remain an existing hydroelectric facility, visitor use near the K1 Switchyard would remain restricted for public safety. Retaining all existing fencing, gates, and signs would continue to provide for public safety.

Under the Proposed Project, PG&E would update the Smalley Cove Recreation Area to support the capacity and level of development inventoried in 2019. PG&E would continue to perform all routine and heavy maintenance at the site, and improve accessibility to persons with disabilities in the course of accomplishing its routine and heavy maintenance by the following:

- Creating two accessible campsites and two accessible picnic sites

- Replacing operating hardware with accessibility-compliant fixtures (e.g., faucets and door handles)

- Creating accessible routes to connect facility elements by leveling, surfacing, and widening routes

Construction would have limited impact on the physical environment since the landscape is previously disturbed from recreationalist activities. Therefore, there would be **No Impact** as a result of construction activities under the Proposed Project for potential impact REC-2.

Operation

The Proposed Project includes operational measures aimed at enhancing recreational use conditions along the PBR that may have the potential to effect the environment, as discussed in the following subsections.

Flow Management Measures

End-of-Spill Flow Recession and Whitewater Flow Releases Measure

Under the EOS Flow Recession Measure, PG&E would provide for the release of a flow recession in conjunction with and immediately following the whitewater boating flow release to the SJR below Kerckhoff Dam. PG&E would provide notification 10 days in advance of the planned end-of-spill flow recession (as required under the Whitewater Notification and Access Measure). The EOS Flow Recession would be scheduled to occur between May 1 and August 31 of each year during the final flow recession from spill after flow is forecasted to decrease below 2,500 cfs by PG&E. The whitewater boating flow release would consist of 2 days annually (9:00 a.m. to 6:00 p.m.) of whitewater boating flows with target flows of 2,500–2,000 cfs on the first day and 2,000–1,600 cfs, on the second day, followed by a ramp down to MIF. Additionally, the ramp-down stage with implementation of the Proposed Project's EOS Flow Recession Measure would reduce rapidly varying stage changes and provide a gradual reduction in stage as flows are decreased to MIF. This operational measure is intended to provide safer conditions for recreationists, as well as benefit aquatic biota by providing more

stable flows while ramping down, and therefore, would not have an adverse physical impact to the environment. This measure does not increase recreational use such that it requires the expansion or development of new facilities. Therefore, the EOS Flow Recession Measure would have **No Impact** as a result of operational activities for potential impact REC-2.

Subsequent Spill Ramp Down Measure

Under the Subsequent Spill Ramp Down Measure, PG&E would provide for a ramp down to benefit aquatic biota from stranding for spills that infrequently occur due to unexpected high flows originating upstream of the Kerckhoff Hydroelectric Project after the end-of-spill through October 31. It does not apply during outages of the K2 Powerhouse. This measure would have minimal effects on recreation and would not result in an adverse physical impact to the environment. Therefore, the Subsequent Spill Ramp Down Measure would have **No Impact** as a result of operational activities for potential impact REC-2.

Planned Outage Measure

Flow measures within the POM under the Proposed Project are intended to enhance safety for the recreating public in and near the river, as well as provide protection for aquatic biota during planned outages. As discussed in greater detail in Section 2 *Proposed Project*, measures provide for signage and notification of planned outages at the K2 powerhouse, with parameters for different flow and operational situations. This operational measure is intended to provide safer conditions for recreationists, as well as benefit aquatic biota by providing more stable flows while ramping spill flows from Kerckhoff Dam, and therefore would not have an adverse physical impact to the environment. This measure does not increase recreational use such that it requires the expansion or development of new facilities. Therefore, the POM would have **No Impact** as a result of operational activities for potential impact REC-2.

Spill Season Flow Measure

Similar to the safety measures implemented under the POM, Spill Season Flow Measures provide visual cues with the use of flows when Kerckhoff Dam is spilling during non-outage times. During the March 1 through August 31 spill season, when sustained spills are 500 cfs or more for at least 5 continuous hours, a 500-cfs target flow would be released for up to 5 hours to deter people from entering the water during intermittent periods of low flow, while also providing benefit to aquatic biota, and then ramped down to MIF. It would not apply during outages of the K2 Powerhouse. This operational measure is intended to provide safer conditions for recreationists, as well as benefit aquatic biota by providing more stable flows while ramping down, and therefore would not have an adverse physical impact to the environment. This measure does not increase recreational use such that it requires the expansion or development of new facilities. Therefore, the Spill Season Flow Measure would have **No Impact** as a result of operational activities for potential impact REC-2.

Whitewater Notification and Access Measure

The Proposed Project would include two days of scheduled whitewater flows each year. Under the Proposed Project, PG&E would implement the Whitewater Notification and Access Measure, which would include advanced notification of the upcoming whitewater boating flow releases, thereby enabling boaters to plan for, and take advantage of, the scheduled whitewater flows. In addition, with implementation of this measure, boaters would be provided escorted access through the Proposed Project's operational footprint to the J-2 Stream Gage access trail below the dam on each day of the whitewater boating flow release. This escorted access would greatly reduce the effort needed to access the river channel and provide enhanced opportunities for larger crafts, such as rafts, catarafts, and inflatable kayaks, to access the put-in. In addition, under the proposed Whitewater Notification and Access Measure, PG&E would conduct a trail assessment to develop a plan to improve trail conditions along the J-2 Stream Gage access trail for whitewater boating access, if needed, (e.g., widening to a maximum of

three feet, vegetation clearing, and avoiding surface disturbance in rocky outcrops or erodible soils).

The Whitewater Notification and Access Measure has the potential to indirectly impact the physical environment by making access to whitewater boating opportunities easier. The public would have notification before the flows begin, so they could plan their trip, unlike baseline conditions, where boaters are not notified and optimal boating flows are accessed by chance. With easier access and advanced notice, an increase in whitewater boating activity may occur, bringing an increase in vehicle traffic, foot traffic, and trail traffic to the area. However, the J-2 Stream Gage access trail is already an established trail; therefore, any improvements made to accommodate increased activity would occur in an already disturbed area. Therefore, the Whitewater Notification and Access Measure would have **No Impact** as a result of operational activities for potential impact REC-2***.***

Project Boundary Modification

Modifying the existing FERC Project Boundary would result in a physical reduction of the existing shoreline buffer at Kerckhoff Reservoir from more than 200 feet in some places to 50 feet around most of the reservoir. The 50-foot boundary would not be implemented in the vicinity of Kerckhoff Dam, Smalley Cove Recreation Area, and the dispersed day use area. Because the boundary modification would remove land that is mostly steep and rocky, this reduction would not diminish availability of land suitable for recreation use, and important shoreline access would be retained for recreation use. The small boat-in access areas that would be created, as specified in the Proposed Project's Recreation Management Plan, would be located within this modified buffer. Consequently, this potential operational impact of the Proposed Project would not significantly affect recreation resources at Kerckhoff Reservoir and would not result in the construction or expansion of recreational facilities. Therefore, the Proposed FERC Project Boundary Modification would have **No Impact** as a result of operational activities for potential impact REC-2***.***

Vista Day Use Facility

The proposed Vista Day Use Area would be available for day use under the Proposed Project following construction. PG&E would be responsible for all non-routine maintenance for the Vista Day Use Area, access road, and the connector trail, per the Proposed Project's Recreation Management Plan and Project Road and Trail Maintenance Plan. Routine and periodic maintenance at the day use area and trail would consist of activities that arrest deterioration and may appreciably prolong the life of the facilities, including maintaining the trail tread and repairing or replacing signage. Maintenance activities would not require the physical construction or expansion of recreational facilities and would not cause an adverse physical effect on the environment. Therefore, the Proposed Vista Day Use Area would have a **Less than Significant Impact** as a result of operational activities for potential impact REC-2*.*

Implementation of the Recreation Management Plan

To meet recreation use objectives over the term of a new license PG&E would implement the Recreation Management Plan, which includes operating and maintaining developed Kerckhoff Hydroelectric Project recreation facilities; increasing boat-in reservoir shoreline access; managing Kerckhoff Reservoir shoreline for dispersed day use; repairing resource damage; and monitoring to assess use at Smalley Cove Recreation Area and to detect effects of Proposed Project recreation use on environmental and cultural resources. The Recreation Management Plan includes the specific actions discussed below to achieve these stated objectives.

Updates to Smalley Cove Recreation Area

Under the Proposed Project, PG&E would continue to operate and maintain the Smalley Cove Recreation Area at the capacity and level of development inventoried in 2019. PG&E would continue to perform all routine and heavy maintenance at the site. Maintenance would not result in additional operational requirements that would have a physical impact to the environment, as the area is already disturbed and recreation is anticipated to occur within the facility footprint and therefore would have a less than significant impact. As discussed below, monitoring visitor use at Smalley Cove

Recreation Area following the improvements would occur annually to help identify impacts associated with the recreation facilities at this site. Therefore, the updates to Smalley Cove Recreation Area would have a **Less than Significant Impact** as a result of operational activities for potential impact REC-2.

Monitoring and Plan Review

PG&E would annually monitor visitor use at Smalley Cove Recreation Area by tabulating campground, picnic site, and day use parking occupancy and estimating the number of visitors, as well as monitoring Proposed Project recreation-related effects through the monitoring programs contained in the Vegetation Management Plan (PG&E 2020d), Wildlife Management Plan (PG&E 2020e), and HPMP (PG&E 2020f). The monitoring and plan review effort that occurs annually is meant to identify impacts and monitor use and would not result in physical impacts to the environment. Therefore, the Monitoring and Plan Review would have a **Less than Significant Impact** as a result of operational activities for potential impact REC-2.

Boat-in Access to Kerckhoff Reservoir Shoreline

PG&E would evaluate the shoreline to identify up to three suitable areas on public or PG&E land along the shoreline where boat-in access could be provided for day use by removing or trimming vegetation. Conceptually, each area could accommodate a place for at least two kayaks at one time and have a flat area where people could picnic or otherwise use the shoreline. If suitable areas are identified, PG&E would remove vegetation and implement any other necessary treatments (e.g., post signage to prohibit overnight use and open fires) to create boat-in access sites.

Operational elements associated with this measure include maintaining access by periodically trimming vegetation, and patrolling these locations to remove any trash, both to be completed by PG&E. Vegetation removal would occur only as needed along the trail and would not be widespread. PG&E would consult with the USFS and Tribes, as necessary, to evaluate suitable areas and identify where these boat-in access areas could be created, thereby reducing the potential for adverse impacts to sensitive areas

or culturally significant resources. Therefore, the Boat-in Access to Kerckhoff Reservoir Shoreline would have a **Less than Significant Impact** as a result of operational activities for potential impact REC-2.

Dispersed Day Use Area at Kerckhoff Reservoir

Under the Proposed Project, PG&E would manage its land on the shoreline between Smalley Cove Recreation Area and the SJR bridge on Road 222 for dispersed day use. Actions proposed under this measure to allow for continued shoreline use, launching watercraft, and protection of shoreline resources include the following:

- Providing one area for launching tailored watercraft
- Installing physical barriers (e.g., boulders) to prevent vehicles from accessing land below the maximum water surface elevation, except for the launch site, for safety and to protect vegetation
- Adding road base, as needed, to the areas used for parking
- Smoothing the transition access points between the parking areas and Road 222
- Trimming vegetation to improve sight distance along Road 222
- Installing and maintaining signs displaying rules and regulations (i.e., day use only, no campfires, and pack-in/pack-out trash)
- Regularly patrolling this area to ensure compliant use and trash removal

The operational elements of this measure include trimming vegetation, maintaining facility infrastructure, and regular patrolling of the area. These measures are meant to ensure public safety and to keep the facilities clean and accessible. Trimming of vegetation would be limited to only the necessary areas that are being used by recreationists and would be completed in concurrence with the proposed Wildlife Management Plan and Vegetation Management Plan to prevent adverse physical impacts. Therefore, the Dispersed Day Use Area at Kerckhoff Reservoir would have a **Less than Significant Impact** as a result of operational activities for potential impact REC-2.

Address Resource Impacts of Project Recreation Use

When and where necessary to minimize the effects of Proposed Project-related recreation use on environmental and cultural resources within the Proposed FERC Project Boundary, PG&E would do the following:

- Identify and implement appropriate best management practices and avoidance and minimization measures that may be necessary to protect water quality, special status plants, special-status wildlife, and cultural resources
- Manage drainage by installing and maintaining erosion control features such as culverts, drains, ditches, and water bars, as needed
- Manage vegetation, including weed removal, as needed
- Remove debris, as needed
- Install access control features, such as posts, rails, gates, and barrier rock, as needed
- Maintain surfaces by grading and placing aggregate fill in undeveloped areas, as needed
- Identify necessary permits, as appropriate, in consultation with the resource agencies, with consideration to the type of work to be completed and the location of the work
- Review and incorporate measures contained in other resource management plans (e.g., HPMP, Vegetation Management Plan), including new plans that may be developed or existing plans that may be revised during the license term, into any actions taken to address Proposed Project recreation use effects

The considerations given herein to protect natural and cultural resources while developing and improving the Proposed Project-related recreation facilities, as well as the use of BMPs during construction and operation of the sites, would help mitigate any potential impacts. Operational elements associated with the Proposed Project potentially affecting the resource impact REC-2 involve flow changes, vegetation management, increased patrolling of the sites, and maintenance activities.

The proposed vegetation management measures, which would be carried out in accordance with the Vegetation Management Plan, the Project Road and Trail Maintenance Plan, and potential impacts from the operation of proposed recreational facilities would result in less than significant impacts. Therefore, the Resource Impacts of Project Recreation Use would have a **Less than Significant Impact** as a result of operational activities for potential impact REC-2.

Considering all operational activities together, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact REC-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.17.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same construction analysis and impact determination as described in Section 4.17.4.2.1 for potential impact REC-2. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 1 for potential impact REC-2**.**

Operation

Alternative 1 identifies three Spill Year Schedule Boating Flows and Down Ramping of Spill Flow schedules, which include whitewater boating flows. The three schedules used under Alternative 1 correspond to the schedules implemented by SCE under the Mammoth Pool Contract. The spill down ramping schedules are Spill Year Schedule D, Spill Year Schedule C or B (High Storage) Boating Flows and Down Ramping of Spill Flows, and Spill Year Schedule A or B (Low Storage) Boating Flows and Down Ramping of Spill Flows. Alternative 1 would also provide non-spill year boating flows.

The boating flows and down ramping of spill flows requirements under Alternative 1 differ significantly from the Proposed Project and from the baseline conditions. Under the current FERC license (baseline conditions), no formal boating flows exist in the PBR and whitewater boaters use flows when available. These whitewater boaters currently do not coordinate with PG&E to access boating flows below Kerckhoff Dam. These are informal opportunities and are not associated with planned or advanced notification of upcoming whitewater boating flow releases or escorted access to specific locations.

Alternative 1 would increase the number of boating days compared to the baseline conditions. Under Alternative 1 during the Spill Year Schedule Boating Flows and Down Ramping of Flows, boating flows would be provided following a declining limb of spill between May 1 and August 31. The down ramping spill schedule varies based on WY type (schedule), such that wetter WYs have a longer down ramping schedule than drier WYs. A minimum of 2 boating days would be provided per year (Spill Year Schedule A or B (Low Storage) Boating Flows and Down Ramping of Spill Flows) but could be up to 8 days a year under Schedule D with flows ranging from 3,500 cfs (maximum for whitewater flows) to 1,600 cfs (minimum boating flow). Additionally, under the Non-Spill Year Boating Flows and Down Ramping Measure, two days (9 a.m. to 6 p.m.) of whitewater boating flows would be provided on weekends between May 15 to June 15. The feasibility of Spill Year Schedule Boating Flows and Down Ramping of Spill Flows and Non-Spill Year Boating Flows are dependent on inflows from SCE's Big Creek 4 Project and the Proposed Project's facility limitations. This is a result of the intended goal for down ramping operations and boating flows under Alternative 1. The Proposed Project under Alternative 1 would in essence pass recreational benefits of boating flows from SCE's Big Creek 4 Project below Kerckhoff Dam and into the PBR.

PG&E would coordinate with boaters to provide safe access to boating locations and provide notification before boating flows are implemented. When implementing the ramp down, boating flows cannot drop below the minimum flow within each flow step between 9 a.m. and 6 p.m. If the spill down ramp does not provide a minimum of 2 boating days ≥2,000 cfs, then the PG&E would increase flows to provide 2 days of boating flows (i.e., ≥2,000 cfs) and down ramp according to the schedule associated with the WY type for

that year. Under Alternative 1, PG&E would make a good faith effort to provide the boating flow at the beginning of the spill down ramp.

The primary difference between the Proposed Project and Alternative 1 is in operational requirements to decrease flow fluctuation below Kerckhoff Dam and increase scheduled recreational opportunities in the PBR. Under Alternative 1, the LTOR Boating Flows and Down Ramping measures would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures, and the down ramping components of the Spill Season Flow Measure. Under the LTOR, the hydroelectric project would have a varied length of down ramping of spill based on WY types, such that wetter WYs have a longer down ramping schedule than drier WYs. Measures under Alternative 1 and the impact they may have are discussed below.

Spill Year Schedule Boating Flows and Down Ramping of Spill Flows

Under the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure, PG&E would ramp down flows between May 1 through August 31 in the PBR after SCE has identified when down ramping of spill flows at Big Creek 4's Dam No. 7 will start. Standard down ramping for end of spills are determined by the WY Schedules, A, B (low storage), B (high storage), C, or D.

Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), each schedule was successfully implemented and provided the desired boating flows and days. As such, recreationalists would have, at minimum, two formal boating days each year during the spill years and up to eight days during Schedule D WY years.

The fluctuations in the model were contained within the operating band of 980.0 feet msl to 984.5 feet msl. Over time, this could have an impact on the Kerckhoff Reservoir shoreline and impact the physical resources through erosion. Depending on the WY, this measure is operated 5 to 21 days each year and therefore would have varying impacts on erosion within the Kerckhoff Reservoir. Since the Kerckhoff Reservoir would still be contained within the operating band, it is not expected this would have a significant adverse physical effect on the shoreline of Kerckhoff Reservoir.

While the model showed this measure was technically successful 100 percent of the time, the measure in practice would be infeasible. As shown in the model, the reservoir elevation drops very close to the K2 Powerhouses minimum operating reservoir elevation. As the reservoir approaches the K2 Powerhouses minimum operating reservoir elevation, the K2 Powerhouse cycles above and below the ROZ in an attempt to keep the reservoir high enough to stay above the minimum operating elevation for the K2 Powerhouse. The K2 Powerhouse cycling frequency is anywhere from half an hour to two hours, which represents an unrealistic operating scenario. Based on the documented operational constraints, any operation that requires K2 to dwell in the ROZ is considered infeasible due to excessive cavitation and vibration impacts and the associated maintenance and outage consequences. That means operating strategies that would require repeated short interval oscillations across the ROZ are not considered feasible, because they can increase cycling wear and raise reliability/maintenance risk even if each individual crossing is brief (personal email communication, J. Hartman and C. McCormick, March 5, 2026).

Implementation of these operational measures would not require construction or expansion of recreational facilities that could cause an adverse effect on the environment as compared with baseline conditions. Therefore, if the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure were implemented, there would be a **Less than Significant Impact** for potential impact REC-2.

Non-Spill Year Boating Flows and Down Ramping

The Non-Spill Year Boating Flows and Down Ramping schedule would be implemented every weekend from May 15 to June 15 of non-spill years. The modeled Non-Spill Year Boating Flows and Ramp Down Measure success was primarily dependent on the volume of inflows coming into Kerckhoff Reservoir during the weekends. Based on the past data in the model, this measure was only successful in providing boating flows 28.6 percent of the time. The measure was only fully feasible when natural flows were high enough to support 2 days of 2,500 cfs to 1,600 cfs. While unsuccessful in the model, the attempt would still result in more boating days when compared to the baseline

conditions and the same amount of Proposed Project boating days if inflows were sufficient.

Table 4.17-9 presents a summary of success or failure of the modeled Non-Spill Year Boating Flows and Down Ramping schedules. In the table, “S” with the green shade represents a successful completion and two full boating days. “PS” with the orange shade represents a partial successful completion; this means it was able to achieve boating flows for some duration but not for the full scheduled duration. “F” with the red shade represents failure to reach boating flows for any substantial duration. In years 2013, 2014, and 2015, there were five weekends that fell within the May 15 – June 15 period for boating flows. In years 2007 and 2012, there were only four weekends that met the criteria for boating flows. Based on the model, the rate of success would be highly dependent on water availability of that year. While some years failed to provide any boating days, other years were capable of provide just one day a weekend or a few weekends of successful flows.

The modeling Non-Spill Year Boating Flows and Down Ramping resulted in more ramping and down ramping downstream of the Proposed Project when compared to the baseline conditions, which achieves the goal of providing boating flows. Implementation of this measure would not require construction or expansion of recreational facilities that could cause an adverse effect on the environment as compared with existing conditions. Therefore, if the Non-Spill Year Boating Flows and Down Ramping Measure were implemented, there would be a **Less than Significant Impact** for potential impact REC-2.

Table 4.17-9: Non-Spill Year Boating Flows Succes and Failure Based on the Alternative Modeling

	Weekend				
WY	**1**	**2**	**3**	**4**	**5**
2007	S	S	F	F	
2012	PS	F	PS	PS	
2013	S	PS	F	PS	PS
2014	S	S	S	F	PS
2015	F	F	F	F	F

Notes: S = Success, PS = Partial Success, F= Failure

Source: Appendix G Project Operations Model – CEQA Alternatives 1 and 2, Section 4.0

Stranding Protection Down Ramp Measure

The Stranding Protection Down Ramping Measure covers initial and subsequent spills between May 1 and August 31. In other words, the ramp down schedules (AB, BC, D) are reserved for the large spill events in each spill season, while all other spill events are handled by the Stranding Protection Down Ramping Measure. Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), the Stranding Protection Down Ramping ramp down was successful 100 percent of the time applied in the model. Encroachment on the K2 Powerhouse minimum operating reservoir elevation occurred 37.5 percent of the time and only induced K2 Powerhouse over-cycling once (WY 2016) in the model. Based on this, this measure is considered to be feasible since powerhouse cycling was minimal. Since the Stranding Protection Down Ramping ramp down better matches the inflow reductions over the same period, the pool elevation drops are minimal and avoid the K2 Powerhouse over-cycling. Implementation of this measure would not require construction or expansion of recreational facilities that could cause an adverse effect on the environment as compared with existing conditions. Therefore, the Stranding Protection Down Ramping Measure would have a **Less than Significant Impact** for potential impact REC-2.

September – October Down Ramp Measure

During the September – October Ramp Down Measure, a ramp down is triggered during declining limb of spills once the average daily flow declines below 1,600 cfs. Based on the alternatives modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), this measure was successfully implemented 100 percent of the time but did encroach on the K2 Powerhouses minimum operating reservoir elevation every time. This is due to the low inflows typically seen during the September and October months at the Kerckhoff Hydroelectric Project. However, no powerhouse cycling was seen in the model and therefore this measure is considered feasible.

The measure was shown to have similar impacts as the Stranding Protection Down Ramp Measure, where pool elevation drops are minimal and the flows better match inflow. Implementation of this measure would not require construction or expansion of recreational facilities that could cause an adverse effect on the environment as compared with existing conditions. Therefore, the September – October Ramp Down Measure would have a **Less than Significant Impact** for potential impact REC-2.

Alternative 1 Ramp Up Measure

The Alternative 1 Ramp Up Measure imposes a limit on the rate increase of stage as measured at Gage J-2, for spill events starting between MIF and 4,000 cfs, regardless of time of year. To model this measure, the alternatives modeling report (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0) analyzed if a one foot per hour ramp rate in general would be feasible, subject to sufficient storage and powerhouse capacity regardless of the inflow recorded at the gage above of the reservoir. Based on the modeling, this measure was successful 97.6 percent of the time and caused no encroachment toward Kerckhoff Dam's minimum operating elevation or K2 Powerhouse over-cycling. The success of the application of this measure depends heavily on advanced notification of the magnitude and timing of forecasted inflows from upstream projects, as well as the skill of the operator to predict the time, in advance of an increase in inflows, at which initiation of the ramp up protocol should begin. It would be better for the operator to initiate the protocol earlier than later, as an earlier start would allow the operator to back off spill if the reservoir were draining too fast and still maintain a rate of stage increase at Gage J-2 of less than one foot per hour. A late start would require the operator to spill more than the protocol allows to prevent the reservoir from rising above guide curve.

Since this measure is aimed at ramping up slowly, the water levels in the PBR would rise slower, mimicking the natural hydrograph. However, the success of the measure is dependent on forecasted inflow information and the operators' timing of implementing the measure. Implementation of this measure would not require construction or expansion of recreational facilities that could cause an adverse effect on the

environment as compared with existing conditions. Therefore, the Alternative 1 Ramp Up Measure would have a **Less than Significant Impact** for potential impact REC-2.

Impact Summary

Overall, Alternative 1 results in less than significant impacts and potentially provides safer boating conditions and access when compared to the baseline conditions (see Section 4.11.4.8 in *Hydrology and Water Quality*), and often an increase of boating days when compared to the Proposed Action and baseline conditions. While there could be an increase of recreationists in the Area of Analysis due to the increased opportunities of formal boating days, it is not expected this would result in a significant impact on the surrounding environment. It would be expected that recreationalists would be concentrated within the Vista Day Use Area, which has been designed for this use. While operations may have an impact on the Kerckhoff Reservoir, fluctuations would remain within the normal operating band and could be limited with hydroelectric project operator's interference. Additionally, as the Proposed Project Area has been historically exposed to frequent and sizeable changes in hydrological conditions, it is not expected that erosion would further increase under Alternative 1 when compared to baseline conditions. Therefore, there would be a **Less Than Significant Impact** as a result of construction or operational activities under Alternative 1 for potential impact REC-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.17.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same construction analysis and impact determination as described in Section 4.17.4.2.1. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 2 for potential impact REC-2.

Operation

Alternative 2 has a similar operation analysis and impact determination as described in Section 4.17.4.2.1 for potential impact REC-2. Impacts to the physical environment from the operational changes under Alternative 2 would provide safer conditions for recreationists (see Section 4.11.4.8 in *Hydrology and Water Quality*), as well as benefit aquatic biota by providing more stable flows via ramping compared to baseline conditions. Impacts associated with the flow operations are similar to those described under the Proposed Action.

Based on the modeling report, (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), POM Initial Release Protocol could result in large stage increases in the PBR. The model found that if inflows cannot sustain the initial release protocol, the reservoir would either be drawn down towards the minimum amount in the normal operating range (980 ft. msl) or the protocol would have to be suspended to keep the reservoir above 980 ft. msl. With the K2 Powerhouse being in an outage, flows can only be released via the radial gates at the dam. Therefore, once the reservoir is at full capacity, any additional inflow must be spilled at Kerckhoff Dam. To summarize, if inflows recede while the initial release protocol is being implemented, the protocol would likely be suspended and any potential enhancement from the protocol would be negated once higher inflows arrive later in the day. As described in the Appendix G *Project Operations Model – CEQA Alternatives 1 and 2,* Section 4.0, stage changes at the monitoring sites in the PBR of 1.2 feet to as high as 11.7 feet are possible as a result of implementation of the POM Initial Release Protocol. However under baseline conditions, the Proposed Project Area has generally been historically exposed to frequent and sizeable changes in hydrological conditions, including as high as 11.7 feet in short periods of time. For that reason, Alternative 2 is not expected to result in a significant impact that would require the expansion or construction of recreation facilities that would have an adverse physical effect on the environment. Therefore, there would be a **Less Than Significant Impact** as a result of operational activities under Alternative 2 for potential impact REC-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.17.5 Literature Cited

A Wet State. 2019a. San Joaquin River (Patterson Bend). Accessed April 5, 2026. Retrieved from: http://www.awetstate.com/SanJoaquinPB.html.

_____.2019b. San Joaquin River (Squaw Leap). Accessed March 20, 2026. Retrieved from: http://www.awetstate.com/SanJoaquinSL.html.

American Whitewater. 2020a. San Joaquin, Patterson Bend (Kerckhoff Reservoir to Kerckhoff #1 PH). Accessed: February 12, 2026. Retrieved from: https://www.americanwhitewater.org/content/River/detail/id/288/.

_____. 2020b. San Joaquin, K1 to K2 (Kerckhoff #1 PH to Kerckhoff #2 PH). Accessed: February 12, 2026. Retrieved from: https://www.americanwhitewater.org/content/River/detail/id/4197/.

_____. 2021. San Joaquin, Millerton Lake Bottom (Kerckhoff #2 PH to Millerton Reservoir). Accessed: February 12, 2026. Retrieved from: https://www.americanwhitewater.org/content/River/detail/id/4196/

_____. 2022. American Whitewater. Safety Code of American Whitewater. VI. International Scale of River Difficulty. Accessed: February 12, 2026. Retrieved from: https://www.americanwhitewater.org/content/Wiki/safety:start.

BLM (United States Bureau of Land Management). 2014. *Bakersfield Field Office Record of Decision and Approved Resource Management Plan.* United States Department of the Interior, Bureau of Land Management. December. Accessed: April 3, 2026. Retrieved from: https://www.govinfo.gov/content/pkg/GOVPUB-I53-PURL-gpo83734/pdf/GOVPUB-I53-PURL-gpo83734.pdf.

California Department of Parks and Recreation. 2021. *California's 2021–2025 Statewide Comprehensive Outdoor Recreation Plan* (SCORP). Accessed: April 5, 2026. Retrieved from: https://www.parksforcalifornia.org/scorp/2021.

California Department of Water Resources. 2020. Chronological Reconstructed Sacramento and San Joaquin Valley Water Year Hydrologic Classification Indices. Accessed: March 30, 2026. Retrieved from: http://cdec.water.ca.gov/cgi-progs/iodir_ss/wsi.

Central Valley Regional Water Board (Central Valley Regional Water Quality Control Board). 2019. *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region*. Fifth Edition, Revised February 2019 (with Approved Amendments). The Sacramento River Basin and San Joaquin River Basin. Accessed: April 3, 2026. Retrieved from: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201902.pdf.

Fresno County. 2024. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

Madera County. 1995. *Madera County General Plan Policy Document*. Adopted October 24. Accessed: April 3, 2026. Retrieved from:https://www.maderacounty.com/home/showpublisheddocument/40825/638615574804870000.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas & Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Ramping Follow-Up,” on March 5, 2026.

PG&E (Pacific Gas and Electric Company). 2017. *Pre-Application document (PAD), Kerckhoff Hydroelectric Project, FERC Project No. 96.* San Francisco, CA. November.

_____. 2019. *Technical Study Report 08: Recreation facility assessment (Study REC 2), Kerckhoff Hydroelectric Project, FERC Project No. 96.* Pacific Gas and Electric Company, San Francisco, CA. December.

_____. 2020a. *Technical Study Report 16: Recreation Visitor Use (Study REC 3), Kerckhoff Hydroelectric Project, FERC Project No. 96.* Pacific Gas and Electric Company, San Francisco, CA. February.

_____. 2020b. *Technical Study Report 17: Recreation Visitor Use Surveys (Study REC 4), Kerckhoff Hydroelectric Project, FERC Project No. 96.* Pacific Gas and Electric Company, San Francisco, CA. February.

_____. 2020c. *Technical Study Report (TSR-05): Whitewater Boating Assessment (REC 1)*. Kerckhoff Hydroelectric Project, FERC Project No. 96. In Final License Application Volume III, Exhibit E, Supporting Document B, Appendix C. June.

_____. 2020d. *Vegetation Management Plan. Kerckhoff Hydroelectric Project, FERC Project No. 96.* Pacific Gas and Electric Company, San Francisco, CA.

_____. 2020e. *Wildlife Management Plan. Kerckhoff Hydroelectric Project, FERC Project No. 96.* Pacific Gas and Electric Company, San Francisco, CA.

_____. 2020f. *Historic Properties Management Plan. Kerckhoff Hydroelectric Project, FERC Project No. 96.* Pacific Gas and Electric Company, San Francisco, CA.

_____. 2020g. *Final License Application. Kerckhoff Hydroelectric Project, FERC Project No. 96.* Pacific Gas and Electric Company, San Francisco CA.

_____. 2021. *Public Safety Plan, Kerckhoff Hydroelectric Project, FERC Project No. 96.* Filed with FERC December 28. FERC Accession No. 20211228-5025.

_____. 2022. *Supplemental Information Filing in Support of Final Application for New License, FERC Project No.96.* May.

_____. 2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

USFS (United States Forest Service). 2023. *Land Management Plan for the Sierra National Forest: Fresno, Madera, and Mariposa Counties, California*. Accessed: April 3, 2026. Retrieved from: https://acconsensus.org/wp-content/uploads/2024/08/05-SNF_LMP_final_20230504_Web.pdf.

West, C., P. Allen, and M. Tiley. 2021. *Final Historic Properties Management Plan. Kerckhoff Hydroelectric Project, Fresno and Madera Counties, CA, FERC Project No. 96*. Pacific Gas and Electric Company. Final June. Prepared by Cardno for Pacific Gas and Electric Company, San Francisco, California. June.

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4.18 TRANSPORTATION

This section describes existing conditions and analyzes potential impacts on transportation as a result of implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts of the Proposed Project, Alternative 1, and Alternative 2 on transportation were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.18-1).

Table 4.18-1: CEQA Checklist for Transportation

Would the Project:	**Proposed Project**	**Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping**	**Alternative 2: Proposed Project with BLM Revised 4(e) Conditions**
Impact TSP-1: Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	No Impact	No Impact	No Impact
Impact TSP-2: Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact TSP-3: Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	No Impact	No Impact	No Impact
Impact TSP-4: Result in inadequate emergency access?	No Impact	No Impact	No Impact

4.18.1 Environmental Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public lands administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and United States Bureau of Reclamation (Reclamation) under BLM management.

4.18.1.1 Roadways and Trails

The Kerckhoff Hydroelectric Project includes approximately 3.94 miles of Kerckhoff Hydroelectric Project roads and 0.94 mile of Kerckhoff Hydroelectric Project trails that are used to access, operate, and maintain existing facilities (Appendix A, *Project Facilities and Maps*; refer to Table A1-1 of Appendix A-1 and Appendix A-2: Map A2-2a through Map A2-2e; PG&E 2023). The roads are used year-round. PG&E performs maintenance on Kerckhoff Hydroelectric Project roads using an annually generated maintenance program. The maintenance area includes a 10-foot-wide buffer on either

side of Kerckhoff Hydroelectric Project roads and the Smalley Cove Recreation Area Road and a 5-foot-wide buffer on either side of Kerckhoff Hydroelectric Project trails. Corrective actions and maintenance are performed on an as-needed basis for other roads and trails. All Kerckhoff Hydroelectric Project roads, except for the Smalley Cove Recreation Area road, have gated entrances. Kerckhoff Hydroelectric Project trails are not accessible by vehicle.

The closest State Routes (SR) to the Kerckhoff Hydroelectric Project are SR 41 and SR 168. State routes provide for high-speed through traffic that connect points within the county and to other parts of the state (Fresno County 2024). SR 41 is approximately 13 miles west and northwest of Kerckhoff Dam. SR41 extends from Yosemite National Park, east of Madera County, through Fresno County, to Kettleman City in Kings County near Interstate 5 (I-5). From I-5, SR 41 continues west and connects to U.S. Highway101 (US 101) and SR 1 on the Central Coast (City of Fresno 2014).

SR 168 lies approximately six miles southeast of Kerckhoff Dam. SR 168 begins at a freeway-to-freeway interchange with SR 180 in Fresno approximately 1.5 miles east of SR 41 and extends northeast toward the USFS-SNF.

Auberry Road is the closest arterial road and is approximately four miles east of the Kerckhoff Hydroelectric Project. Arterials provide mobility, carry through traffic on continuous routes, and join major traffic routes (Fresno County 2024). Auberry Road connects to Powerhouse Road, which continues to the northern end of Kerckhoff Reservoir. Powerhouse Road crosses the San Joaquin River (SJR) at the Powerhouse Road Bridge and connects to Road 222, which provides access to Smalley Cove Recreation Area Road and the Smalley Cove Campground and Day Use Area. The Smalley Cove Recreation Area Road is managed by the USFS and is used by the public to access the area for recreation and by PG&E for operation and maintenance of the recreation facilities. Road 222 continues north to North Fork. Kerckhoff Reservoir is only accessible by vehicle from Road 222/Powerhouse Road (PG&E 2023). Powerhouse Road in Fresno County is a two-lane paved road and is classified as a

collector road. Collector roads provide internal traffic movement within communities and connect local roads to arterials and expressways (Fresno County 2024).

Powerhouse Road also provides access to Smalley Road near New Auberry. Smalley Road is classified as a local road, which means it provides direct access to abutting property and connects with other local roads, collectors, arterials, and expressways (Fresno County 2024). Smalley Road is an approximately six-mile two-lane paved road linking Powerhouse Road in New Auberry and the northern portion of Millerton Lake. Smalley Road connects to several Kerckhoff Hydroelectric Project roads (Access Roads 1 to 10) that are used to access the Kerckhoff 1 (K1) Powerhouse and the Kerckhoff 2 (K2) Powerhouse as well as recreation sites downstream of Kerckhoff Dam. Access Roads 1 to 10 are on private property or are managed by BLM and receive a low level of use (PG&E 2020). Access Roads 3 through 10 are primarily only used by PG&E for operations and maintenance of the Kerckhoff Hydroelectric Project. Access Roads 3, 4, and 6A receive daily vehicle use while the other access roads are used infrequently for inspections or maintenance of the water conveyance systems. Access Roads 3, 6A, 6C, 7, 8, 9, and 10 are paved, and Access Roads 4 and 7 are unpaved. Access Roads 1 to 10 undergo annual maintenance while culvert and trail maintenance occur as needed (PG&E 2020).

4.18.1.2 Bicycle and Pedestrian Facilities

There are no sidewalks on the roadways within the Kerckhoff Hydroelectric Project. There are existing unofficial biking / walking trails around Kerckhoff Reservoir. Pedestrians and bicyclists are permitted to use roadways in the Proposed Project, but there are no designated facilities.

4.18.1.3 Public Transit

There are no public transit stops within the Kerckhoff Hydroelectric Project Area. The nearest public transportation stop in Madera County is approximately seven miles north of Kerckhoff Dam, at the North Fork Supermarket (Madera County Connection 2025). The nearest public transportation stop in Fresno County is located in the community of

Auberry, approximately 4.8 miles southeast of Kerckhoff Dam (Fresno County Rural Transit Agency 2019).

4.18.1.4 Air Traffic

The Johnston Field Airport (5CL9) is the nearest private airstrip, located approximately 1.5 miles northeast of Kerckhoff Dam and less than 0.5 mile outside of the Kerckhoff Hydroelectric Project. The dirt surface runway is 2,000 linear feet (Airport-Data.com 2025). The nearest public airport is Fresno Yosemite International Airport located in Fresno County, approximately 27 miles southwest of the Proposed Project.

4.18.2 Regulatory Background

The following sections contain an overview of regulations related to transportation.

4.18.2.1 Federal

4.18.2.1.1 Federal Power Act

The Federal Power Act (16 United States Code Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created the Federal Energy Regulatory Commission (FERC or Commission) and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (18 Code of Federal Regulations [CFR] Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.18.2.1.2 United States Bureau of Land Management

Bakersfield Field Office Resource Management Plan

Proposed Project activities that occur on public lands managed by the BLM must be consistent with BLM's *Bakersfield Field Office Record of Decision and Approved Resource Management Plan* (RMP) (BLM 2014), including roadways and trails within

the Proposed Project. The following goal and objectives in the RMP address transportation:

- **Goal:** Improve access to and recreational opportunities on public lands that complement the character of each geographic zone and the surrounding regions
- **Objectives:**
  - Provide reasonable, safe, and environmentally sound access to visitors, local residents, licensed and permitted activities, and property owners through coordination and collaboration on travel systems with other agencies, state and local governments, and interested stakeholders
  - Reduce or halt proliferation of motorized and non-motorized routes
  - Maintain an accurate route inventory for management purposes, and for the production of both general and recreation specific Transportation Management Network maps
  - Manage off-highway vehicle (OHV) use to protect environmental resources, promote public safety, and provide OHV use opportunities where appropriate

4.18.2.1.3 United States Forest Service

Sierra National Forest Land and Resource Management Plan

The USFS uses the direction in the revised *Land Management Plan for the Sierra National Forest*, pursuant to the 2012 Forest Service Planning Rule (36 CFR Part 219), to guide its decisions regarding the relicensing of the Proposed Project and the development of associated licensing conditions (USFS 2023). The revised plan aims to sustain forest and watershed health and productivity by addressing tree mortality, restoring forest conditions, facilitating use of fire to achieve desired conditions, and providing for sustainable recreation. According to the plan, Kerckhoff Reservoir is located in the San Joaquin Conservation Watershed, which contains much of the middle and upper SJR watershed area in the USFS-SNF (USFS 2023). In addition to general guidance for the management of conservation watersheds, the plan contains management direction and guidelines that pertain to infrastructure, including roads and

trails. The desired conditions related to infrastructure relevant to the Proposed Project Area include the following:

- Forest infrastructure, such as roads, buildings, campgrounds, water systems and bridges, is managed to provide for the planned use and protection of resources, and is maintained for health and safety
- Roads allow for safe and healthy wildlife movement in areas of human development
- Infrastructure (administrative sites, recreation facilities, and roads) has minimal adverse effects to riparian and aquatic resources

4.18.2.2 State

The California Department of Transportation (Caltrans) is the administrating agency for state 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.

4.18.2.3 Local

4.18.2.3.1 Fresno County

The Fresno Council of Governments (FCOG) is the federally recognized metropolitan planning organization (MPO) and the state-designated Regional Transportation Planning Agency for Fresno County and oversees transportation planning and programming. The FCOG prepares the Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS), which discusses transportation policies, options, and projects and guides how and where people and goods travel through identifying existing and needed transportation facilities and services. The most recent RTP/SCS was completed in 2022 and plans regional transportation through 2046 (FCOG 2022). The FCOG also oversees the Federal Transportation Improvement Program of financially constrained transportation projects.

The Fresno County General Plan (Fresno County 2024) governs local transportation in the region of the Proposed Project. The Transportation and Circulation Element of the plan describes the circulation system, roadway standards and classifications, the

bikeway system, and transit corridors. The goals and policies applicable to transportation in the Proposed Project Area include the following:

- **Goal TR-A:** To plan and provide a unified multi-modal, coordinated and cost-efficient countywide street and highway system that ensures the safe, orderly, and efficient movement of people and goods, including travel by walking, bicycle, or transit.
- **TR-A.8 Regional Transportation Plan Coordination:** The County shall continue to participate with the Fresno Council of Governments, Caltrans, and other agencies, to maintain a current Regional Transportation Plan, and to identify funding priorities and development expenditure plans for available regional transportation funds, in accordance with regional, State, and Federal transportation planning and programming procedures. Such regional programming may include improvements to State Routes, city streets, and County roadways.
- **TR-A.25 Vehicles Miles Traveled (VMT) Threshold:** Projects that would generate or attract more than 110 daily vehicle trips shall be evaluated for a transportation VMT impact on an individual basis. The threshold of significance shall be 87 percent below the countywide average rate of VMT. Any individual project resulting in VMT that exceeds 87 percent below the countywide average shall be required to implement project specific mitigation.
- **Goal TR-C:** To reduce travel demand on the County's roadway system and maximize the operating efficiency of transportation facilities so as to reduce the quantity of motor vehicle emissions and reduce the amount of investment required in new or expanded facilities.

4.18.2.3.2 Madera County

The Madera County Transportation Commission (MCTC) is the federally recognized MPO and the state-designated regional transportation planning agency for Madera County and is required to prepare a long-range transportation plan. MCTC links transportation, land use, economic growth, equity, and the environment in the long-range planning process. The MCTC prepared the 2022 RTP/SCS, which guides the existing and future regional transportation system and policies and programs in the county (MCTC 2022).

The goals and policies from the Madera County General Plan (Madera County 1995) that are applicable to transportation are listed below:

- **Goal 2.A:** To maintain a comprehensive and coordinated multimodal transportation system that enhances the mobility of people, improves the environment, and is safe, efficient, and cost effective
- **Goal 2.A.2:** The County shall develop the transportation system to reduce vehicle miles traveled, conserve energy resources, minimize air pollution, and reduce greenhouse gas emissions
- **Goal 2.B:** To improve County roadways to include pedestrian, bicycle, and transit facilities to better serve all users, including drivers, pedestrians, bicyclists, and transit passengers of all ages and abilities
- **Goal 2.C:** To provide for the long-range planning and development of the county's roadway system, ensure the safe and efficient movement of people and goods, and provide sufficient access to existing and new development
- **Goal 2.E:** To provide a safe, comprehensive, and integrated system of facilities for non-motorized transportation to meet the needs of commuters and recreational users
- **Goal 2.F:** To maintain a balanced freight transportation system to provide for the safe and efficient movement of goods
- **Madera County Policy 2.C.8:** The County shall ensure that through traffic is accommodated in a manner that discourages the use of neighborhood roadways, particularly local streets. This through traffic, including through truck traffic, shall be directed to appropriate routes to maintain public safety and local quality of life. Where feasible, the County shall seek to develop alternate routes around urban centers to accommodate through traffic
- **Madera County Policy 2.F.9:** The County shall strive to minimize traffic conflicts among automobiles, trucks, and trains, and shall strive to ensure adequate safety measures are in place to protect residents from truck and rail hazards

4.18.3 Analysis Methodology

4.18.3.1 Analytical Approach

According to Section 15002(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(b) of the CEQA Guidelines, the significance of an activity may vary with the setting. The Area of Analysis for transportation is the Proposed Project Area (i.e., all lands, waters, and facilities within the revised FERC Project Boundary). The potential impacts related to transportation for the Proposed Project, Alternative 1, and Alternative 2 are evaluated against significance standards provided in Appendix G of the CEQA Guidelines.

4.18.3.2 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on transportation if it would:

- Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities (TSP-1);
- Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b) (TSP-2);
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) (TSP-3); and
- Result in inadequate emergency access (TSP-4)

4.18.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing

FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below

SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cubic feet per second (cfs) for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the Project Bypass Reach cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient[1] storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill

[1] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this

modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.18.4.1 Potential Impacts Related to Transportation Programs, Plans, Ordinances, and Policies

Impact TSP-1: Would the project conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

4.18.4.1.1 Proposed Project

Construction

Construction related transportation during the Proposed Project would include vehicles carrying workers to and from work sites, dump trucks, and construction vehicles carrying equipment and materials. The Proposed Project does not include the development of any new roads or trails; only existing roads would be used. As the Proposed Project does not include the development of any new roads or trails, it does not directly conflict with any relevant program, plan, ordinance, or policy.

The anticipated vehicles and equipment needed for the proposed retirement and modification of the K1 Powerhouse includes up to 10 crew-cab pickup trucks, one concrete truck, a crane, and a semi-truck for hauling equipment. The K1 Powerhouse would be accessed from Smalley Road, Access Roads 3, 4, 5, and 6 for one to four weeks at a time between April and October 2036.

Installation of the new flow gage in the SJR upstream of Kerckhoff Reservoir would require one pickup truck and potentially a tractor and backhoe for one week in August 2027. The installation area would be accessed via Road 222/Powerhouse Road.

The proposed improvements at Smalley Cove would require one dump truck, one pickup truck, and construction vehicles to transport equipment, such as a grader, backhoe, or compactor, for one to two weeks in August 2028. The area would be accessed via Road 222/Powerhouse Road.

Construction of the Vista Day Use Area and reconstruction of a trail segment is anticipated to require a work truck (e.g., pickup truck), two dump trucks, and vehicles to transport equipment, such as a grader, excavator, backhoe, compacter, paver, or asphalt roller, to the site in August 2030. Trucks would also be needed to carry the materials for the amenities (i.e., picnic tables, restrooms, gates, fencing materials) to the Vista Day Use Area. The proposed Vista Day Use Area would be accessed from Smalley Road and Access Road 6.

Based on the anticipated number of vehicles needed during construction, there would likely not be more than 10 additional vehicles using Proposed Project roads at any one time. This low number of additional vehicles would be unlikely to block roads or cause any road closures. However, there would be potential for an increased risk of an accident between a work, construction, or public vehicle. As specified in the Project Roads and Trails Maintenance Plan, in the event of an emergency that blocks road or trail access to a Kerckhoff Hydroelectric Project facility or threatens public safety, PG&E would notify the appropriate land management agency or property owner to coordinate repair work.

During construction, the existing Kerckhoff Hydroelectric Project roads would receive use by more vehicles than normal. While these roads typically receive daily use, additional construction vehicles could contribute to further ware and tare to paved roads and to erosion of unpaved roads.

Under the Proposed Project, PG&E would implement the Project Road and Trail Maintenance Plan. The management objectives of the plan include regularly inspecting and maintaining the roads and trails to ensure safe access to Proposed Project facilities, minimizing erosion and sedimentation along roads and trails, and identifying the consultation, permitting, and reporting requirements for non-routine maintenance

activities. The plan also specifies that non-routine maintenance would be completed in accordance with either the BLM or USFS standards, as applicable, in consideration of the type and level of use that occurs along the Proposed Project roads or trails. The plan includes regular inspections and routine maintenance activities that would ensure Kerckhoff Hydroelectric Project facilities are safety accessible, reduce the potential for erosion, defer the need for non-routine maintenance throughout the proposed construction activities and reduce any potential impacts of construction activities on transportation in the Area of Analysis.

Under the Proposed Project, PG&E would implement a Recreation Management Plan, which describes PG&E's responsibilities to manage the public recreation use of the Proposed Project's recreation facilities, which would include the circulation and vehicular access elements related to the Vista Day Use Area. As specified in the Recreation Management Plan, PG&E would plan and design the area in consultation with BLM to meet regional direction, regulations, design, and other applicable standards in place at the time of design. In addition, PG&E would have an on-site meeting with BLM during initial planning and design to collaboratively evaluate details about the site design. This consultation during planning would ensure that the circulation elements related to the Proposed Project conform to BLM's management objectives and the BLM's Bakersfield RMP (BLM 2014).

The Vista Day Use Area includes reconstruction of an existing, approximately 470 linear feet, foot-only trail segment that extends east from the day use area and connects to BLM's SJR Trail. All activities associated with this upgrade would conform to all relevant programs, plans, ordinances, and policies, including the BLM's Bakersfield RMP (BLM 2014). The Proposed Project would not affect any other existing pedestrian access trails.

There are no sidewalks or designated bicycle facilities on any of the roadways within the Proposed Project Area and no public transit routes are located near the Proposed Project. The Proposed Project would not conflict with a program, plan, ordinance, or

policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.

Therefore, there would be **No Impact** as a result of construction activities under the Proposed Project for potential impact TSP-1.

Operation

During operation of the Proposed Project, transportation through the Area of Analysis would occur during routine and non-routine inspections and maintenance activities by work vehicles. Under the Proposed Project, vehicle use of the roads used to access the K1 Powerhouse would likely be less than current conditions, while use of the roads used to access the K2 Powerhouse (e.g., Access Road 6) would be similar to existing conditions. During operation, most of the Proposed Project access roads would continue to be primarily used by PG&E employees to operate and maintain the Proposed Project and by recreationists visiting the Smalley Cove Recreation Area and recreation areas near the K1 and K2 powerhouses. There would likely be additional use of Access Road 6 by recreationists visiting the Vista Day Use Area.

PG&E would implement the Project Roads and Trails Maintenance Plan, which includes conducting regular inspections and routine maintenance to ensure Kerckhoff Hydroelectric Project roads and trails remain suitable for safe travel. Implementation of this plan would reduce the potential for impacts to transportation on Kerckhoff Hydroelectric Project roads and trails.

Therefore, there would be **No Impact** as a result of operational activities under the Proposed Project for potential impact TSP-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.18.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same impact analysis and impact determination as the Proposed Project described in Section 4.18.4.1.1. Alternative 1 would not change any construction activities included in the Proposed Project. In addition, Alternative 1 does not require relocation of the Proposed Project or the use of roads and trails not already discussed. Therefore, there would be **No Impact** as a result of construction activities under Alternative 1 for potential impact TSP-1.

Operation

Under Alternative 1, there would potentially be more vehicle traffic due to the provision of additional whitewater boating flows based on the spill year designation. Potential impacts to transportation would be reduced through implementation of the Project Road and Trail Maintenance Plan. Other than the potential for additional recreational use, Alternative 1 would not involve changes in the existing environment that could result in the conflict with transportation programs, plans, ordinances, or policies. Therefore, there would be **No Impact** as a result of operational activities under Alternative 1 for potential impact TSP-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.18.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same impact analysis and impact determination as the Proposed Project as described in Section 4.18.4.1.1. Alternative 2 would not change any construction activities included in the Proposed Project. In addition, Alternative 2 does not require relocation of the Proposed Project or the use of roads and trails not already

discussed. Therefore, there would be **No Impact** as a result of construction activities under Alternative 2 for potential impact TSP-1.

Operation

Alternative 2 has the same impact analysis and impact determination as the Proposed Project as described in Section 4.18.4.1.1. Potential impacts to transportation would be reduced through implementation of the Project Road and Trail Maintenance Plan. Alternative 2 would not involve changes in the existing environment that could result in the conflict with transportation programs, plans, ordinances, or policies. Therefore, there would be **No Impact** as a result of operational activities under Alternative 2 for potential impact TSP-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.18.4.2 Potential Impacts Related to Vehicle Miles Traveled

Impact TSP-2: Would the project conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?

CEQA Guidelines Section 15064.3(b) describes considerations for evaluating the transportation impacts of a project and states that, generally, VMT is the most appropriate measure of transportation impacts. VMT refers to the amount and distance of automobile travel attributable to a project. Increased VMT exceeding an applicable threshold could constitute a significant impact. If existing models or methods are not available to estimate the VMT for the particular project being considered, a lead agency may analyze the project's VMT qualitatively, evaluating factors such as the availability of transit or proximity to other destinations. For construction traffic, a qualitative analysis of VMT impacts (instead of a more detailed quantitative analysis) is often appropriate (CEQA Guidelines Section 15064.3(b)(3)).

According to technical guidance by the Governor's Office of Planning and Research (Governor's OPR), absent substantial evidence indicating that a project would generate a potentially significant level of VMT, or inconsistency with a sustainable communities strategy or general plan, projects that generate fewer than 110 trips per day generally may be assumed to cause a less than significant transportation impact (Governor's OPR 2018). The Fresno County General Plan also uses 110 daily vehicle trips as a threshold for determining when a more detailed VMT analysis may be needed (Fresno County 2024).

4.18.4.2.1 Proposed Project

Construction

During Proposed Project construction, there would be a temporary increase in vehicle use of Kerckhoff Hydroelectric Project roads during short time periods (i.e., days to weeks). None of the proposed construction activities overlap in time. Construction activities associated with the K1 Powerhouse retirement and modification are anticipated to require approximately 10 to 15 vehicles per day for 1 to 4 weeks at a time between April and October 2036. Installation of the new flow gage would likely require two vehicles for one week in August 2027. The proposed improvements at Smalley Cove are anticipated to use three or four vehicles for one to two weeks in August 2028. Construction of the Vista Day Use Area is expected to require three trucks as well as vehicles to transport equipment and material for up to one month (August 2030). Thus, each component of the Proposed Project construction would not require more than 110 vehicle trips per day.

Public transit is not available, and Smalley Road and the Kerckhoff Hydroelectric Project access roads are the only roads with direct access to the Area of Analysis. A temporary increase in the use of this roadway near the Proposed Project during construction would be necessary for construction access. The Proposed Project would not conflict with or be inconsistent with CEQA Guidelines Section 15064.3(b) during construction. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact TSP-2.

Operation

Operation of the Proposed Project would not result in an increase to the permanent workforce at the Kerckhoff Hydroelectric Project and would not result in an appreciable increase in recreational use in the Proposed Project Area (i.e., more than 110 trips per day); thus, the Proposed Project would not cause an increase in vehicle trips during operation. The Proposed Project includes existing and continued maintenance of existing roads and trails, as well as implementation of the Proposed Project Road and Trail Maintenance Plan, which includes regularly inspecting and maintaining the Proposed Project roads and trails to enable safe access. Since execution of this plan is ongoing, operations and continued maintenance of roads and trails would not result in an appreciable increase in vehicle trips (i.e., exceedance of 110 vehicle trips per day).

The Proposed Project includes updating the existing FERC Project Boundary around facilities and boundary corridors representing distance off-set from the centerline of existing linear infrastructure, especially access roads. This aspect of the Proposed Project would not lead to any new vehicle trips or other potential impacts on transportation.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact TSP-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.18.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same impact analysis and impact determination as the Proposed Project as described in Section 4.18.4.2.1. Alternative 1 would not conflict with or be inconsistent with CEQA Guidelines Section 15064.3(b) during construction activities.

Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 1 for potential impact TSP-2.

Operation

Routine operation, inspection, and maintenance activities under Alternative 1 would have the same impact analysis as the Proposed Project as described in Section 4.18.4.2.1. Under Alternative 1, there is the potential for more vehicle trips by the public due to the provision of more whitewater boating flows. The number of days that whitewater flows would be provided would vary by year depending on the WY type. Considering that current use of the SJR downstream of Kerckhoff Dam for whitewater boating is low (PG&E 2023), additional whitewater boating days under Alternative 1 would likely not result in more than 110 vehicle trips per day. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 1 for potential impact TSP-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.18.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same impact analysis and impact determination as the Proposed Project as described in Section 4.18.4.2.1. Alternative 2 would not conflict with or be inconsistent with CEQA Guidelines Section 15064.3(b) during construction activities. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 2 for potential impact TSP-2.

Operation

Routine operation, inspection, and maintenance activities under Alternative 2 would have the same impact analysis as the Proposed Project as described in Section

4.18.4.2.1. Under Alternative 2, there is the potential for more vehicle trips by the public due to the provision of more whitewater boating flows. The number of days that whitewater flows would be provided would vary by year depending on the WY type. Considering that current use of the SJR downstream of Kerckhoff Dam for whitewater boating is low (PG&E 2023), additional whitewater boating days under Alternative 2 would likely not result in more than 110 vehicle trips per day. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 2 for potential impact TSP-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.18.4.3 Potential Impacts Related to Design and Incompatible Use Hazards

Impact TSP-3: Would the Project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

4.18.4.3.1 Proposed Project

Construction and Operation

The Proposed Project does not include the construction of any new roads or trails. The existing Kerckhoff Hydroelectric Project Roads are primarily used by PG&E employees to access Kerckhoff Hydroelectric Project facilities. There would be a temporary increase in worker vehicles and construction vehicles during construction activities; however, this would not be incompatible with the typical use of the roads or increase any hazards.

The Proposed Project would provide vehicular access to the Vista Day Use Area including paving an existing gravel road between Access Road 6A and the day use area; constructing a new up to 20-car parking lot; installing a gate, signs, and fencing

across Access Road 6A at the intersection of the day use area access road; and installing vehicle control barriers along Access Road 6A between the K2 Switchyard and the day use area access road. These Proposed Project features would be designed to meet current design standards for safety and would not substantially increase hazards due to a geometric design feature or incompatible use. In accordance with the Proposed Recreation Management Plan, PG&E would consult with BLM during the planning and design phase for the Vista Day Use Area. Moreover, the construction of a new 20-car parking lot with defined traffic flow, gates, signs, and fencing would reduce any potential hazard risk in the Proposed Project Boundary compared to baseline conditions. The area near the proposed Vista Day Use Area is already used for recreation purposes by the public to access nearby trails; thus, development of the Vista Day Use Area would not be an incompatible use once it is operational.

Therefore, there would be **No Impact** as a result of construction and operational activities under the Proposed Project for potential impact TSP-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.18.4.3.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project as described in Section 4.18.4.3.1. Alternative 1 would not change any construction activities and does not require relocation of the Proposed Project. The only changes to operation under Alternative 1 are the full or partial replacement of flow measures included in the Proposed Project, which would not impact transportation. Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 1 for potential impact TSP-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.18.4.3.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project as described in Section 4.18.4.3.1 for potential impact TSP-3. Alternative 2 would not change any construction activities and does not require relocation of the Proposed Project. The only changes to operation under Alternative 2 are the replacement of flow measures included in the Proposed Project, which would not impact transportation. Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 2 for potential impact TSP-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.18.4.4 Potential Impacts Related to Emergency Access

Impact TSP-4: Would the Project result in inadequate emergency access?

4.18.4.4.1 Proposed Project

Construction and Operation

Access to Kerckhoff Hydroelectric Project facilities for construction of the Proposed Project would be on existing Kerckhoff Hydroelectric Project roads that either undergo annual or as needed maintenance. The Proposed Project includes implementation of the Project Road and Trail Maintenance Plan, which specifies that in the event of an

emergency incident that blocks road/trail access to a Kerckhoff Hydroelectric Project facility and/or threatens public safety, PG&E would notify the appropriate land management agency (e.g., BLM or USFS) or property owner to coordinate repair work.

The Proposed Project also includes implementation of the Vegetation Management and Pest Control Plan. This plan describes management measures, such as buffers along the sides of roads and trails, for vegetation clearing and hazard tree removal. These measures would ensure that Kerckhoff Hydroelectric Project roads and trails remain accessible for emergency access.

As described in the Proposed Recreation Management Plan, the Proposed Project would include construction of the Vista Day Use Area, which includes paving an existing access road, reconstructing an approximately 470-foot-long existing trail segment, and several measures to control and direct public access and protect public safety. These measures include opening gate access on Access Road 6A near the K2 Switchyard to allow public access to the day use area; installing a gate, signs, and fencing at the intersection with the day use area to prohibit access beyond the gate; installing fencing, control barriers, and signage to control public access near the K2 Switchyard; and installing additional safety and directional signage between the K2 Switchyard and the day use access area. PG&E would consult with BLM in the planning, scheduling, and design of the Vista Day Use Area to ensure applicable standards and regulations are met. PG&E would also develop a construction plan that includes measures to provide appropriate traffic and parking during construction. Thus, development of the Vista Day Use Area would improve public safety and access in this area compared to existing conditions once it is operational.

Therefore, there would be **No Impact** as a result of construction and operational activities under the Proposed Project for potential impact TSP-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.18.4.4.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project as described in Section 4.18.4.4.1 for potential impact TSP-4. Alternative 1 would not change any construction activities and does not require relocation of the Proposed Project. The only changes to operation under Alternative 1 are the full or partial replacement of flow measures included in the Proposed Project, which would not impact emergency access. Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 1 for potential impact TSP-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.18.4.4.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project as described in Section 4.18.4.4.1 for potential impact TSP-4. Alternative 2 would not change any construction activities and does not require relocation of the Proposed Project. The only changes to operation under Alternative 2 are the replacement of flow measures included in the Proposed Project, which would not impact emergency access. Therefore, there would be **No Impact** as a result of construction and operational activities under Alternative 2 for potential impact TSP-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.18.5 Literature Cited

Airport-Data.com. 2025. Johnston Field Airport (5CL9) Information. Accessed: April 3, 2026. Retrieved from: https://airport-data.com/airport/5CL9/.

BLM (United States Bureau of Land Management). 2014. *Bakersfield Field Office Record of Decision and Approved Resource Management Plan*. United States Department of the Interior, Bureau of Land Management. December. Accessed: April 3, 2026. Retrieved from: https://www.govinfo.gov/content/pkg/GOVPUB-I53-PURL-gpo83734/pdf/GOVPUB-I53-PURL-gpo83734.pdf.

City of Fresno. 2014. *Master Environmental Impact Report General Plan and Development Code Update City of Fresno, Fresno County, California.* Accessed: April 3, 2026. Retrieved from: https://www.fresno.gov/wp-content/uploads/2023/03/upload_temp4-Mobility-and-Transportation-9-30-2021.pdf.

FCOG (Fresno Council of Governments). 2022. Regional Transportation Plan. Accessed: April 3, 2026. Retrieved from: https://www.planfresno.com/previous-rtps/.

Fresno County. 2024. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

Fresno County Rural Transit Agency. 2019. *Services Map.* Accessed: April 3, 2026. Retrieved from: https://www.ruraltransit.org/wp-content/uploads/2021/08/FCRTA-Service-Map_2019.pdf.

Governor's OPR (Office of Planning and Research). 2018. *Technical Advisory on Evaluating Transportation Impacts in CEQA*. Accessed: April 3, 2026. Retrieved from: https://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf.

Madera County. 1995. *Madera County General Plan Policy Document*. Adopted October 24. Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/40825/638615574804870000.

Madera County Connection. 2025. Eastern Madera County. Accessed: April 3, 2026. Retrieved from: https://mcctransit.com/routes/eastern_madera_county/.

MCTC (Madera County Transportation Commission). 2022. 2022 Regional Transportation Plan and Sustainable Communities Strategy. Accessed: April 3, 2026. Retrieved from: https://www.maderactc.org/transportation/page/your-madera-2046-rtpscs

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding "Kerckhoff: Prefilling Meeting & CEQA Discussion," on January 13, 2026.

PG&E (Pacific Gas and Electric Company). 2020. *Technical Study Report 10 Project Roads and Trails Assessment (LAND 1)*. Kerckhoff Hydroelectric Project, FERC Project No. 96. In Final License Application, Volume III, Exhibit E, Supporting Document B.

_____2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

USFS (United States Forest Service). 2023. *Land Management Plan for the Sierra National Forest: Fresno, Madera, and Mariposa Counties, California*. Accessed: April 3, 2026. Retrieved from: https://acconsensus.org/wp-content/uploads/2024/08/05-SNF_LMP_final_20230504_Web.pdf.

4.19 TRIBAL CULTURAL RESOURCES

This section describes existing conditions and analyzes potential impacts on Tribal cultural resources (TCRs) that could result from implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts on TCRs from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.19-1). TCRs are also addressed in Section 4.6 *Cultural Resources*.

Table 4.19-1: CEQA Checklist for Tribal Cultural Resources

Would the Project	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact TCR-1: 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	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Would the Project	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
is 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)?			
Impact TCR-2: 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 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 Resources Code Section 5024.1, the lead agency shall	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Would the Project	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
consider the significance of the resource to a California Native American Tribe?			

4.19.1 Environmental Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public lands administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and United States Bureau of Reclamation (Reclamation) under BLM management. This section describes the methodology of the study area and summarizes the known Tribal resources within the Proposed Project and immediate vicinity.

Section 21074(a) of the Public Resources Code (PRC) defines TCRs as follows:

- Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe that are either of the following:
  - Included or determined to be eligible for inclusion in the California Register of Historical Resources (CRHR)
  - Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1
- 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 Section 5024.1. In applying the criteria set forth in subdivision (c) of

Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American Tribe

- A cultural landscape that meets the criteria of subdivision (a) is a TCR to the extent that the landscape is geographically defined in terms of the size and scope of the landscape
- A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a "nonunique archaeological resource" as defined in subdivision (h) of Section 21083.2 may also be a TCR if it conforms with the criteria of subdivision (a) (CEQA Statute Section 21074)

4.19.1.1 Existing Conditions Methodology

4.19.1.1.1 Literature Review and Consultation

The existing conditions for the Proposed Project, Alternative 1, and Alternative 2 are based on the following technical studies completed for PG&E's Federal Energy Regulatory Commission (FERC) relicensing efforts:

- *Tribal Resources Inventory and Evaluation Report (TSR-23), Kerckhoff Hydroelectric Project (CUL 2), FERC Project No. 96* (Davis-King 2020b)
- *Final Historic Properties Management Plan* (HPMP; West et al. 2021)

4.19.1.1.2 Tribal Cultural Resources Study Area

The study area for TCRs is the area within the existing FERC Project Boundary plus the area within 200 feet of any existing Kerckhoff Hydroelectric Project facility that is not within the existing FERC Project Boundary (excluding buried features such as the Kerckhoff 1 [K1] and Kerckhoff 2 [K2] Tunnels), where the Proposed Project may cause a substantial adverse change in the significance of a historical resource; an archaeological resource; or disturb any human remains, including those outside of a dedicated cemetery. The study area is identical to the Area of Potential Effect (APE) established for the National Historic Preservation Act (NHPA) Section 106 process, defined as the area where the Proposed Project could directly or indirectly cause alterations in the use or character of a historical resource. The Advisory Council on

Historic Preservation and the State Historic Preservation Office (SHPO) provide guidance for federal agencies and delegated licensees regarding potential impacts that may occur immediately or directly, are reasonably foreseeable and may occur later, may be caused by indirect impacts, and potential cumulative impacts resulting from the Proposed Project.

On January 16, 2018, FERC designated PG&E as its non-federal representative for the purposes of consultation pursuant to Section 106 of the NHPA. On February 25, 2019, PG&E reached out to the California SHPO in support of relicensing the Kerckhoff Hydroelectric Project as designated as FERC's non-federal representative for the purposes of consultation pursuant to Section 106 of the NHPA. In response, on March 27, 2019, the California SHPO asked for more information regarding the APE, and asked in defining the APE to consider both direct and indirect effects and include a narrative description and mapping of the APE.

The APE was developed in consultation with the Proposed Project's Cultural Resources Working Group (CRWG), which includes Native American Tribes;[1] land management agencies, including BLM and USFS-SNF; the California SHPO; PG&E as the Applicant; and interested individuals. Per the Proposed Project's HPMP, Reclamation was invited to be part of the CRWG because portions of the Proposed Project are located on its property; however, the agency declined to participate because the relicensing did not constitute an undertaking under Section 106 for its purposes.

The APE was submitted by PG&E to the SHPO on February 12, 2021, and the SHPO approved PG&E's final description and reasoning of the APE on March 26, 2021. If PG&E identifies any new resources or proposes alterations to the Proposed Project Area, these would be integrated into the Proposed Project's HPMP, after consultation with stakeholders. Since the 2021 APE submittal, construction of a day use area (Vista

[1] PG&E consulted with the following Tribes: North Fork Rancheria of Mono Indians, Mono Nation, Picayune Rancheria, North Fork Mono Tribe, Cold Springs Rancheria, Dunna Wo-Wah Tribal Government, Table Mountain Rancheria, and Wuksache Tribe.

Day Use Area) that would be connected to a BLM foot trail, installation of an upstream flow gage, and upgrades to the Kerckhoff Dam radial gates have been proposed, which alter the Proposed Project Area; these elements, therefore, must be integrated into the Proposed Project's HPMP.

The study area totals 507.96 acres. Land ownership is as follows: 328.1 acres owned by the federal government, 162.5 acres owned by PG&E, and 41.1 acres of other privately owned land. The study area encompasses all lands and facilities necessary for Proposed Project operation. As stated above, construction of the Vista Day Use Area, installation of an upstream flow gage, and upgrades to the Kerckhoff Dam radial gates were proposed after the 2021 HPMP and must be analyzed. All accessible TCRs located within the 2021 HPMP study area were inventoried and assessed as part of the cultural studies and are considered part of the affected environment for TCRs.

A Precontact overview and a historical overview are provided in Section 4.6 *Cultural Resources*.

4.19.1.2 Ethnohistorical Overview

Ethnographically, the study area is located at a linguistic and cultural boundary that includes both the Western Mono and Foothill Yokuts. The upstream or northern portion of the Proposed Project Area is generally located in the southernmost portion of the lands traditionally occupied by the Western Mono. The North Fork Tribe are the most northern of the Western Mono Tribe who, together with other Mono Tribes, occupied an area of the Sierra Nevada foothills extending from Crane Valley to south of Kings River. Adjacent to the North Fork Tribe and across the San Joaquin River (SJR) to the south is the Big Sandy Rancheria in Auberry (Gayton 1948; Gifford 1932). The Mono Tribes all speak the Western Mono language, a member of Numic branch of the Uto-Aztecan language family, which was, and is still, spoken among Tribes across the Great Basin (Shipley 1978).

The downstream or southern portion of the Proposed Project is generally located in lands traditionally occupied by Yokuts. These consist of the Picayune Rancheria of the Chukchansi Indians at Coarsegold and the Dumna (Spier 1978a). The Chukchansi and

the Dumna both speak Yokuts languages that belong to the Yokutsun language family (Penutian Stock), which are spoken throughout the San Joaquin Valley and southern Sierra Nevada foothills (Shipley 1978). These groups likely intermixed and used the entire study area.

By the time of Euro-American contact (circa 1800), the central Sierra foothill region contained a significant Native American population, including over 600 Western Mono. Chukchansi population figures are more difficult to estimate, but they were probably roughly equal to the Western Mono in population if not somewhat larger (Baumhoff 1958; Cook 1955, 1976; Kroeber 1925; Merriam 1905).

Despite early ethnographic studies and traditional associations with lands in and adjacent to the Proposed Project, exactly which Native American groups inhabited the region prior to the ethnographic recordation remains unknown. The earliest documentation of Tribes and their territories in California treats the Yokuts Tribes extensively but provides little information about the Mono Tribes. Stephen Powers' *Tribes of California* (Powers 1976), Kroeber's *Handbook of the Indians of California* (Kroeber 1925), and Anna Gayton (Gayton 1948) all concentrated on the Chukchansi Yokuts and neglect to investigate the other SJR groups, including the Dumna. The *Handbook of the Yokuts Indians* (Latta 1977) even emphasized valley-dwelling groups, with the extensive oral histories collected on the Dumna not included.

There is mixed information regarding inhabitants of the area that is now Kerckhoff Reservoir. Kroeber (1907) attributed habitation of this area to a Yokuts group referred to as the Toltichi, which translates to "stream people." Kroeber reported that the Toltichi lived at the large village known as Tsobotipau, just below the A.G. Wishon Powerhouse (Kroeber 1925). He declared the Toltichi extinct as of the early twentieth century (Kroeber 1907).

However, Spier (1978a) attributed the area north of Kerckhoff Reservoir to the Northfork Mono with the Foothill Yokuts (Spier 1978b) territory, encompassing both sides of the SJR between Kerckhoff Reservoir and Millerton Lake. Powers (1976) placed Yokuts on the SJR on Whisky Creek (a tributary of Willow Creek upstream of its confluence with

the SJR near Wishon Powerhouse) but never mentioned the Toltichi that Kroeber described. Merriam unequivocally assigned the Kerckhoff Reservoir area to the North Fork Mono (Merriam 1966, 1967; Merriam and Talbot 1974) from his 1902 journey through Western Mono lands, which included passing directly through the study area. He did not identify the Toltichi as a Tribe native to the area, and the Toltichi do not appear on the list of signatory Tribes on the 1851 “Treaty N,” part of which established the Fresno River Reservation (Heizer 1972; Muñoz 1806).

It is likely that, to some extent, both the Yokuts Tribes and Mono Tribes overlapped and intermingled in the study area and maintained no discrete boundaries or that those boundaries shifted over time. It is also likely that cultural boundaries were already disrupted by Euro-American invasion and disease within California by the time Powers, Merriam, Kroeber, Gifford, Gayton, and others arrived to study California Native cultures.

4.19.2 Regulatory Background

The following subsections contain an overview of regulations related to TCRs.

4.19.2.1 Federal

4.19.2.1.1 Federal Power Act

The Federal Power Act (Title 16 United States Code [USC] Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created FERC and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations [CFR] Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.19.2.1.2 Section 106 of the National Historic Preservation Act of 1966

Section 106 of the NHPA 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 places (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 in the NRHP (36 CFR Section 800.16(l)(1)). A property may be listed in the NRHP if it meets criteria provided in the NRHP regulations (36 CFR 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 and meet the following criteria:

- That are associated with events that have made a significant contribution to the broad patterns of our history (Criterion A);
- That are associated with the lives of persons significant in our past (Criterion B);
- 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 (Criterion C); or
- That have yielded, or may be likely to yield, information important in prehistory or history (Criterion D)

4.19.2.1.3 Native American Graves Protection and Repatriation Act

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 Native American 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 USC Section 3002). Intentional excavation of Native American human remains or objects on lands owned or controlled by the federal government may occur under a strict set of circumstances (25 USC Section 3002(c)).

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 to the ownership provisions above (25 USC Section 3002(d)).

4.19.2.1.4 Archaeological Resources Protection Act

The Archaeological Resources Protection Act (ARPA) requires a permit for intentional excavation of archaeological materials on federal lands (16 USC Section 470ee(a)). The federal agency that owns or controls the land may dispense permits for excavation as provided in the ARPA regulations (43 CFR Section 7.5). The permit may require notice to affected Native American Tribes (43 CFR Section 7.7) and compliance with the terms and conditions provided in the ARPA regulations (43 CFR Section 7.9).

4.19.2.1.5 American Indian Religious Freedom Act

The American Indian Religious Freedom Act of 1978, 42 USC Section 1996, protects Native American religious practices, ethnic heritage sites, and land uses.

4.19.2.1.6 Executive Order 11593 of 1971 and Executive Order 13007 of 1996

Executive Order 11593, Protection and Enhancement of the Cultural Environment, states that the federal government, specifically the agencies of the executive branch, will provide leadership to the nation for the preservation, restoration, and maintenance of the historic and cultural environment. Executive Order 13007, Indian Sacred Sites, states that each executive branch agency that manages federal lands, to the extent practicable, will accommodate access to and ceremonial use of sacred sites by Native American religious practitioners and will avoid adversely affecting these sacred sites. These agencies will also maintain confidentiality of the sacred sites.

4.19.2.1.7 United States Bureau of Land Management Bakersfield Field Office Resource Management Plan

The *Bakersfield Field Office Record of Decision and Approved Resource Management Plan* (RMP) (BLM 2014) is considered relevant because the Proposed Project is located within BLM's SJR Gorge Recreation Area. This plan provides direction for the management and protection of natural resources on public lands administered by BLM. Relevant management goals, objectives, decisions, and administrative actions in this plan related to TCRs are as follows (BLM 2014):

Goal [CR-G-1]. Identify, preserve, and protect significant TCRs and ensure that they are available for appropriate uses by present and future generations (Federal Land Policy and Management Act [FLPMA], Section 103(c), 201(a) and (c); NHPA, Section 110(a); ARPA, Section 14(a).

Goal [CR-G-2]. Seek to reduce imminent threats and resolve potential conflicts from natural or human-caused deterioration, or potential conflict with other resource uses (FLPMA Section 103(c), NHPA 106, 110 (a) (2)) by ensuring that all authorizations for land use and resource use will comply with the NHPA Section 106.

Goal [CR-G-3]. Continue to provide Native Americans' access to public lands to conduct traditional cultural and religious practices.

Objective [CR-O-2]. Design BLM actions and authorizations to minimize impacts on TCRs including places of traditional cultural and religious importance to Native Americans.

Objective [CR-O-3]. Identify places of religious and cultural importance to Native Americans and facilitate access to these locations for traditional use.

Decision [CR-D-1]. Allocate evaluated TCRs within the decision area as "scientific use" for study, determination of eligibility and appropriate recordation, pending assignment to another use category.

Decision [CR-D-3]. Restore or stabilize cultural resources when they are damaged or deteriorating to the extent possible.

Administrative Actions SHPO/NHPA. Continue to regularly communicate with the California SHPO to share information and obtain technical advice on issues related to

compliance with Sections 106 and 110 of the NHPA, in accordance with the BLM California State Protocol.

Tribal Consultation and Concerns

- Continue to consult with the Picayune Rancheria of the Chukchansi Indians, North Fork Rancheria of Mono Indians, Tule River Reservation, Cold Springs Rancheria, Big Sandy Rancheria, Table Mountain Rancheria, Santa Ynez Band of Chumash Indians, Tejon Indian Tribe, and the Tachi-Yokuts of the Santa Rosa Rancheria, and other interested Native American Tribes to identify places of traditional importance and associated access needs. Develop measures for management and protection of such places that may be identified by Tribes during the life of the RMP
- Identify sacred areas in consultation with Native American Tribes and, where practicable, limit land uses to those that do not conflict with ascribed values
- Honor Tribal requests to protect the confidentiality of sensitive information to the extent permitted by law
- Provide opportunities for participation by Native American Tribes in research and interpretation
- Develop specific management prescriptions for sites allocated to the Traditional Use category in consultation with the Native American Tribes to which they are culturally important
- Restrict public information about the locations of sites that are not allocated to public use as allowed by law and regulation

4.19.2.1.8 Sierra National Forest Land Management Plan

The United States Forest Service (USFS) uses the direction in the revised *Land Management Plan for the Sierra National Forest* (USFS 2023), pursuant to the 2012 Forest Service Planning Rule (36 CFR Part 219), to guide its decisions regarding the relicensing of the Proposed Project and the development of associated license conditions. It provides general direction for achieving forest-wide desired conditions and management directions to meet those conditions and recognizes that Tribal communities are important partners in forest management activities. Desired conditions,

goals, guidelines, and management approaches related to TCRs and relevant to the Proposed Project are as follows:

Desired Conditions

TRIB-FW-DC 01. The USFS recognizes Native American needs and viewpoints and fosters a robust relationship with federally and non-federally recognized Tribes and related groups with which it consults. National forest personnel, including but not limited to line officers, departmental staff, archaeologists, historians, and Tribal liaisons consult and communicate with Tribal leadership, Tribal historic preservation officers, traditional religious practitioners, traditional gatherers, Tribal members, and other Tribal organizations.

TRIB-FW-DC 02. The Sierra staff coordinates with Tribes and interested parties when appropriate to ensure traditional ecological knowledge and Tribal interests aid in the protection of TCPs, sacred sites, and other natural and TCR values that are identified and managed in the spirit of co-stewardship.

TRIB-FW-DC 03. Native Americans have access to areas that provide them an opportunity to practice traditional, cultural, and religious lifeways, such as plant gathering, fishing, hunting, and ceremonial activities that are essential in maintaining their cultural identity and the continuity of their culture.

TRIB-FW-DC 04. Traditional ecological knowledge is a valued part of the process when developing and implementing restoration projects and other forest programs.

TRIB-FW-DC 05. The USFS-SNF provides a setting for the education of Tribal youth in culture, history, and land stewardship and for the exchange of information between Tribal elders and youth.

TRIB-FW-DC 06. Vegetation types and vegetation conditions support continued use by Tribes for traditional, ceremonial, and medicinal purposes. Plants known to be used by Tribes that traditionally use the forest are thriving.

Goals

TRIB-FW-GOAL 01. Manage the land in a spirit of shared stewardship with Tribes, supporting Tribal rights and recognizing the mutual benefits of restoration.

TRIB-FW-GOAL 03. Develop memoranda of agreements or other protocols between the Forest and Native American Tribes as appropriate to guide consultation processes, reflect Tribes' particular perspectives and interests, and protect sacred sites.

Guidelines

TRIB-FW-GDL 01. Manage surface uses to minimize and/or prevent impacts on sacred sites and designated TCPs from mining operations. This includes requiring an operating plan and incorporating appropriate stipulations in the conditions of approval. It may include seeking mineral withdrawals, after appropriate assessment and consultation.

CULT-FW-GDL 02. Cultural artifacts should only be collected for diagnostic dating purposes, answering research questions, or protection of the artifact when special circumstances require collection. Artifact collections should be curated at nearby facilities and accessible to local Tribes and researchers.

Management Approaches

- Provide training to USFS-SNF employees about federal Tribal trust responsibilities and ways in which the Forest staff honors and implements these responsibilities
- Include culturally significant species in monitoring protocols related to management activities, where appropriate

CULT-FW-DC 01. TCRs (buildings, sites, districts, structures, and objects) with scientific, cultural, or social values are preserved and protected for their cultural importance. Site integrity and stability are protected and maintained on sites that are susceptible to imminent risks or threats, or where the values are rare or unique. Priority heritage assets are stable, and their significant values are protected; vandalism, looting, theft, and human-caused damage to heritage resources are rare. Site significance and integrity are maintained through conservation and preservation efforts.

CULT-FW-DC 02. TCRs, TCPs, and sacred sites are protected through project design and consultation with Native American Indian Tribes, Tribal cultural leaders, and consulting parties.

4.19.2.2 State

4.19.2.2.1 California Register of Historical Resources

California PRC Section 5024.1 and Section 15064.5 of the CEQA Guidelines define a historical resource as "a resource listed or eligible for listing on the California Register of Historical Resources." A historical resource may be eligible for inclusion in the CRHR if it:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. Is associated with the lives of persons important to our past;
3. 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
4. Has yielded, or may be likely to yield, information important in prehistory or history

Excavation must be stopped whenever human remains are uncovered, and the county coroner must be called in to assess the remains (CEQA Guidelines Section 15064.5(e)). If the county coroner determines that the remains are those of a Native American, the Native American Heritage Commission (NAHC) must be contacted within 24 hours, and the provisions for treating or disposing of the remains and any associated grave goods, as described in Section 15064.5 of the CEQA Guidelines, must be followed.

4.19.2.2.2 Assembly Bill 52

Assembly Bill 52, approved in September 2014 and effective July 1, 2015, required an update to Appendix G of the CEQA Guidelines to include questions related to TCRs. Section XVII *Tribal Cultural Resources* was added to ask the following:

- Would the project cause a substantial adverse change in the significance of a TCR, defined in PRC 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:

a) Listed or eligible for listing in the CRHR, or in a local register of historical resources as defined in PRC Section 5020.1(k); or
b) 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 PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American Tribe

The bill also established a formal consultation process with California Native American Tribes to identify potential significant impacts on TCRs, as defined by CEQA (PRC Section 21074).

Assembly Bill 52 applies to projects that file a Notice of Preparation or Notice of Negative Declaration/Mitigated Negative Declaration on or after July 1, 2015. CEQA lead agencies for such projects must initiate the consultation process by providing notice to Tribes traditionally and culturally affiliated with the geographic area of a project that have submitted written requests to be notified (PRC Section 21080.3.1(b)). The Tribe must respond to the lead agency within 30 days of receipt of notification if it wishes to engage in consultation on a proposed project. The lead agency must begin the consultation process within 30 days of receiving a Tribe's request for consultation (subdivision (e)).

4.19.2.3 Local

4.19.2.3.1 Fresno County General Plan

The Fresno County General Plan (Fresno County 2024) is relevant because the Proposed Project is located within Fresno County. The Fresno County General Plan is a comprehensive, long-term framework for the protection of the county's agricultural, natural, and cultural resources and for development in the county. Relevant goals, policies, and programs for TCR management are contained in the Open Space and Conservation Element and seek to preserve the historical, archaeological, paleontological, geological, and cultural resources of the county through development

review, acquisition, encouragement of easements, coordination with other agencies and groups, and other methods. The goals, policies, and programs include the following:

Goal OS-J. To identify, protect, and enhance Fresno County's important historical, archaeological, paleontological, geological, and cultural sites and their contributing environment, and promote and encourage preservation, restoration, and rehabilitation of Fresno County's historically significant resources in order to promote historical awareness, community identify, and to recognize the county's valued assets that have contributed to past county events, trends, styles of architecture, and economy.

OS-J.4 Cultural Resources Protection and Mitigation. The County shall require that discretionary development projects, as part of any required CEQA review, identify and protect important historical, archaeological, Tribal, paleontological, and cultural sites and resources. For projects requiring ground disturbance and located within a high or moderate cultural sensitivity area, a cultural resources technical report may be warranted, including accurate archival research and site surveys conducted by qualified cultural resources practitioners. The need to prepare such studies shall be determined based on the Tribal consultation process and initial outreach to local or state information centers.

OS-J.5 Archeological Sites Confidentiality. The County shall, within the limits of its authority and responsibility, maintain confidentiality regarding the location of archaeological sites in order to preserve and protect these resources from vandalism and the unauthorized removal of artifacts.

OS-J.6 Native American Consultation. The County shall solicit the views of the local Native American community in cases where development may result in disturbance to sites containing evidence of Native American activity and/or sites of cultural importance.

4.19.2.3.2 Madera County General Plan

The Madera County General Plan (Madera County 1995) is relevant because a portion of the Proposed Project is located within Madera County. The plan includes information regarding land uses in the vicinity of the Proposed Project and management goals and policies relevant to the Proposed Project Area. The General Plan provides an overall framework for development of the county and protection of its natural and TCRs.

Relevant policies regarding TCR management are in Section 4 *Recreational and Cultural Resources* of the plan:

Goal 4.D. To identify, protect, and enhance Madera County's important historical, archaeological, paleontological, and cultural sites and their contributing environment.
Policy 4.D.1. The County shall solicit the views of the local Native American community in cases where development may result in disturbance to sites containing evidence of Native American activity and/or to sites of cultural importance.
Policy 4.D.4. The County shall, within its power, maintain confidentiality regarding the locations of archaeological sites in order to preserve and protect these resources from vandalism and the unauthorized removal of artifacts. If significant archaeological and TCRs are open to the public, the County shall control public access to prevent damage or vandalism.
Policy 4.D.8. The County shall support the registration of TCRs in appropriate landmark designations (i.e., NRHP, California Historical Landmarks, Points of Historical Interest, or Local Landmark). The County shall assist private citizens seeking these designations for their property.
Policy 5.H.5. The County shall require that significant natural, open space, and TCRs be identified in advance of development and incorporated into site-specific development project design.

4.19.3 Analysis Methodology

4.19.3.1 Analytical Approach

As part of *Tribal Resources Inventory and Evaluation Report (TSR-23), Kerckhoff Hydroelectric Project (CUL 2), FERC Project No. 96* (Davis-King 2020), a review of TCRs was completed for the study area of all previous work, including archival research, pedestrian and reconnaissance surveys, and interviews with Native American community members and other stakeholders from the CRWG. The study includes an archaeological study that was developed in consultation with the CRWG. To determine the presence or absence of archaeological resources within the study area, PG&E contracted with Cardno (2020) to complete an archaeological study. Results are also

documented in the Proposed Project's HPMP (West et al. 2021). In 2023, the construction of the Vista Day Use Area, installation of the new upstream gage, and the upgrade of two gates on Kerckhoff Dam were proposed; these areas were not subject to investigation in the 2021 HPMP. PG&E expects environmental studies and analysis will be needed for the Vista Day Use Area and will complete the permitting process required for developing the site (PG&E 2023), which will also be subject to review under the HPMP.

The focus of this analysis is on physical changes to the environment that may affect TCRs. The following methods were used to evaluate the potential impacts on TCRs in the study area:

- Analyze the results of CUL 2 (Davis-King 2020b) to identify potential impacts
- Set a level of significance for the individual TCRs within the Proposed Project Area as the basis for the potential impact analysis

4.19.3.2 Background Research

As part of relicensing efforts, PG&E retained ethnographers to conduct background research and interviews with interested Tribal representatives. In addition to consultation with relevant Tribal groups and representatives, an array of published and unpublished background literature was compiled and reviewed in CUL 2 (Davis-King 2020b) and is summarized herein. Background research included study of digital archives from the National Archives; visits to university and state libraries and museums; and visits to local and county libraries and archives. Review of historical maps, General Land Office maps, and cultural databases maintained by numerous agencies and repositories were included in the background research efforts. Additionally, field notes prepared by various ethnographers including Anna Gayton, Edward Gifford, John Hudson, Frank Latta, Helen McCarthy, C. Hart Merriam, Robert Spier, and Barbara Thrall were compiled and reviewed because their work overlaps the study area covered by CUL 2. Additionally, contextual published literature was incorporated to provide further information regarding Native American occupation of the study area.

4.19.3.3 Native American Heritage Commission and Tribal Consultation

As the lead agency for the relicensing, FERC delegated PG&E as its non-federal representative for conducting informal consultation for the Proposed Project. PG&E and Proposed Project ethnographers consulted with Native American Tribes and Tribal groups to identify Tribal resources in the study area, including traditional cultural landscapes (TCLs) and TCPs of traditional/cultural/spiritual importance and other Tribal resources that could be affected by Proposed Project operation. Consultation, fieldwork, and Tribal resource documentation was implemented in accordance with Section 106 of the NHPA, as amended, and took into consideration National Register Bulletin No. 38, *Guidelines for Evaluating and Documenting Identification of Traditional Cultural Properties* (Parker and King 1998).

To identify potential relicensing participants, PG&E first solicited a list of Tribal groups and representatives from the California NAHC in June 2017. The list provided by the NAHC identified 14 Tribes/groups that were potentially interested in the relicensing effort.

PG&E identified additional Tribal groups, individuals, and organizations that might have an interest in the Proposed Project by requesting Tribal contact lists from the USFS-SNF, Sequoia National Forest, and BLM; coordinating with the Tribes with whom FERC initiated contact; and reviewing internal PG&E records from previous hydroelectric relicensing efforts and ongoing license management in the region. PG&E solicited additional contact information from Tribes/groups attending meetings and through phone calls to Tribes. PG&E worked with TCR consultants to refine the list of Tribal contacts further. These efforts resulted in the identification of 42 Tribal groups that may have an interest in the Proposed Project. Of these, eight local Tribes chose to participate in subsequent meetings, interviews, and/or field visits. The following Tribal groups chose to participate:

- Big Sandy Rancheria
- Cold Springs Rancheria of Mono Indians of California
- Dumna WoWah Tribal Government

- North Fork Mono Tribe
- North Fork Rancheria of Mono Indians
- Picayune Rancheria of Chukchansi Indians
- SJR Tribe
- Table Mountain Rancheria

Ethnographic interviews were arranged with those who responded and expressed interest. Consultation with these Tribes and any others that express interest will continue through the remainder of the relicensing process.

4.19.3.4 Tribal Interviews and Meetings

PG&E's outreach to Tribes occurred primarily through interaction at events, interviews, and field visits. Various events, including the Mono Storytelling Workshop and annual Tribal gatherings, provided a venue where the ethnographers could make contacts for interviews, conduct field visits more informally, and discuss the Proposed Project.

Interviews were conducted with individuals from the North Fork Rancheria, North Fork Mono Tribe, Picayune Rancheria of Chukchansi Indians, and Dumna/SJR Tribe. Some Tribal representatives were interviewed multiple times. Attempts to conduct interviews with the Table Mountain Rancheria of California, the Big Sandy Rancheria of Western Mono Indians, and the Cold Springs Rancheria of Mono Indians of California were unsuccessful. Field visits with Tribal representatives occurred largely in 2019 and early 2020 to places including Smalley Cove, K2 Powerhouse area, SJR Gorge, and potential TCLs.

In addition to these collaborations, PG&E established a CRWG that meets periodically throughout the relicensing process to discuss study progress and exchange information.

4.19.3.5 Tribal Cultural Resources Identified within the Study Area

Four main types of TCRs were identified in the study area: (1) areas of intense ethnobotanical patterns, especially those directly related to medicine rocks or harvesting; (2) areas of ceremony and cultural tradition; (3) TCL 1, Tsobotebau, which includes a previously documented TCP, contributing elements, ethnobotanical areas,

and associated archaeological sites; and (4) TCL 2, North Fork Mono Trail, which includes various segment areas of communication, mainly trails and crossings of the Mono Trail (portions of which have been previously documented as a TCP and an NRHP-eligible property); the trails connect archaeological sites and ethnobotanical areas. All are summarized in the following subsections.

4.19.3.5.1 Ethnobotanical Sensitive Areas

Plants and animals—two types of TCRs to the people of the SJR watershed—remain important in the lives and well-being of the community. Many native food items are revered, such as acorn, sourberry, manzanita berry, blackberry, mushrooms, salmon, freshwater mussels (such as western pearlshell mussels), and suckers.

At least 13 potential ethnobotanically sensitive areas or concentrations of culturally important plants are located within the study area and were identified; these areas are described in detail in CUL 2. Of the 13 areas, 7 are located within TCL 1, Tsobotebau, and are found near or in archaeological sites. It appears that seven ethnobotanical areas are located within or adjacent to TCL 2. One ethnobotanically sensitive area is found in both TCL 1 and TCL 2. Some of these concentrations were identified by Native American members, but others were identified by botanists and not confirmed by the Native American members of the CRWG. These areas are considered TCRs.

4.19.3.5.2 Areas of Ceremony and Cultural Tradition

Areas of ceremony and cultural tradition are located throughout the study area and are used by the distinct Tribal communities. Due to confidentiality laws, they cannot be detailed here but are considered TCRs.

4.19.3.5.3 Traditional Cultural Landscape 1/Tribal Cultural Property/Tribal Cultural Resource 1, Tsobotebau

Tsobotebau (also spelled Chobatebau) is a large landscape used aboriginally and especially into the modern era by North Fork Mono (the Nim or Nuim). TCL 1/TCR 1, Tsobotebau, includes historic-era and present land allotments, living areas, trails, cemeteries, medicine gardens, food acquisition areas, at least one ancestral dance ground, and a ceremonial activity area. A portion of this landscape includes a TCP evaluated by (McCarthy 2011) for the Crane Valley Project. Contributing resources may include several archaeological and other Tribal resources.

Not only have the North Fork Mono long identified with this place because it is associated with an ancestral river crossing and gathering area, but also because it became home, in the late 1700s to early 1800s, to numerous families whose members lived and died here. A substantial number of features are associated with this landscape, most of which are well outside the study area and include Native American architectural features; five or more cemeteries; a large gathering area for medicines, food, and materials, particularly sourberry and various geophytes; and several trails, including segments of the NRHP-eligible TCL 2/TCR 2, North Fork Mono Trail.

TCL 1/TCR 1, Tsobotebau, is recommended eligible for listing in the NRHP. Eight archaeological resources contribute to this landscape. In a letter dated October 2, 2020, PG&E stated that, in consultation with the CRWG, it identified two TCLs (TCL 1, Tsobotebau; and TCL 2, the North Fork Mono Trail) and determined both sites are NRHP eligible as historic districts. PG&E provided the following documents in support of its finding:

- Going Down to the River, Pacific Gas and Electric Company Kerckhoff Hydroelectric Project, FERC No. 96 TSR-23, Appendix A, Tribal Resources Inventory and Evaluation Report, Fresno and Madera Counties, California (Davis-King 2020a)
- Tribal Resources Technical Study Report (TSR-23), Kerckhoff Hydroelectric Project (CUL 2), FERC Project No. 96 (Davis-King 2020b)

On December 8, 2020, the California SHPO provided concurrence on the eligibility determinations.

4.19.3.5.4 Traditional Cultural Landscape 2/Tribal Cultural Resource 2, North Fork Mono Trail

The Mono Trail is somewhat of a catchall phrase for the transportation network that was used by the Nim and other Mono to traverse their homeland; travel to the Pacific Coast for shells and materials; travel to the crest of the Sierra Nevada; or, if desirous, travel to their Paiute relatives on the east side of the Sierra Nevada, mainly in Mono and Inyo counties. Previously, NRHP evaluations have been prepared on portions of the higher elevation trail. One (Planas 2009) evaluation described the higher elevations of the trail and its branches in the Ansel Adams Wilderness, the John Muir Wilderness, and a small portion of trail on the Inyo National Forest. The evaluation considered the trail as a TCP, with the California SHPO concurrence that the Mono Trail is a TCP eligible for listing in the NRHP under Criterion A in June 2009 (refer to SHPO letter dated June 8, 2009, USFS060512A; Office of Historic Preservation 2009). A second evaluation of another segment was prepared by USFS Archaeologist Steve Marsh (Marsh 2016), who created a formal NRHP nomination for the “Mono Trail Corridor Traditional Cultural Property District.” His trail description began at Mono Hot Springs where Planas’ (2009) description ended and continued easterly to Mosquito Flat Trailhead at Rock Creek Lake in the Inyo National Forest. The evaluation was approved by the California SHPO on June 7, 2016. Both Planas and Marsh acknowledge that the Mono Trail is a much larger property than what either of them recorded and it includes a number of locations not on federal lands, continuing to the coast and well into the eastern Sierra Nevada. For CUL 2, Ron Goode, North Fork Mono Chairman, described 10 segments or offshoots of the North Fork Mono Trail (TCL 2/TCR 2) that are part of this network (Goode 2020). Like TCL 1/TCR 1, Tsobotebau, most of the segments described are located outside the Proposed FERC Project Boundary. Overall, the North Fork Mono Trail (TCL 2/TCR 2), as described by Goode, covers about 125 linear miles not including the sections farther east and west. This linear district is yet another component of the two previously recorded sections of the Mono Trail as described by

Planas (2009) and Marsh (2016). Two segments of the North Fork Mono Trail are located within and adjacent to the APE:

- Browns Bay Trail (formerly called Smalley Cove Trail)
- Kennedy Flats Trail

Based on information from Tribal members, this Tribal network of TCL 2, North Fork Mono Trail, is deeply connected to TCL 1, Tsobotebau, and appears to have the appropriate features and connections to make it eligible for listing in the NRHP (SHPO concurrence pending on determination of eligibility). TCL 2 is also recommended eligible for the California Register of Historic Resources (CRHR) as a TCR. On December 8, 2020, the California SHPO provided concurrence on the eligibility determinations.

4.19.3.6 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project and Alternatives would have a significant impact on TCRs if it would do the following:

- Cause a substantial adverse change in the significance of a TCR, defined in PRC 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:
  - Listed or eligible for listing in the CRHR, or in a local register of historical resources as defined in PRC Section 5020.1(k) (TCR-1); or
  - 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 PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American Tribe (TCR-2)

4.19.3.7 Environmental Management Measures and Monitoring Plans

PG&E would implement environmental management measures and monitoring plans designed to protect, maintain, and enhance environmental, recreational, and cultural resources over the term of the new FERC license, which are included in the Second Supplemental Final License Application and described below.

Under the Proposed Project, PG&E would continue to conduct routine maintenance activities at the existing Kerckhoff Hydroelectric Project facilities, some of which have been incorporated within the monitoring plans.

Monitoring plans that are relevant to TCR management include the Proposed Project's Recreation Management Plan, Vegetation Management and Pest Control Plan, Project Road and Trail Maintenance Plan, and HPMP.

4.19.3.7.1 Recreation Management Plan

PG&E would implement the Proposed Project's Recreation Management Plan to manage public use of the Proposed Project's recreation resources over the term of the license. The Proposed Project's Recreation Management Plan includes monitoring to estimate recreation use at Proposed Project recreation developments and detect and address potential impacts of Proposed Project recreation use on environmental and TCRs. PG&E would plan and design planned developments located on BLM-managed lands, such as the Vista Day Use Area, in consultation with the BLM to meet regional direction, regulations, design, and other applicable standards in place at the time of design. PG&E would also prepare a construction plan for approval by the BLM that includes a description of the measures to avoid potential impacts on sensitive resources (i.e., TCRs). When and where necessary to minimize the potential impacts of Proposed Project-related recreation use on environmental and TCRs within the Proposed FERC Project Boundary, PG&E would identify and implement appropriate best management practices (BMPs) and avoidance and minimization measures that may be necessary to protect TCRs and review and incorporate measures contained in other RMPs (e.g., Proposed Project's HPMP), including new plans that may be developed or existing plans that may be revised during the license term. Every 12 years after re-licensure,

PG&E would review the Proposed Project's Recreation Management Plan with agencies and Tribes, as necessary, and, if necessary, revise the plan.

4.19.3.7.2 Vegetation Management and Pest Control Plan

PG&E would implement the Proposed Project's Vegetation Management and Pest Control Plan to define a framework for implementation of invasive weed and pest management and routine vegetation and fuels management within the Proposed Project Area, which could affect TCRs, including Tribally significant plant gathering sites (PG&E 2023). The Proposed Project's Vegetation Management and Pest Control Plan aims to provide for the protection of TCRs during implementation of these activities. A listed objective of the Proposed Project's Vegetation Management and Pest Control Plan is to "avoid TCRs, including culturally significant plant gathering sites, during vegetation management activities." Routine and non-routine vegetation management activities and targeted invasive weed treatments will be subject to protection measures and processes identified in the Proposed Project's HPMP for Tribally significant plants and TCRs. An annual invasive weed monitoring report will be submitted to resource agencies (the United States Fish and Wildlife Service, USFS, BLM, and California Department of Fish and Wildlife) and members of the CRWG that summarizes monitoring results, provides comparisons to past monitoring/survey results, and presents any relevant changes or trends in the resource.

Specifically, vegetation management activities have the potential to impact archaeological sites, portions of the NRHP eligible TCL 1, Tsobotebau, and culturally sensitive plants that contribute to the NRHP eligible properties through ground disturbance vegetation removal, and use of herbicides and pesticides.

To reduce potential direct and indirect impacts to culturally significant plants and trees that contribute to the significance of NRHP eligible archaeological properties and the setting of cultural resources during routine vegetation management activities, PG&E will coordinate with the CRWG at the annual HPMP meeting and determine the appropriate management protocol. The HPMP prescribes site-specific protection and treatment

measures for each site located with the APE depending on the type of potential impacts from ongoing Proposed Project operations and maintenance.

4.19.3.7.3 Project Road and Trail Maintenance Plan

Maintenance of paved, gravel, and native soil roadbeds are regularly maintained to access the Kerckhoff Hydroelectric Project and PG&E facilities. Maintenance activities of these Kerckhoff Hydroelectric Project roads include grading, ditch excavation and culvert replacement, which has the potential to affect culture resources within the immediate vicinity. Maintenance activities must be reviewed by qualified personnel to determine if the proposed activity would cause potential impacts to the cultural resources.

To reduce potential impacts on historical properties and cultural resources, PG&E would coordinate with the CRWG at the annual HPMP meeting and/or prior to road maintenance activities to determine if the proposed activities have the potential to affect these resources and the appropriate management protocol, if needed. The HPMP prescribes site-specific protection and treatment measures for each site, TCL, or Tribal resource located with the APE depending on the type of potential impact from ongoing Kerckhoff Hydroelectric Project operations and maintenance.

4.19.3.7.4 Historic Properties Management Plan

Activities associated with the Proposed Project have the potential to affect known and unknown TCRs (e.g., unrecorded resources that could be discovered during the term of the proposed new license) within the Proposed FERC Project Boundary that are potentially eligible for inclusion in the CRHR. PG&E developed an HPMP (West et al. 2021) as part of the relicensing effort to guide the management of prehistoric and historic-period properties that are listed in, eligible for listing in, or that are unevaluated for listing in the NRHP, during the term of the proposed new license pursuant to Section 106 of the NHPA. The Proposed Project's HPMP provides the procedures required to comply with federal and state laws and regulations and conduct consultation with Tribes, agencies, and the California SHPO for the continued management of historic properties under the proposed new license pursuant to Section 106 of the NHPA. These

measures include avoidance, protection, monitoring, and mitigation measures. Furthermore, the HPMP identifies the goals for preserving historic properties, establishes guidelines for routine maintenance and operation, and establishes procedures for consulting with the California SHPO, Tribal Historic Preservation Officer (THPO), Indian Tribes, historic preservation experts, and the public concerning effects to historic properties and Tribal resources.

Properties that have not been evaluated for listing on the NRHP are to be managed as if they are eligible in the same manner as listed or eligible properties that have been formally evaluated. PG&E developed the Proposed Project's HPMP in consultation with the CRWG. The Proposed Project's HPMP is required to be implemented and provides detailed actions that are required to avoid potential impacts on TCRs that have yet to be evaluated for inclusion into the NRHP or CRHR. Avoidance is the preferred action for all historic properties. The required actions in the Proposed Project's HPMP are summarized below (West et al. 2021).

Summary of Required Actions in the Historic Properties Management Plan

The following on-site historic property protection actions in the HPMP are required to be implemented and are summarized here (West et al. 2021).

Summary of General Management Measures from the Historic Properties Management Plan

The following on-site historical property protection actions in the HPMP are required to be implemented as part of any license issuance (West et al. 2021) for the continued operation and maintenance of the Kerckhoff Hydroelectric Project (O&M), which includes the following actions: general repair, replacement of constituent components, electrical and mechanical upgrade and maintenance, and structural and material enforcement, as well as reservoir fluctuation, vegetation management and development, road maintenance, use and construction, FERC Project Boundary development, and emergency repairs. However, these measures do not apply to non-routine projects such as major modifications or additions to Kerckhoff Hydroelectric Project facilities that require immediate action to prevent system damage or personal

injury or death. These activities would be addressed individually by PG&E to ensure compliance with Section 106 requirements and would involve their own separate consultation for the proceeding, though the measures in the HPMP would apply to identifying and resolving effects from such activities.

Flag and Avoid. Avoidance is the preferred protection measure for all historic properties. During the planning stage of any undertaking, all work locations for the undertaking will be reviewed by PG&E's Cultural Resources Specialist (CRS) so that historic properties that may be affected can be identified for flag and avoid protection. Qualified personnel will work with the Proposed Project team to adjust the design where possible to avoid TCRs. If such avoidance is not possible, the CRS will consult with the CRWG to determine the nature of potential impacts and any mitigation necessary at the annual HPMP meeting. Appropriate agencies will be notified of activities, and the appropriate flagging type and duration to mark resources will be determined in discussion with the agency.

Barriers. Barriers, such as fences, boulders, and gates, can be an effective protection measure where the potential impact is the result of access by people, cars, or other machinery. PG&E's CRS will develop any permanent barriers in collaboration with the CRWG and other PG&E resource specialists (e.g., recreation resources, vegetation resources, biological resources [e.g., amphibians, reptiles]), who will ensure that the size, extent, and placement of barriers is effective in minimizing potential impacts from accessing historic properties and that the placement of barriers does not affect TCRs.

Stabilization and Protection. Some sites within the APE may be subjected to potential impacts that may be either minimized or eliminated through additional physical management. Such management might include rerouting a trail to avoid an archaeological site, erecting signage or fencing, and/or gating an access road to a particularly sensitive area. PG&E's CRS may develop erosion control measures in collaboration with the CRWG and its vegetation, biological, and recreation specialists. These erosion control measures may include adding a combination of rip rap and native rock or plantings of native vegetation (for example, sedge) where practical to stabilize

cultural deposits along the reservoir shoreline or create erosion control features to divert water and run off away from sensitive cultural areas. PG&E will consult with the CRWG to develop appropriate protection measures to address potential impacts. Site condition monitoring may also be implemented to test the effectiveness of stabilization and protection measures.

Site Testing and Data Recovery. Avoidance, barriers, stabilization, and protection are not always possible. When impacts on archaeological sites are unavoidable or unanticipated, PG&E will evaluate any unevaluated resources for the NRHP through a testing or evaluation program (e.g., subsurface testing and archival research). The Evaluation Plan developed for the *Archaeological Resources Evaluation Report, Kerckhoff Hydroelectric Project FERC Project No. 96 (CUL 1b)* (Cardno 2020) will be used as a framework in developing site-specific testing and evaluation plans. Any archaeological or TCR sites determined eligible for the NRHP, for which adverse impacts are unavoidable, will be treated to mitigate the identified impacts. PG&E will consult with the CRWG, including land management agencies, at either the annual HPMP meeting or on a case-by-case basis regarding any determinations of eligibility, analysis of impacts, or proposed treatment measures.

Redesign of Project Facilities and Features. In some instances, impacts may be caused by Proposed Project-related facilities and features such as a system road bisecting a site, a culvert draining onto sensitive archaeological deposits, or a recreation area overlapping with a significant site component. Redesign or modification of these facilities and/or Proposed Project features in coordination with the CRS and stakeholders is a practical and effective way to eliminate a potential impact in such cases.

Additional Studies. Inventory and Evaluation of Submerged Resources within Kerckhoff Reservoir Archaeological and ethnographic inventories and evaluations of resources surrounding and within Kerckhoff Reservoir were predominantly conducted during summer and fall 2019 when the Kerckhoff Reservoir was low. However, to fully document and evaluate submerged resources under Criterion D for listing in the NRHP,

PG&E intends to conduct surveys and limited testing of the dry lakebed reservoir during any drawdown that results in a sufficiently low reservoir levels for enough time to allow such study to be safely completed. These surveys and evaluations, which would occur within five years after license issuance but may be conducted prior to license issuance, are contingent on the reservoir being maintained at a low level (well below current seasonal lows) for a sufficient amount of time to safely conduct the additional studies (e.g., no risk of dam releases upstream or sudden filling of the reservoir). These studies will be most successful if planned in coordination with planned annual outages and regular maintenance activities for PG&E operations, which typically occur during naturally low flow periods between September and December. Pursuant to the Proposed Project's HPMP, PG&E may need to coordinate with Southern California Edison (SCE), which operates hydroelectric projects upstream of Kerckhoff Reservoir, to determine flows into the reservoir. In addition, PG&E will consult with the CRWG on the testing plan and schedule for the studies prior to implementation (West et al. 2021).

Studies to Address FERC Project Boundary Modifications. Approved modifications to the existing FERC Project Boundary may require additional surveys in areas not previously surveyed if additional lands can be safely surveyed. These surveys will be conducted within one year of license issuance or prior to license issuance, if possible, and planned in consultation with the CRWG and landowners. Testing and evaluation of Site P-20-000291/ FS-05-15-55-00141, located within the Smalley Cove Recreation Area, will be conducted to determine site extents and data potential under Criterion D for the NRHP. This site was determined to contribute to TCL 1, Tsobotebau, under Criterion A; however, results regarding individual eligibility under Criterion D for the NRHP were inconclusive during the relicensing study. PG&E, in consultation with the CRWG and the SHPO, will test and evaluate this site prior to license issuance or within one year of license issuance. If the opportunity to perform the above studies occurs before the license is issued, these studies will be done and considered complete.

Tribal Resources Documentation. Within one year of license issuance, PG&E will complete district and/or site records for TCL 1, Tsobotebau, and TCL 2, North Fork Mono Trail, within the APE. This work may include additional research with the Dumna

and BLM regarding the ethnographic trail system, associated ethnobotanically sensitive areas, and archaeological sites located in the SJR Gorge between K1 and K2 Powerhouses. This will likely include an update to the San Joaquin River Gorge Archaeological District (SJRGA)record to include additional Tribal resources identified during Study CUL 2. If the opportunity to complete the records occurs before the license is issued, it will be done and considered complete.

Project-Specific Consultation. Where general property protection measures are unable to prevent adverse impacts on historic properties, the CRS will initiate Proposed Project-specific consultation with the CRWG and any other stakeholders. Such consultation will seek to address, avoid, and/or mitigate any adverse impacts on historic properties. If such alternatives cannot be developed through consultation, PG&E will work with stakeholders to develop appropriate mitigation.

Annual Meeting. An annual HPMP implementation meeting will be held within the first quarter of each year. All TCRs stakeholders (i.e., members of the CRWG) will be invited. The purpose of the annual meeting will be to discuss implementation of the HPMP and other resource management plans for the Proposed Project as they relate to TCR management (e.g., Proposed Project's Vegetation Management and Pest Control Plan, Recreation Management Plan, Aquatic Resources Plan, and Wildlife Management Plan). This annual meeting will provide a forum and include a field visit, if applicable and desired by CRWG members, to discuss all activities required by the plan and any TCR concerns. The timing of the meeting will be scheduled so that annual vegetation management activities can be discussed. The meeting will be accompanied by an Annual Report that summarizes activities undertaken under the HPMP for the previous year. The meeting may include, but is not limited to, a discussion of the following resource topics:

- HPMP annual report and previous year's activities
- Any monitoring from the previous year
- Exempt and screened activities conducted in previous year
- Any identified impacts and management measures implemented in previous year

- Annual bald eagle nest monitoring results per the Proposed Project's Wildlife Management Plan
- Proposed routine annual operation activities (including vegetation management activities)
- Proposed operational activities with the potential to affect TCRs
- Any TCR concerns or updates
- Any updates to TCLs or existing resources within the Proposed Project APE
- Environmental Sensitive Area maps, developed with Tribal input, for distribution to vegetation, recreation, roads, and trail maintenance personnel and contractors
- Protection and/or treatment measures
- Access to Tribal resources
- Any updates to the CRWG points of contact
- Opportunities for a site visit, if warranted and requested by members of the CRWG
- Opportunities for cooperation in site stewardship
- Opportunities for Tribal input on PG&E personnel training materials

Site Condition Monitoring. Site condition data for all TCRs within the APE were collected during the relicensing studies in 2018 and 2019. These monitoring data will be used as a baseline upon which comparisons of current and ongoing site conditions will be made through periodic monitoring. The proposed monitoring program will be dependent on identified Proposed Project operation activities but will occur at an interval of no less than every three years. Monitoring will occur for all sites that are NRHP-eligible or are unevaluated and pending NRHP determinations. Monitoring will be conducted by a qualified archaeologist under the Secretary of the Interior's Professional Qualification Standards (36 CFR Part 61) in collaboration with PG&E's CRS. Site Condition Assessment forms will be used to document specific disturbances, impacts, or other physical alterations observed at any site. Sites will also be photo-documented, as necessary, and appropriate. A non-invasive marker (e.g., a prominent tree) may be used for photographic reference points (photo station) to record an ongoing impact. The locations of photo stations, the compass bearing used to take any photographs, and the subject matter being photographed will be noted on the Site Condition Assessment forms. Additionally, Global Positioning System points and shapes will be taken at photo

locations and areas where specific disturbances are observed. Information regarding the results of monitoring will be disseminated in the Annual HPMP Implementation Report for the year of monitoring.

Treatment of Unanticipated Discoveries. Proposed operations and maintenance activities have the potential to expose and/or damage previously unidentified cultural resources or previously unknown constituents of previously recorded cultural resources. In the event unanticipated discoveries are made, the following steps should be taken:

All work in the immediate area will cease and all artifacts left in place until the Applicant's CRS (or designee) and agency specialist, if on federal land and as appropriate, are able to assess and evaluate the find:

1. If the cultural materials constitute isolated material, or an "isolated find" (e.g., less than five unformed-non-diagnostic artifacts per square meter, isolated formed tools, isolated historic items), PG&E's CRS (or designee) will document the material as such to current National Park Service standards on a Primary Record, and the construction activity may continue without any further consultation. An exception would be for isolated cultural materials or a feature that could be eligible for the NRHP on its own merit following application of the NRHP criteria (for example, rock art, paleo-period projectile point)
2. If the cultural materials constitute a "site" (e.g., greater than five unformed artifacts per square meter) or an isolated find that may be eligible for the NRHP on its own merit, PG&E's CRS (or designee) will document the property to current National Park Service standards, and the material will be assumed eligible for the NRHP in accordance with 36 CFR 800.13
3. Following documentation, where feasible, measures will be taken to protect newly discovered sites from further disturbance. PG&E's CRS will consult with stakeholders, as appropriate, to seek ways to avoid, minimize, or mitigate potential adverse effects
4. PG&E will notify the California SHPO and Tribes via email within 48 hours of the new site discovery in accordance with 36 CFR 800.13(b)(3). The notification will

describe any assessment of NRHP eligibility (either formal or informal) and the recommended actions to be undertaken to resolve potential adverse effects

5. In accordance with 36 CFR 800.13(b)(3), California SHPO and the Tribes will have 48 hours to respond to the notification of a new site discovery. Any response will be taken into account by PG&E, who will assume the lead role as delegated by FERC and coordinate with agency leads, as appropriate. If no response is received within 48 hours, PG&E will assume that no comments are forthcoming, that California SHPO and the Tribes concur with the proposed actions, and that it may proceed with implementing the actions. Following completion of the actions, work in the vicinity of the find may continue
6. Following completion of all construction activities, PG&E will provide to the California SHPO, Tribes, and agencies, as appropriate, a report of the actions that were undertaken during construction activities and copies of all field documentation and consultation. This report will describe in detail the isolated finds and potential historic properties (sites) identified during construction activities, describe all measures undertaken to resolve potential adverse effects, and include copies of all consultation documents

Treatment of Human Remains. As addressed in Section 5.3.3 of the HPMP, human remains, graves, and cemeteries that may be encountered during Proposed Project-related activities are protected by state and/or federal law. On privately owned lands, the California Health and Safety Code (7050.5, 7051, 7054), and California PRC (5097) prohibit damage, defacement, or disinterment of human remains without legal authority and establish civil and criminal penalties. Under federal law, the provisions of ARPA, American Indian Religious Freedom Act, and NAGPRA protect human graves, associated funerary objects, and the free expression of Native American religious beliefs. These statutes extend and are also applicable to anyone who knowingly loots precontact or historical Native American and/or other graves. Human remains and associated funeral artifacts must be treated with respect, and sensitivity must be had towards all interested parties whenever human remains are concerned. Accordingly, if human remains are found on lands administered by BLM, USFS, or Reclamation, they would be treated in accordance with NAGPRA and the federal management agency's

protocols for compliance with NAGPRA. If human remains are discovered on private lands, PG&E would comply with state statutes regarding notifying the appropriate parties and treatment of human remains.

Archaeological and Tribal Resources Site-Specific Management Measures

Section 5.4 of the Proposed Project's HPMP provides detailed site-specific measures for Tribal and archaeological sites within the APE. If new resources are discovered within the APE, the general management measures of inadvertent discoveries would be followed to address any new effects. There are four main types of Tribal resources identified in the Study Area: (1) areas of intense ethnobotanical patterns; (2) areas of ceremony and cultural tradition; (3) TCL 1, which includes a previously documented TCP, contributing elements and associated archaeological sites; and (4) TCL 2, North Mono Trail, which includes various branches of communication, trails, and crossing as part of the larger Mono Trail.

Road maintenance, vegetation management, recreation, reservoir fluctuation, Proposed Project-related maintenance could affect archaeological and Tribal resources. As discussed above, measures such as Flag and avoid, annual meetings, low-level survey, annual site-condition monitoring, and project-specific consultation are recommended measures to address any effects from the above activities on archaeological and Tribal resources.

Identifying and Evaluating Properties

Pursuant to Section 6.4 of the Proposed Project's HPMP, the CRS must identify any historic properties located within the area of an operation and maintenance activity, which is described above, in accordance with 36 CFR 800.4(a)(2-4) and 36 CFR 800.4(b). Any properties that have not been evaluated, the CRS must conduct such an evaluation or oversee a qualified cultural resources specialist in the evaluation of the property if potential adverse effects cannot be avoided. Any cultural resource investigations would be performed under an appropriate permit and/or approval. For archaeological test or data recovery investigations on federal lands, the CRS or their

designated contractor would complete an ARPA permit application and submit it for agency approval prior to initiating the investigation

4.19.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures and plans were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping, which are also implemented upstream of the Kerckhoff Hydroelectric Project by SCE's Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill

Season Flow Measure. The LTORs are a series of down-ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach (PBR) of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cfs for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the PBR cannot exceed a maximum of 1 foot per hour (or

less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient[2] storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability.

[2] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.19.4.1 Potential Impacts Related to Tribal Cultural Resources that are Eligible or Potentially Eligible for the California Register or a Local Register of Historical Resources

Impact TCR-1: Would the project cause a substantial adverse change in the significance of a Tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:
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)?

4.19.4.1.1 Proposed Project

Construction

Potential impacts to TCRs could occur during construction of the Proposed Project. Impacts are considered significant if a project would cause a substantial adverse change in the significance of a TCR, as defined in PRC Section 21074, including consideration of the resource's importance to a California Native American Tribe.

A total of 24 previously recorded and newly identified cultural resource sites are located within the study area. Of these, eight sites are not eligible for listing and do not require further management. Seven sites are individually eligible, and the remainder contribute to the NRHP eligible TCL 1, Tsobotebau. On November 13, 2020, the California State SHPO provided concurrence on these determinations. Sites that are eligible, contributing, or of unknown eligibility are subject to management under the HPMP, which includes site-specific protection and treatment measures. Four primary types of TCRs were identified within the study area: (1) areas exhibiting intensive ethnobotanical use patterns; (2) areas associated with ceremony and cultural tradition; (3) TCL 1, Tsobotebau, which encompasses previously documented Traditional Cultural Places, associated contributing elements, and archaeological sites; and (4) TCL 2, the North Fork Mono Trail, which consists of multiple trail segments, communication routes, and crossing locations within the broader Mono Trail network. The remaining have not been evaluated for listing eligibility but are treated as potential TCRs and are addressed in the HPMP.

Construction activities that could affect TCRs include development of the Vista Day Use Area and installation of one new flow gage upstream of Kerckhoff Reservoir. These activities include paving, installation of picnic facilities with shade structures and a double vault restroom, installation of signage, refurbishment of an existing trail, and other ground disturbing activities involving excavation of soils outside previously developed recreation amenities. However, these areas would be subject to review under the HPMP prior to construction activities taking place, and implementation of the measures within HPMP would be applied to these construction activities.

The retirement of the K1 Powerhouse and replacement of manually operated gates at Kerckhoff Dam would not result in impacts to TCRs. The California SHPO determined that the Kerckhoff Hydroelectric Project facilities are not eligible for listing in the NRHP. Retirement would leave most facilities in place and would involve only minimal removal activities with no effect on identified TCRs.

Under the Proposed Project, modifications to the Kerckhoff Hydroelectric Project Boundary would remove lands. TCRs outside of the revised boundary would no longer be managed under the FERC license, including the HPMP. However, these resources would continue to be protected under applicable state and federal laws, as well as by the jurisdictions in which they occur, including Fresno and Madera counties, the USFS–SNF, and the BLM.

Construction of the Vista Day Use Area would occur on BLM land and must comply with all applicable BLM requirements for the protection of cultural and archaeological resources. PG&E would implement the HPMP, including Tribal and cultural resources monitoring, to minimize impacts to TCRs. The HPMP also includes provisions for avoidance, protection, and the treatment of unanticipated discoveries.

If construction activities cannot avoid adverse effects, mitigation may include stabilization and protection, documentation, or interpretation. Any required mitigation would be developed by PG&E in consultation with the California SHPO and the CRWG, as necessary. The Proposed Project's Recreation Management Plan requires preparation of a construction plan that identifies measures to avoid potential impacts to TCRs. The HPMP also requires development of a cultural resources monitoring plan. With implementation of these measures, impacts to TCRs during construction would be avoided or minimized.

Therefore, there would be a **Less than Significant Impact** as a result of construction activities under the Proposed Project for potential impact TCR-1.

Operation

Under Proposed Project operation, potential impacts on TCRs could occur as a result of modifications to the FERC Project Boundary and ongoing recreation and maintenance activities. These activities could result in a substantial adverse change in the significance of identified TCRs.

Maintenance activities have the potential to adversely affect TCRs. Road and trail maintenance activities, including grading, paving, replacement of control features, and vegetation management, could damage TCRs located within or adjacent to Proposed Project roads and trails. Ongoing maintenance at Smalley Cove Recreation Area and Vista Day Use Area, including utility replacement, paving, and accessibility improvements, could result in ground disturbance affecting TCRs.

Shoreline recreation activities, including creation and maintenance of boat-in access points, may increase public access and result in impacts such as vandalism, looting, or degradation of TCR integrity. If TCRs are present within the reservoir fluctuation zone, repeated drawdowns could lead to exposure, destabilization, or damage.

The HPMP includes measures such as TCR monitoring, avoidance, and worker environmental awareness training to reduce the potential for disturbance during operations. PG&E would also implement the Recreation Management Plan, Vegetation Management and Pest Control Plan, Project Road and Trail Maintenance Plan, and HPMP. PG&E would coordinate with appropriate agencies and comply with applicable BLM and USFS–SNF requirements.

Pursuant to the HPMP, avoidance is the preferred management approach for TCRs. If avoidance is not feasible, PG&E would consult with the CRWG, applicable land managing agencies, and the California SHPO to determine appropriate mitigation measures. Such mitigation may include stabilization and protection, site testing and data recovery, redesign of Proposed Project facilities or features, or additional studies.

The HPMP requires PG&E to coordinate with the CRWG to determine whether planned activities could affect TCRs and to identify appropriate management protocols. The

HPMP also establishes procedures governing operation and maintenance activities, including electrical and communication system maintenance, measures to discourage looting during reservoir fluctuations, routine maintenance of project features, vegetation management, and hazard tree removal.

Therefore, there would be a **Less than Significant Impact** as a result of operational activities under the Proposed Project for potential impact TCR-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.19.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination as the Proposed Project, as discussed in Section 4.19.4.1.1. Construction activities under Alternative 1 would be the same as those described for the Proposed Project and would not introduce any additional ground disturbing activities. In addition, the Proposed Project's HPMP would provide measures to protect TCRs during project construction. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 1 for potential impact TCR-1.

Operation

Similar to the Proposed Project, Alternative 1 would result in fluctuating water levels in the Kerckhoff Reservoir, which could affect any TCRs located within an adjacent to the reservoir.

Based on the Alternative 1 operations modeling results (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), operations would modify the magnitude and timing of flows released from Kerckhoff Dam through implementation of the LTOR Boating Flows and Down Ramping measures, as well as the Alternative 1

Ramp Up Measure. These operational changes could result in short-term fluctuations in Kerckhoff Reservoir water surface elevations and controlled flow transitions in the PBR, which have the potential to temporarily expose historical resources that are usually underwater. These fluctuations would remain in existing normal operating range of 980.0 feet msl to 984.5 feet msl and within areas already subject to periodic inundation and exposure; repeated water level changes could contribute to shoreline erosion and temporarily expose TCRs that are typically submerged. However, these effects on TCRs are consistent with those discussed in the Proposed Project.

As discussed in the Proposed Project, there would be measures to minimize the effects on TCRs as a result of implementation of Alternative 1. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 1 for potential impact TCR-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.19.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination for construction impacts as the Proposed Project, discussed in Section 4.19.4.1.1. Construction activities under Alternative 2 would be the same as those described for the Proposed Project and would not introduce additional ground-disturbing activities or construction-related erosion risks to TCRs. In addition, the Proposed Project's HPMP would provide measures to protect TCRs during project construction. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 2 for potential impact TCR-1.

Operation

Alternative 2 would have similar operational impacts when compared to the Proposed Project. Based on the Alternative 2 operations modeling results (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), implementation of Alternative 2 would result in limited and episodic erosion effects within the Area of Analysis. The Modified EOS Flow Recession Measure resulted in drawdown of Kerckhoff Reservoir toward the K2 Powerhouse minimum operating reservoir elevation, producing short-term reservoir elevation fluctuations; however, all modeled fluctuations remained within the normal operating range of Kerckhoff Reservoir (approximately 980.0 to 984.5 feet msl).

The Subsequent Spill Ramp Down Measure, Modified Spill Season Flow Measure, and POM ramp-down components employed more gradual ramping schedules and were successfully implemented with minimal or no sustained reservoir fluctuations. Although the POM Initial Release Protocol altered the timing of flow changes in the PBR, it did not create conditions that would substantially increase erosion potential.

The Project area has historically experienced frequent hydrologic variability associated with Project operations and regional inflow conditions. Accordingly, Alternative 2 operations could result in repeated water level changes could contribute to shoreline erosion and temporarily expose TCRs that are typically submerged. However, these effects on TCRs are consistent with those discussed in the Proposed Project on TCRs.

As discussed in the Proposed Project, there would be measures to minimize the effects on TCRs as a result of implementation of Alternative 2. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 2 for potential impact TCR-1.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.19.4.2 Potential Impacts Related to Tribal Cultural Resources as Determined by the Lead Agency

Impact TCR-2: Would the project cause a substantial adverse change in the significance of a Tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:

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 Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American Tribe?

4.19.4.2.1 Proposed Project

In accordance with PRC Section 21074 and 5024.1 9(c), the significance of TCRs was evaluated with explicit consideration of their importance to California Native American Tribes. Pursuant to AB 52, the State Water Board (the CEQA lead agency) initiated the consultation process with Tribal organizations who had requested to be notified of projects in the Proposed Project Area when the CEQA process began. On November 10, 2020, the State Water Board notified the Santa Rosa Rancheria Tachi Yokut Tribe of the opportunity for consultation regarding TCRs related to the Proposed Project. The State Water Board did not receive a request for consultation or any other response.

However, California Native American Tribes with traditional affiliations to the study area participated in consultation and provided information regarding areas of cultural sensitivity through the FERC relicensing process. Through this process, Tribes identified TCLs, ethnobotanically important areas, ceremonial and cultural locations, and traditional travel corridors as resources of ongoing cultural significance. These resource types reflect Tribal concepts of cultural value and landscape use and were considered substantial evidence supporting significance under CEQA.

On January 3, 2018, FERC staff issued letters to the following federally recognized Tribes: North Fork Rancheria of Mono Indians of California (North Fork Rancheria), Big Sandy Rancheria of Western Mono Indians of California (Big Sandy Rancheria), Table Mountain Rancheria of California (Table Mountain Rancheria), Santa Rosa Indian Community of the Santa Rosa Rancheria, California (Santa Rosa Rancheria), Picayune Rancheria of Chukchansi Indians of California (Picayune Rancheria), and Cold Springs Rancheria of Mono Indians of California (Cold Springs Rancheria) (Tribes). The North Fork Rancheria responded to staff with interest in consulting on the Proposed Project. In a letter filed on June 14, 2018, Table Mountain Rancheria stated its interest in consulting on the Proposed Project. FERC staff participated with the North Fork Rancheria, North Fork Mono Tribe, Picayune Rancheria, and Cold Springs Rancheria and Big Sandy Rancheria, Dumna Wo-Wah Tribal Government, Eshom Gathering (Davis Clan), San Joaquin River Tribe, Mono Nation, Wuksachi-Michahai Tribe and the Sierra Mono Museum in a cultural resources technical working group (CRWG) sponsored by PG&E. These CRWG meetings were also attended by land management agencies, including BLM, BOR, and USFS-SNF, and the California SHPO.

On April 7, 2017, PG&E provided a Pre Application Document (PAD) questionnaire to the Tribes that staff initially contacted and additional federally recognized Tribes, California Native American Tribes, Tribal groups, and organizations (collectively the Tribes). On November 16, 2017, PG&E provided the Tribes the PAD. PG&E consulted with Tribes on the APE and cultural resource studies beginning with a stakeholder meeting on June 25, 2018. Tribes participated in study plan and field implementation meetings during 2018 and 2019 and in field visits during 2019 and 2020. Between 2020 and 2021, PG&E carried out consultation with Tribes participating in the CRWG for the development of the HPMP.

On May 17, 2024, the North Fork Mono Tribe filed a motion to intervene, comments, and recommendations regarding cultural resources with FERC. The Tribe states that the Proposed Project impacts traditional activities (e.g., fishing, gathering) natural and cultural resources and other traditional uses of the land, including lands that PG&E proposes to remove from the existing FERC Project Boundary. The Tribe also states

that some submerged and/or shoreline archaeological and cultural sites, including areas used for subsistence and/or ceremony, are eroding because of the Kerckhoff Hydroelectric Project. The Tribe also recommends FERC require PG&E to complete a mapping project of the southern segment of the Trail at SJR Gorge to mitigate the survival of the Tribe's historic trails. The Tribe also supports the removal of land from the existing FERC Project Boundary because the Tribe would like to pursue purchase of land significant to the Tribe that is currently within the existing FERC Project Boundary.

As noted in FERC's (2025) Environmental Assessment, FERC's regulations require including within the FERC Project Boundary only those lands necessary to operate and maintain the Kerckhoff Hydroelectric Project and for other Kerckhoff Hydroelectric Project purposes, such as recreation, or for the protection or mitigation of environmental resources (18 CFR 4.41(h)(2)). There is evidence that the Tribe uses Kerckhoff Hydroelectric Project lands for traditional activities. However, there is no justification to add land to the boundary not needed for Proposed Project operation and maintenance, and PG&E states that all land that would be added to, or removed from, the existing FERC Project Boundary would continue to maintain the same land use designations. Therefore, there are no foreseeable changes to the use of the land PG&E proposes to remove from the boundary relative to current conditions. Likewise, there are no barriers that restrict access to Proposed Project land except those needed for public safety such as fencing at the powerhouses, switch yards, access roads leading to the powerhouses, and gates/barriers to the dam. Therefore, relicensing the Proposed Project would not adversely affect Tribal access for traditional activities relative to current conditions. As for the request to complete a mapping project of the southern segment of the Trail at SJR Gorge, FERC stated that the Tribe did not provide information on the Proposed Project to assess the benefit of the recommendation, nor did BLM require any mapping.

The California SHPO reviewed and concurred with the evaluation of resources under the criteria for the CRHR and the NRHP, as previously discussed. The evaluation identified resources that are associated with events, traditions, and practices that are important to the history and culture of California Native American Tribes, as well as cultural landscapes and sites that retain integrity from a Tribal perspective. In applying

these criteria, the evaluation recognized that significance to a Tribe may be based on traditional use, cultural practices, spiritual associations, and ethnobotanical values, rather than solely on physical attributes or archaeological data.

TCL 1 (Tsobotebau) and TCL 2 (North Fork Mono Trail) were identified as significant TCRs based on their association with long-standing Tribal land use patterns, ceremonial practices, and ancestral travel routes. Ethnobotanically sensitive areas identified within the study area were also considered significant due to their importance for the gathering and use of culturally important plant resources.

Resources determined eligible for, contributing to, or of unknown eligibility for listing in the NRHP, including components of TCLs and ethnobotanical areas, were managed as TCRs under CEQA. These determinations were supported by consultation with Tribes and concurrence from the California SHPO.

The preservation of Tribal values and avoidance of impacts to culturally significant resources were further addressed through the development and implementation of the Proposed Project's HPMP, which incorporates site-specific protection measures, cultural resources monitoring, and procedures for the treatment of unanticipated discoveries. These measures reflect consideration of Tribal concerns and acknowledge that adverse effects may occur through disruption of cultural meaning, traditional use, or landscape integrity.

Construction

Potential impacts to TCRs could occur during construction of the Proposed Project. Under CEQA, impacts are considered significant if a project would cause a substantial adverse change in the significance of a TCR, as defined in PRC Section 21074. In determining the significance of a TCR, the lead agency considers the criteria set forth in PRC Section 5024.1(c), including the importance of the resource to a California Native American Tribe.

A total of 24 previously recorded and newly identified cultural resource sites are located within the study area. Of these, eight sites are not eligible for listing and do not require

further management. Seven sites are individually eligible, and 14 sites are contributing resources to the NRHP-eligible TCL 1, Tsobotebau. On November 13, 2020, the California SHPO provided concurrence with these determinations. Sites that are eligible, contributing, or of unknown eligibility are subject to management under the HPMP, which identifies site-specific protection and treatment measures.

In addition to archaeological and historical resources, four primary types of TCRs were identified within the study area based on Tribal consultation and cultural resource investigations. These include areas exhibiting intensive ethnobotanical use patterns; areas associated with ceremony and cultural tradition; TCL 1 (Tsobotebau), which includes documented Traditional Cultural Places, contributing elements, and associated archaeological sites; and TCL 2 (North Fork Mono Trail), which includes various branches of communication, trails, and crossing locations as part of the larger Mono Trail network. These resources reflect cultural practices, traditional land use, and spiritual associations important to California Native American Tribes and were considered in evaluating TCR significance.

At least 13 ethnobotanically sensitive areas or concentrations of culturally important plants were identified within the study area. Of these, seven are located at or surrounding archaeological sites; two are located within TCL 1, Tsobotebau; and four are adjacent to TCL 2, North Fork Mono Trail. The remaining four areas have not yet been evaluated for listing eligibility; however, due to their cultural importance to Tribes, they are managed as potential TCRs. Site-specific protection and treatment measures for ethnobotanical areas are included in the HPMP.

Construction activities with the potential to affect TCRs include development of the Vista Day Use Area and installation of one new flow gage upstream of Kerckhoff Reservoir. These activities would include paving, installation of picnic facilities with shade structures and a double-vault restroom, installation of signage, refurbishment of an existing trail, and other ground-disturbing activities involving excavation of soils outside previously developed recreation amenities. Without appropriate protection measures, these activities could result in a substantial adverse change in the significance of TCRs

through physical disturbance, alteration of contributing cultural landscape elements, or disruption of ethnobotanically sensitive areas. However, these areas would be subject to review under the HPMP prior to construction activities taking place and would provide adequate measures to protect TCRs, as discussed below.

The retirement of the K1 Powerhouse and replacement of manually operated gates at Kerckhoff Dam would not result in impacts to TCRs during operation. As noted in a letter dated November 13, 2020, the California SHPO determined that the Kerckhoff Hydroelectric Project facilities are not eligible for listing in the NRHP. Retirement would leave most facilities in place and would involve only minimal removal activities that would not disturb or affect identified TCRs.

Under the Proposed Project, modifications to the existing Project Boundary would remove lands. TCRs that would no longer be located within the Proposed Project Boundary would not be subject to management and protection measures under the new FERC license, including environmental management measures and monitoring plans. However, these resources would continue to be protected under applicable state and federal laws, as well as by the jurisdictions in which they occur, including Fresno and Madera counties, the USFS–SNF, and the BLM.

Construction of the Vista Day Use Area would occur on BLM land and would be required to comply with all applicable BLM requirements for the protection of cultural and archaeological resources. Adherence to the HPMP, including cultural resources and Tribal monitoring during ground-disturbing activities, would reduce the potential for impacts to TCRs. The HPMP also includes provisions for avoidance, protection, and the treatment of unanticipated discoveries encountered during construction.

If construction activities were to result in an adverse effect on TCRs, mitigation as described in the HPMP would be determined based on the nature and extent of the effect and could include stabilization and protection, additional documentation, and/or interpretation and public outreach. Any required mitigation would be developed by PG&E in consultation with the California SHPO and the CRWG, as necessary.

In addition, the Proposed Project's Recreation Management Plan requires preparation of a construction plan that identifies measures to avoid potential impacts to TCR. The HPMP further requires development and implementation of a cultural resources monitoring plan.

With implementation of these measures, construction of the Proposed Project would not result in a substantial adverse change in the significance of a TCRs. Therefore, there would be a **Less than Significant Impact** as a result of construction under the Proposed Project for potential impact TCR-2.

Operation

Under Proposed Project operation, potential impacts to TCRs within the study area could occur because of proposed modifications to the existing Project Boundary, as well as ongoing Kerckhoff Reservoir shoreline recreation activities and maintenance. Under CEQA, a significant impact would occur if project operation caused a substantial adverse change in the significance of a TCR, as defined in PRC Section 21074. In applying this standard, the lead agency considers the criteria set forth in Public Resources Code Section 5024.1(c), including the importance of the resource to a California Native American Tribe.

As described previously, TCRs identified within the study area include TCL 1 (Tsobotebau), TCL 2 (North Fork Mono Trail), areas associated with ceremony and cultural tradition, and ethnobotanically important areas reflecting traditional plant gathering and use. These resources are culturally significant to California Native American Tribes due to their association with traditional land use, cultural practices, and landscape integrity.

Proposed Project operation and maintenance activities have the potential to adversely affect TCRs. Road and trail maintenance activities, including grading, paving, replacing control features, and vegetation management, could affect TCRs located within or adjacent to Project roads and trails. Ongoing operation and maintenance at Smalley Cove Recreation Area and the proposed Vista Day Use Area, including utility replacement, paving, accessibility improvements, and related activities, could also affect

culturally sensitive areas. In addition, ongoing Kerckhoff Reservoir shoreline recreation activities, including the creation and maintenance of boat-in access points, could increase public access in areas containing TCRs, resulting in the potential for damage, vandalism, looting, or degradation of cultural landscape integrity through changes to setting and introduction of new features.

To reduce the potential for adverse effects on TCRs during operation, the Proposed Project's HPMP requires PG&E to coordinate with the CRWG during annual HPMP meetings and/or prior to recreation management planning to determine whether planned operational activities may affect TCRs and to establish appropriate management protocols. The HPMP also provides guidance for routine operation and maintenance activities, including electrical and communications maintenance, vegetation management, hazard tree removal, and measures to minimize effects related to reservoir fluctuations and recreational use. In addition, the HPMP includes procedures for the treatment of previously unidentified TCRs encountered during operation and maintenance activities.

Pursuant to the HPMP, avoidance is the preferred management strategy for all TCRs. Where avoidance is not feasible, PG&E would consult with the CRWG, applicable land-managing agencies, and the California SHPO to identify and implement appropriate mitigation measures. Such measures may include stabilization and protection, additional studies or documentation, redesign of operational features, and other culturally appropriate treatments.

With implementation of the operational management, avoidance, and consultation measures included in the HPMP and Recreation Management Plan, proposed Project operation would not result in a substantial adverse change in the significance of a TCR. Therefore, there would be a **Less than Significant Impact** as a result of operational activities for the Proposed Project for potential impact TCR-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.19.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction

Alternative 1 has the same analysis and impact determination as the Proposed Project, as discussed in Section 4.19.4.2.1. Construction activities under Alternative 1 would be the same as those described for the Proposed Project and would not introduce any additional ground disturbing activities. In addition, the Proposed Project's HPMP would provide measures to TCRs during construction. Therefore, there would be a **Less than Significant Impact** as a result of construction activities under Alternative 1 for potential impact TCR-2.

Operation

Similar to the Proposed Project, Alternative 1 would result in fluctuating water levels in the Kerckhoff Reservoir, thus having the potential to affect TCRs located in and adjacent to the reservoir.

Based on the Alternative 1 operations modeling results (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), operations would modify the magnitude and timing of flows released from Kerckhoff Dam through implementation of the LTOR Boating Flows and Down Ramping measures, as well as the Alternative 1 Ramp Up Measure. These operational changes could result in short-term fluctuations in Kerckhoff Reservoir water surface elevations and controlled flow transitions in the PBR, which have the potential to temporarily expose TCRs that are usually underwater. These fluctuations would remain in existing normal operating range of 980.0 feet msl to 984.5 feet msl and within areas already subject to periodic inundation and exposure; repeated water level changes could contribute to shoreline erosion and temporarily expose TCRs that are typically submerged. However, these effects on TCRs are consistent with those discussed in the Proposed Project.

As discussed in the Proposed Project, there would be measures to minimize the effects on TCRs as a result of implementation of Alternative 1. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 1 for potential impact TCR-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.19.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction

Alternative 2 has the same analysis and impact determination as the Proposed Project, as discussed in Section 4.19.4.2.1. Construction activities under Alternative 2 would be the same as those described for the Proposed Project and would not introduce any additional ground disturbing activities. In addition, the Proposed Project's HPMP would provide measures to TCRs during project construction. Therefore, there would be a **Less than Significant Impact** as a result of construction under Alternative 2 for potential impact TCR-2.

Operation

Based on the Alternative 2 operations modeling results (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), implementation of Alternative 2 would result in limited and episodic erosion effects within the Area of Analysis. The Modified EOS Flow Recession Measure resulted in drawdown of Kerckhoff Reservoir toward the K2 Powerhouse minimum operating reservoir elevation, producing short-term reservoir elevation fluctuations; however, all modeled fluctuations remained within the normal operating range of Kerckhoff Reservoir (approximately 980.0 to 984.5 feet msl).

The Subsequent Spill Ramp Down Measure, Modified Spill Season Flow Measure, and POM ramp-down components employed more gradual ramping schedules and were

successfully implemented with minimal or no sustained reservoir fluctuations. Although the POM Initial Release Protocol altered the timing of flow changes in the PBR, it did not create conditions that would substantially increase erosion potential.

The Project area has historically experienced frequent hydrologic variability associated with Project operations and regional inflow conditions. Accordingly, Alternative 2 operations could result in repeated water level changes could contribute to shoreline erosion and temporarily expose TCRs that are typically submerged. However, these effects on TCRs are consistent with those discussed in the Proposed Project on TCRs.

As discussed in the Proposed Project, there would be measures to minimize the effects on TCRs as a result of implementation of Alternative 2. Therefore, there would be a **Less than Significant Impact** as a result of operational activities under Alternative 2 for potential impact TCR-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.19.5 Literature Cited

Baumhoff, M.A. 1958. “Ecological Determinants of Aboriginal California Populations.” *University of California Publications in American Anthropology and Ethnology,* Vol. 49, No. 2: 155–236.

BLM (United States Bureau of Land Management). 2014. *Bakersfield Field Office Record of Decision and Approved Resource Management Plan.* United States Department of the Interior, Bureau of Land Management. December. Accessed: April 3, 2026. Retrieved from: https://www.govinfo.gov/content/pkg/GOVPUB-I53-PURL-gpo83734/pdf/GOVPUB-I53-PURL-gpo83734.pdf

Cardno. 2020. *Archaeological Resources Evaluation Report, Kerckhoff Hydroelectric Project FERC Project No. 96 (CUL 1b)*. Prepared for Pacific Gas and Electric Company.

Cook, S.F. 1955. “The aboriginal population of the San Joaquin Valley, California.” *University of California Anthropological Records*, Vol. 16, No. 2: 33–78.

_____. 1976. The population of the California Indians, 1769–1970. University of California Press, Berkeley, CA.

Davis-King, S. 2020a. *Going Down to the River, Pacific Gas and Electric Company Kerckhoff Hydroelectric Project, FERC No. 96 TSR-23, Appendix A, Tribal Resources Inventory and Evaluation Report, Fresno and Madera Counties, California.* Pacific Gas and Electric Company, San Francisco, CA.

_____. 2020b. *Tribal Resources Technical Study Report (TSR-23), Kerckhoff Hydroelectric Project (CUL 2), FERC Project No. 96*. Pacific Gas and Electric Company, San Francisco, CA.

FERC (Federal Energy Regulatory Commission). 2025. *Environmental Assessment for the Kerckhoff Hydroelectric Project, FERC Project No. 96-048*. Washington, D.C. December. Accessed: April 5, 2026. Retrieved from: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20251231-3001&optimized=false&sid=e4353735-bc31-414a-8938-299c96575f03.

Fresno County. 2024. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

Gayton, A.H. 1948. “Yokuts and Western Mono Ethnography. I: Tulare Lake, Southern Valley, and Central Foothill Yokuts.” *University of California Anthropological Records*, Vol. 10, No. 1.

Gifford, E.W. 1932. “The Northfork Mono.” *University of California Publications in American Anthropology and Ethnology*, Vol. 31, No. 2: 15–65.

Goode, R.W. 2020. “The North Fork Mono Trail—Nium Trail Network.” Original segment published in *Tribal Water Stories: A Compilation of California Tribal Stories, Position Papers & Briefing Papers in Conjunction with the 2009 Tribal Water Summit*; Updated in 2020.

Heizer, R.F. 1972. *The Eighteen Unratified Treaties of 1851–1852 between the California Indians and the United States Government*. Archaeological Research Facility, Department of Anthropology, University of California, Berkeley, CA.

Kroeber, A.L. 1907. *"The Yokuts language of south central California." University of California Publications in American Archaeology and Ethnology*, Vol. 2, No. 5: 169–377.

_____. 1925. *"Handbook of the Indians of California." Bureau of American Ethnology Bulletin*, Vol. 78: 1–995. (Facsimile reprint 1966, California Book Company, Ltd., Berkeley.)

Latta, F.F. 1977. *Handbook of the Yokuts Indians. Second Edition*. Bear State Books, Santa Cruz, CA.

Madera County. 1995. *Madera County General Plan Policy Document.* Adopted October 24. Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/40825/638615574804870000.

Marsh, S. 2016. *National Register of Historic Places Nomination of the Mono Trail Traditional Cultural Property.* Sierra National Forest, Prather, CA.

McCarthy, H. 2011. *Ethnographic, Ethnohistoric, and Traditional Cultural Property Study for the Crane Valley Hydroelectric Project Madera County, California*. Submitted to Pacific Gas and Electric Company, Fresno, CA.

Merriam, C. Hart. 1905. *Studies of California Indians*. University of California Press, Berkeley, CA.

_____. 1966. *"Ethnographic Notes on California Indian Tribes." R.F. Heizer (ed.). University of California Archaeological Survey*, No. 68: Part I.

_____. 1967. *"Ethnographic Notes on California Indian Tribes." R.F. Heizer (ed.). University of California Archaeological Survey*, No. 68: Parts II and III.

Merriam, C.H., and Z.M. Talbot. 1974. *Boundary descriptions of the California Indian stocks and Tribes*. Miscellaneous Publications of the University of California Archaeological Research Facility.

Muñoz, P. 1806. *Diario de la Expedicíon hecha por Don Gabriel Moraga, Alferez de la Compañia de San Francisco, a los Nuevos Descubrimientos del Tular, 1806*. Transcript, Bancroft Library, University of California, Berkeley.

Office of Historic Preservation. 2009. *National Register of Historic Places Evaluation of the Mono Trail Traditional Cultural Property, Sierra National Forest, California, Concurrence Letter (USFS060512A)*. On File: Sierra National Forest, High Sierra Ranger District, Prather, CA.

Parker, P.L., and T.F. King. 1998. *Guidelines for Evaluating and Documenting Traditional Cultural Properties*. National Register.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

PG&E (Pacific Gas and Electric Company). 2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

Planas, L. 2009. *Traditional Cultural Property Evaluation of the Mono Trail Corridor.* With contributions from Laughing Coyote. Sierra National Forest, Clovis, CA.

Powers, S. 1976. *Tribes of California. University of California Press, Berkeley, and Los Angeles, California*. Reprinted from *Contributions to North American Ethnology*, Volume III. United States Department of the Interior, United States Geographical and Geological Survey of the Rocky Mountain Region, J.W. Powell, in charge (Washington: Government Printing Office, 1877).

Shipley, W.F. 1978. *Native languages of California*. In *Handbook of North American Indians, Volume 8, California*, edited by R. F. Heizer, pp. 80–90. Smithsonian Institution, Washington, D.C.

Spier, R.F.G. 1978a. *Monache. In Handbook of North American Indians, Volume 8, California*, edited by R.F. Heizer, pp. 426-436. Smithsonian Institution, Washington, D.C.

_____. 1978b. *Foothill Yokuts. In Handbook of North American Indians Volume 8, California*, edited by R.F. Heizer, pp. 99-127. Smithsonian Institution, Washington, D.C.

USFS (United States Forest Service). 2023. *Land Management Plan for the Sierra National* Forest: Fresno, Madera, and Mariposa Counties, California. Accessed: April 3, 2026. Retrieved from: https://acconsensus.org/wp-content/uploads/2024/08/05-SNF_LMP_final_20230504_Web.pdf.

West, C., P. Allen, and M. Tiley. 2021. *Final Historic Properties Management Plan*. *Kerckhoff Hydroelectric Project, Fresno and Madera Counties, CA, FERC Project No. 96*. Pacific Gas and Electric Company. Final, June. Prepared by Cardno for Pacific Gas and Electric Company, San Francisco, CA.

4.20 UTILITIES AND SERVICE SYSTEMS

This section describes existing conditions and analyzes potential impacts on utilities and service systems from implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts on utilities and system services from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.20-1).

Table 4.20-1: CEQA Checklist for Utilities and Service Systems

Would the Project:	**Proposed Project**	**Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping**	**Alternative 2: Proposed Project with BLM Revised 4(e) Conditions**
Impact USS-1: Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	No Impact	No Impact	No Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact USS-2: Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?	No Impact	No Impact	No Impact
Impact USS-3 Result in a determination by the wastewater treatment provider, which serves or may serve the project, that it has adequate capacity to serve the project's forecasted demand in addition to the provider's existing commitments?	No Impact	No Impact	No Impact
Impact USS-4: Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	No Impact	No Impact	No Impact
Impact USS-5 Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	No Impact	No Impact	No Impact

4.20.1 Environmental Setting

4.20.1.1 Regional Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located in the foothills of the western slope of the Sierra Nevada on the San Joaquin River (SJR) in sparsely populated areas of Fresno and Madera counties. The upper SJR drainage basin is highly developed for hydroelectric generation, flood control, and irrigation storage. In general, development in the vicinity of the Kerckhoff Hydroelectric Project is constrained by steep terrain, limited road access, and the presence of public lands, and only a few scattered rural residences are present. The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public lands administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and United States Bureau of Reclamation (Reclamation) under BLM management.

4.20.1.2 Project Setting

The Kerckhoff Hydroelectric Project supports power generation for PG&E's energy portfolio and does not provide municipal water to consumers. The Project Area is generally undeveloped, does not generate stormwater or have collection infrastructure for processing, and is not connected to a stormwater system. The Smalley Cove Recreation Area includes utilities that provide service to visitors, including vault toilets and potable water faucets, but these are not connected to a wastewater system. There are two water faucets at the Smalley Cove campground and one faucet at the day use area. Piped water comes out of the faucets and any overflow goes into a gravel-filled sump under the faucet where it infiltrates the surrounding ground. There is also potable water provided to the host site which has a septic tank to handle the drainage. PG&E pumps both the septic tank and vault toilet (PG&E 2024). There is no electricity, natural gas, or telecommunication services provided at the Smalley Cove Recreation Area (Californiasbestcamping.com n.d.). There is also a vault restroom at the BLM day use area across from the Kerckhoff 2 (K2) Powerhouse switchyard. Both the Kerckhoff 1 (K1) and K2 powerhouses have pit toilets.

4.20.2 Regulatory Background

The following subsections contain an overview of regulations related to utilities and service systems.

4.20.2.1 Federal

4.20.2.1.1 Federal Power Act

The Federal Power Act (Title16 United States Code [USC] Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created the Federal Energy Regulatory Commission (FERC or Commission) and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations [CFR] Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.20.2.2 State

CalRecycle is the state department that oversees recycling and waste management programs through regulations described in Title 14 and Title 27 of the California Code of Regulations (CCR). Title 14 describes regulations related to recycling and nonhazardous waste management. Title 27 of the CCR Division 2 describes the regulations of CalRecycle and the SWRCB related to waste disposal on land. Title 27 describes requirements related to the treatment, storage, processing, and disposal of solid waste; minimum standards for the handling and disposal of solid waste; permitting and exemptions; siting and design; water monitoring; criteria for landfills and disposal sites; and standards for site closure (CalRecycle 2025).

4.20.2.3 Local

Both the Fresno County (Fresno County 2024) and Madera County (Madera County 1995) general plans establish policies related to utilities and service systems potentially

relevant to the Proposed Project. The policies are aimed at ensuring the availability of an adequate and safe water supply; adequate wastewater collection, treatment, and disposal; and safe and efficient disposal or recycling of solid waste. Relevant Fresno General Plan policies include the following:

- **Policy PF-C.1 Retain Existing Water Supplies**: The County shall engage in, and support, the efforts of others within Fresno County to retain existing water supplies and develop new water supplies
- **Policy PF-C.4 Water Storage:** The County shall support efforts to expand groundwater and/or surface water storage that benefits Fresno County
- **Policy PF-F.1 Solid Waste Source Reduction:** The County shall continue to promote maximum use of solid waste source reduction, reuse, recycling, composting, and environmentally safe transformation of wastes

PF-F.8 Existing Public Landfills: The County has designated the American Avenue Landfill as the regional landfill to serve the incorporated and unincorporated areas of the county. The publicly-operated Coalinga and Clovis landfills may continue to operate provided the sites are operated economically and in compliance with all environmental laws and regulations. Existing publicly-operated landfills may be expanded.

Relevant Madera County General Plan policies include the following:

- **Goal 3.C:** To ensure the availability of an adequate and safe water supply and the maintenance of high-quality water in water bodies and aquifers used as sources of domestic and agricultural water supply
- **Goal 3.D:** To ensure adequate wastewater collection and treatment and the safe disposal of liquid and solid waste
- **Goal 3.F:** To endure the safe and efficient disposal or recycling of solid waste generated in Madera County

4.20.3 Analysis Methodology

4.20.3.1 Analytical Approach

For this analysis, construction and operation of the Proposed Project was reviewed for conformance with applicable state and local utilities and service system policies and implementation measures. The Area of Analysis for assessing potential impacts on utilities and service systems is the Proposed FERC Project Boundary and the utilities and service systems providers that service it.

4.20.3.2 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on utilities and service systems if it would do the following:

- Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects (USS-1);
- Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years (USS-2);
- Result in a determination by the wastewater treatment provider which serves or may serve the project, that it has adequate capacity to serve the project's forecasted demand in addition to the provider's existing commitments (USS-3);
- Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals (USS-4); or
- Comply with federal, state, and local management and reduction statutes and regulations related to solid waste (USS-5)

4.20.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed*

Project Description. The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new operational flow gage upstream of Kerckhoff Reservoir, upgrading two manual radial gates on the dam, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure, Spill Season Flow Measure, and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cubic feet per second (cfs) for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the Project Bypass Reach cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient[1] storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities

[1] Sufficient storage and powerhouse capacity is dependent on combined volume of water from inflow and storage within Kerckhoff Reservoir and flow through the K2 Powerhouse.

associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 Modified Spill Season Flow Measure. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model

for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.20.4.1 Potential Impacts Related to Utilities

Impact USS-1: Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

4.20.4.1.1 Proposed Project

Construction and Operation

The Proposed Project does not include construction or operation of new buildings or housing requiring the expansion or relocation of water, wastewater treatment, electric power, natural gas, or telecommunication facilities. Construction activities would result in a short-term increase in the number of workers on site, but the permanent workforce associated with the Proposed Project is not expected to change under operation (PG&E 2020, 2023). Water usage during construction would be limited to potable water that construction staff would bring to the site with them for daily consumption, and construction staff would use portable sanitary systems, as needed. As the proposed construction workforce is relatively small, wastewater generated from the portable sanitary systems would be limited, contained, and handled by a licensed sanitation contractor.

No staff would be permanently located or reside on site during construction or operation. No changes to the utilities available at the Smalley Cove Recreation Area

would occur. As part of the Proposed Project, new utilities for visitor use at the Vista Day Use Area would include one double-vault restroom with pit toilets. The wastewater generated would be contained and periodically pumped into a truck for transport to a licensed off-site waste facility for proper disposal. Wastewater generated during operation would, therefore, not be disposed of onsite.

With retirement of the K1 Powerhouse under the Proposed Project, water would continue to be diverted from Kerckhoff Reservoir through the K2 Powerhouse to generate electricity, but this would have no impact on on-site water or electricity use. The Proposed Project would not generate new electric energy demand or demand for natural gas, nor result in the relocation or construction of energy facilities. Additionally, retirement of the K1 Powerhouse would decrease overall power generation of the Kerckhoff Hydroelectric Project by about 3.5 percent; however, the reduction of power does not differ from baseline conditions and would not require relocation or construction of new facilities elsewhere.

Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact USS-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.20.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project as described in Section 4.20.4.1.1. Alternative 1 would not change any construction activities included in the Proposed Project. In addition, Alternative 1 does not require relocation of the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 1 would not require or result in the relocation of new or expanded utilities. Therefore, there would be **No Impact** as a

result of construction or operational activities under Alternative 1 for potential impact USS-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.20.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project as described in Section 4.20.4.1.1. Alternative 2 would not change any construction activities included in the Proposed Project and does not require relocation of the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 2 would not require or result in the relocation of new or expanded utilities. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact USS-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.20.4.2 Potential Impacts Related to Sufficient Water Supply

Impact USS-2: Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?

4.20.4.2.1 Proposed Project

Construction and Operation

PG&E currently operates the Kerckhoff Hydroelectric Project in compliance with dry and normal WY requirements established in the existing FERC agreement and stipulations in the existing water rights. PG&E proposes to operate the Kerckhoff Hydroelectric Project in accordance with the proposed flow and environmental management measures under a new license. The Proposed Project would not require changes to existing water rights. While the Proposed Project would result in minor reductions to power generation (K1 Powerhouse retirement), other beneficial uses of the SJR (including municipal and agricultural water supply) would not be adversely affected (PG&E 2020, 2022). As the Proposed Project would not directly require the consumption or use of any new water supply during construction and operation, the Proposed Project would have sufficient water supplies available to serve the Proposed Project and reasonably foreseeable future development during normal, dry, and multiple dry years. Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact USS-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.20.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project as described in Section 4.20.4.2.1. Alternative 1 would not change any construction activities included in the Proposed Project and does not require relocation of the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 1 would not require new water

supplies. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact USS-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.20.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project as described in Section 4.20.4.2.1. Alternative 2 would not change any construction activities included in the Proposed Project and does not require relocation of the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 2 would not require new water supplies. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact USS-2.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.20.4.3 Potential Impacts Related to Wastewater Treatment

Impact USS-3: Would the project result in a determination by the wastewater treatment provider, which serves or may serve the project, that it has adequate capacity to serve the project's forecasted demand in addition to the provider's existing commitments?

4.20.4.3.1 Proposed Project

Construction and Operation

As described under criteria USS-1, construction workers would generate small volumes of sanitary wastewater, which would be contained and disposed of by a licensed sanitation contractor. The Smalley Recreation Area has vaulted toilets and potable water that might also be used by the limited number of staff present during construction. Both the K1 Powerhouse and the K2 Powerhouse have a pit toilet.

Overall, wastewater generation during operation would be similar to existing conditions, with the addition of one double vault restroom with pit toilets at the Vista Day Use Area, which would be small in quantity and contained and disposed of by a licensed sanitation contractor. No new wastewater-generating facilities would be constructed or operated as part of the Proposed Project. The Proposed Project would not cause a wastewater treatment provider to determine that it has inadequate capacity to serve the Proposed Project's forecasted demand in addition to the provider's existing commitments.

Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact USS-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.20.4.3.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project as described in Section 4.20.4.3.1. Alternative 1 would not change any construction activities included in the Proposed Project and does not require relocation of the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 1 would not require any changes in

wastewater treatment. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact USS-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.20.4.3.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project as described in Section 4.20.4.3.1. Alternative 2 would not change any construction activities included in the Proposed Project and does not require relocation of the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 2 would not require any changes in wastewater treatment. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact USS-3.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.20.4.4 Potential Impacts Related to Solid Waste Generation

Impact USS-4: Would the project generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

4.20.4.4.1 Proposed Project

Construction and Operation

The Proposed Project would produce minimal solid waste during construction and operation. Construction activities would result in a short-term increase in the number of workers on site as well as construction related waste (e.g., containers, plastic, cardboard), but the permanent workforce associated with the Proposed Project is not expected to change under operation (PG&E 2020, 2023). The production of solid waste during operation and maintenance is not expected to differ from baseline conditions.

Retirement of the K1 Powerhouse includes activities such as lining the turbine pits with mass concrete or other suitable material and permanently closing the turbine shutoff valve, which would not produce appreciable solid waste. The K1 intake structure and headworks, tunnel, surge chamber, penstocks, switchyard, and powerhouse would be secured and the facilities would be left in place, and thus would not produce solid waste.

There would be a small increase in solid waste generation due to operation of the Vista Day Use Area that includes four picnic sites, but this would not exceed local or state standards or infrastructure capacity. The closest landfill to the Proposed Project, American Avenue Landfill in Fresno, is expected to continue collecting waste until it is full in 2031 and would have capacity to serve the Proposed Project (California Department of Resources Recycling and Recovery 2025).

Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact USS-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.20.4.4.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project as described in Section 4.20.4.4.1. Alternative 1 would not change any construction activities included in the Proposed Project and does not require relocation of the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 1 would not generate solid waste. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact USS-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.20.4.4.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project as described in Section 4.20.4.4.1. Alternative 2 would not change any construction activities included in the Proposed Project and does not require relocation of the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 2 would not generate solid waste. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact USS-4.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.20.4.5 Potential Impacts Related to Solid Waste Regulations

Impact USS-5: Would the Project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

4.20.4.5.1 Proposed Project

Construction and Operation

The Kerckhoff Hydroelectric Project does not currently conflict with any federal, state, or local solid waste management statutes or regulations and would continue to operate in compliance with relevant standards. The Proposed Project would have no impact on the provision of solid waste services within the Area of Analysis. Proposed Project operation would generate negligible waste and would not significantly differ from existing conditions. As described in Section 4.20.4.4 *Potential Impacts Related to Solid Waste Generation*, the landfill closest to the Proposed Project would have enough capacity to accept any generated non-hazardous waste from the Proposed Project. The Proposed Project would comply with federal, state, and local management and reduction statutes and regulations related to solid waste. Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact USS-5.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.20.4.5.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Alternative 1 has the same analysis and impact determination as the Proposed Project as described in Section 4.20.4.5.1. Alternative 1 would not change any construction activities included in the Proposed Project and does not require relocation of the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 1 would not result in noncompliance with statues and regulations related to solid waste. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact USS-5.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.20.4.5.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Alternative 2 has the same analysis and impact determination as the Proposed Project as described in Section 4.20.4.5.1. Alternative 2 would not change any construction activities included in the Proposed Project and does not require relocation of the Proposed Project. The alteration of the timing, duration, and magnitude of flows downstream of Kerckhoff Dam under Alternative 2 would not result in noncompliance with statues and regulations related to solid waste. Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact USS-5.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.20.5 Literature Cited

Californiasbestcamping.com. n.d. Smalley Cove Campground. Accessed: April 3, 2026. Retrieved from: http://www.californiasbestcamping.com/sierra_lakes/smalley_cove.html.

California Department of Resources Recycling and Recovery. 2025. SWIS Facility/Site Activity Details. American Avenue Disposal Site (10-AA-0009). Accessed: April 3, 2026. Retrieved from: https://www2.calrecycle.ca.gov/SolidWaste/Site/Summary/352.

CalRecycle. 2025. Regulations. Accessed April 3, 2026. Retrieved from: https://calrecycle.ca.gov/Laws/Regulations/.

Fresno County. 2024. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed: April 3,, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

Madera County. 1995. *Madera County General Plan Policy Document*. Adopted October 24. Accessed: April 3, 2026. Retrieved from: https://www.maderacounty.com/home/showpublisheddocument/40825/638615574804870000.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

PG&E (Pacific Gas and Electric Company). 2020. *Final Application for New License for the Kerckhoff Hydroelectric Project, FERC Project No. 96.* November 20.

_____. 2022. *Revised Final License Application Sections, FERC Project No. 96-048.* May.

_____. 2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

_____. 2024. *Additional Information Request from State Water Board via email.* December 13.

4.21 WILDFIRE

This section describes existing conditions and analyzes potential impacts related to wildfire from implementation of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2). The analysis is based on review of existing resources, technical data, and applicable laws and regulations. The potential impacts related to wildfires from the Proposed Project, Alternative 1, and Alternative 2 were evaluated using the significance criteria set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and best professional judgment (Table 4.21-1).

Table 4.21-1: CEQA Checklist for Wildfire

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact WF-1: Substantially impair an adopted emergency response plan or emergency evacuation plan?	No Impact	No Impact	No Impact
Impact WF-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?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

Would the Project:	Proposed Project	Alternative 1: Proposed Project with Alternative Spill Recession and Flow Ramping	Alternative 2: Proposed Project with BLM Revised 4(e) Conditions
Impact WF-3: Require the installation or maintenance 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?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact
Impact WF-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?	Less than Significant Impact	Less than Significant Impact	Less than Significant Impact

4.21.1 Environmental Setting

The existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) is located in the foothills of the western slope of the Sierra Nevada on the San Joaquin River (SJR) in a sparsely populated area of Fresno and Madera counties, California. The Kerckhoff Hydroelectric Project located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant), and on public lands administered by United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and the United States Bureau of Reclamation (Reclamation) under BLM management.

The Kerckhoff Hydroelectric Project Area is defined as all areas within the existing Federal Energy Regulatory Commission (FERC) Project Boundary. Generally, the

Kerckhoff Hydroelectric Project Area is characterized by steep, mountainous terrain and foothill landscapes, with elevations range between 500 and 1,000 feet above mean sea level (msl). Most of the land surrounding Kerckhoff Reservoir consists of undeveloped forest and shrubland typical of the Sierra Nevada foothills, with limited agricultural activity. Land uses in the vicinity of the Kerckhoff Hydroelectric Project primarily consist of hydroelectric power generation, cattle grazing, and recreation use.

The landscape surrounding the Kerckhoff Hydroelectric Project is rural and dominated by dense, mid-elevation Sierra Nevada oak woodland and annual grassland. Therefore, this area is prone to wildfires like other forested parts of California. Since 1980, several large wildfires, each totaling over 200 acres, have occurred within a mile of Kerckhoff Hydroelectric Project facilities. According to the California Department of Forestry and Fire Protection (CAL FIRE) database, the largest fire within a mile of the Kerckhoff Hydroelectric Project occurred in the 1930s and burned a total of 35,335 acres. The 2020 Creek Fire burned approximately 380,000 acres upriver of the Kerckhoff Hydroelectric Project and burned within approximately 2 miles of Kerckhoff Hydroelectric Project facilities. Although no major fires have occurred within the Proposed FERC Project Boundary, the 2020 Power Fire came close (within 0.3 mile) and burned a total of approximately 108 acres; the cause of the fire was not identified (CAL FIRE 2007).

Small portions of the Kerckhoff Hydroelectric Project are within the Wildland-Urban Interface, which is the zone of transition between unoccupied land and human development, where structures meet or intermingle with wildland or vegetative fuels. Unpaved dirt roads provide access to nearby streams and reservoirs. Structures associated with the Smalley Cove Campground are present on the north shore of Kerckhoff Reservoir, and dispersed camping occurs between the Smalley Cove Recreation Area and Powerhouse Road. Other structures present are those associated with power generation and existing Kerckhoff Hydroelectric Project operations. The Kerckhoff Dam and Reservoir are approximately 15 miles from any city, town, or local political subdivision having a population of 5,000 or more persons, although there are a few private residences in the vicinity. The closest municipalities to the Kerckhoff

Hydroelectric Project are Auberry, Lerona, and Prather in Fresno County; and Fine Gold, North Fork, and Hildreth in Madera County. The city of Fresno is approximately 25 miles from the Kerckhoff Hydroelectric Project.

The Kerckhoff Hydroelectric Project is located within both Federal Responsibility Areas (FRA) and State Responsibility Areas (SRA), as shown on Figure 4.21-1. These designations identify areas where federal agencies or CAL FIRE are responsible for wildland fire protection, respectively, and are defined based on land ownership, population density, and land use.

The SRAs are classified by three fire hazard severity zones (FHSZ): moderate, high, and very high. The Kerckhoff Hydroelectric Project is located within two FHSZs: moderate (71.4 acres) and high (55.5 acres) (CAL FIRE 2007). Mapped FHSZs are shown on Figure 4.21-2. Two CAL FIRE units manage SRAs in the Kerckhoff Hydroelectric Project vicinity: the Madera-Mariposa-Merced Unit, north of the SJR, and the Fresno-Kings Unit, to the south.

Additionally, the Kerckhoff Hydroelectric Project is located within areas mapped by the California Public Utilities Commission (CPUC) as a high fire threat district (HFTD), as shown on Figure 4.21-2. The HFTD identifies three tiers of elevated risk for wildfires associated with utilities, with Tier 3 Extreme being the highest risk. The Kerckhoff Hydroelectric Project is located mainly within CPUC HFTD Tier 2 Elevated (448.6 acres), with limited areas (83.3 acres) north of Kerckhoff Lake within HFTD Tier 3 (CPUC 2021).

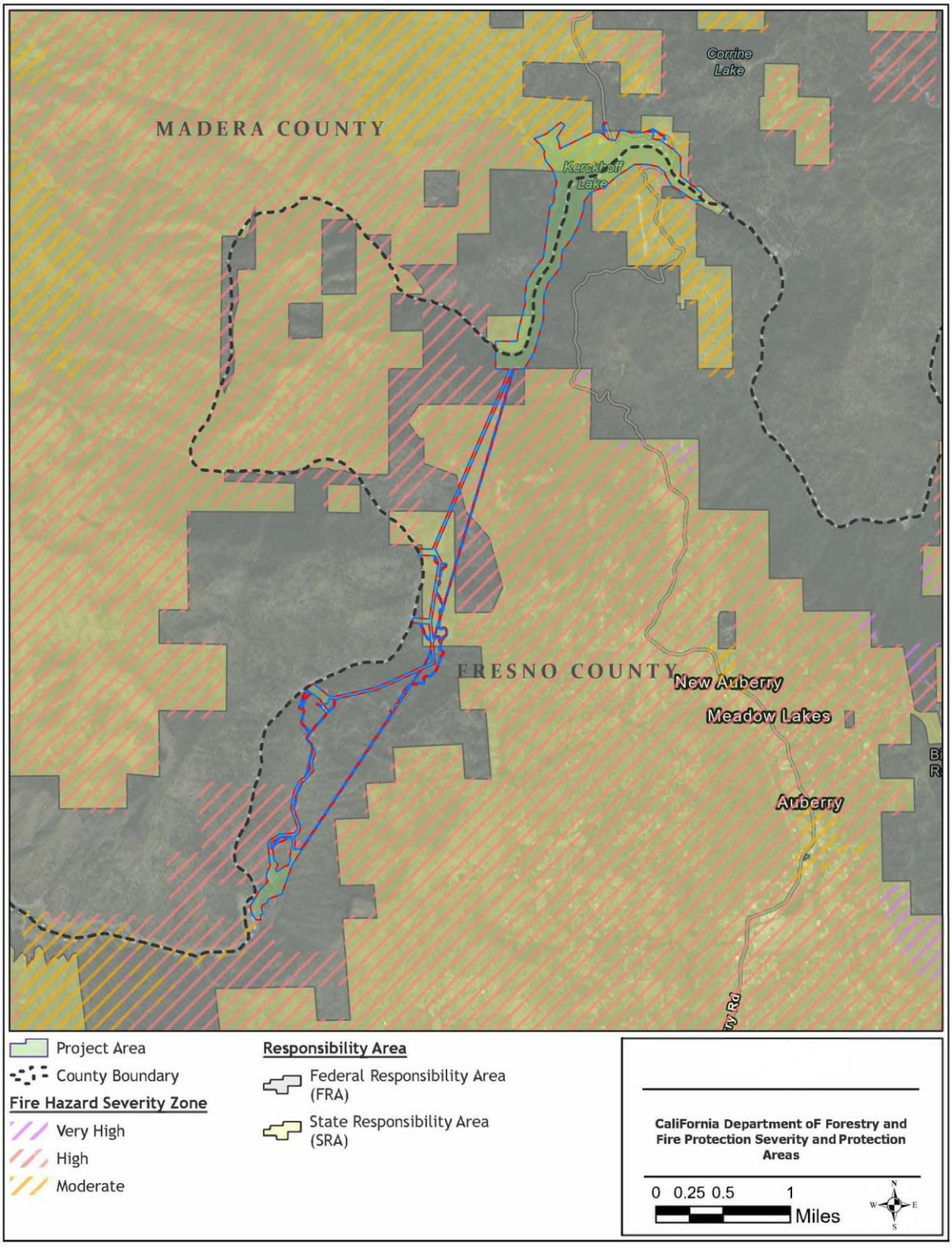


Figure 4.21-1: California Department of Forestry and Fire Protection Fire Hazard Severity and Responsibility Areas

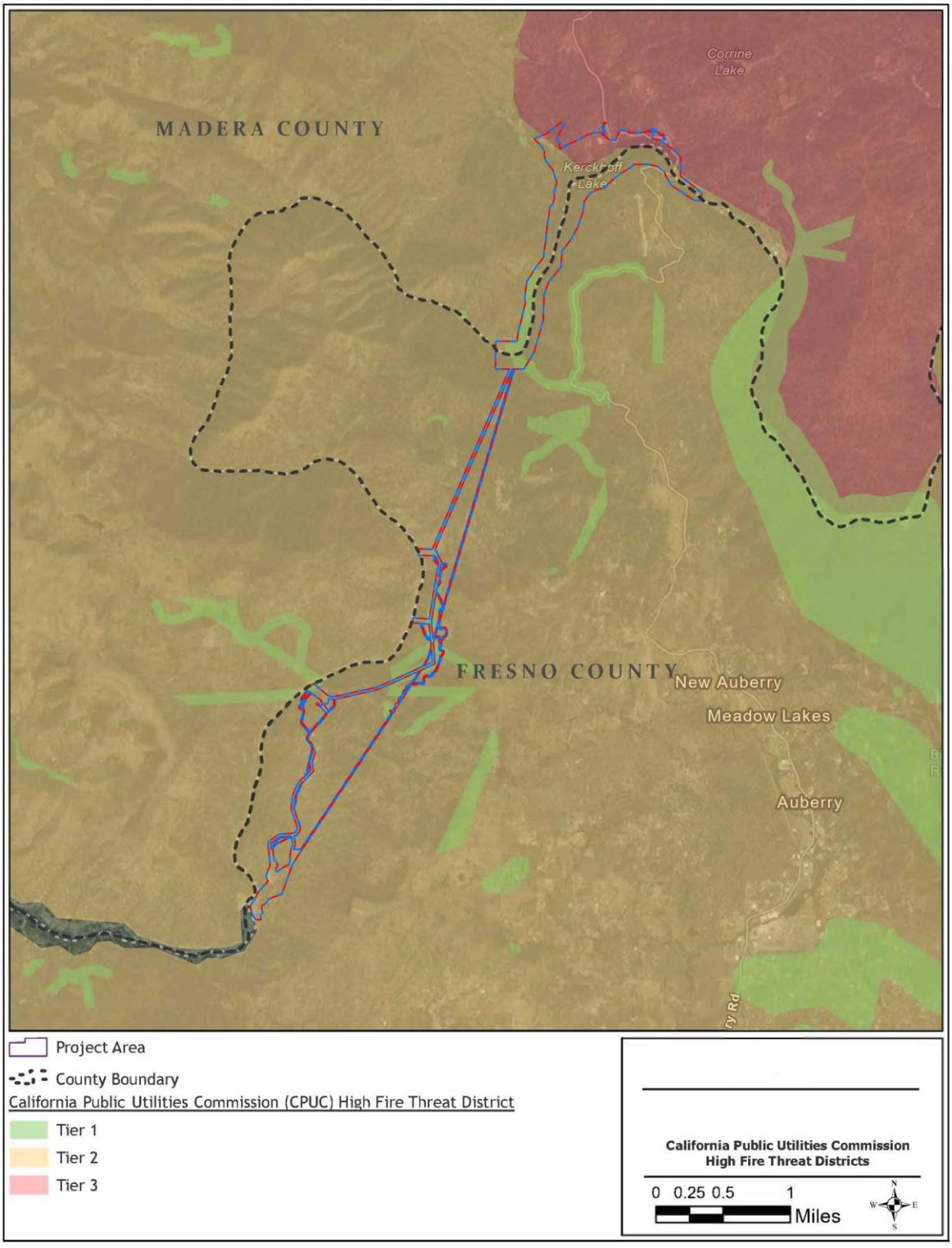


Figure 4.21-2: California Public Utilities Commission High Fire Threat Districts

4.21.2 Regulatory Background

The following subsections contain an overview of regulations related to wildfire management in the Proposed Project.

4.21.2.1 Federal

4.21.2.1.1 Federal Power Act

The Federal Power Act (Title 16 United States Code Chapter 12), originally enacted as the Federal Water Power Act in 1920 and then amended multiple times, was created to coordinate the development of hydroelectric power projects. The Federal Power Act created FERC and now covers multiple energy sectors.

For hydroelectric power projects, the Federal Power Act provides the license application process and requirements (Title 18 Code of Federal Regulations Part 5), including agencies to be consulted, study plan requirements, Tribal consultations, proposals, filing instructions, and amendment processes.

4.21.2.1.2 United States Bureau of Land Management

Bakersfield Field Office Resource Management Plan

Proposed Project activities that occur on public lands managed by BLM must be consistent with BLM's *Bakersfield Field Office Record of Decision and Approved Resource Management Plan* (RMP) (BLM 2014). The Bakersfield RMP identifies comprehensive management direction for all resources and uses and provides broad-scale guidance on project implementation for renewable energy, fluid mineral, livestock grazing, and recreation management. Appendix 3 *Best Management Practices/Standard Operating Procedures* of the BLM Bakersfield RMP (BLM 2014) provides guidance relevant to potential wildfire and wildfire impacts, as follows:

- Conduct prescribed fire practices for site preparation and methods to suppress wildfires in a manner that limits loss of soil organic matter and litter and that reduces the potential for runoff and erosion

BLM preliminary 4(e) condition No. 18 would require PG&E to develop and implement a Fire Management and Response Plan in consultation with stakeholders within one year of finalization of the conditions by FERC. The plan would help prevent and minimize potential Proposed Project-related fires from spreading beyond Kerckhoff Hydroelectric lands, and would aid PG&E, USFS, BLM, and CAL-FIRE personnel if a fire were to move beyond the Proposed FERC Project Boundary. Implementing the plan would also reduce the effects of any fire induced by the Proposed Project, which would protect PG&E's hydropower assets and the environmental resources and non-Kerckhoff Hydroelectric Project facilities and infrastructure on or adjacent to Kerckhoff Hydroelectric Project lands (FERC 2025).

4.21.2.1.3 United States Forest Service

Sierra National Forest Land Management Plan

The United States Forest Service (USFS) uses guidance in the revised *Land Management Plan for the Sierra National Forest* (USFS 2023), pursuant to the 2012 Forest Service Planning Rule (36 Code of Federal Regulations Part 219), for decision-making regarding the relicensing of the Proposed Project and the development of associated license conditions. The revised USFS-SNF Land Management Plan aims to help sustain forest and watershed health and productivity by addressing tree mortality, restoring forest conditions, facilitating use of fire to achieve desired conditions, and providing for sustainable recreation. According to the plan, Kerckhoff Reservoir is located in the San Joaquin Conservation Watershed, which contains much of the middle and upper SJR watershed area in the USFS-SNF (USFS 2023a).

The USFS preliminary 4(e) condition No. 30 would require PG&E to develop and implement a Fire Prevention and Response Plan in consultation with USFS, BLM, and CAL FIRE. The Plan would detail PG&E's responsibility to: (1) identify fire hazard reduction and recurring maintenance measures to prevent the spread of fire outside of the project boundary; (2) address fire hazard and public safety associated with project recreation use and access of the project facilities; (3) identify water drafting sites and other fire suppression resources; (4) report any project-related fire immediately to

USFS; (5) analyze fire prevention and suppression equipment and personnel; and (6) advise USFS of the locations and availability of those resources. The plan shall be filed with FERC within two years of license issuance, subject to prior review and approval by USFS (FERC 2025).

4.21.2.2 State

4.21.2.2.1 California Building Code (California Code of Regulations, Title 24, Part 2) Chapter 7A

Chapter 7A of the California Building Code (CBC), Materials and Construction Methods for Exterior Wildfire Exposure, prescribes building materials and construction methods for new buildings in a FHSZ, and is applicable to the Proposed Project.

4.21.2.2.2 California Fire Code

The California Fire Code (CFC) is Part 9 of Title 24 of the California Code of Regulations (CCR). 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 FHSZs; requirements generally parallel to those of CBC Chapter 7A. The CFC is applicable to the Proposed Project.

4.21.2.2.3 California Public Resources Code

California Public Resources Code (PRC) Sections 4291 et seq., describe requirements regarding removal of brush, flammable vegetation, or combustible growth within 100 feet of buildings. Sections 4906 and 4907 describe requirements regarding hazardous vegetation and fuel management.

The PRC Section 4290 requires 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.

These sections of the California PRC are applicable to the Proposed Project.

4.21.2.2.4 California Code of Regulations Title 14, Sections 1250 Et Seq.

Fire Prevention Standards for Electric Utilities, Title 14 of the CCR, Sections 1250 et seq., set forth fire prevention standards for electric utilities. Sections 1254 and 1256 provide the requirements for vegetation clearance from poles, towers, and wires. These sections of the CCR are applicable to the Proposed Project.

4.21.2.2.5 Senate Bill 901

Senate Bill (SB) 901 is California-enacted legislation requiring public electric utilities to develop and implement wildfire mitigation plans if their overhead lines and equipment are in an area that has a significant risk of wildfire resulting from those electric lines and equipment. All electrical corporations are required to submit a wildfire mitigation plan in compliance with this legislation and with direction from the CPUC (Rulemaking 18–10–007 updated December 16, 2019, as clarified December 23, 2019). The wildfire mitigation plan is to include, among other requirements, a description of preventative strategies and programs to be adopted to minimize the risk of electrical lines and equipment causing catastrophic wildfires, as well as plans for inspection of electrical infrastructure and vegetation management activities. It is assumed that the CPUC expects the wildfire mitigation plan to be implemented during all phases of a project, including initial construction and operation (CPUC 2020).

Since the Proposed Project is within Tier 2 and Tier 3 Elevated HFTD according to the CPUC, PG&E would be required to provide annual updates that focus on any adjustments, provide verification of activities, identify planned infrastructure changes, and report on actual outcomes.

4.21.2.2.6 California Department of Forestry and Fire Protection

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. CAL FIRE outlined its values, missions, and goals in its 2024 Strategic Plan (CAL FIRE 2024). Additionally, both the Madera-Mariposa-Merced CAL FIRE Unit and the Fresno-Kings CAL FIRE Unit have individual strategic plans (CAL FIRE 2025a, 2025b).

Fire management in the Proposed FERC Project Boundary is a shared responsibility through the Cooperative Fire Protection Agreements with CAL FIRE and Fresno County Fire Department. The CAL FIRE Fresno King Unit 73 in Millerton, California is the closest to the Proposed FERC Project Boundary. In addition, the Auberry Volunteer Fire Department is located in nearby Clovis, California.

CAL FIRE designates FHSZs pursuant to the California Government Code (CGC) 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.

The California Board of Forestry and Fire Protection SRA Fire Safe regulations outline basic wildland fire protection standards that can significantly decrease the risk of wildfire events in the wildland interface for building, construction, and development in SRA. The regulations do not supersede local regulations that equal or exceed minimum state regulations. The state statute to provide regulations implementing safety standards related to defensible space in SRAs for wildfire protection is PRC Section 4290.

4.21.2.3 Local

4.21.2.3.1 Fresno County General Plan

The Fresno County General Plan Health and Safety Element (Fresno County 2024a) establishes policies to protect people and property from hazards, including wildland fire,

and provides a framework for fire prevention, emergency response, and land use planning in high fire hazard areas. These policies are directly relevant to the Proposed Project because portions of the Proposed Project are located in the Sierra Nevada foothills within SRAs and very high FHSZs, as mapped by CAL FIRE.

4.21.2.3.2 Fresno County Hazard Mitigation Plan

The Fresno County *Hazard Mitigation Plan* (Fresno County 2024b) is a federally compliant, multi-jurisdictional strategy designed to effectively use appropriate resources in order to prepare, respond, and recover disasters, including wildfire. The Fresno County *Hazard Mitigation Plan* provides a framework for hazard mitigation at the county level and can inform planning for projects within the county, including the Proposed Project.

4.21.2.3.3 Madera County Community Wildfire Protection Plan

The Madera County Community Wildfire Protection Plan (Madera County 2008) outlines Madera County's mission to protect natural and human-made resources from the impacts of wildfire as cost-effectively as possible by mobilizing all who govern, live, work, and visit Eastern Madera County to make their homes, businesses, neighborhoods, communities, and recreational areas fire safe. The Madera County Community Wildfire Protection Plan provides a framework for wildfire mitigation at the county level and can inform planning for projects within the county, including the Proposed Project.

4.21.2.4 Management Plans and Standards

4.21.2.4.1 PG&E

PG&E currently implements measures to prevent and mitigate wildfire risks on lands where its facilities are located, as detailed in its *2026-2028 Wildfire Mitigation Plan* (PG&E 2025), which was prepared in compliance with SB 901 and CPUC Energy Safety Division requirements. The *2026-2028 Wildfire Mitigation Plan* is a system-wide corporate compliance plan that applies across PG&E's electric service territory and is

part of PG&E's ongoing operational framework; it is not specific to the Kerckhoff Hydroelectric Project and is not a condition of the FERC license.

The *2026-2028 Wildfire Mitigation Plan* establishes key objectives focused on reducing wildfire risk associated with PG&E facilities and operations, reducing impacts associated with wildfire mitigation actions such as Public Safety Power Shutoffs and Enhanced Powerline Safety Settings, and improving situational awareness and decision-support capabilities through a risk-informed framework. Key strategies include risk assessment and mapping, situational awareness and forecasting, grid design and system hardening, asset management and inspections, vegetation management and inspections, resource allocation and methodology, emergency planning and preparedness, and stakeholder cooperation and community engagement. The *2026-2028 Wildfire Mitigation Plan* also addresses hazard reduction and fuel treatment, resource allocation for fire prevention and response, and reporting protocols for fire investigations. Additionally, PG&E requires contractors to follow Utility Standard TD 1464S, which includes ignition risk reduction measures such as vehicle operation guidelines, pre-work readiness for spark-producing activities, firefighting equipment availability, and no-smoking policies.

Mandatory 4(e) conditions issued by USFS and BLM would require PG&E to develop and implement a Fire Prevention and Response Plan, in consultation with USFS, BLM, and CAL FIRE, as a condition of any new FERC license for the Kerckhoff Hydroelectric Project, consistent with FERC staff recommendations (FERC 2025).

4.21.3 Analysis Methodology

4.21.3.1 Analytical Approach

For this analysis, the potential Proposed Project impacts related to wildfire were evaluated against applicable regulations (described above) and the CEQA significance criteria. The Proposed Project is located within an FRA and SRAs classified as high and moderate FHSZs, respectively (CAL FIRE 2007). The Proposed Project is also within CPUC Tier 2 Elevated, and Tier 3 Extreme HFTDs. 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 Analysis for addressing potential wildfire impacts is the Proposed FERC Project Boundary.

4.21.3.2 Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines and best professional judgment, the Proposed Project would have a significant impact on wildfire if it would do the following:

- Substantially impair an adopted emergency response plan or emergency evacuation plan (WF-1);
- 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 (WF-2);
- Require the installation or maintenance 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 (WF-3); or
- 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 (WF-4)

4.21.3.3 Environmental Management Measures and Monitoring Plans

The following Proposed Project monitoring plans and environmental management measures are pertinent to wildfire. The plans identified below are included under the Proposed Project and both Alternatives.

4.21.3.3.1 Fire Prevention and Response Plan

Mandatory 4(e) conditions issued by USFS and BLM would require PG&E to develop and implement a Fire Prevention and Response Plan, in consultation with USFS, BLM, and CAL FIRE, as a condition of any new FERC license for the Kerckhoff Hydroelectric Project, consistent with FERC staff recommendations (FERC 2025). The plan would

help prevent and minimize potential Kerckhoff Hydroelectric Project-related fires from spreading beyond Kerckhoff Hydroelectric Project lands, and would aid PG&E, USFS, BLM, and CAL-FIRE personnel if a fire were to move beyond the Kerckhoff Hydroelectric Project Boundary. Implementing the plan would also reduce the effects of Kerckhoff Hydroelectric Project-induced fire, which would protect PG&E's hydropower assets and the environmental resources and non-Project facilities and infrastructure on or adjacent to Kerckhoff Hydroelectric Project lands. The plan shall be filed with FERC within two years of license issuance, subject to prior review and approval by USFS (FERC 2025).

4.21.3.3.2 Project Road and Trail Maintenance Plan

The Project Road and Trail Maintenance Plan includes regularly inspecting and maintaining roads and trails to ensure safe access to Kerckhoff Hydroelectric Project facilities. The maintenance performed under the Project Road and Trail Maintenance Plan will be coordinated with activities conducted under the Proposed Project's Vegetation Management and Pest Control Plan for appropriate vegetation maintenance and in accordance with the Proposed Project's Historic Properties Management Plan (HPMP).

4.21.3.3.3 Recreation Management Plan

The Recreation Management Plan includes guidance on construction, maintenance, and operation of existing and Proposed Project recreation facilities; managing Kerckhoff Reservoir shoreline access; and minimizing resource damage from recreation use. Modification of the existing FERC Project Boundary to remove lands that are not necessary for operation would have no impact on wildfire and is not discussed further.

4.21.4 Environmental Impacts and Mitigation

The Proposed Project would relicense the Kerckhoff Hydroelectric Project for a new 50-year term and modify the operating capacity, as described in Section 2 *Proposed Project Description*. The Proposed Project includes retiring the Kerckhoff 1 (K1) Powerhouse and modifying associated facilities; constructing a new day use recreation

facility (Vista Day Use Area); installing one new operational flow gage upstream of Kerckhoff Reservoir; upgrading two manual radial gates on the dam to be automated; reducing the acreage of the existing FERC Project Boundary; and implementing new monitoring plans and environmental management measures. The environmental management measures include the following flow measures: American Shad Spawning Season Flow Release Regime Measure; End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure; Subsequent Spill Ramp Down Measure; Spill Season Flow Measure; and Planned Outage Measure (POM), which modify PG&E's existing operations. Included in these measures are 2 annual days of whitewater flows provided to the public with 10 days of prior notice to the public and resource agencies. These measures were designed to protect, maintain, or enhance resources associated with the Proposed Project and are described in detail in Section 2.4.2.1 *Proposed Project Environmental Management Measures*.

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down-ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach (PBR) of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cfs for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the PBR cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient storage and powerhouse capacity to meet this requirement.

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned K2 Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The California State Water Resources Control Board (State Water Board) evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

Due to the significant differences in requirements among the Alternatives for implementation of these measures, they are discussed in greater detail in Section 2 *Project Description* and Section 3 *Alternatives Description*.

4.21.4.1 Potential Impacts to Emergency Response or Evacuation Plan

Impact WF-1: Would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

4.21.4.1.1 Proposed Project

Construction and Operation

Implementation of the Proposed Project would not substantially impair an adopted emergency response plan or emergency evacuation plan. Construction activities associated with the Proposed Project are limited in scope and duration, access roads and public routes would remain open, and any temporary traffic control measures would be coordinated with local agencies to maintain emergency ingress and egress. No road closures are proposed during construction activities. The Proposed Project would not introduce new barriers, alter designated evacuation routes, or conflict with emergency planning requirements established by local, state, or federal agencies, including any USFS or CAL FIRE response strategies for fires.

Emergency access routes may be improved through Proposed Project activities, including paving an existing gravel access road between Access Road 6A and the Vista Day Use Area and reconstructing an existing approximately 470-foot-long trail segment connecting the day use area to BLM's SJR Trail. Installation of gates, signage, and fencing to enhance public safety and manage public access (as described in Section 2 *Proposed Project Description*) would further support emergency access control and fire prevention.

PG&E's *2026-2028 Wildfire Mitigation Plan* (PG&E 2025) emphasizes coordination with emergency response frameworks and maintaining access for first responders during construction, operation, and maintenance activities associated with PG&E electric

facilities, including the Proposed Project. The Wildfire Mitigation Plan includes emergency preparedness and response components focused on coordination with local, state, and federal agencies, risk-informed planning and situational awareness, and implementation of procedures intended to preserve ingress and egress for emergency vehicles during periods of elevated fire risk. PG&E also conducts drills and tabletop exercises with external agencies to support coordination of operational activities with community evacuation strategies and mutual aid agreements. Vegetation management and system-hardening initiatives under the Wildfire Mitigation Plan are designed to reduce ignition risk without compromising emergency routes.

Mandatory 4(e) conditions issued by USFS and BLM would require PG&E to develop and implement a Fire Prevention and Response Plan, in consultation with USFS, BLM, and CAL FIRE, as a condition of any new FERC license for the Kerckhoff Hydroelectric Project. The Fire Prevention and Response Plan would establish project-specific procedures for fire prevention, reporting, emergency response, and coordination with responding agencies (FERC 2025).

Additionally, the Proposed Project's Road and Trail Maintenance Plan specifies that, in the event of an emergency incident that blocks road or trail access to a Proposed Project facility or threatens public safety, PG&E would notify the appropriate land management agency or property owner to coordinate response and repair actions.

Therefore, there would be **No Impact** as a result of construction or operational activities under the Proposed Project for potential impact WF-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.21.4.1.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Construction activities under Alternative 1 would be the same as those described for the Proposed Project. Construction under Alternative 1 would not substantially impair an adopted emergency response plan or emergency evacuation plan. As with the Proposed Project, Alternative 1 would not modify access roads or public routes, introduce new barriers, alter designated evacuation routes, or conflict with emergency planning requirements established by local, state, or federal agencies, including applicable USFS or CAL FIRE response strategies for fires.

Operation under Alternative 1 would modify the magnitude and timing of flows released below Kerckhoff Dam but would not change access, circulation, or emergency response routes. The modified flow management measures under Alternative 1 are operational in nature and would not introduce changes to circulation patterns that could affect emergency access or evacuation routes. Whitewater boating opportunities in the PBR may increase under Alternative 1 compared to the Proposed Project, which could result in increased recreational use and vehicle traffic on roads leading to and within the FERC Project Boundary. However, recreation use, including whitewater boating between Kerckhoff Dam and Millerton Lake, occurs under existing conditions, and access routes would remain unchanged; therefore, any potential increase in vehicle traffic would not be expected to substantially impair emergency response or evacuation plans.

Alternative 1 would incorporate the same project-wide operational protocols as the Proposed Project, including road and trail maintenance procedures and emergency coordination measures. Mandatory Section 4(e) conditions issued by the USFS and BLM would continue to require development and implementation of a Fire Prevention and Response Plan, which would support coordination with emergency responders and protection of emergency access routes.

Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 1 for potential impact WF-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.21.4.1.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Construction activities under Alternative 2 would be the same as those described for the Proposed Project. Construction under Alternative 2 would not substantially impair an adopted emergency response plan or emergency evacuation plan. As with the Proposed Project, Alternative 2 would not modify access roads or public routes, introduce new barriers, alter designated evacuation routes, or conflict with emergency planning requirements established by local, state, or federal agencies, including applicable USFS or CAL FIRE response strategies for fire.

Operation under Alternative 2 would include modified flow management measures but would not introduce new construction activities or changes to circulation patterns that could affect emergency access or evacuation routes. Recreational access and use patterns within the FERC Project Boundary would remain generally consistent with the Proposed Project. Operational activities would continue to be coordinated with applicable agencies, as needed, to maintain emergency ingress and egress and ensure continued access for emergency responders.

Alternative 2 would incorporate the same project-wide operational protocols as the Proposed Project, including road and trail maintenance procedures and emergency coordination measures. Mandatory Section 4(e) conditions issued by the USFS and BLM would continue to require development and implementation of a Fire Prevention

and Response Plan, which would support coordination with emergency responders and protection of emergency access routes.

Therefore, there would be **No Impact** as a result of construction or operational activities under Alternative 2 for potential impact WF-1.

Mitigation Measures

No Mitigation Required

Level of Significance

No Impact

4.21.4.2 Potential Impacts to project Occupants Due to External Environmental Factors

Impact WF-2: Would the project, 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?

4.21.4.2.1 Proposed Project

Construction and Operation

The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new flow gage, upgrading two manual radial gates on the dam to be automated, reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures.

Proposed Project construction and operation activities would occur within the Proposed FERC Project Boundary and would be largely confined to previously disturbed sites with established access roads. Construction activities would involve limited vegetation clearing, equipment staging, and use of unpaved roads, which could increase ignition potential if not properly managed. However, the Proposed Project incorporates vegetation management and hazard tree removal around facilities and access roads,

and reduces fuel loads adjacent to work areas. In addition, the Proposed Project would not involve large-scale grading or expansion into undeveloped wildlands, thereby limiting changes to slope conditions, fuel continuity, and wind exposure that could exacerbate wildfire behavior. During operation, vehicles and equipment used for routine and non-routine maintenance, as well as continued public access at shoreline areas and new facilities such as the Vista Day Use Area, could introduce potential sources of human-caused ignition. While these activities could incrementally increase wildfire risk, the limited extent of disturbance, existing access conditions, and fuel-management measures would constrain the potential for wildfire spread and associated exposure of Proposed Project occupants or nearby communities to smoke or pollutant concentrations.

PG&E's *2026–2028 Wildfire Mitigation Plan* (PG&E 2025) establishes a risk-informed framework for preventing and responding to wildfire ignitions associated with PG&E electric facilities and activities. The plan includes ignition prevention measures, situational awareness and forecasting, vegetation management and inspections, asset management and inspections, emergency preparedness and response, and coordination with external agencies. PG&E also requires implementation of Utility Standard TD1464S (Preventing and Mitigating Fires While Performing PG&E Work), which includes ignition-risk reduction requirements such as vehicle-operation guidelines, pre-work readiness for spark-producing activities, availability of firefighting equipment and water supply at job sites, restrictions on hot work during elevated fire conditions, and fire-watch and reporting protocols. These measures are designed to reduce the likelihood of wildfire ignition and provide rapid response and containment should an ignition occur.

Mandatory 4(e) conditions issued by USFS and BLM would require PG&E to develop and implement a Fire Prevention and Response Plan, in consultation with USFS, BLM, and CAL FIRE, as a condition of any new FERC license for the Kerckhoff Hydroelectric Project. The Fire Prevention and Response Plan would establish project-specific procedures for fire prevention, reporting, emergency response, and coordination with responding agencies (FERC 2025).

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under the Proposed Project for potential impact WF-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.21.4.2.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Construction activities under Alternative 1 would be the same as those described for the Proposed Project and would occur within the FERC Project Boundary, primarily in previously disturbed areas with existing access. Construction under Alternative 1 would not involve large-scale grading, expansion into undeveloped wildlands, or changes to slope conditions, prevailing wind exposure, or fuel continuity that could exacerbate wildfire behavior.

Operation under Alternative 1 would include modified flow management measures designed to better mimic the natural hydrograph, which would reduce rapid flow fluctuations and help address existing safety concerns associated with changing river conditions. These operational changes would not introduce new ground-disturbing activities, expand facilities into undeveloped areas, or modify slope conditions, prevailing wind exposure, or fuel continuity within the FERC Project Boundary. Recreation use, including whitewater boating between Kerckhoff Dam and Millerton Lake, occurs under existing conditions and would continue under Alternative 1. Although Alternative 1 may influence the timing and magnitude of flows in the PBR, these changes would not affect physical conditions that influence wildfire behavior or increase exposure of Project occupants to wildfire-related smoke or pollutant concentrations.

In addition, Alternative 1 would incorporate the same project-wide operational protocols as the Proposed Project, including road and trail maintenance procedures and emergency coordination measures. Mandatory Section 4(e) conditions issued by the USFS and BLM would continue to require development and implementation of a Fire Prevention and Response Plan, which would establish project-specific procedures for fire prevention, reporting, emergency response, and coordination with responding agencies.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 1 for potential impact WF-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.21.4.2.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Construction activities under Alternative 2 would be the same as those described for the Proposed Project and would occur within the FERC Project Boundary, primarily in previously disturbed areas with existing access. Construction under Alternative 2 would not involve large-scale grading, expansion into undeveloped wildlands, or changes to slope conditions, prevailing wind exposure, or fuel continuity that could exacerbate wildfire behavior.

Operation under Alternative 2 would include modified flow management measures but would not introduce new ground-disturbing activities, expand facilities into undeveloped areas, or modify slope conditions, prevailing wind exposure, or fuel continuity within the FERC Project Boundary. Recreation use, including whitewater boating between Kerckhoff Dam and Millerton Lake, occurs under existing conditions and would continue under Alternative 2. Although Alternative 2 may modify the timing and magnitude of

flows in the PBR, these operational changes would not affect physical conditions that influence wildfire behavior or increase exposure of Proposed Project occupants to wildfire-related smoke or pollutant concentrations.

In addition, Alternative 2 would incorporate the same project-wide operational protocols as the Proposed Project, including road and trail maintenance procedures and emergency coordination measures. Mandatory Section 4(e) conditions issued by the USFS and BLM would continue to require development and implementation of a Fire Prevention and Response Plan, which would establish project-specific procedures for fire prevention, reporting, emergency response, and coordination with responding agencies.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 2 for potential impact WF-2.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.21.4.3 Potential Impacts Related to Associated Infrastructure and Wildfire Risk

Impact WF-3: Would the project require the installation or maintenance 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?

4.21.4.3.1 Proposed Project

Construction and Operation

The Proposed Project includes retiring the K1 Powerhouse and modifying associated facilities, constructing a new day use recreation facility (Vista Day Use Area), installing one new flow gage, upgrading two manual radial gates on the dam to be automated,

reducing the acreage of the existing FERC Project Boundary, and implementing new monitoring plans and environmental management measures. These activities involve limited installation, modification, and maintenance of existing Kerkhoff Hydroelectric Project infrastructure.

Proposed Project construction and operation activities would occur within the Proposed FERC Project Boundary and would be largely confined to previously disturbed sites with established access roads. Construction activities would involve limited vegetation clearing, equipment staging, and use of unpaved roads, which could increase ignition potential if not properly managed. However, the Proposed Project incorporates vegetation management and hazard tree removal around facilities and access roads, and reduces fuel loads adjacent to work areas. The Proposed Project would not require construction of new access roads, fuel breaks, emergency water sources, or utility corridors, nor would it involve large-scale grading or expansion into undeveloped wildlands. As a result, installation or modification of Proposed Project infrastructure would not substantially exacerbate wildfire risk or result in temporary or ongoing environmental impacts associated with wildfire.

During operation, routine and non-routine maintenance of existing facilities, roads, and recreation areas, as well as continued public use of shoreline areas and new facilities such as the Vista Day Use Area, could introduce potential sources of human-caused ignition. While these activities involve ongoing maintenance of Proposed Project infrastructure, the limited extent of new or modified facilities, use of existing access routes, and implementation of fuel-management measures would constrain fire risk associated with infrastructure maintenance activities.

PG&E's *2026–2028 Wildfire Mitigation Plan* (PG&E 2025) establishes a risk-informed framework for preventing and responding to wildfire ignitions associated with PG&E electric facilities and activities. The Wildlife Mitigation Plan includes ignition-prevention measures, vegetation management and inspections, asset management and inspections, emergency preparedness and response, and coordination with external agencies. PG&E also requires implementation of Utility Standard TD1464S (Preventing

and Mitigating Fires While Performing PG&E Work), which includes ignition-risk-reduction requirements such as vehicle-operation guidelines, pre-work readiness for spark-producing activities, availability of firefighting equipment and water supply at job sites, restrictions on hot work during elevated fire conditions, and fire-watch and reporting protocols.

In addition, mandatory 4(e) conditions issued by USFS and BLM would require PG&E to develop and implement a Fire Prevention and Response Plan, in consultation with USFS, BLM, and CAL FIRE, as a condition of any new FERC license for the Kerckhoff Hydroelectric Project. The Fire Prevention and Response Plan would establish project-specific procedures for fire prevention, reporting, emergency response, and coordination with responding agencies (FERC 2025).

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under the Proposed Project for potential impact WF-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.21.4.3.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Construction activities under Alternative 1 would be the same as those described for the Proposed Project and would occur within the FERC Project Boundary, primarily in previously disturbed areas with existing access. Alternative 1 would not require construction of new access roads, fuel breaks, emergency water sources, power lines, or other utility corridors beyond those associated with existing Kerckhoff Hydroelectric Project facilities. Construction under Alternative 1 therefore would not introduce new infrastructure that could exacerbate wildfire risk or result in temporary or ongoing environmental impacts related to fire hazard.

Operation under Alternative 1 would include modified flow management measures designed to better mimic the natural hydrograph, which would reduce rapid flow fluctuations and help address existing safety concerns associated with changing river conditions. These operational changes would not require installation, expansion, or intensified maintenance of infrastructure such as roads, fuel breaks, emergency water sources, or utilities beyond existing conditions. Recreation use, including whitewater boating between Kerckhoff Dam and Millerton Lake, occurs under existing conditions and would continue under Alternative 1 without necessitating new infrastructure that could increase wildfire risk.

In addition, Alternative 1 would incorporate the same project-wide operational protocols as the Proposed Project, including road and trail maintenance procedures and emergency coordination measures. Mandatory Section 4(e) conditions issued by the USFS and BLM would continue to require development and implementation of a Fire Prevention and Response Plan, which would establish project-specific procedures for fire prevention, reporting, emergency response, and coordination with responding agencies.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 1 for potential impact WF-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.21.4.3.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Construction activities under Alternative 2 would be the same as those described for the Proposed Project and would occur within the FERC Project Boundary, primarily in previously disturbed areas with existing access. Alternative 2 would not require

construction of new access roads, fuel breaks, emergency water sources, power lines, or other utility corridors beyond those associated with existing Kerckhoff Hydroelectric Project facilities. Construction under Alternative 2 therefore would not introduce new infrastructure that could exacerbate wildfire risk or result in temporary or ongoing environmental impacts related to fire hazard.

Operation under Alternative 2 would include modified flow management measures but would not require installation, expansion, or intensified maintenance of infrastructure such as roads, fuel breaks, emergency water sources, or utilities beyond existing conditions. Recreation use, including whitewater boating between Kerckhoff Dam and Millerton Lake, occurs under existing conditions and would continue under Alternative 2 without necessitating new infrastructure that could increase wildfire risk or result in ongoing environmental impacts.

In addition, Alternative 2 would incorporate the same project-wide operational protocols as the Proposed Project, including road and trail maintenance procedures and emergency coordination measures. Mandatory Section 4(e) conditions issued by the USFS and BLM would continue to require development and implementation of a Fire Prevention and Response Plan, which would establish project-specific procedures for fire prevention, reporting, emergency response, and coordination with responding agencies.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 2 for potential impact potential impact WF-3.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.21.4.4 Potential Impacts Related to Exposure to Risks Due to Wildfire

Impact WF-4: Would the project 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?

4.21.4.4.1 Proposed Project

Construction and Operation

No construction or operational activities associated with the Proposed Project are anticipated to affect downslope or downstream flooding in the Proposed Project Area.

The Proposed Project is located in a geologically stable area underlain by granitic bedrock and well-drained soils, which exhibit low susceptibility to deep-seated landslides. Field investigations and studies for the Proposed Project showed no evidence of significant mass soil movement or instability. No deep-seated landslides or large-scale mass wasting sites were identified within the Area of Analysis. No significant soil instability or mass movement has been observed around the reservoir (E-1, FERC 2025). Minor localized erosion and small landslides have been observed along Access Roads 1, 2, and 3, with a small amount of raveling occurring along Road 3, but these features are associated with road cuts and do not pose a substantial hazard to existing or Proposed Project facilities or public safety.

A landslide in May 2023 affected the helicopter landing zone for Kerckhoff Dam. PG&E reported the incident to FERC and will continue to monitor the landslide area for additional movement and will include this monitoring in its Dam Safety Surveillance and Monitoring Plan (see Section 4.8 *Geology and Soils*).

The limited increase in impervious surfaces resulting from the Proposed Project would not substantially affect existing drainage patterns. Routine maintenance of Kerckhoff Hydroelectric Project facilities is ongoing and would continue under the Proposed Project; therefore, no increased risk from runoff, post-fire slope instability, or drainage modification is expected as a result of these activities.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under the Proposed Project for potential impact WF-4.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.21.4.4.2 Alternative 1: Alternative Spill Recession and Flow Ramping

Construction and Operation

Construction activities under Alternative 1 would be the same as those described for the Proposed Project and would occur within the FERC Project Boundary, primarily in previously disturbed areas with existing access. Construction under Alternative 1 would not involve large-scale grading, modification of drainage patterns, or expansion into undeveloped areas that could increase runoff, post-fire slope instability, or the potential for downslope or downstream flooding or landslides. As a result, construction activities under Alternative 1 would not expose people or structures to increased risks associated with runoff, post-fire slope instability, or drainage-related hazards.

Operation under Alternative 1 would include modified flow management measures designed to better mimic the natural hydrograph, which would reduce rapid flow fluctuations and help address existing safety concerns associated with changing river conditions. These operational changes would not alter drainage patterns, slope stability, or geomorphic conditions in a manner that would increase the potential for downslope or downstream flooding or landslides, including those that could occur following a wildfire. Operation under Alternative 1 therefore would not expose people or structures to increased risks associated with runoff, post-fire slope instability, or drainage changes.

In addition, Alternative 1 would incorporate the same project-wide operational protocols as the Proposed Project, including road and trail maintenance procedures and emergency coordination measures. Mandatory Section 4(e) conditions issued by the

USFS and BLM would continue to require development and implementation of a Fire Prevention and Response Plan, which would establish project-specific procedures for fire prevention, reporting, emergency response, and coordination with responding agencies.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 1 for potential impact WF-4.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.21.4.4.3 Alternative 2: Proposed Project with BLM Revised 4(e) Conditions

Construction and Operation

Construction activities under Alternative 2 would be the same as those described for the Proposed Project and would occur within the FERC Project Boundary, primarily in previously disturbed areas with existing access. Construction under Alternative 2 would not involve large-scale grading, modification of drainage patterns, or expansion into undeveloped areas that could increase runoff, post-fire slope instability, or the potential for downslope or downstream flooding or landslides. As a result, construction activities under Alternative 2 would not expose people or structures to increased risks associated with runoff, post-fire slope instability, or drainage-related hazards.

Operation under Alternative 2 would include modified flow management measures designed to better mimic the natural hydrograph, which would reduce rapid flow fluctuations and help address existing safety concerns associated with changing river conditions. These operational changes would not alter drainage patterns, slope stability, or geomorphic conditions in a manner that would increase the potential for downslope or downstream flooding or landslides, including those that could occur following a

wildfire. Operation under Alternative 2 therefore would not expose people or structures to increased risks associated with runoff, post-fire slope instability, or drainage changes.

In addition, Alternative 2 would incorporate the same project-wide operational protocols as the Proposed Project, including road and trail maintenance procedures and emergency coordination measures. Mandatory Section 4(e) conditions issued by the USFS and BLM would continue to require development and implementation of a Fire Prevention and Response Plan, which would establish project-specific procedures for fire prevention, reporting, emergency response, and coordination with responding agencies.

Therefore, there would be a **Less than Significant Impact** as a result of construction or operational activities under Alternative 2 for potential impact WF-4.

Mitigation Measures

No Mitigation Required

Level of Significance

Less than Significant Impact

4.21.5 Literature Cited

BLM (United States Bureau of Land Management). 2014. *Bakersfield Field Office Record of Decision and Approved Resource Management Plan*. United States Department of the Interior, Bureau of Land Management. Accessed: April 3, 2026. Retrieved from: https://www.govinfo.gov/content/pkg/GOVPUB-I53-PURL-gpo83734/pdf/GOVPUB-I53-PURL-gpo83734.pdf.

CAL FIRE (California Department of Forestry and Fire Protection). 2007. *Fire Hazard Severity Zones Map in SRA, Fresno County and Madera County*. November 7, 2007. Accessed: April 3, 2026. Retrieved from: https://calfire-forestry.maps.arcgis.com/.

_____. 2024. *Strategic Plan*. State of California, California Natural Resources Agency, California Department of Forestry and Fire Protection. Accessed: April 5, 2026. Retrieved from: https://www.fire.ca.gov/about/cal-fire-strategic-plan-2024.

_____. 2025a. *2025 Madera-Mariposa-Merced Unit Fire Plan*. May. Accessed: April 5, 2026. Retrieved from: https://osfm.fire.ca.gov/what-we-do/community-wildfire-preparedness-and-mitigation/pre-fire-planning.

_____. 2025b. *2025 Fresno-Kings Unit Fire Plan*. Accessed: April 5, 2026. Retrieved from: https://osfm.fire.ca.gov/what-we-do/community-wildfire-preparedness-and-mitigation/pre-fire-planning.

CPUC (California Public Utilities Commission). 2020. Attachment 2.2, WMP Guidelines Template. November.

_____. 2021. *CPUC Fire-Threat Map*. Version 3 revised on August 19. Accessed: April 5, 2026. Retrieved from: https://files.cpuc.ca.gov/safety/fire-threat_map/2021/CPUC%20Fire%20Threat%20Map_v.3_08.19.2021.Letter%20Size.pdf.

FERC (Federal Energy Regulatory Commission). 2025. *Environmental Assessment for the Kerckhoff Hydroelectric Project, FERC Project No. 96-048*. Washington, D.C. December. Accessed: April 5, 2026. Retrieved from: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20251231-3001&optimized=false&sid=e4353735-bc31-414a-8938-299c96575f03.

Fresno County. 2024a. *Fresno County General Plan Policy Document*. Comprehensive General Plan Review and Revision. February. Accessed: April 3, 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/public-works-and-planning/development-services/planning-and-land-use/general-plan/fcgpr_general-plan_county_final_2024_02.pdf.

_____. 2024b. *Hazard Mitigation Plan*. May. Accessed: April 5 2026. Retrieved from: https://www.fresnocountyca.gov/files/sharedassets/county/v/1/resources/hazard-mitigation-plan/draft-2024-fresno-county-hazard-mitigation-plan.pdf.

Madera County. 2008. *Madera County Community Wildfire Protection Plan*. Accessed: April 5, 2026. Retrieved from: https://www.maderacounty.com/home/showdocument?id=3608.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

PG&E (Pacific Gas and Electric Company). 2025. *2026–2028 Wildfire Mitigation Plan*. Volumes 1 and 2. April 4, 2025. Accessed: April 3, 2026. Retrieved from: https://www.pge.com/assets/pge/docs/outages-and-safety/outage-preparedness-and-support/pge-2026-2028-base-wmp-vol1-r0.pdf and https://www.pge.com/assets/pge/docs/outages-and-safety/outage-preparedness-and-support/pge-2026-2028-base-wmp-v2-r1.pdf.

USFS (United States Forest Service). 2023. *Land Management Plan for the Sierra National Forest: Fresno, Madera, and Mariposa Counties, California*. Accessed: April 3, 2026. Retrieved from: https://acconsensus.org/wp-content/uploads/2024/08/05-SNF_LMP_final_20230504_Web.pdf.

5 ALTERNATIVES SUMMARY

5.1 INTRODUCTION

As discussed in Section 3 *Alternatives Descriptions*, California Environmental Quality Act (CEQA) Guidelines Section 15126.6(a) states that:

> *An [Environmental Impact Report (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 section is intended to describe a reasonable range of feasible alternatives for the Proposed Project that would avoid or substantially lessen any significant impact of the Proposed Project. This section includes the following discussions:

- Overview of Proposed Project objectives;
- Assumptions and methodology of the alternatives analysis;
- Summary of the Alternatives (detailed descriptions can be found in Section 3 *Alternatives Descriptions*);
- Analysis of how each alternative would reduce the potential 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 5.1-1 provides a summary of potential Proposed Project impacts compared to the No Project Alternative impacts, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1) impacts, and Alternative 2: Proposed Project with Implementation of the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2) impacts. Detailed descriptions of the No Project Alternative, Alternative 1, and Alternative 2 can be found in Section 3 *Alternatives Descriptions*.

Impacts are evaluated by comparing the Proposed Project, the No Project Alternative, and each identified Alternative to baseline environmental conditions, which reflect existing physical conditions at the time of publication of the May 2023 Notice of Preparation (NOP), consistent with CEQA Guidelines Section 15125. Significance is determined based on the extent to which each scenario would result in a direct or indirect change from those baseline conditions. Environmental resource sections in Section 4 *Environmental Analysis* discuss separately identified potential construction and operation impacts for each CEQA Checklist question for each alternative. The impact determination for those checklist items identifies the greatest impact determination if the impact for construction and operations are different.

Table 5.1-1: Comparison of Proposed Project, No Project Alternative, Alternative 1, and Alternative 2 Impacts

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
Aesthetics				
AE-1) Would the project have a substantial adverse effect on a scenic vista?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
AE-2) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
AE-3) In nonurbanized areas, would the project 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 a publicly accessible vantage points)?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
AE-4) Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
Agricultural and Forest Resources				
AF-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?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
AF-2) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
AF-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))?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
AF-4) Would the project result in the loss of forest land or conversion of forest land to non-forest use?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
AF-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?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
Air Quality				
AQ-1) Would the project conflict with or obstruct implementation of the applicable air quality plan?	Significant and Unavoidable Impact	No Impact (+)	Significant and Unavoidable Impact	Significant and Unavoidable Impact
AQ-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?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
AQ-3) Would the project expose sensitive receptors to substantial pollutant concentrations?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
AQ-4) Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
Biological Resources – Aquatics and Fisheries				
BIO-1) Would the 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?	Less than Significant Impact with Mitigation Incorporated	No Impact (+)	Less than Significant Impact with Mitigation Incorporated (=)	Less than Significant Impact with Mitigation Incorporated (=)
BIO-2) Would the 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 CDFG or USFWS?	Less than Significant Impact with Mitigation Incorporated	No Impact (+)	Less than Significant Impact with Mitigation Incorporated (=)	Less than Significant Impact with Mitigation Incorporated (=)
BIO-3) Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
BIO-4) Would the 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?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
BIO-5) Would the project conflict with any local policies or ordinances protecting biological resources, such as tree preservation policy or ordinance?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
BIO-6) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plan?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
Biological Resources – Terrestrial				
BIO-1) Would the 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?	Significant and Unavoidable	No Impact (+)	Significant and Unavoidable	Significant and Unavoidable

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
BIO-2) Would the 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?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
BIO-3) Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
BIO-4) Would the 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?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
BIO-5) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
BIO-6) Would the 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?	No Impact	No Impact (+)	No Impact (=)	No Impact (=)
Cultural Resources				
CR-1) Would the project cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
CR-2) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
CR-3) Would the project disturb any human remains, including those interred outside of dedicated cemeteries?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
Energy				
EN-1) Would the project result in potentially significant environmental impact due to wasteful, inefficient, unnecessary consumption of energy resources during Project construction or operation?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
EN-2) Would the project conflict with or obstruct State or local plan for renewable energy or energy efficiency?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
Geology and Soils				
GEO-X) Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving				
GEO-1. 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?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
GEO-2. Strong seismic ground shaking?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
GEO-3. Seismic-related ground failure, including liquefaction?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
GEO-4. Landslides?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
GEO-5) Would the project result in substantial soil erosion or the loss of topsoil?	Less than Significant Impact with Mitigation Incorporated	No Impact (+)	Less than Significant Impact with Mitigation Incorporated (=)	Less than Significant Impact with Mitigation Incorporated (=)
GEO-6) Would the project 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?	Less than Significant Impact with Mitigation Incorporated	No Impact (+)	Less than Significant Impact with Mitigation Incorporated (=)	Less than Significant Impact with Mitigation Incorporated (=)
GEO-7) Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
GEO-8) Would the project 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?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
GEO-9) Would the project directory or indirectly destroy a unique paleontological resource or site or unique geologic feature?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
Greenhouse Gas Emissions				
GHG-1) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
GHG-2) Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
Hazards and Hazardous Materials				
HM-1) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
HM-2) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	Less than Significant Impact with Mitigation Incorporated	No Impact (+)	Less than Significant Impact with Mitigation Incorporated (=)	Less than Significant Impact with Mitigation Incorporated (=)
HM-3) 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?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
HM-4) 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?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
HM-5) 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?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
HM-6) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
HM-7) Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involved in wildland fires?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
Hydrology and Water Quality				
HYD-1) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	Less than Significant Impact with Mitigation Incorporated	No Impact (+)	Less than Significant Impact with Mitigation Incorporated (=)	Less than Significant Impact with Mitigation Incorporated (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
HYD-2) Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin?	No Impact	No Impact (+)	No Impact (=)	No Impact (=)
HYD-3) Would the project 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:				
HYD-3i. Result in substantial erosion or siltation on- or off-site?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
HYD-3ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on site or off site?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
HYD-3iii. 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?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
HYD-3iv. Impede or redirect flood flows?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
HYD-4) In flood hazard, tsunami, or seiche zones, would the Project risk release of pollutants due to Project inundation?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
HYD-5) Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	Significant and Unavoidable	No Impact (+)	Significant and Unavoidable	Significant and Unavoidable
Land Use and Planning				
LAND-1) Would the project physically divide an established community?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
LAND-2) Would the project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
Mineral Resources				
MIN-1) Would the project result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
MIN-2) Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
Noise				
NOI-1) Would the project 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 standards of other agencies?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
NOI-2) Would the project result in generation of excessive groundborne vibration or groundborne noise levels?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
NOI-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?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
Population and Housing				
PH-1) Would the project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
PH-2) Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
Public Services				
PS-X) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:				

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
PS-1) Fire Protection?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
PS-2) Police Protection?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
PS-3) Schools?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
PS-4) Parks?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
PS-5) Other public facilities?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
Recreation				
REC-1) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that the substantial physical deterioration of the facility would occur or be accelerated?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
REC-2) Would the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
Transportation				
TSP-1) Would the project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
TSP-2) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
TSP-3) Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
TSP-4) Would the project result in inadequate emergency access?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
Tribal Cultural Resources				
TCR-X) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe and that is:				

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
TCR-1) 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)	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
TCR-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. In applying the criteria set forth in subdivision (c) of Public Resources Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
Utilities and Service Systems				
USS-1) Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
USS-2) Would the project have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
USS-3) Would the project result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the Provider's existing commitments?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
USS-4) Would the project generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
USS-5) Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)
Wildfire				
WF-1) Would the project substantially impair an adopted emergency response plan or emergency evacuation plan?	No Impact	No Impact (=)	No Impact (=)	No Impact (=)

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1: Alternative Spill Recession and Flow Ramping	Alternative 2: Revised BLM 4e Conditions
WF-2) Would the project, 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?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
WF-3) Would the project require the installation or maintenance 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 of the environment?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)
WF-4) Would the project 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?	Less than Significant Impact	No Impact (+)	Less than Significant Impact (=)	Less than Significant Impact (=)

+ reduced level of impact; = similar level of impact; – increased level of impact
CDFG = California Department of Fish and Game; CDFW = California Department of Fish and Wildlife; USFWS = United States Fish and Wildlife Service

5.2 PROPOSED PROJECT OBJECTIVES

The underlying purpose of the Proposed Project is to provide hydroelectric power. The California State Water Resources Control Board (State Water Board) has identified the following Proposed Project objectives, as required by Section 15124, Subdivision (b) of the CEQA Guidelines:

1. Continue to provide renewable energy to help California meet its Renewables Portfolio Standard (RPS)
2. Improve the long-term water quality and associated beneficial use conditions for Kerckhoff Reservoir and the San Joaquin River (SJR)
3. Ensure safe contact and non-contact recreation opportunities for members of the public

5.3 ALTERNATIVES ANALYSIS ASSUMPTIONS

The No Project Alternative evaluates conditions that would occur if the Proposed Project were not approved. Under this alternative, no changes would be made to existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) operations, facilities, or environmental management measures, and the Kerckhoff Hydroelectric Project would not be relicensed at this time. Instead, relicensing negotiations would continue until a resolution is reached, potentially delaying any proposed improvements for an unknown period.

The Proposed Project includes operational modifications intended to improve aquatic resource conditions, update management plans, and enhance recreational facilities. Under the No Project Alternative, these improvements would not occur. Although construction-related impacts associated with the Proposed Project would be avoided, certain existing facilities, such as roadways and trails requiring repair, could continue to degrade over time in the absence of proposed upgrades and maintenance improvements.

In addition, proposed flow modifications intended to improve recreational safety below the Kerckhoff Hydroelectric Project Dam and to benefit downstream aquatic resources would not be implemented. As a result, potential environmental benefits associated with the Proposed Project would not be realized under the No Project Alternative. Resource areas where beneficial effects would not occur include aesthetics, air quality, biological resources (aquatic and terrestrial), cultural and Tribal cultural resources, energy, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, noise, recreation, transportation, utilities and service systems, and wildfire. See Table 5.4-1 for additional details by resource section.

As described throughout Section 4 *Environmental Analysis*, monitoring plans and environmental management measures would be required to reduce potential construction and operation impacts to less than significant, and, if necessary, mitigation measures would be required to reduce potential construction and operation impacts to less than significant.

5.4 ALTERNATIVES TO THE PROPOSED PROJECT

5.4.1 No Project Alternative

Under CEQA, an EIR must include an evaluation of a no project alternative (California Code of Regulations, Title 14, Section 15126.6, Subdivision (e)): “The purpose of describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project.” (Id. Section 15126.6, subd. (e)(1).) “The ‘no project’ analysis shall discuss the existing conditions at the time the notice of preparation is published . . . as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.” (Id., Section 15126.6, Subdivision (e)(2))

Under the No Project Alternative in this EIR, the State Water Board would deny PG&E’s application for water quality certification for the Kerckhoff Hydroelectric Project pursuant to Section 401 of the Clean Water Act (CWA) (Title 33 of the United States Code,

Section 1341). While the effects of denial are not certain, it can be reasonably assumed that the facilities associated with the Kerckhoff Hydroelectric Project would not be modified or retired.

If the Proposed Project is not implemented, the existing environmental conditions and resources would be maintained or unchanged in the future over the short term. Section 2.3 *Existing Kerckhoff Hydroelectric Project* describes the existing facilities and operations that would be maintained as part of the No Project Alternative. This short-term scenario is anticipated for a period of one to five years with annual license renewals of the existing Federal Energy Regulatory Commission (FERC or Commission) license and until a new proposal is put forth for the Kerckhoff Hydroelectric Project.

Forecasting one specific No Project scenario for a longer term greater than five years would be speculative, in light of the above, and it would be contrary to the CEQA Guidelines' mandate to disclose and assess the environmental impacts that would "reasonably be expected to occur in the foreseeable future." The potential future for the existing hydroelectric facilities could include the transfer, decommissioning, or relicensing with modifications of all or some of the dam and associated facilities.

The State Water Board developed the following assumptions regarding reasonable events that would occur under the No Project Alternative if selected:

- The Kerckhoff Hydroelectric Project would continue to operate as described in the existing FERC license and amendments
- The Kerckhoff 1 (K1) Powerhouse and associated facilities would remain in their current state and would not be formally decommissioned
- The Vista Day Use Area would not be developed for recreation
- The FERC Project Boundary would not be revised
- Proposed environmental management measures would not be implemented, including the Water Temperature Measure, American Shad Spawning Season Flow Release Regime Measure, End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure, Subsequent Spill Ramp Down Measure,

Spill Season Flow Measure, Planned Outage Measure (POM), Flow Notifications Measure, SJR Above Kerckhoff Reservoir Inflow Gage Measure, Modification of Infrastructure and Procedures Measure, and Whitewater Notification and Access Measure

- Proposed new and revised management plans would not be implemented including the Aquatic Resources Plan, Wildlife Management Plan, Vegetation Management and Pest Control Plan, Project Road and Trail Maintenance Plan, Recreation Management Plan, and Historic Properties Management Plan
- Further stakeholder engagement and negotiations would occur until a decision on relicensing is reached

5.4.2 Alternative 1 – Alternative Spill Recession and Flow Ramping

As described in Section 3.4.2 *Alternative 1: Alternative Spill Recession and Flow Ramping*, Alternative 1 maintains all activities associated with the Proposed Project with the exception of fully or partially replacing flow measures.

Under Alternative 1, the Long-Term Operating Rules (LTOR) Boating Flows and Down Ramping of Spill Flows, which are also implemented upstream of the Kerckhoff Hydroelectric Project by Southern California Edison's (SCE) Big Creek 4 Project (FERC Project No. P-2017), would replace the PG&E-proposed EOS Flow Recession and Subsequent Spill Ramp Down measures. In addition, the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure replaces the down ramping components of the Applicant's proposed Spill Season Flow Measure. The LTOR are a series of down ramping operations with specific water year (WY) and implementation criteria. Under the LTOR, the Kerckhoff Hydroelectric Project would have a varied length of down ramping of spill based on WY types, and the down ramping of spills would be performed in a manner that simultaneously provides boating flows. The WYs in this alternative are described as spill years versus non-spill years.

Since the Big Creek 4 Project implements the same LTOR upstream and those inflows feed into Kerckhoff Reservoir, the intent of this Alternative is to pass the recreating benefits and supplemental aquatic resource benefits from flow releases provided below

SCE's Redinger Dam (Big Creek 4 Project) through the Project Bypass Reach (PBR) of the Proposed Project.

Alternative 1 aims to increase the number of boating days compared to the Proposed Project. During designated spill years, boating flows would be provided following a declining limb of spill between May 1 and August 31, with a minimum of two boating days provided per year. During designated non-spill years, boating flows would be provided on the weekends between May 15 and June 15 starting on Saturdays, if sufficient flow is available.

Based on the alternative modeling (Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0), the Spill Year Schedule Boating Flows and Down Ramping of Spill Flows Measure was modeled successfully and gradually ramped down flows within the PBR, while keeping the reservoir within the normal operating range (980.0 feet to 984.5 feet msl). However, it was only able to do so under infeasible operational practices due to drawing down Kerckhoff Reservoir toward the minimum operating elevation for the K2 Powerhouse in the model (981.5 feet msl.). As the reservoir approaches the K2 Powerhouse's minimum operating reservoir elevation, the K2 Powerhouse cycles above and below the ROZ in an attempt to keep the reservoir high enough to stay above the minimum operating elevation for the K2 Powerhouse. The K2 Powerhouse cycling frequency is anywhere from half an hour to two hours, which represents an unrealistic operating scenario. Based on the documented operational constraints, any operation that requires K2 to dwell in the ROZ is considered infeasible due to excessive cavitation and vibration impacts and the associated maintenance and outage consequences. That means operating strategies that would require repeated short interval oscillations across the ROZ are not considered feasible, because they can increase cycling wear and raise reliability/maintenance risk even if each individual crossing is brief (personal email communication, J. Hartman and C. McCormick, March 5, 2026).

The Stranding Protection Down Ramping Measure would be implemented from May 1 to August 31 to reduce flows from the dam once the average daily flow declines below 1,600 cubic feet per second (cfs) for initial or subsequent spills in relation to the LTOR down ramping operation. A down ramp of spills would occur between September 1 and October 31 in all WY types once average daily flow declines below 1,600 cfs.

Additionally, under Alternative 1, a ramp up measure (Alternative 1 Ramp Up Measure) would replace the ramp up components of the Applicant's proposed Spill Season Flow Measure and POM. This measure puts limits on the rate increase of stage as measured at Gage J-2. The ramp up in the PBR cannot exceed a maximum of 1 foot per hour (or less) at Gage J-2 between minimum instream flow (MIF) and 4,000 cfs, provided there is sufficient storage and powerhouse capacity to meet this requirement. Based on the modeling conducting in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0, this measure would be feasible during normal operations only if PG&E operators were given advanced notification of incoming flows. The feasibility of this measure is dependent on forecasted inflow information, sufficient storage, and powerhouse capacity.

5.4.3 Alternative 2 – Proposed Project with BLM Revised 4(e) Conditions

As described in Section 3.4.3 *Alternative 2: Proposed Project with United States Bureau of Land Managements Revised 4(e) Conditions*, Alternative 2 maintains all activities associated with the Proposed Project but modifies PG&E's proposed flow measures. Under Alternative 2, there is a Modified EOS Flow Recession Measure, Modified Spill Season Flow Measure, and Modified POM, but the Subsequent Spill Ramp Down Measure remains the same as the Proposed Project.

Under Alternative 2, the WYs are categorized under Above Average (AA) and Below Average (BA) years. Under the Modified EOS Flow Recession Measure, a ramp down would be provided following the final spill event of the year between May 1 and August 31, with the first two to three days of the ramp down providing boating flows, depending on the WY type. The Subsequent Spill Ramp Down Measure would be implemented for

any spill events that occur after the EOS Flow Recession Measure through October 31 for all WY types when flows decline below 1,600 cfs.

The Modified Spill Season Flow Measure replaces PG&E's Spill Season Flow Measure and has two down ramping protocols following a spill event depending on the WY type (AA or BA) as described in Section 3.4.3.3 *Modified Spill Season Flow Measure*. Under the Modified Spill Season Flow Measure, down ramping would occur between March 1 and August 31 if the EOS Flow Recession or Subsequent Spill Ramp Down Measure is not being implemented.

The Modified POM under Alternative 2 implements the initial release protocol from the Proposed Project and new down ramping operations during planned Kerckhoff 2 (K2) Powerhouse outages. The initial release protocol begins with the initiation of a spill event that falls within a planned K2 Powerhouse outage and is subject to sufficient water availability. The initial spill would be released at 3:30 a.m. when flows below Kerckhoff Dam are expected to exceed a daily average flow of 1,000 cfs for AA WYs and 500 cfs for BA WYs and there is sufficient water availability. Under Alternative 2, the planned outage ramp up protocol described under the Proposed Project was eliminated and replaced with a higher flow step during AA WYs as a deterrence flow, per an email from PG&E dated January 13, 2026 (personal email communication, J. Hartman and C. McCormick, January 13, 2026).

The State Water Board evaluated detailed operations modeling for Alternatives 1 and 2 using PG&E's Operations Model for WYs 2003 and 2005–2017 in the United States Army Corps of Engineers Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). Results of this modeling effort can be found in Appendix G *Project Operations Model – CEQA Alternatives 1 and 2*, Section 4.0.

5.4.4 Alternatives Analysis

This section analyzes the potential impacts of the No Project Alternative, Alternative 1, and Alternative 2.

5.4.4.1 No Project Alternative

Section 15126.6(e)(2) of the CEQA Guidelines states that "The 'no project' analysis shall discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services." Specifically, where a CEQA document concerns revisions to an ongoing operation, "the 'no project' alternative will be the continuation of the existing … operation into the future."

In this instance, in the short term, 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 or Alternatives were not approved and implemented.

The Proposed FERC Project Boundary runs through Rural Mountain District and Public Open Space zones in Madera County and Recreational, Exclusive Agricultural, and Resource Conservation zones in Fresno County. Under the No Project Alternative, existing land uses would continue under the current ownership, and 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 Section 4 *Environmental Analysis*.

However, the No Project Alternative would not meet most of the Proposed Project objectives since the 16 new environmental management plans and measures would not be implemented, including measures proposed to protect water quality and associated beneficial use conditions for Kerckhoff Reservoir and the SJR (Objectives 2 and 3). The No Project Alternative would not include any scheduled whitewater boating access, trail improvements would not occur, and the Vista Day Use Area would not be constructed. This short-term scenario is anticipated for a period of one to five years with annual

license renewals of the existing FERC license and until a new proposal is put forth for the Kerckhoff Hydroelectric Project.

Forecasting one specific No Project scenario for a longer term greater than five years would be speculative, in light of the above, and would be contrary to the CEQA Guidelines' mandate to disclose and assess the environmental impacts that would "reasonably be expected to occur in the foreseeable future." The potential future for the existing hydroelectric facilities could include the transfer, decommissioning, or relicensing with modifications of all or some of the dams and associated facilities. Table 5.4-1

5.4.4.2 Alternative 1 – Alternative Spill Recession and Flow Ramping

Under Alternative 1, impacts to resource categories aesthetics, agriculture and forestry resources, energy, greenhouse gas emissions, land use and planning, mineral resources, noise, population and housing, public services, transportation, and utilities and service systems are either no impact or less than significant impacts.

Potentially significant impacts could result from Alternative 1 to resource categories biological resources – aquatics and fisheries, geology and soils, hazards and hazardous materials, and hydrology and water quality, but they would be mitigated with mitigation measures. A potentially significant impact would be mitigated for biological resources – aquatics and fisheries through Mitigation Measure BIO-1: Conduct a Preconstruction Survey for Northwestern Pond Turtle at the new SJR gage and Mitigation Measure BIO-3: Compensate for the Temporary and Permanent Losses of Waters of the United States/Waters of the State, which compensates for impacts resulting from the construction of the new inflow gage. For geology and soils, a potentially significant impact would be mitigated through Mitigation Measure GEO-1: Erosion and Sediment Control Plan and Mitigation Measure WQ-3: Construction General Permit, WQMP, and Dewatering Plans. Potential impacts to hazards and hazardous materials would be potentially significant without the implementation of Mitigation Measure WQ-3: Construction General Permit, WQMP, and Dewatering Plans. Additionally, one of the hydrology and water quality resource impacts (potential impact HYD-1) was mitigated

through Mitigation Measure WQ-1: Retirement Plan for Kerckhoff 1 Powerhouse and Associated Facilities, Mitigation Measure WQ-2: San Joaquin River Above Kerckhoff Reservoir Inflow Gage Plan, Mitigation Measure WQ-3: Construction General Permit, WQMP, and Dewatering Plans, and Mitigation Measure WQ-4: A Low-Level Outlet (LLO) Sediment Sluicing Management Plan.

Significant and unavoidable impacts would occur for hydrology and water quality, air quality, and biological resources – terrestrial if recommended mitigation measures were not implemented. More specifically, for hydrology and water quality, a significant and unavoidable impact to recreation-related beneficial uses under potential impact HYD-5 would occur if Recommended Mitigation Measure WQ-5: Instream Flow Public Safety Plan were not implemented to notify recreators of spills at Kerckhoff Dam and by prompting recreators to exit the water. A significant and unavoidable impact may also be seen on air quality if Recommended Mitigation Measure AQ-1: Fugitive Dust PM10 Measures and Construction Equipment is not implemented to minimize or avoid the emission of dust. Additionally, for biological resources – terrestrial, a significant and unavoidable impact to special-status bats from construction associated with the K1 Powerhouse decommissioning could be seen without the implementation of Recommended Mitigation Measure BIO-2. These impacts and mitigation measures are the same as under the Proposed Project.

5.4.4.3 Alternative 2 – Proposed Project with Revised BLM 4(e) Conditions

Alternative 2 analysis has the same impact levels and mitigation measures as discussed under Alternative 1 in Section 5.4.4.2. Impacts to resource categories aesthetics, agriculture and forestry resources, energy, greenhouse gas emissions, land use and planning, mineral resources, noise, population and housing, public services, transportation, and utilities and service systems have either no impact or less than significant impacts. Potentially significant impacts were mitigated by mitigation measures for resource categories biological resources – aquatics and fisheries, geology and soils, hazards and hazardous materials, and hydrology and water quality. Significant and unavoidable impacts would occur for hydrology and water quality, air

quality, and biological resources – terrestrial if recommended mitigation measures were not implemented.

Table 5.4-1: Beneficial Impacts of Proposed Project and Alternatives from Implementation of Environmental Management Measures by Resource Area

Resource	Outcomes
Hydrology and water quality	• Reduced flow variability and ramping in the PBR (potential beneficial impact) • Enhanced recreation opportunities (providing planned whitewater boating flows) in the PBR (potential beneficial impact)
Biological resources – aquatics and fisheries	• Maintained or enhanced aquatic habitat for fish and aquatic resources in Kerckhoff Reservoir and the PBR • Periodic fish population monitoring in the PBR • Maintained or enhanced environmental protections of fish and aquatic resources, including native species • Adaptive management measures should deleterious changes to fish or mussel populations be noticed through monitoring
Biological resources – terrestrial	• Protection for special-status plant populations and modified operation activities, where necessary, to avoid potential impacts on these populations • Minimized potential for the spread or introduction of invasive weeds resulting from operational activities • Minimized potential for impacts on non-target botanical and wildlife resources resulting from use of pesticides • Minimized potential for impacts on bald eagles from ongoing and routine activity in the vicinity of a nest and by preserving water quality in foraging habitat

Resource	Outcomes
	• Protections for wildlife species and habitats during Proposed Project routine and non-routine heavy maintenance activities and construction
Geology and soils	• Protections for water quality by minimizing erosion and sedimentation along the Proposed Project roads and trails • Protections for special-status plants, special-status wildlife, and cultural resources when implementing maintenance along Proposed Project roads and trails • Established protocol for PG&E's consultation, permitting, and reporting requirements when implementing non-routine maintenance along Proposed Project roads and trails • Maintained channel geomorphology • Maintained sediment composition and transport
Land use and planning	• Ensures that only land necessary to operate the Proposed Project is encompassed in the Proposed FERC Project Boundary • Maintained land management uses, including in the vicinity of the K1 Powerhouse
Recreation	• Provision of recreation facilities that meet the needs of Proposed Project recreation users and are consistent with state and federal land management guidance • Enhanced, developed, and dispersed recreation opportunities for Proposed Project visitors • Provision of reasonable access to Kerckhoff Reservoir shoreline and water surface and increased boat-in shoreline access for day use recreation • Improved access to Proposed Project recreation facilities for persons with disabilities

Resource	Outcomes
	• Measures to monitor and minimize potential impacts of Proposed Project recreation use on environmental and cultural resources • Provision of visitor interpretive and educational opportunities about the Proposed Project and its associated resources • Enhanced visitor awareness about flows in the SJR and improved wayfinding for visitors using roads and trails in the SJR Gorge Recreation Area • Ensures two days of whitewater boating opportunities every year in the PBR • Enhanced public safety that includes the planned outage ramp up protocol and public notification protocols
Aesthetics	• Maintained visual quality associated with Kerckhoff Reservoir, the PBR, and existing hydroelectric facilities, including the K1 Powerhouse facilities being retired, in conformance with BLM visual management objectives • Maintained cultural and scenic outstandingly remarkable values for Wild and Scenic River suitability of Segment 1 of the SJR
Cultural and Tribal cultural resources	• Established resource management and preservation goals and priorities through the Proposed Project's HPMP • Established protocols for review of operational activities and protection of cultural and Tribal resources, and management of cultural and Tribal resources over the life of the Proposed Project license • Establishment of implementation procedures including roles and responsibilities, communication, and review by stakeholders including agencies and Native American Tribes

Resource	Outcomes
	• Establishment of procedures for amending the Proposed Project's HPMP to provide for adaptive management

HPMP = Historic Properties Management Plan; SJR = San Joaquin River; PG&E = Pacific Gas and Electric Company

The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by PG&E; and on public land administered by the United States Forest Service, Sierra National Forest (USFS-SNF); BLM; and the United States Bureau of Reclamation (Reclamation) under BLM management. Under the No Project Alternative, land ownership within the existing FERC Project Boundary would not change. There are no current proposals to change current land ownership or management. Since the K1 Powerhouse was not operational under baseline conditions, there would not be a decrease in annual generation related to the K1 Powerhouse retirement under the No Project Alternative. Generation would continue to be highly variable among years primarily based on the magnitude and duration of inflow to Kerckhoff Reservoir.

Since the No Project Alternative would allow continuation of the existing uses, it would not result in any of the potential impacts identified for the Proposed Project, as described in Section 4 *Environmental Analysis*.

However, the No Project Alternative would not meet some of the Proposed Project objectives. While it would continue to produce renewable energy at approximately the same rate as current conditions and contribute to California's RPS program, it would not provide the same level of improvements that could benefit hydrology and water quality, biological resources (aquatic and terrestrial), land use and planning, geology and soils, recreation, aesthetics, and cultural resources as the Proposed Project.

5.5 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Section 15126.6(e)(2) of the CEQA Guidelines requires that an "environmentally superior" alternative be identified. 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, and CEQA does not require the lead agency to select the environmentally superior alternative if it would not accomplish the basic project objectives (see CEQA Guidelines Section 15126.6).

A project may be approved even though it would cause a significant impact on the environment, provided the lead agency makes a fully informed and publicly disclosed decision that there is no feasible way to lessen or avoid the significant impact and specifically identified expected benefits from the project outweigh the significant impacts on the environment (see CEQA Guidelines, Sections 15042–15043).

Alternative 2, the Proposed Project with BLM Revised 4(e) Conditions, plus the Alternative 1 Ramp Up Measure as described in Section 2 *Proposed Project Description* (Section 4.11.4.1.2 and Section 4.11.4.1.3), is the environmentally superior alternative among the other alternatives since it best achieves the Proposed Project objectives while improving downstream river flows and providing recreational resources.

Implementation of Alternative 2, plus the Alternative 1 Ramp Up Measure, would meet all three objectives of the Proposed Project. The Kerckhoff Hydroelectric Project under Alternative 2 plus the Alternative 1 Ramp Up Measure would continue to provide renewable energy to help California meet its RPS (Objective 1). Alternative 2 plus the Alternative 1 Ramp Up Measure would improve the long-term associated beneficial use conditions for Kerckhoff Reservoir and the SJR, such as contact and non-contact recreation, canoeing, and rafting, in part by providing scheduled whitewater boating flow releases with releases that are optimal for the Kerckhoff Hydroelectric PBR. Finally, this Alternative would satisfy the third objective of the Proposed Project, which is ensuring safe contact and non-contact recreation opportunities for members of the public. This would be accomplished by limiting, when feasible, rapid stage changes caused by sudden flow fluctuations within the Project Bypass Reach. These sudden flow fluctuations can significantly impact recreation-related beneficial uses for sources to Millerton Lake (contact and non-contact recreation, canoeing, and rafting) and can be mitigated by limiting rapid stage changes, when feasible. Implementation of the

environmentally superior alternative (Alternative 2 plus Alternative 1 Ramp Up Measure) would provide gradual ramp down measures, provide scheduled boating flows, implement a one foot per hour ramp up when feasible, and further protect recreationalists below Kerckhoff Dam with Mitigation Measure WQ-5 through real-time flow change notification procedures.

As discussed in this EIR, by implementing the mitigation measures, the environmental management measures, and monitoring plans, Alternative 2 plus the Alternative 1 Ramp Up Measure would result in less than significant impacts.

5.6 LITERATURE CITED

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas and Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Prefilling Meeting & CEQA Discussion,” on January 13, 2026.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas & Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff: Ramping Follow-Up,” on March 5, 2026.

6 CUMULATIVE IMPACTS

A cumulative impact consists of an impact created as a result of the combination of the Proposed Project evaluated in the Environmental Impact Report (EIR), together with other reasonably foreseeable impacts not caused by the Proposed Project. California Environmental Quality Act (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 impacts of an individual project could be significant when viewed in connection with the impacts of past projects, the impacts of other current projects, and the impacts of probable future projects. Where the cumulative impact caused by the project's incremental impact and the impacts of other reasonably foreseeable projects is not significant, the EIR must briefly indicate why the cumulative impact is not significant. Cumulative impacts can result from individually minor but collectively significant actions taking place over time, including hydropower and other land and water development activities. Determinations of cumulatively considerable effects is required by CEQA Section 15065[a][3], Mandatory Findings of Significance, and CEQA Section 15130 guides the discussion of cumulative impacts. Three questions are useful to make determinations:

1. Do the Proposed Project and Alternatives make an adverse contribution to the impact in question?
2. Is the combined impact of the Proposed Project or Alternatives and other projects significant and adverse?
3. Are the Proposed Project and Alternatives' incremental impact cumulatively considerable?

CEQA states that when a project's contribution is not cumulatively considerable, the EIR need only briefly describe supporting reasoning for this conclusion (Section 15130[a][2]).

6.1 ANALYTICAL APPROACH

Section 15130 of the CEQA Guidelines permits two 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 Proposed Project Area; 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 cumulative impacts analysis in this EIR is based on a combination of the list approach and projections approach.

The Proposed Project would relicense the existing Kerckhoff Hydroelectric Project (Kerckhoff Hydroelectric Project) for a new 50-year term and would include modifications to operation, as discussed in Section 2 *Proposed Project Description*. The Proposed Project is located within a deeply entrenched and meandering section of the San Joaquin River (SJR). The local drainage area to the Kerckhoff Hydroelectric Project, downstream from Redinger Lake (operated by Southern California Edison [SCE]) to Millerton Lake (operated by United States Bureau of Reclamation [Reclamation]), is known as the Auberry watershed.

The Kerckhoff Hydroelectric Project is located on private lands, some of which are owned by Pacific Gas and Electric Company (PG&E or Applicant); on public land administered by the United States Forest Service, Sierra National Forest (USFS-SNF); the United States Bureau of Land Management (BLM); and Reclamation lands under BLM management. The general area considered in the cumulative impact analysis is the geographic scope defined by the physical limits or boundaries of the Proposed Project’s potential impact on the resources and contributing impacts from other hydropower and non-hydropower activities within the upper SJR Basin. Based on the 50-year license for the Kerckhoff Hydroelectric Project, this cumulative analysis evaluates up to 50 years into the future and recognizes that the quality and quantity of information diminishes the further into the future potential impacts are assessed.

The Proposed Project includes the Kerckhoff hydroelectric facility; Kerckhoff Dam and Reservoir; Kerckhoff 1 (K1) Powerhouse; Kerckhoff 2 (K2) Powerhouse; and associated facilities. The area of the Proposed Project for the cumulative impacts analysis also includes projects and plans occurring within or potentially affecting the upper SJR Basin, with specific emphasis on the river from Kerckhoff Reservoir to the confluence with Millerton Lake. These projects and plans were examined for their potential to result in a cumulative impact when combined with the Proposed Project (Table 6.1-1).

Table 6.1-1: Projects and Plans Included in the Cumulative Impact Analysis

Project/ Plan Name	Location Relative to Proposed Project	Project/ Plan Type	Status
SCE's Big Creek Hydroelectric System	Immediately upstream of Kerckhoff Reservoir	Hydroelectric	Ongoing operation; Relicense issuance expected in the near term for Mammoth Pool Project (FERC Project No. 2085); Big Creek Nos.1 and 2 (FERC Project No. 2175); Big Creek Nos. 2a, 8, and Eastwood (FERC Project No. 67); Big Creek No. 3 (FERC Project No. 120)
California Independent System Operator Big Creek No. 4 Project	Immediately upstream of Kerckhoff Reservoir	Hydroelectric	Ongoing operation

Source: PG&E 2023

FERC = Federal Energy Regulatory Commission; No. = number; SCE = Southern California Edison

6.2 CUMULATIVE IMPACT SETTING

The impact discussions in Section 4 *Environmental Analysis* explain the geographic scope of the Proposed Project resource area being analyzed for cumulative impacts (immediate Proposed Project Vicinity, county, watershed, air basin, etc.). The geographic area considered for each resource's cumulative impact depends on the potential impact analyzed. For example, in assessing potential aesthetic impacts, the pertinent geographic study area is the vicinity of the Proposed Project from which another project could be publicly viewed and may contribute to a significant cumulative visual impact. Conversely, in assessing potential air quality impacts, all development within the air basin contributes to regional emissions of criteria pollutants, and basinwide projections of emissions is the best tool for determining the cumulative impact.

The following provides a summary of the potential cumulative impact setting for each resource area:

- Aesthetics: The cumulative setting for visual impacts that can be publicly viewed includes the Proposed Project together with other built development in the immediate Proposed Project Vicinity, including from waterways, of which none are identified
- Agriculture and Forestry Resources: The agricultural and forest resources cumulative setting considers the Proposed Project's potential impacts when considered with other projects in USFS-SNF, BLM lands, and the SJR Basin
- Air Quality: The air quality cumulative setting is based on the regional growth within the San Joaquin Valley Air Basin based on the Air Quality Attainment Plans (Valley Air District 2023)
- Biological Resources – Aquatics and Fisheries: The aquatics and fisheries cumulative setting includes the SJR Basin
- Biological Resources – Terrestrial: The terrestrial biological resources cumulative setting includes the USFS-SNF, BLM lands, and the SJR Basin
- Cultural Resources: The cultural resources cumulative setting is the area defined by Federal Energy Regulatory Commission (FERC or Commission) as the Area of

Potential Effects (APE), which was developed in consultation with the State Historic Preservation Office (SHPO)

- Energy: The energy cumulative setting relates to statewide use of energy resources
- Geology and Soils: The geology and soils cumulative setting includes the SJR Basin
- Greenhouse Gas (GHG) Emissions: The cumulative GHG setting is based on the Air Quality Attainment Plans for the San Joaquin Valley Air Pollution Control District (Valley Air District 2023), as well as statewide GHG emissions estimates
- Hazards and Hazardous Materials: The hazards and hazardous materials cumulative setting includes the SJR Basin
- Hydrology and Water Quality: The hydrology and water quality cumulative setting includes the SJR Basin
- Land Use and Planning: The land use and planning cumulative setting includes the Proposed Project's potential impacts when considered with other known projects in the immediate Proposed Project Vicinity, including in USFS-SNF and BLM lands
- Mineral Resources: The mineral resources cumulative setting includes Fresno and Madera counties, the USFS-SNF, BLM lands, and the SJR Gorge
- Noise: The noise cumulative setting includes the Proposed Project and projects in the immediate vicinity of the Proposed Project
- Population and Housing: The population and housing cumulative setting includes the Proposed Project's potential impacts when considered with other projects in the Proposed Project Area, including USFS-SNF and BLM lands
- Public Services: The public services cumulative setting includes the service areas of the providers that would provide public services to the Proposed Project
- Recreation: The recreation cumulative setting considers other projects within the Proposed Project Area, including USFS-SNF, BLM lands, and the SJR Basin
- Transportation: The transportation cumulative setting includes other projects within the Proposed Project area, including USFS-SNF and BLM lands
- Tribal Cultural Resources: The Tribal cultural resources cumulative setting is the area defined by FERC as the APE, which was developed in consultation with the SHPO

- Utilities and Service Systems: The utilities and service systems cumulative setting includes other projects within the service areas of the providers that provide utilities and services to the Proposed Project
- Wildfire: The wildfire cumulative setting is Fresno and Madera counties, focusing on the California's State Responsibility Areas (SRA) and the High Fire Hazard Severity Zones, as defined by the California Department of Forestry and Fire Protection (CAL FIRE 2007). In addition, the California Public Utilities Commission's (CPUC) High Fire Threat District (HFTD) Tier 2 and Tier 3 designations are considered

6.3 CUMULATIVE IMPACTS

The Proposed Project as described in Section 4 *Environmental Analysis*, for aesthetics, agriculture and forestry resources, energy, GHG emissions, hazards and hazardous materials, land use and planning, mineral resources, noise, population and housing, public services, transportation, and utilities and service systems, either has no potential impact or the potential impacts are so minor they would have no contribution to potential cumulative impacts in the areas where potential cumulative impacts could occur, as defined under each resource in Section 6.2 *Cumulative Impact Setting*. Therefore, these topics are not discussed further in this section.

The Proposed Project includes the implementation of environmental management measures and monitoring plans designed to protect, maintain, and enhance environmental, cultural, and recreational resources during the new license term. A full list of the plans and measures is included in Section 2 *Proposed Project Description*.

Implementation of the Proposed Project's environmental management measures and monitoring plans, mitigation measures, and recommended mitigation measures would reduce potential impacts on air quality, biological resources – aquatics and fisheries, biological resources – terrestrial, and geology and soils to less than significant and therefore would have less than significant potential contributions to cumulative impacts in the Proposed Project Area. Implementation of Recommended Mitigation Measures AQ-1, BIO-2, and WQ-5 is uncertain and discussed in sections below. Additionally,

cumulative impacts to cultural resources, Tribal resources, and wildfire are discussed below.

The projects in Table 6.1-1 are ongoing operation of existing facilities or management plans that do not include site-specific projects. Possible changes to the future upstream operation of existing facilities operated by SCE and California Independent System Operator have not been proposed and are unknown at this time. Depending on the scope, timing, and location of future site-specific projects, as well as a project's individual likelihood to contribute to potential impacts in any given resource area, other projects in the area may increase the risks or potential impacts on a resource if protection and prevention measures are not implemented. While future impacts associated with the projects and plans in Table 6.1-1 are unknown at this time, any future project would be required to undergo environmental analysis, as the Proposed Project is currently undertaking, and would be required to comply with federal, state, local, and regional management strategies, policies, and plans.

6.3.1 Air Quality

As discussed in Section 4.3 *Air Quality,* adherence to best management practices (BMPs) and implementation of Recommended Mitigation Measure AQ-1 and Mitigation Measure GEO-1 reduces potential impacts on air quality under the Proposed Project to less than significant levels. However, since Recommended Mitigation Measure AQ-1 is not enforceable and has not been agreed upon by PG&E, impacts would remain potentially significant on implementation of Valley Air District's applicable air quality plans. While not all impacts would be reduced to less than significant without implementation of Recommended Mitigation Measure AQ-1, the Proposed Project and Alternatives' potential localized incremental impacts on air quality would not be cumulatively considerable when viewed in connection with the impacts of the other projects and plans evaluated within the Area of Analysis.

6.3.2 Biological Resources – Aquatics and Fisheries

As discussed in Section 4.4 *Biological Resources – Aquatics and Fisheries*, the Proposed Project would adhere to the following environmental management measures and monitoring plans, which would reduce potential impacts on aquatic biological resources:

- American Shad Spawning Season Flow Release Regime;
- Water Temperature Measure
- End-of-Spill Flow Recession and Whitewater Flow Releases (EOS Flow Recession) Measure
- Subsequent Spill Ramp Down Measure
- Spill Season Flow Measure
- Planned Outage Measure (POM)
- Aquatic Resources Plan
- Vegetation Management and Pest Control Plan
- Project Road and Trail Maintenance Plan

With adherence to these monitoring plans; implementation of the construction stormwater pollution prevention plan (SWPPP); required BMPs to prevent stormwater erosion and sedimentation during construction; and Mitigation Measure BIO-1 and Mitigation Measure BIO-3, potential impacts associated with the Proposed Project would be less than significant on fish communities, invertebrates, riparian and wetland communities, or other aquatic biological resources. Some of the proposed environmental management measures implemented during operations would result in beneficial impacts on aquatic biological resources through management for native species compared to management for non-native fish resources. Therefore, the Proposed Project's potential incremental impacts on aquatic biological resources would not be cumulatively considerable when viewed in connection with the potential impacts of the other projects and plans evaluated.

6.3.3 Biological Resources – Terrestrial

As discussed in Section 4.5 *Biological Resources – Terrestrial*, the Proposed Project would adhere to the measures and protections included in the Proposed Project's Vegetation Management and Pest Control Plan, Wildlife Management Plan, and Recreation Management Plan that include preconstruction surveys to implement measures to ensure construction does not affect terrestrial resources. Tree removal may be necessary to increase the width of the trail for safer access along the J-2 Stream Gage access trail for whitewater boating access. The total number of trees needed to be removed, if any, would be expected to be small and therefore would not substantially affect nesting bird habitat on the broader landscape scale. If any resources are found to be significantly adversely affected by the planned construction, that section of the trail would be excluded from improvements. Modification of the FERC Project Boundary would reduce the amount of potentially suitable habitat subject to the license agreement and any associated vegetation management requirements. Significant and unavoidable impacts could be seen on special-status bats in or around K1 facilities from retirement/modification activities if Recommend Mitigation Measure BIO-2 is not implemented. All other potential impacts on terrestrial biological resources under the Proposed Project would be less than significant with measures and protections in the plans implemented during construction and operations. While not all impacts would be reduced to less than significant without implementation of Recommended Mitigation Measure BIO-2, the Proposed Project's potential incremental impacts on terrestrial biological resources would not be cumulatively considerable when viewed in connection with the potential impacts of the other projects and plans evaluated.

6.3.4 Cultural Resources and Tribal Cultural Resources

A project's impacts with respect to cultural and Tribal resources are generally site specific and would not affect or be affected by other development in the region. Given past investigations in the region, cultural and Tribal resources are likely to be present at some of the project sites evaluated for cumulative impacts. However, the projects in Table 6.1-1 are either ongoing operations that involve previously disturbed sites or are management plans that cannot be evaluated from a site-specific perspective. Mitigation

would 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. The Historic Properties Management Plan (HPMP) provides procedures required to comply with federal and state laws and regulations and conduct consultation with Tribes, agencies, and the SHPO for the continued management of historical properties under the proposed new license. The HPMP prescribes site-specific protection and treatment measures for each site located within the APE depending on the type of potential impacts from ongoing Proposed Project construction, operations, and maintenance. All accessible cultural resources located within the HPMP 2021 study area were inventoried and assessed as part of the cultural resources studies and are part of the affected environment for cultural resources. If PG&E identifies any new resources or proposes alterations to the Proposed Project Area, these would be integrated into the Proposed Project's HPMP, after consultation with stakeholders. Construction of the Vista Day Use Area, installation of an upstream flow gage, and upgrades to the Kerckhoff Dam radial gates were proposed after the 2021 HPMP (West et al. 2021) and must be analyzed pursuant to the provisions of the HPMP.

As discussed in Section 4.6 *Cultural Resources* and Section 4.19 *Tribal Cultural Resources*, the HPMP provides procedures requiring PG&E to comply with federal and state laws and regulations and conduct consultation with Tribes, agencies, and the SHPO for the protection of Tribal resources for the construction, operation, and maintenance of the Kerckhoff Hydroelectric Project license. The HPMP prescribes site-specific protection and treatment measures for Tribal resources located within the APE depending on the type of potential impacts from construction and ongoing Proposed Project operations and maintenance. Therefore, the Proposed Project's potential incremental impacts would not be cumulatively considerable when viewed in connection with the impacts of the other projects and plans evaluated.

6.3.5 Geology and Soils

As discussed in Section 4.8 *Geology and Soils*, the Proposed Project would have a less than significant potential impact on erosion and loss of topsoil, based on the implementation of appropriate BMPs and erosion control measures outlined in the

Proposed Project's Vegetation Management and Pest Control Plan, Project Road and Trail Maintenance Plan, and Recreation Management Plan during activities requiring ground disturbance as well as implementation of Mitigation Measures GEO-1 and WQ-3. The Proposed Project's would result in less than significant potential impacts from soil erosion or the loss of topsoil. Therefore, the Proposed Project's potential incremental impacts would not be cumulatively considerable when viewed in connection with the impacts of the other projects and plans evaluated.

6.3.6 Hydrology and Water Quality

As described in Section 4.11 *Hydrology and Water Quality*, the Proposed Project would adhere to the following environmental management measures and monitoring plans, which would reduce potential impacts on hydrology and water quality:

- Proposed Retirement Plan for K1 Powerhouse and Associated Facilities
- Minimum Instream Flows
- American Shad Spawning Season Flow Release Regime
- Aquatic Resources Plan
- Water Temperature Measure
- EOS Flow Recession Measure
- Subsequent Spill Ramp Down Measure
- Spill Season Flow Measure
- POM
- Flow Notifications Measure
- SJR Above Kerckhoff Reservoir Inflow Gage Measure
- Modification of Infrastructure and Procedures Measure
- Wildlife Management Plan
- Vegetation Management and Pest Control Plan
- Project Road and Trail Maintenance Plan
- Recreation Management Plan
- Whitewater Notification and Access Measure

Adherence to these monitoring plans; adherence to BLM's Bakersfield Resource Management Plan; and implementation of Mitigation Measures WQ-1, WQ-2, WQ-3, WQ-4, and Recommended Mitigation Measure WQ-5 reduce potential impacts on hydrology and water quality under the Proposed Project to less than significant levels. However, since implementation of Recommended Mitigation Measure WQ-5 is not clear and has not been agreed upon by PG&E, impacts would remain significant and unavoidable on the Water Quality Control Plan for the Sacramento River Basin and the SJR Basin such as contact recreation, non-contact recreation, and canoeing and rafting. While not all impacts would be reduced to less than significant without implementation of Recommended Mitigation Measure WQ-5, the Proposed Project's potential incremental impacts on hydrology and water quality would not be cumulatively considerable when viewed in connection with the impacts of the other projects and plans evaluated.

6.3.7 Recreation

As discussed in Section 4.17 *Recreation*, the Proposed Project would preserve or improve recreational resources and opportunities by providing continued and new, safe and compliant, public recreation facilities and opportunities. With adherence to the Proposed Project's Recreation Management Plan, Project Road and Trail Maintenance Plan, Vegetation Management and Pest Control Plan, Spill Season Flow Measure, POM, EOS Flow Recession Measure, and Whitewater Notification and Access Measure, the Proposed Project's potential impacts on recreation would be beneficial compared to baseline conditions and therefore considered less than significant. As discussed in Section 4.17 *Recreation*, the Proposed Project is not expected to result in a significant increase in recreational use in the Proposed Project Area, but it would improve access to recreation facilities and opportunities, which may result in higher use levels in the future. Therefore, it is expected that public demand for recreation in the Proposed Project Area would increase over the 50-year license. The Proposed Project's Recreation Management Plan requires that every 12 years after FERC approval, PG&E shall review the plan with agencies and Tribes, as necessary, and, if necessary, revise the plan. The Proposed Project's contribution to potential cumulative impacts on

recreation would be considered beneficial, as the Proposed Project contains specific elements to accommodate recreational resources over time. Therefore, the Proposed Project's potential incremental impacts on recreation would not be cumulatively considerable when viewed in connection with the impacts of the other projects and plans evaluated.

6.3.8 Wildfire

CAL FIRE has identified the Proposed Project as being in two Fire Hazard Severity Zones characterized as moderate (71.4 acres) and high (55.5 acres) for risk for wildfires. Additionally, the Proposed Project is located within areas mapped by the CPUC as HFTD Tier 2 (448.6 acres) and Tier 3 (83.3 acres). Construction activities, as well as ongoing operation of Proposed Project structures and recreation areas, could provide a source of ignition for a fire (e.g., diesel- and fuel-powered vehicles, welding, or cutting) and have the potential to increase the risk of wildland fire occurrence. Any wildfire in the Proposed Project Area could threaten infrastructure and people in the vicinity. Also, an increase in wildfires in the upper SJR Basin could cause an increase in slope erosion and sedimentation in the watershed. Implementation of the Proposed Project's routine maintenance activities at existing facilities, such as vegetation management, and adherence to the Proposed Project's Vegetation Management and Pest Control Plan would reduce wildfire risk. Additionally, adherence to all state fire safety standards and plans, as discussed in Section 4.21 *Wildfire*, and implementation of the Proposed Project's Project Road and Trail Maintenance Plan and PG&E's *2026–2028 Wildfire Mitigation Plan* (PG&E 2025) would further reduce wildfire risk associated with the Proposed Project. Therefore, the Proposed Project's potential incremental impacts on wildfire would not be cumulatively considerable when viewed in connection with the impacts of the other projects and plans evaluated.

6.4 Conclusion of Proposed Project Cumulative Impacts

For this analysis, there are no resources that may contribute to or result in potential cumulative impacts due to the Proposed Project in combination with past, present, and reasonably foreseeable future actions. While not all impacts would be reduced to less

than significant without implementation of recommended mitigation measures, adherence to environmental management measures, monitoring plans, and mitigation measures would ensure that the Proposed Project's incremental contribution to cumulative impacts is not cumulatively considerable.

6.5 LITERATURE CITED

CAL FIRE (California Department of Forestry and Fire Protection). 2007. Fire Hazard Severity Zones Map in SRA, Fresno County and Madera County. November 7, 2007. Accessed: April 3, 2026. Retrieved from: https://calfire-forestry.maps.arcgis.com/.

PG&E (Pacific Gas and Electric Company). 2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

_____. 2025. *2026–2028 Wildfire Mitigation Plan*. Volumes 1 and 2. April 4, 2025. Accessed: April 3, 2026. Retrieved from: https://www.pge.com/assets/pge/docs/outages-and-safety/outage-preparedness-and-support/pge-2026-2028-base-wmp-vol1-r0.pdf and https://www.pge.com/assets/pge/docs/outages-and-safety/outage-preparedness-and-support/pge-2026-2028-base-wmp-v2-r1.pdf.

Valley Air District (San Joaquin Valley Air Pollution Control District). 2023. *Air Quality Attainment Plans*. Accessed: April 3, 2026. Retrieved from https://ww2.valleyair.org/rules-and-planning/air-quality-plans/.

West, C., P. Allen, and M. Tiley. 2021. *Final Historic Properties Management Plan. Kerckhoff Hydroelectric Project, Fresno and Madera Counties, CA, FERC Project No. 96*. Pacific Gas and Electric Company. Final June. Prepared by Cardno for Pacific Gas and Electric Company, San Francisco, CA. June.

7 CEQA-MANDATED SECTIONS

This section provides an overview of the potential impacts of the Proposed Project, Alternative 1: Alternative Spill Recession and Flow Ramping (Alternative 1), and Alternative 2: Proposed Project with Implementation of the United States Bureau of Land Management's (BLM) Revised 4(e) Conditions (Alternative 2) based on the analyses presented in Section 4 *Environmental Analysis* of this Environmental Impact Report (EIR). The topics covered in this section include impacts found not to be significant, significant and unavoidable impacts, significant irreversible changes, and growth-inducing impacts.

7.1 IMPACTS FOUND NOT TO BE SIGNIFICANT

Section 15128 of the California Environmental Quality Act (CEQA) Guidelines allows environmental issues for which there is no likelihood of a significant impact to be "scoped out" and not analyzed further in the EIR. None of the resources in Appendix G of the CEQA Guidelines were scoped out, and all resources are analyzed in Section 4.

7.2 SIGNIFICANT AND UNAVOIDABLE IMPACTS

As discussed in this EIR under Section 4, there are potential significant and unavoidable impacts in the Terrestrial Resource.

Air Quality: Construction activities associated with the decommissioning of the K1 Powerhouse and the Vista Day Use Area would have a potentially significant impact on air quality and fugitive dust in particular. Construction of the Vista Day Use Area would require excavation or grading during ground disturbing activities. Recommended Mitigation Measure AQ-1 would minimize or avoid the emission of dust by watering the ground prior to disturbance and following disturbance, covering soil on transport vehicles, minimizing vehicle speeds on unpaved roads, and providing signage for the public to voice any complaints regarding dust emissions.

With implementation of the steps outlined in Recommended Mitigation Measure AQ-1, potentially significant impacts could be reduced to less than significant.

On March 11, 2026, California State Water Resources Control Board (State Water Board) staff provided Recommended Mitigation Measure AQ-1 to Pacific Gas and Electric Company (PG&E or Applicant) staff and requested that PG&E agree to implement the measure to ensure that Proposed Project impacts remain less than significant with mitigation. On March 17, 2026, PG&E responded that it does not plan to agree to mitigation measures to reduce Proposed Project impacts to a less than significant level without first reviewing the draft EIR upon its circulation. On March 19, 2026, PG&E provided comments and suggested edits to the mitigation measures shared on March 11, 2026 (personal email communication, J. Hartman and C. McCormick, March 19, 2026).

Without commitment from PG&E, implementation of Recommended Mitigation Measure AQ-1 is uncertain. Without the implementation of any mitigation, construction activities under the Proposed Project and Alternatives would result in Significant and Unavoidable Impacts.

Hydrology: Operations in Proposed Project and Alternatives have the potential to result in significant impacts by conflicting with standards in the *Water Quality Control Plan (Basin Plan) for the Sacramento River Basin and the San Joaquin River* (SR/SJR Basin Plan) (Central Valley Regional Water Board 2019) as described in potential impact HYD-5. Specially, the Proposed Project and Alternatives have the potential to result in rapid flow changes that could impact contact and non-contract beneficial uses of the San Joaquin River. Recommended Mitigation Measure WQ-5 would reduce impacts to recreation-related beneficial uses by notifying recreators of spills at Kerckhoff Dam and by prompting recreators to exit the water. Warning sirens are currently installed at the Kerckhoff 1 (K1) and Kerckhoff 2 (K2) powerhouses to alert those in the vicinity of flow releases. However, PG&E's (2023) Final License Application and Public Safety Plan submitted to the Federal Energy Regulatory Commission (FERC) (PG&E 2021) did not detail how warning sirens at Proposed Project facilities alert recreators of spill from Kerckhoff Dam. Implementation of Recommended Mitigation Measure WQ-5 would require PG&E to develop protocols for activating the sirens for situations where a larger stage change than one foot per hour as measured at Gage J-2 is expected and has the

potential to impact recreators or whitewater boaters. The protocols would include the times of day that PG&E would activate the sirens, and siren activations would be based on estimated flow travel times to downstream river recreation sites as determined in consultation. Recommended Mitigation Measure WQ-5 would require any facility upgrades needed for PG&E to ensure these sirens can be heard at recreation sites throughout the Project Bypass Reach (from Kerckhoff Dam to the K2 Powerhouse). Implementation of Recommended Mitigation Measure WQ-5 would reduce the potentially significant impact associated with the Proposed Project to less than significant with mitigation incorporated.

On March 11, 2026, State Water Board staff provided Recommended Mitigation Measure WQ-5 to PG&E staff and requested that PG&E agree to implement the measure to ensure that Proposed Project impacts remain less than significant with mitigation. On March 17, 2026, PG&E responded that it does not plan to agree to mitigation measures to reduce Proposed Project impacts to a less than significant level without first reviewing the draft EIR upon its circulation. On March 19, 2026, PG&E provided comments and suggested edits to the mitigation measures shared on March 11, 2026 (personal email communication, J. Hartman and C. McCormick, March 19, 2026).

Without commitment from PG&E, implementation of Recommended Mitigation Measure WQ-5 is uncertain. Without the implementation of any mitigation, operational impacts under the Proposed Project and Alternatives would result in Significant and Unavoidable Impacts.

7.2.1 Terrestrial

Construction activities associated with the decommissioning of the K1 Powerhouse would have a potentially significant impact on terrestrial special-status species and their habitats. Specifically, the K1 Powerhouse itself and the surrounding area have been identified as suitable bat habitat, and evidence of bat habitation was recorded inside the facility during surveys. The Proposed Project and Alternatives would retire and seal the K1 Powerhouse and associated facilities, potentially resulting in direct disturbance to

bats using the area concurrent with decommissioning activities. Recommended Mitigation Measure BIO-2: Roosting Bats outlines steps that can be taken during the decommissioning to reduce impacts to roosting bats, including avoiding work during the bat maternity season, pre-construction surveys for bats and their habitat, and development and implementation of appropriate avoidance and minimization measures if bats or active roosts are identified.

With implementation of the steps outlined in Recommended Mitigation Measure BIO-2, potentially significant impacts could be reduced to less than significant. On March 11, 2026, State Water Board staff provided Recommended Mitigation Measure BIO-2 to PG&E staff and requested that PG&E agree to implement the measure to ensure that Proposed Project impacts remain less than significant with mitigation. On March 17, 2026, PG&E responded that it does not plan to agree to mitigation measures to reduce Proposed Project impacts to a less than significant level without first reviewing the draft EIR upon its circulation. On March 19, 2026, PG&E provided comments and suggested edits to the mitigation measures shared on March 11, 2026 (personal email communication, J. Hartman and C. McCormick, March 19, 2026).

Without commitment from PG&E, implementation of Recommended Mitigation Measure BIO-2 is uncertain. Without the implementation of any mitigation, construction activities under the Proposed Project and Alternatives would result in Significant and Unavoidable Impacts.

7.3 SIGNIFICANT IRREVERSIBLE CHANGES

Section 15126.2(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.

7.3.1 Construction and Operation

Construction and operation of the Proposed Project would require the manufacture of new materials made of, for example, metals, plastics, petrochemicals, and wood that require the use of energy to make and transport. However, the Proposed Project would

continue to assist California in meeting its Renewable Portfolio Standard (RPS) goals in the generation of renewable energy.

On the other hand, construction and operation of the Proposed Project also has the potential to increase wildfire risks in the Proposed Project Area, as discussed in Section 4.21 *Wildfire*. The Proposed Project would adhere to PG&E's *2026–2028 Wildfire Mitigation Plan* (PG&E 2025), which provides standards for preventing, preparing for, suppressing, reporting, and investigating fires associated with during construction and operation. Additionally, PG&E requires its contractors to implement PG&E's Utility Standard TD-1464S (PG&E 2022), which includes requirements to reduce risks of fire ignition prior to and during work. These include guidelines for vehicle operation; pre-work readiness for work that could cause a spark, fire, or flame to originate or when using portable tools powered by an internal combustion engine; readiness of firefighting tools and equipment at job sites; and no smoking. Adherence to these standards would reduce potential wildfire impacts to less than significant, thereby reducing the potential irreversible loss of resources by wildfire from the Proposed Project.

Construction and operation for the Proposed Project would result in fuel consumption from use of construction tools, equipment, and vehicle trips to and from the Proposed Project site to transport materials and workers. Kerckhoff Dam is only accessible by helicopter and boat. It is assumed that no more than one boat would be used at any one time and would make five trips per day, four days per week for three months, beginning in September 2028. The boat emissions are included in Appendix D *Kerckhoff Air Emissions Modeling* and were estimated manually using emissions factors from the 2022 Port of Long Beach Air Emissions Inventory (Port of Long Beach 2023).

The Proposed Project would not result in any new, permitted operational sources of air emissions. The proposed emergency generator at the dam is exempt per San Joaquin Valley Air Pollution Control District (Valley Air District) Rule 6.1.2 because it would be less than 50 horsepower (hp) (Valley Air District 2020). There would be emissions associated with vehicles related to operation activities, recreation use, and energy use; however, there would not be a significant increase in vehicle trips or energy use under

the Proposed Project. Such vehicle trips would comply with the Proposed Project's Infrastructure and Procedures Measure, Project Road and Trail Maintenance Plan, and Recreation Management Plan. Also, as discussed in Section 4.7 *Energy*, all vehicles would be compliant with United States Environmental Protection Agency (USEPA) Corporate Average Fuel Economy standards and the latest USEPA and California Air Resources Board standards for off-road vehicles (including vehicles, aircraft, and waterborne vessels). Therefore, the Proposed Project would consume fuel responsibly, as necessary, and would not wastefully or excessively use non-renewable fuel resources.

Potential environmental accidents of concern include those that would have impacts 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. During construction activities associated with modification of the K1 Powerhouse facilities and features, construction of the Vista Day Use Area, installation of one new flow gage, and upgrade of two manually operated gates, there is an increased potential for an accidental release of fluids from a vehicle or motorized piece of equipment. Operation and maintenance of Proposed Project facilities would involve the limited use and storage of hazardous materials, such as fuels, hydraulic fluid, lubricants, chemicals, and/or other materials unchanged in quantity or quality from existing conditions. The quantity of hazardous materials would be slightly less than existing conditions because of retirement of the K1 Powerhouse. There is the potential for chemical or waste leakage from the pit toilet to occur. Additionally, herbicides and pest control chemicals may be used as part of existing vegetation management and pest control and implementation of the Proposed Project's Vegetation Management and Pest Control Plan. PG&E's existing Hazardous Materials Business Plan (HMBP) would remain in place for the Proposed Project and would include spill prevention and response provisions. For both Proposed Project construction and operation, fuels and hazardous material and wastes would be transported, stored, used, and disposed of in accordance with relevant regulations and hazardous substance control and emergency response procedures, as described in PG&E's Water Quality Certification application.

However, these activities would be monitored by state and federal agencies and follow professional industry standards governing the use, storage, transport, and disposal of hazardous materials, as identified in Section 4.10 *Hazards and Hazardous Materials*, and Section 4.11 *Hydrology and Water Quality*. The existing HMBP for the Kerckhoff Hydroelectric Project facility, which includes spill prevention and response provisions and worker training in safe handling procedures, would remain in place for the Proposed Project. Also, the Proposed Project includes the Modification of Infrastructure and Procedures Measure and Vegetation Management and Pest Control Plan, which address hazardous materials use. As a result, the Proposed Project would not pose a substantial risk of accidental release of hazardous materials.

Under operation, the Proposed Project facilities would not cause a substantial increase in the consumption or use of non-renewable resources, as they would continue to operate using approximately the same or less energy as current conditions. No increases in inefficiencies or unnecessary energy consumption are expected to occur as a direct or indirect consequence of the Proposed Project. Potential energy impacts associated with the Proposed Project, as discussed in Section 4.7 *Energy*, would not have any measurable impact on per capita energy consumption.

Potential impacts under Alternative 1 and Alternative 2 would be comparable to the Proposed Project. Alternative 1 and Alternative 2 would alter the timing, duration, and magnitude of flows below Kerckhoff Dam, which would not result in a significant increase in vehicle trips or energy use, and would not result in new or increased hazard exposures or wildfire risk during construction, operations, and maintenance.

7.4 GROWTH-INDUCING IMPACTS

The discussion on growth-inducing impacts involves examining how the Proposed Project might contribute to economic or population growth and additional housing construction in the surrounding area (CEQA Guidelines Section 15126.2(d)). The growth-inducing impacts of a potential project are considered significant if it directly causes population growth exceeding local and regional land use plans or other population growth predictions. These impacts would also be significant if the project

could enable population growth beyond what is already planned in local and regional land use plans or other relevant population growth forecasts.

7.4.1 Growth Caused by Direct and Indirect Employment

The Proposed Project or Alternatives would not lead to a permanent increase in the local population, need for housing, or new employment. During peak construction periods for the Proposed Project, there may be a temporary need for a minimal number of additional employees, but the existing workforce that performs routine maintenance and operation at the Kerckhoff Hydroelectric Project facility is expected to remain constant and would not require more workers on site during Proposed Project operation. It is anticipated that most, if any, additional workers required during the temporary, approximately three-year construction period would be drawn from the existing PG&E labor pool in Fresno and Madera counties, commuting to the construction sites rather than relocating to the area. Consequently, there is no demand for additional housing to accommodate these workers.

7.5 LITERATURE CITED

Central Valley Regional Water Board (Central Valley Regional Water Quality Control Board). 2019. *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region*. Fifth Edition, Revised February 2019 (with Approved Amendments). The Sacramento River Basin and San Joaquin River Basin. Accessed: April 3, 2026. Retrieved from: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201902.pdf.

PG&E (Pacific Gas and Electric Company). 2021. *Public Safety Plan, Kerckhoff Hydroelectric Project, FERC Project No. 96.* Filed with FERC December 28. FERC Accession No. 20211228-5025.

_____. 2022. Utility Standard TD-1464S: Preventing and Mitigating Fires While Performing PG&E Work.

_____. 2023. *Second Supplemental Information Filing in Support of Final Application for New License, FERC Project No. 96-048*. March 31.

_____. 2025. *2026–2028 Wildfire Mitigation Plan*. Volumes 1 and 2. April 4, 2025. Accessed: April 3, 2026. Retrieved from: https://www.pge.com/assets/pge/docs/outages-and-safety/outage-preparedness-and-support/pge-2026-2028-base-wmp-vol1-r0.pdf and https://www.pge.com/assets/pge/docs/outages-and-safety/outage-preparedness-and-support/pge-2026-2028-base-wmp-v2-r1.pdf.

Personal Email Communication between J. Hartman, Project Manager, Pacific Gas & Electric Company, San Francisco, CA, and C. McCormick, Environmental Scientist, State Water Resources Control Board, CA, regarding “Kerckhoff CEQA Mitigation Measures” on March 19, 2026.

Port of Long Beach. 2023. *Air Emission Inventory – 2022*. September. Accessed: April 5, 2026. Retrieved from: https://polb.com/environment/air/#emissions-inventory.

Valley Air District (San Joaquin Valley Air Pollution Control District). 2020. Rule 2020 Exemptions. Accessed: April 5, 2026. Retrieved from: https://ww2.valleyair.org/media/afydweme/rule-2020.pdf

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APPENDICES

All appendices are available on the State Water Resources Control Board's Kerckhoff Hydroelectric Project webpage at: https://waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/kerckhoff_hydroelectric_ferc96.html.