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2.2.3.6 Geology and Soils

This section describes the geology and soils in the vicinity of PG&E's Potter Valley Hydroelectric Project (Project) and the surrounding area. Specifically, it describes the general tectonic, physiographic, and geologic setting; structural features and seismicity; bedrock lithology and stratigraphy; soils; groundwater; mineral resources; and glacial features. The information presented is focused on the areas and/or topics relevant to the decommissioning of the Project facilities. Additional related information is included in Volume II, Section 2.2.3.7, Geomorphology. A generalized geologic time scale is provided in Table 2.2.3.6-1 for reference.

Table 2.2.3.6-1. Simplified geologic time scale.

Eon	Era	Period	Dates
Phanerozoic (542.0 mya to present)	Cenozoic (65.5 mya to present)	Quaternary Holocene Pleistocene Tertiary	2.6 mya to present 11,700 years to present 2.588 mya to 11,700 years 65.5 to 2.6 mya
	Mesozoic (251.0 to 65.5 mya)	Cretaceous Jurassic Triassic	145.5 to 65.5 mya 199.6 to 145.5 mya 251.0 to 199.6 mya
	Paleozoic (542.0 to 251.0 mya)	Permian Carboniferous Devonian Silurian Ordovician Cambrian	299.0 to 251.0 mya 359.2 to 299.0 mya 416.0 to 359.2 mya 443.7 to 416.0 mya 488.3 to 443.7 mya 542.0 to 488.3 mya
Precambrian			

Source: UC Museum of Paleontology 2011

Note: mya = million years ago

2.2.3.6.1 Information Sources

The information presented in this section is primarily based on information contained in the following source documents:

- Earthquake fault zones Lake Pillsbury 7.5-minute topographic quadrangle map (California Division of Mines and Geology [CDMG] 1995);
- *Geology and Ground Water in Russian River Valley Areas and in Round, Laytonville, and Little Lake Valleys, Sonoma and Mendocino Counties, California* (Cardwell 1965);
- Mineral Resources Data System (MRDS) (USGS 2015);
- Soil Survey Geographical Data Base (SSURGO) (Natural Resources Conservation Service [NRCS] 2016);
- *Geologic Map of the Bartlett Springs Fault Zone in the Vicinity of Lake Pillsbury and Adjacent Areas of Mendocino, Lake, and Glenn Counties, California* (Ohlin et al. 2010);

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- Recently active traces of the Bartlett Springs fault, California (Lienkaemper 2010);
- *Regional Geology and Tectonics for the PG&E Northern Area Hydroelectric System, Potter Valley Area Hydro, Lake and Mendocino Counties, California* (PG&E 2016);
- *Integrated Geologic and Geophysical Modeling Across the Bartlett Springs Fault Zone, Northern California (USA): Implications for Fault Creep and Regional Structure* (Langenheim et al. 2024);
- Well Completion Report Map Application (California Department of Water Resources [DWR] 2024); and
- Draft Potter Valley water supply reliability study (Jacobs 2025, prepared for Sonoma Water).

2.2.3.6.2 Tectonic and Physiographic Setting

Northern California's current geologic features are a product of long-term tectonic activity associated with the subduction of the Gorda and Pacific plates beneath the North American Plate during the Paleozoic and Mesozoic eras (approximately 438 to 144 million years ago [mya]). Accretion of oceanic sediments along the western margin of the North American continent and their subsequent uplift and intrusion by granitic batholiths, including intermittent periods of volcanism, have resulted in the formation of California's present-day landscape and the geologic features associated with the Project. Map 2.2.3.6-1 shows the regional tectonic setting.

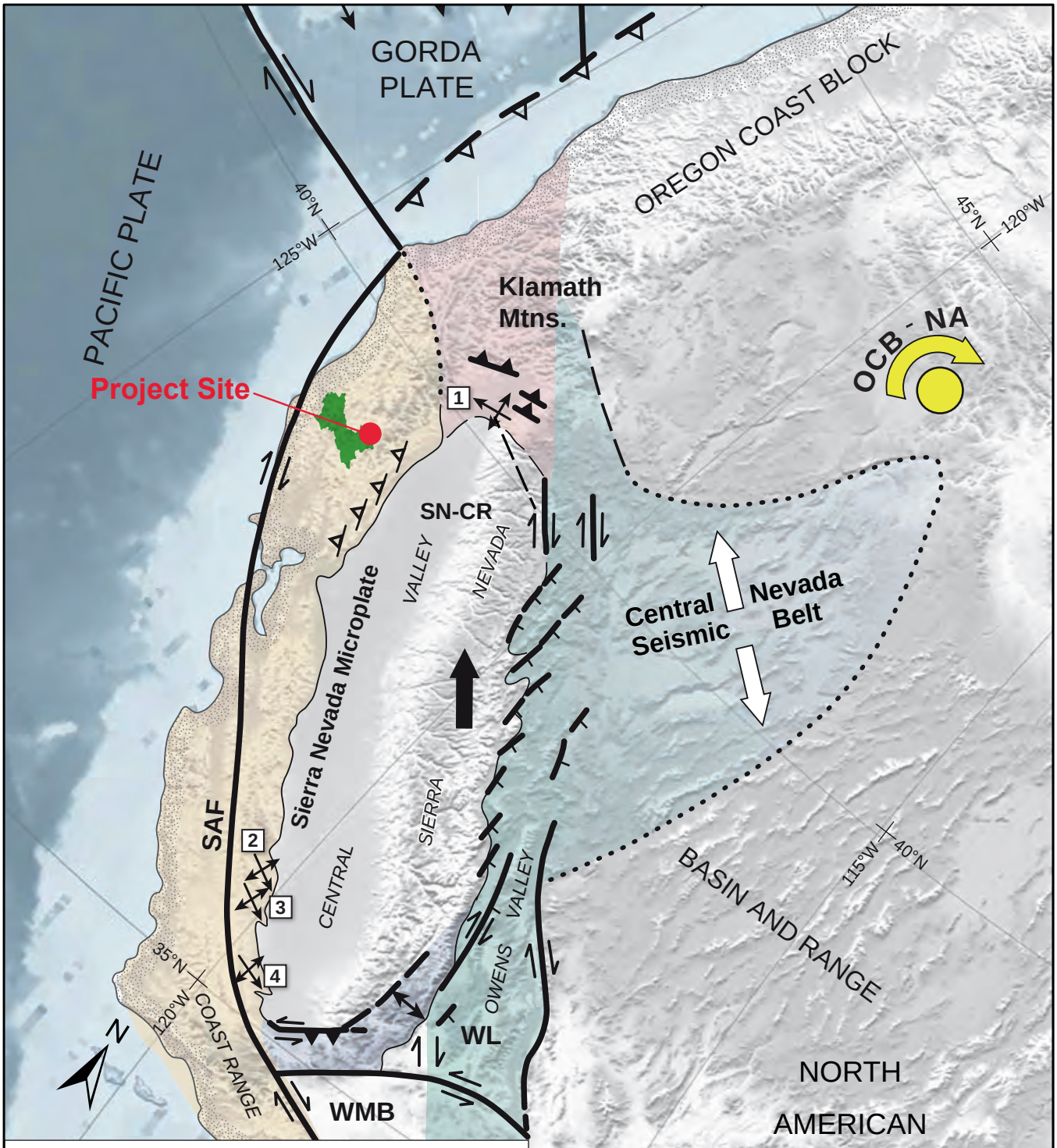
The Project is located in the Coast Ranges of California, which extend approximately 400 mi. from Santa Barbara to Eureka, and are bound to the west by the Pacific Ocean and to the east by the Central Valley. The Coast Ranges consist of two physiographic provinces, the northern Coast Ranges and the southern Coast Ranges, which are informally divided by San Francisco Bay. All of the Project facilities and associated river reaches are located in the northern Coast Ranges.

The northern Coast Ranges consist of three distinct geomorphic regions: the Eastern belt, the Central belt, and the Western (coastal) belt (Map 2.2.3.6-2). These three parallel belts are characterized by rugged northwest-southeast-trending ridges separated by intervening valleys. The Eastern belt includes some of the highest peaks in the northern Coast Ranges, including Snow Mountain with a summit elevation of 7,057 ft. above mean sea level (msl). The Central belt is characterized by mountains with elevations up to 4,300 ft. above msl, separated by the intervening valleys, including the well-known Napa Valley. The Western (coastal) belt borders the coastline from San Francisco Bay to Cape Mendocino. The bedrock and geologic structures underlying these three belts control the alignment of the ridges and valleys and the drainage patterns of most of the streams and rivers in the northern Coast Ranges (Ohlin et al. 2010; PG&E 2016).

2.2.3.6.3 Geologic Setting

The northern Coast Ranges are underlain by the deformed Mesozoic rocks of the Franciscan Complex, consisting of an accumulation of sedimentary, metamorphic, and igneous rocks that were assembled in a subduction zone and accreted to the western margin of the modern North American Plate between the Late Jurassic and Miocene (Jayko et al. 1989; Ohlin et al. 2010). The regional geologic setting is shown on Map 2.2.3.6-3.

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EXPLANATION

- Approximate location of watersheds addressed in this report
- **SAF** – San Andreas fault
- **SN-CR** – Sierra Nevada-Cascade Range boundary zone
- **WMB** – Western Mojave block
- **WL** – Walker Lane fault zone
- **OCB–NA** – Euler pole to describe motion of the Oregon coastal block and North America
- 1 Inks Creek fold belt
- 2 Coalinga Anticline
- 3 Kettleman Anticline
- 4 Wheeler Ridge Anticline

Regional Tectonic Setting
(Modified from Unruh et al. [2003])

PG&E Potter Valley Project
FERC Project No.77

Pacific Gas and Electric Company | Map 2.2.3.6-1

Source: Regional Geology and Tectonics for the PG&E Northern Area Hydroelectric System, Potter Valley Area Hydro, Lake and Mendocino Counties, California (PG&E 2016)



EXPLANATION

Quaternary faults (PG&E, 2014)

- Historical and Holocene displacement
- Early to late Pleistocene displacement

Coast Range regions

- Western belt
- Central belt
- Eastern belt

N

0 25 50 75 mi.

0 50 100 km

Map projection and scale: WGS 84 / UTM Zone 10N, 1:2,000,000

Quaternary fault zones and physiography of the Northern Coast Ranges.

PG&E Potter Valley Project
FERC Project No.77

Pacific Gas and Electric Company

Map 2.2.3.6-2

Source: Regional Geology and Tectonics for the PG&E Northern Area Hydroelectric System, Potter Valley Area Hydro, Lake and Mendocino Counties, California (PG&E 2016)



PG&E Facility Location

Geologic Units

- E — Eocene marine rocks
- Ep — Eocene and Paleocene marine rocks, undivided
- J — Jurassic marine rocks
- K — Cretaceous marine rocks (in part non-marine)
- KJf — Franciscan Complex
- KJfm — Franciscan melange
- KJfs — Franciscan schist
- Kl — Lower Cretaceous marine rocks
- Ku — Upper Cretaceous marine rocks
- M — Miocene marine rocks
- Mzv — Mesozoic volcanic rocks
- P — Pliocene marine rocks
- Q — Quaternary alluvium
- QPc — Plio-Pleistocene/Pliocene loosely consolidated deposits
- Qoa — Pleistocene sedimentary rocks
- Qrv — Recent (Holocene) volcanic flow rocks
- Qs — Quaternary sand deposits
- Qv — Quaternary volcanic flow rocks
- TK — Tertiary-Cretaceous coastal belt rocks
- Tv — Tertiary volcanic flow rocks
- Tvp — Volcanic rocks (Tertiary)
- um — Ultramafic rocks, chiefly Mesozoic

Fault Zone Data*

Fault Age:

- Historical (<150 years)
- Latest Quaternary (<15,000 years)
- Late Quaternary (<130,000 years)
- Middle and Late Quaternary (<750,000 years)
- Undifferentiated Quaternary (<1.6 million years)

*SOURCES:
U.S. Geological Survey and California Geological Survey, Quaternary fault and fold database for the United States, accessed May 10, 2024, at: https://www.usgs.gov/natural-hazards/earthquake-hazards/faults.

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FERC Project No. 77

Map 2.2.3.6-3

Regional Geology

0 2.5 5 7.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 6/23/2025

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In general, uplift caused by the subduction of the Pacific Plate beneath the North American Plate formed the Coast Ranges. The subduction of the Gorda Plate beneath the North American Plate at the Mendocino Triple Junction further influenced the geomorphic evolution of the northern Coast Ranges (see Map 2.2.3.6-1). Movement along the boundaries of these three plates is continuing today and is responsible for the high heat flow and volcanic activity in portions of the northern Coast Ranges, as well as seismic activity along the San Andreas and associated fault zones (PG&E 2016).

2.2.3.6.4 Structural Features and Seismicity

The northern Coast Ranges are dominated by structures associated with the San Andreas fault and other regionally significant faults associated with the boundary between the Pacific and the North American plates. The evolution of the San Andreas fault in Northern California is closely tied to the northward migration of the Mendocino Triple Junction (Atwater 1970). In the northern Coast Ranges, strike-slip faulting along the San Andreas fault system splays into several separate major faults across a 50-mi.-wide zone. As shown in Map 2.2.3.6-2, from west to east, the major structures in this system are the San Andreas fault, the Rodgers Creek-Maacama fault system, and the Green Valley–Bartlett Springs fault system (PG&E 2016). All three of these structures have been active in the Quaternary and are associated with ongoing seismic activity. Geomorphic evidence indicates late Holocene displacement (PG&E 2016) along all three fault systems. The Bartlett Springs fault, located east of Scott Dam, is the most significant seismic feature near the Project (PG&E 2016) and is described further below.

Seismicity

Various types of earthquake records for the Project vicinity are available as far back as the late 19th century. Historical (1800–1974) and instrumental (1975–present) seismicity within a 100-mi. radius of the center of the Project area is shown on Map 2.2.3.6-4, which shows the location of earthquake magnitudes ranging from M4.0 to >M7.0. Dates of occurrence of earthquakes >M6.0 are identified on the map. The largest earthquake event on record (M7.2) occurred in 1992 near Petrolia, California, approximately 90 mi. northeast of the center of the Project area. The largest closest earthquake event (M6.7) occurred in 1898 and was located near the offshore continuation of the San Andreas fault zone, roughly 47 mi. to the south-southwest.

Regional seismicity, as recorded by strong motion instruments from 1975 to 2014, is characterized by a diffuse pattern of minor earthquakes (<M5.0) northwest of the Bartlett Springs fault system and concentrated activity along the Rodgers Creek-Maacama and Bartlett Springs fault systems (PG&E 2016). Activity along the Bartlett Springs fault system itself is concentrated primarily along a 25-mi.-long section of the Bartlett Springs fault zone near Scott Dam. The largest recorded earthquake event in proximity to the Bartlett Springs fault occurred on August 10, 2016, and was recorded as a M5.1 earthquake event with an epicenter located approximately 9 mi. southeast of Scott Dam.

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Bartlett Springs Fault

As part of a Cooperative Research and Development Agreement, PG&E partnered with USGS in a series of long-term studies to characterize the geologic and seismic setting of Scott Dam, including geologic constraints and ground-motion estimates for the nearby Bartlett Springs fault. The findings of these evaluations are summarized in the PG&E report *Regional Geology and Tectonics for the PG&E Northern Area Hydroelectric System* (PG&E 2016) and are documented in technical reports by USGS scientists (Langenheim et al. 2007; Langenheim et al. 2024; Lienkaemper 2010; Ohlin et al. 2010).

The Bartlett Springs fault is a right-lateral strike-slip fault that is part of the San Andreas fault system in Northern California, with an estimated slip rate of approximately 7 millimeters per year (mm/yr). Near Lake Pillsbury reservoir, the slip rate of the fault is expressed as fault creep at a rate of 0.2 to 3.4 mm/yr. Lozos et al.'s (2015) rupture models estimate that an earthquake on the Bartlett Springs fault could produce a magnitude range of M6.32 to M7.24.

First recognized by geologists as a regionally significant seismic source in the 1980s, the Bartlett Springs fault is the northward continuation of the Calaveras–Green Valley fault system and includes both the Round Valley fault and the Bartlett Springs fault zone (Map 2.2.3.6-2 and Map 2.2.3.6-5). The fault has a general strike of N35W and a length of about 86 mi. The Bartlett Springs fault zone is the main fault in the Bartlett Springs fault system and extends 50 mi. from the Middle Fork Eel River southeast of Round Valley, past Lake Pillsbury reservoir and Bartlett Springs to just north of Cache Creek (Lienkaemper 2010). The Bartlett Springs fault is part of the wide zone of earthquake faults generated by the boundary between the Pacific and the North American plates along the San Andreas fault, which governs the geology of most of California.

The surface expression of the fault zone follows a series of small structural basins, narrow valleys, and low drainage divides. The geomorphic features generally coincide with a 0.9-mi.-wide zone of Franciscan mélange and ultramafic rocks that marks the location of the Tertiary subduction zone, which follows the boundary between the Central and Eastern belts of the northern Coast Ranges (Map 2.2.3.6-2). Several major creeks and rivers drain linear valleys that are eroded into weak, sheared rocks of the former subduction zone. These include the North Fork of Cache Creek, the Rice Fork of the Eel River, and Elk Creek. Fault exposures with pervasively altered serpentine and steeply dipping chaotic rocks are present in exposures along the southern portion of the Bartlett Springs fault zone (Lienkaemper 2010; Ohlin et al. 2010).

The Bartlett Springs fault is considered active by the California Geological Survey (formerly CDMG) and has the potential for surface rupture. It has been mapped in accordance with the Alquist-Priolo Earthquake Zoning Act (CDMG 1995) (Map 2.2.3.6-6). Alquist-Priolo earthquake fault zones are regulatory zones surrounding the surface traces of active faults in California. A fault trace is a line on the Earth's surface defining a fault. Wherever an active fault exists, if it has the potential for surface rupture, a structure for human occupancy cannot be placed over the fault and must be a minimum distance from the fault (generally 50 ft.).

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Pacific Ocean

1909
1890
2021
1871
1992
1991
1952
1893
1892
1892
2014
1893

Cape Horn Dam
Scott Dam

San Andreas Fault Zone
Maacama Fault Zone
Bartlett Springs Fault System
Hunting Creek-Berryessa Fault System

Redding
Chico
Reno
Carson City
Roseville
Citrus Heights
Arden-Arcade
Rancho Cordova
Sacramento
Elk Grove
Davis
Vacaville
Fairfield
Napa
Santa Rosa
Petaluma
Vallejo
Lodi
Pittsburg
Concord
Walnut Creek
Antioch
Stockton
Tracy
Pleasanton
San Rafael
Richmond
Berkeley
Oakland
San Francisco
Alameda
San Leandro
South San Francisco

Facilities

PG&E Dam Location

Other Features

100 Mile Buffer

City Boundary

Fault Zone Data*

Fault Age:

- Historical (<150 years)
- Latest Quaternary (<15,000 years)
- Late Quaternary (<130,000 years)
- Middle and Late Quaternary (<750,000 years)
- Undifferentiated Quaternary (<1.6 million years)

*SOURCES:
U.S. Geological Survey and California Geological Survey, Quaternary fault and fold database for the United States, accessed May 10, 2024, at: https://www.usgs.gov/natural-hazards/earthquake-hazards/faults.

Seismicity Data 1800 - Present**

Magnitude:

- >7.0
- 6.0 -7.0
- 5.0 - 6.0
- 4.0 - 5.0

**SOURCE:
USGS Earthquake Catalogue, May 2024
https://earthquake.usgs.gov/earthquakes/search/

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FERC Project No. 77

Map 2.2.3.6-4

Seismicity and faults within a 100-mi. radius of the Project.

0 12.5 25 Miles

Date: 6/23/2025

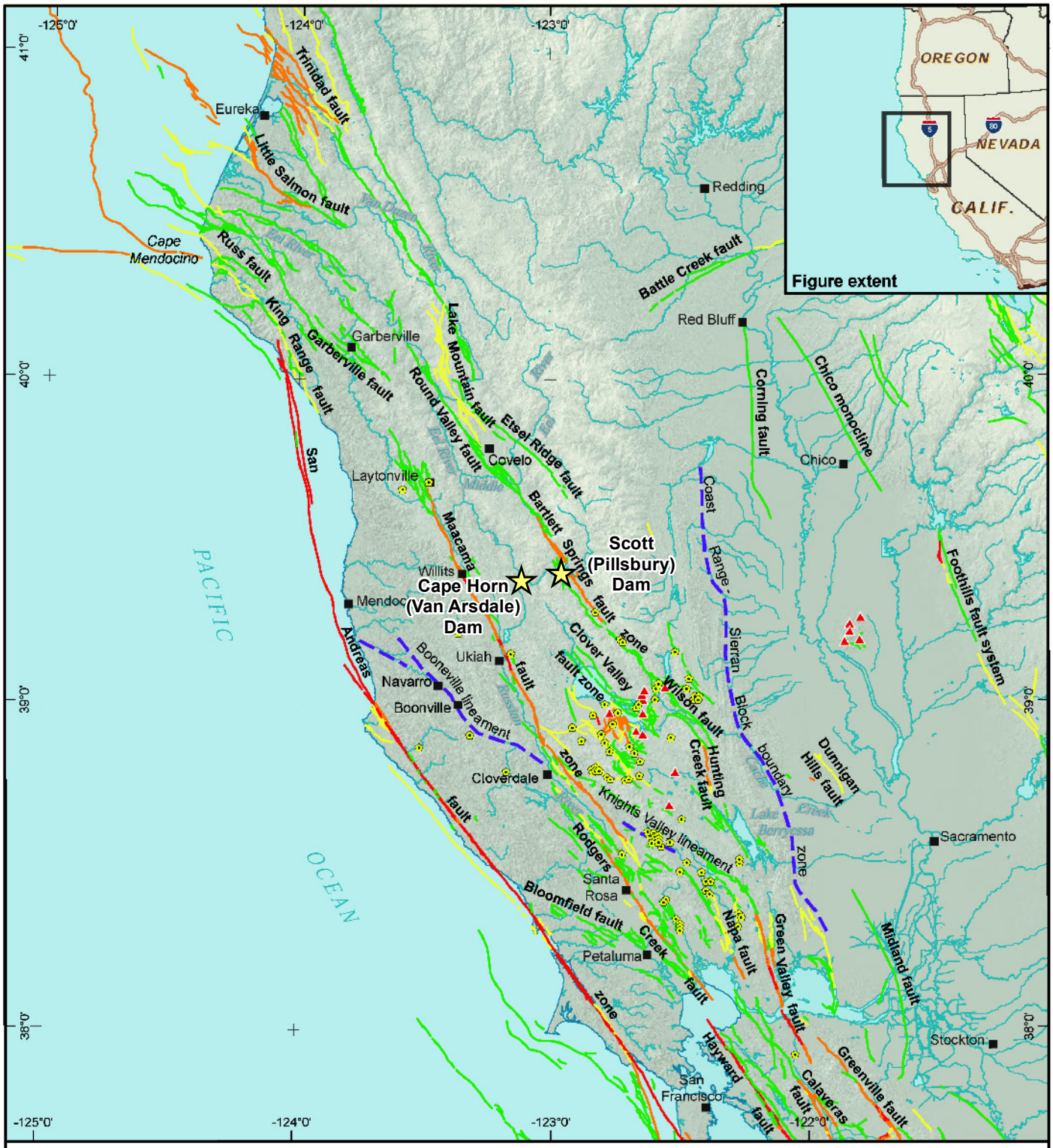
Projection: UTM Zone 11
Datum: NAD 83

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EXPLANATION

- Thermal spring/well (Jennings, 1975)
- Lineament of possible tectonic origin
- Plio-Quaternary volcanic center (Jennings, 1975)

Quaternary faults (PG&E, 2014)

- Historical displacement
- Holocene displacement
- Middle-to-late Quaternary displacement
- Early to middle Quaternary displacement

N

0 25 50 75 mi.

0 50 100 km

Map projection and scale: WGS 84 / UTM Zone 10N, 1:2,000,000

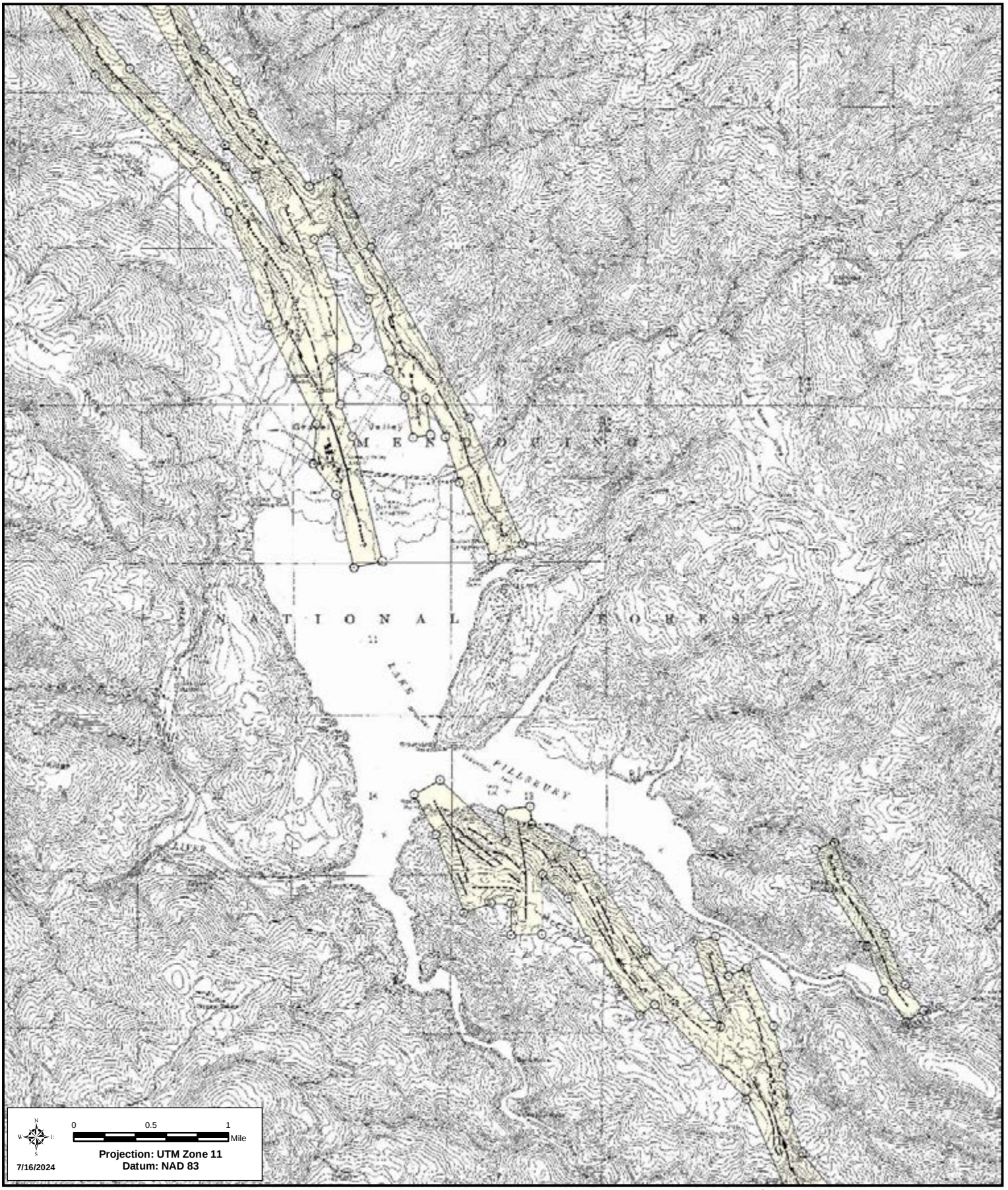
Quaternary fault zones, volcanic centers, and hot springs of the Northern Coast Ranges.

PG&E Potter Valley Project
FERC Project No.77

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Map 2.2.3.6-5

Source: Regional Geology and Tectonics for the PG&E Northern Area Hydroelectric System, Potter Valley Area Hydro, Lake and Mendocino Counties, California (PG&E 2016)



Faults considered to have been active during Holocene time and to have potential for surface rupture; solid line where accurately located, long dash where approximately located, short dash where inferred, dotted where concealed; query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

Earthquake Fault Zone Boundaries

These are delineated as straight-line segments that connect encircling turning points so as to define Earthquake Fault Zone segments.

Seaward projection of zone boundary.

Date Source:
California Division of Mines and Geology
Lake Pillsbury Quadrangle
Earthquake Fault Zones. June 1, 1995

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Project No.77

Map 2.2.3.6-6

Earthquake fault zone map (Bartlett Springs Fault Zone).

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Local agencies regulate development projects within earthquake fault zones. Before a new project can receive a building permit, cities and counties require a geologic investigation to demonstrate that proposed buildings will not be constructed on active faults.

2.2.3.6.5 Bedrock Lithology and Stratigraphy

The Eel River upstream of Lake Pillsbury reservoir transects the Eastern belt to the northeast (Maps 2.2.3.6-2 and 2.2.3.6-3). The basement rocks underlying the Eastern belt include the Franciscan Formation and serpentinized ultramafic rocks. In the central and northern parts of the Eastern belt, pre-Cretaceous metasedimentary rocks overlie the basement (PG&E 2016).

The Project facilities are primarily located in the Central belt (Maps 2.2.3.6-2 and 2.2.3.6-3). The rocks underlying the Central belt are varied; the basement rocks are Franciscan Complex rocks, with serpentine and stringers of ultramafic rocks. In the southern portion of the Central belt, extensive deposits of the Mio-Pliocene Sonoma volcanics overlie the Franciscan rocks (Ohlin et al. 2010). The basins and valleys in the Central belt are underlain by deep alluvium, with margins flanked by continental sedimentary rocks including claystone, siltstone, and fluvial gravel and sand (Langenheim et al. 2007; PG&E 2016). Geologic units in the Project vicinity and along the Bartlett Springs fault are characterized by extensive landslides, particularly between Gravelly Valley and the Middle Fork Eel River (Ohlin et al. 2010; PG&E 2016).

Basement rocks in the Coastal belt are composed primarily of sandstone, greenstone, and metagraywacke of the Franciscan Complex, with northerly trending stringers and layers of serpentinized ultramafic rock. In the northern portion of the Coastal belt, including the area west of the Project, the Franciscan rocks are overlain by late Cretaceous and Tertiary rocks. These younger rocks consist of marine sandstone, shale, conglomerate, and minor limestone (PG&E 2016).

Serpentine rock is common throughout all of the Coast Ranges. Serpentine rock, particularly ultramafic rocks, can contain naturally occurring asbestos, with the most common type being chrysotile. When this rock is disturbed, broken, or crushed, the asbestos fibers can become airborne, posing a potential health risk. Serpentine rocks have been mapped in the vicinity of the north end of Scott Dam and could also be present in the vicinity of Cape Horn Dam. It is not known if the serpentine rock that is present in the vicinity of Scott Dam contains naturally occurring asbestos or if serpentine rock that contains asbestos is in the vicinity of Cape Horn Dam.

As discussed further under Reservoir Sediments below, sediment collected from Lake Pillsbury reservoir was tested for asbestos. Asbestos was not detected in any of the samples. Sediment in Lake Pillsbury reservoir is most likely derived from the slopes that border the reservoir as well as sediment transported by the Eel River. The absence of asbestos in the sediment collected from Lake Pillsbury reservoir suggests that asbestos is not present in the rock formations that surround the reservoir.

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Unconsolidated Sediments

Numerous Quaternary terrace deposits and more recent Holocene alluvial deposits are present in the Project area (Ohlin et al. 2010). A geologic map of the Lake Pillsbury reservoir area is shown on Map 2.2.3.6-7. The largest terrace deposit is the thick sequence of weakly consolidated sands and gravels that covers most of the valley on the east side of Lake Pillsbury reservoir from 1,700 ft. near Scott Dam (USGS 1922) up to an elevation of 2,300 ft. above msl. The most significant alluvial deposits in the area include Gravelly Flat, which forms the valley floor immediately north of Lake Pillsbury reservoir; the flat valley bottom around Van Arsdale Reservoir; and Potter Valley (FERC 1978). Otherwise, unconsolidated sediments in the Project vicinity are generally limited to surface soils and recent alluvium—deposited in the stream and river courses and associated terraces—and colluvium.

Geophysical surveys completed by USGS provide information on constraints on basin geometry beneath Lake Pillsbury reservoir and Potter Valley and suggest maximum basin depths of approximately 1,300 ft. to 1,500 ft., respectively (Langenheim et al. 2007). Unconsolidated sediments pertaining to fluvial geomorphology are discussed further in Volume II, Section 2.2.3.7, Geomorphology.

Soils

Soils found within 1 mi. of the Project facilities and the Eel River between Scott Dam and Van Arsdale Reservoir are shown on Map 2.2.3.6-8. Detailed descriptions of the soils shown on Map 2.2.3.6-8 are available via the SoilWeb Online Soil Survey (UC Davis 2024) and summarized in Table 2.2.3.6-2. Soils are grouped by alluvial/floodplain deposits, terraces, and hills and mountain slopes. A summary of the soils that occur in the vicinity of the Project as documented by FERC (FERC 1978) is provided in the following paragraphs.

Soils in the Eel River drainage are well-drained, loamy, and of medium acidity. In the area around Lake Pillsbury reservoir and other areas on the Eel River, soils are generally shallow, gravelly loams formed on 15 to 75 percent slopes. The steep slopes, shallow thickness, low hydraulic conductivity and transmissivity, and very high erosion susceptibility of these particular soils preclude their use for cultivated crops, pasture, grazing, or industrial forestry. Soils formed on the level to moderately sloping surfaces of the river wash and alluvial deposits, such as the soils at the north end of Lake Pillsbury reservoir, are deep, well-drained sands, gravels, and cobbles. These soils have very high infiltration rates and low runoff potential. However, their erosion hazard is very high (U.S. Department of Agriculture [USDA] 1970).

Near Van Arsdale Reservoir, soils on slopes ranging from 0 to 30 percent have a moderate erosion hazard and are marginally suited for cultivation. Steeper slopes (30–50 percent) have higher erosion potential, which precludes their use for cultivated crops. Areas with steeper slopes are useful primarily for pasture, range, woodland, and wildlife.

Potter Valley, including the area bisected by the East Branch Russian River, is characterized by thick deposits of alluvium (40–60 ft. thick) overlying Pliocene and Pleistocene continental deposits on the west side of the valley and bedrock and terrace deposits on the east side of the valley (Cardwell 1965). The terrace deposits are best exposed on the southeastern part of the valley and

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are composed of floodplain, fan, and lacustrine deposits, accumulated after the present valley was formed and mostly eroded away before the alluvium was deposited (Cardwell 1965). Soils on the alluvial and terrace deposits in Potter Valley are very deep, well to moderately rapidly drained, medium to slightly acid, very fine sandy loam and silt loam. These soils have few limitations or hazards and are suited to cultivated crops, pasture, range, woodland, or wildlife. Soils on the hills surrounding Potter Valley, including the area of the penstocks and the powerhouse, are moderately deep to deep, medium-acid loams. Slopes range from 0 to 75 percent (level to very steep), and the erosion susceptibility of these soils is moderate to very high. These soils are primarily used for grazing (USDA 1972).

Reservoir Sediments

Geosyntec (2019) conducted a preliminary environmental contamination source assessment, which identified historical activities that could contribute to a release of contaminants and accumulate in sediments behind Scott Dam and Cape Horn Dam. Subsequently, Geosyntec (2020) designed and implemented a sediment characterization investigation for Lake Pillsbury reservoir and Van Arsdale Reservoir to support the California State Coastal Conservancy with an evaluation of current sediment quality conditions. The objective was to chemically analyze the soft reservoir sediments that have accumulated behind Scott and Cape Horn dams and could potentially mobilize upon dam removal. Maps 2.2.3.6-9 and 2.2.3.6-10 show where the samples were collected in Lake Pillsbury reservoir and Van Arsdale Reservoir, respectively.

Analytical results were compared to published freshwater sediment screening levels and background concentrations. Overall, the results indicated that the Lake Pillsbury reservoir and Van Arsdale Reservoir sediments are generally not contaminated and represent background conditions for remote reservoirs. Specific analytical findings were as follows:

- Many constituents were not detected, including PCBs, organophosphate pesticides, herbicides, diesel-range organics (total petroleum hydrocarbons [TPH]), asbestos, many semi-volatile organic compounds (SVOCs), some metals (i.e., antimony, beryllium, cadmium, molybdenum, selenium, silver, thallium), and most organochlorine pesticides.
- The chemicals/metals detected included some metals, methylmercury, some SVOCs, motor-oil-range TPH, methoxychlor, and two dioxin congeners (in Van Arsdale Reservoir only). Except for nickel, all other detected chemicals were below freshwater sediment screening levels. Nickel concentrations were elevated about two- to three-fold above the screening levels, but are likely indicative of background concentrations in this area, as they fall within the range of concentrations measured in sediments in other reservoirs (Szarek-Gwiazda et al. 2011) and soils/sediments from other remote areas in California (Goldhaber et al. 2009; Kearney Foundation of Soil Science 1996; Morrison et al. 2009; USGS 1984).

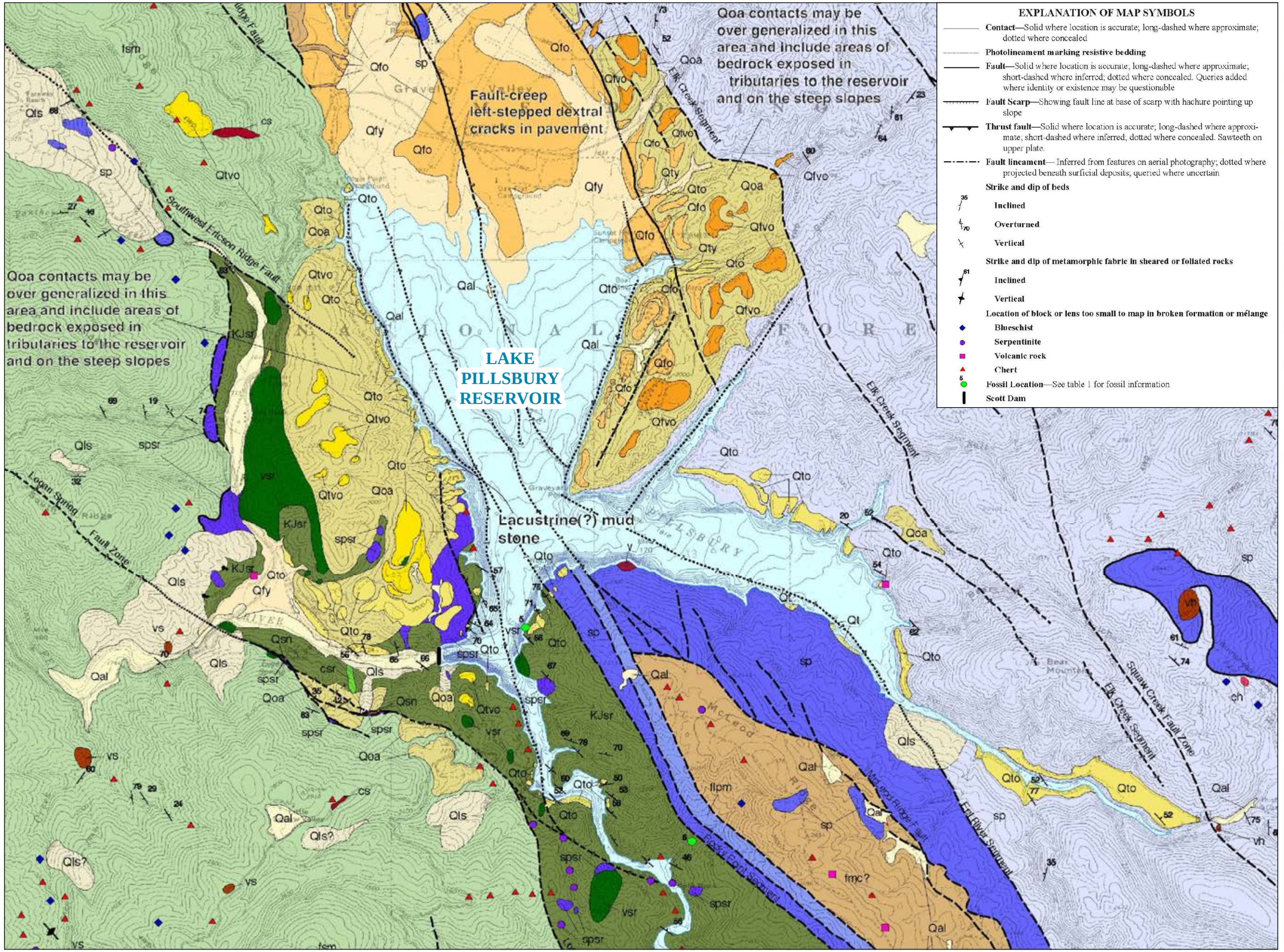
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2.2.3.6.6 Slope Stability

Landslides are common throughout the Eel River watershed (PG&E 2021). As shown on Map 2.2.3.6-7, landslides have been mapped immediately upgradient of Scott Dam and downstream of Scott Dam along the Eel River. An active landslide is located upgradient of the abutment adjacent to Scott Dam on the south side of Lake Pillsbury reservoir. A seismic slope stability analysis of the landslide was preliminarily evaluated by Miller Pacific Engineering Group (MPEG) (MPEG 2018). They characterized movement as having occurred at various depths up to 110 ft. The total mass of the landslide complex is over 8 million cubic feet, weighing over 520,000 tons.

Except where the upper Eel River enters the reservoir, no other landslides have been mapped on the slopes that surround Lake Pillsbury reservoir. All slopes on the south side of the reservoir appear to be generally stable (Map 2.2.3.6-7). However, the Quaternary sedimentary deposits on the steep slopes that border the western and eastern limits of Lake Pillsbury reservoir may be at risk of shallow slope failure if rapid changes in water level occur when Lake Pillsbury reservoir is drained. Deep-seated landslides are not expected on these slopes.

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EXPLANATION OF MAP SYMBOLS

Contact—Solid where location is accurate; long-dashed where approximate; dotted where concealed

Photolineament marking resistive bedding

Fault—Solid where location is accurate; long-dashed where approximate; short-dashed where inferred; dotted where concealed. Queries added where identity or existence may be questionable

Fault Scarp—Showing fault line at base of scarp with hachure pointing up slope

Thrust fault—Solid where location is accurate; long-dashed where approximate; short-dashed where inferred, dotted where concealed. Sawteeth on upper plate.

Fault lineament— Inferred from features on aerial photography; dotted where projected beneath surficial deposits; queried where uncertain

Strike and dip of beds

35 **Inclined**

70 **Overturned**

Vertical

Strike and dip of metamorphic fabric in sheared or foliated rocks

61 **Inclined**

Vertical

Location of block or lens too small to map in broken formation or mélange

Blueschist

Serpentinite

Volcanic rock

Chert

5 **Fossil Location**—See table 1 for fossil information

Scott Dam

Geologic Map Units

Qsn	Siliceous and calcareous sinter deposits
Qfy	Young alluvial fan deposits and surfaces
Qfo	Old alluvial fan deposits and surfaces
Qfvo	Very old alluvial fan deposits and surfaces
Qal	Alluvium
Qt	Alluvial stream terrace deposits, undivided
Qty	Young alluvial stream terrace deposits and surfaces
Qto	Old alluvial stream terrace deposits and surfaces
Qtvo	Very old alluvial stream terrace deposits and surfaces
Qoa	Older alluvial deposits, undivided
Qls	Landslide deposits
KJsr	Ophiolitic mélange and sedimentary rocks of Split Rock
spsr	Blocks and lenticular bodies of ultramafic rock
csr	Blocks of chert
vsr	Blocks of mafic volcanic and plutonic rocks
fmc	Mélange of the Central Belt
v	Mafic volcanic rocks
fsm	Metasedimentary rocks of Sanhedrin Mountain
cs	Blocks and lenses of metachert associated with metavolcanic rocks
vs	Blocks and intercalated lenses of metavolcanic rocks
fhm	Metasandstone and argillite of Hull Mountain
flpm	Metasandstone of Hull Mountain
sp	Ultramafic rocks and serpentinite of the Coast Range Ophiolite
water	water

DATA SOURCE:
Geologic map of the Bartlett Springs Fault Zone in the Vicinity of Lake Pillsbury and Adjacent Areas of Mendocino, Lake, and Glenn Counties, California:
U.S. Geological Survey Open-File Report 2010-1301
[http://pubs.usgs.gov/of/2010/1301].

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Map 2.2.3.6-7

Geologic map of the Lake Pillsbury reservoir area.

0 0.25 0.5 Miles

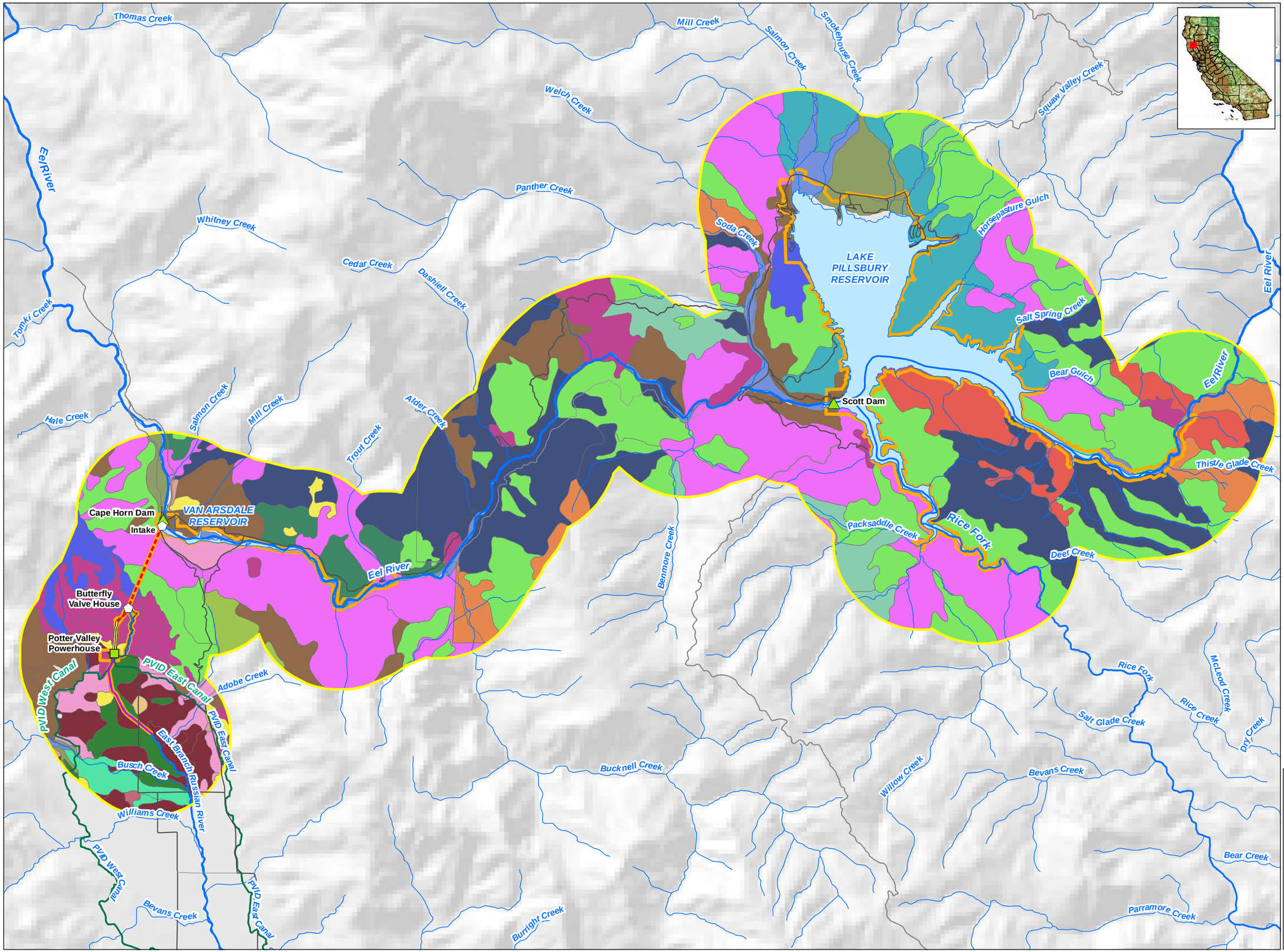
Projection: UTM Zone 11
Datum: NAD 83

Date: 5/15/2025

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PG&E Project Facilities

- Powerhouse
- Dam
- Water Conveyance Feature
- Water Conduit
- Penstock
- Powerhouse Discharge Canal
- FERC Project Boundary

Other Features

- General Access Road
- Canal
- Watercourse
- Water Body

Soil Series Type*

ALLUVIUM

- Xerofluvents
- Clear Lake
- Talmage
- Cole
- Feliz
- Gielow
- Russian

TERRACES

- Pinnobie
- Pinole
- Jafa

HILLS/BACKSLOPE

- Henneke
- Bearwallow
- Yorkville
- Hopland
- Maymen
- Ashokawna

MOUNTAINS/BACKSLOPE

- Nashmead
- Neuns
- Okiota
- Bamtush
- Sanhedrin
- Speaker

*SOURCE: SSURGO, 2016

Soil Description types are summarized in Table 2.2.3.6-2

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Map 2.2.3.6-8

Soils within 1 mile of the Potter Valley Hydroelectric Project Boundary.

0 0.25 0.5 1 Miles

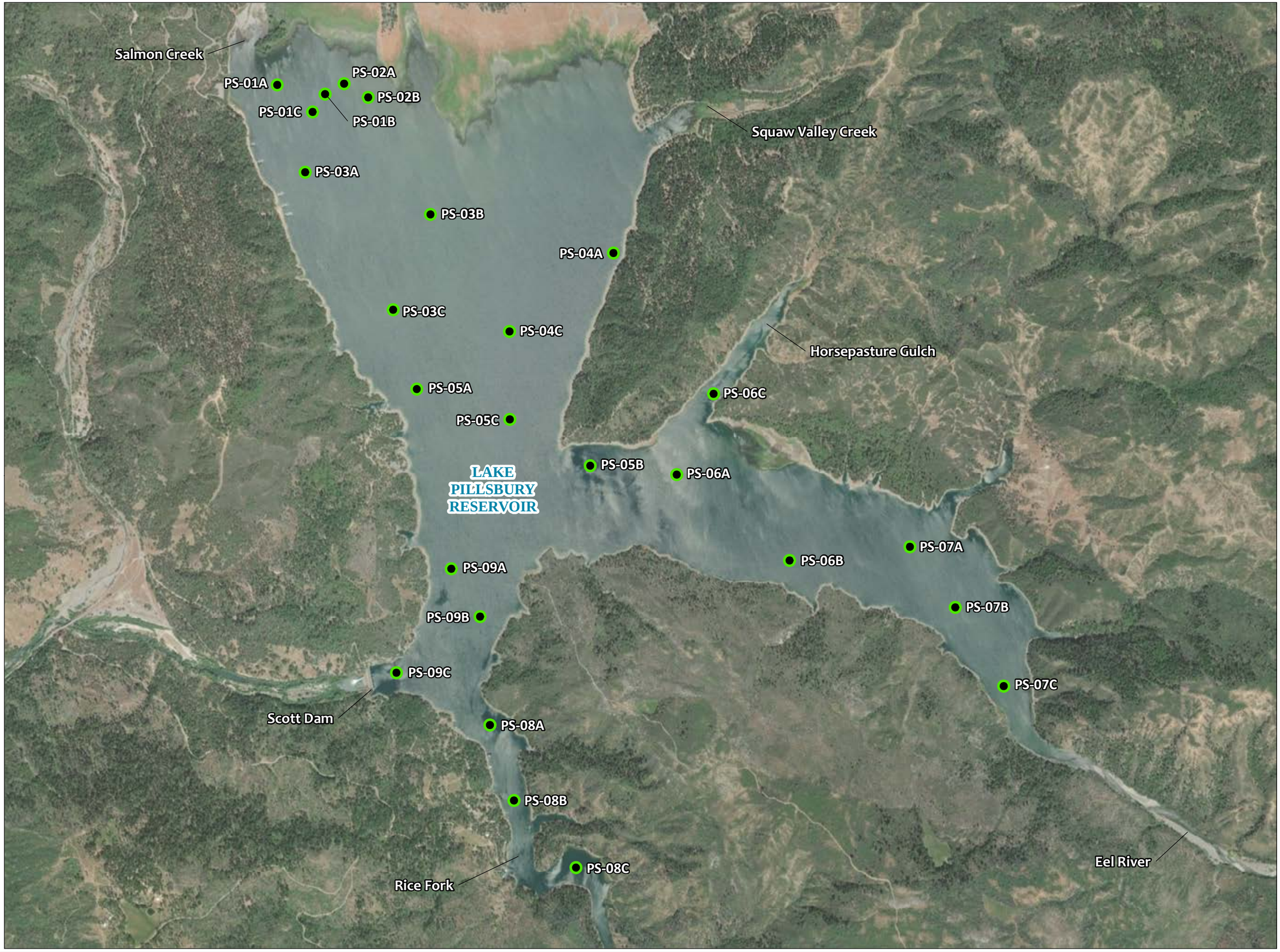
Projection: UTM Zone 10 N
Datum: NAD 83

Date: 6/17/2025

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Legend

Sample Location*

**Data Source: Geosyntec Consultants, Inc. (Geosyntec). 2020. Memorandum: Lake Pillsbury and Van Arsdale Reservoir Sediment Characterization. Prepared for California State Coastal Conservancy. April.*

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Map 2.2.3.6-9

Lake Pillsbury reservoir sediment sampling locations.

0 1,000 2,000 Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 5/15/2025

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Sample Location*

**Data Source: Geosyntec Consultants, Inc. (Geosyntec). 2020. Memorandum: Lake Pillsbury and Van Arsdale Reservoir Sediment Characterization. Prepared for California State Coastal Conservancy. April.*

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Map 2.2.3.6-10

Van Arsdale Reservoir sediment sampling locations.

0 200 400 Feet

Projection: UTM Zone 11
Datum: NAD 83

Date: 5/15/2025

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Table 2.2.3.6-2. Soil types in the vicinity of the Project.

Soil Name	Soil Description	Slope (%)	Parent Rock	Runoff	Geographic Position
ALLUVIUM					
Xerofluvents	–	0	Alluvium	Excessively drained	River wash / floodplain / channel
Clear Lake	Clay	0 to 2	Clayey alluvium derived from metamorphic and sedimentary rock	Poorly drained; high runoff	Basin floor
Talmage	Gravelly sandy loam	–	Alluvium	Somewhat excessively drained; very low runoff	Floodplain
Gielow	Sandy loam	0 to 5	Alluvium	Somewhat poorly drained; low runoff	Floodplain
Russian	Gravelly loam	0 to 2	Alluvium derived from sedimentary rock	Well-drained; low runoff	Floodplain
Cole	Loam	0 to 2	Alluvium	Somewhat poorly drained; high runoff	Alluvial fan
Feliz	Loam	0 to 2	Alluvium	Well-drained; low runoff	Alluvial fan
TERRACES					
Pinnobie	Loam	2 to 8	Alluvium	Well-drained; medium runoff	Terraces
Pinole	Gravelly loam	2 to 8	Alluvium derived from sedimentary rock	Well-drained; high runoff	Terraces
Jafa	Fine-loamy	5 to 30	Alluvium	Well-drained; medium runoff	Terraces
HILLS/BACKSLOPE					
Henneke	Rock outcrop	10 to 50	Residuum weathered from serpentinite	Well-drained; very high runoff	Hills/backslope
Bearwallow	Loam	15 to 30	Residuum weathered from sandstone and shale	Well-drained; very high runoff	Hills/backslope

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Soil Name	Soil Description	Slope (%)	Parent Rock	Runoff	Geographic Position
Yorkville	–	15 to 50	Residuum weathered from mica schist and/or residuum weathered from metamorphic and sedimentary rock	Moderately well-drained; very high runoff	Hills/backslope
Hopland	–	30 to 50	Colluvium derived from sandstone and shale and/or residuum weathered from sandstone and shale	Well-drained; very high runoff	Hills/backslope
Maymen	Loamy	30 to 75	Colluvium derived from sandstone and shale	Somewhat excessively drained; high runoff	Hills/backslope
Ashokawna	Loamy	50 to 75	Colluvium derived from sandstone and/or residuum weathered from sandstone	Well-drained; high runoff	Hills/backslope
MOUNTAINS/BACKSLOPE					
Okiota	–	15 to 50	Residuum weathered from serpentinite	Well-drained; very high runoff	Mountains/backslope
Nashmead	Gravelly sandy loam	30 to 50	Residuum weathered from sandstone and shale	Well-drained; medium runoff	Mountains/backslope
Bamtush	Loamy	50 to 70	Residuum weathered from sandstone	Well-drained; high runoff	Mountains/backslope
Neuns	Loamy	30 to 50	Residuum weathered from sandstone	Well-drained; medium runoff	Mountains/backslope
Sanhedrin	Fine-loamy	30 to 75	Residuum weathered from sedimentary rock	Well-drained; low to very high runoff	Mountains/backslope
Speaker	Fine-loamy	30 to 75	Residuum weathered from sandstone and shale	Well-drained; high runoff	Mountains/backslope

Source: UC Davis 2024

Note: – = Information not provided

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2.2.3.6.7 Groundwater

Private residents, businesses, agricultural and farming interests, and the developed recreation facilities surrounding Lake Pillsbury reservoir, along the Eel River, and in Potter Valley rely on groundwater wells for water. Surface water is currently diverted from the Eel River to the East Branch Russian River in Potter Valley year-round and is believed to recharge groundwater in Potter Valley.

Two groundwater basins are identified by DWR (2021)—Gravelly Valley Groundwater Basin (basin number 1-048) located northeast of the Lake Pillsbury reservoir and Potter Valley Groundwater Basin (basin number 1-051) located in Potter Valley. The groundwater basin locations are shown on Map 2.2.3.6-11. Neither groundwater basin is managed under the Sustainable Groundwater Management Act. The following information regarding the Gravelly Valley and Potter Valley groundwater basins was obtained from DWR (2021).

Gravelly Valley Groundwater Basin

The Gravelly Valley Groundwater Basin is located northeast of Lake Pillsbury reservoir. The basin is bounded to the south by Lake Pillsbury reservoir and on all other sides by rocks of the Franciscan Formation (DWR 2021). The surface area is approximately 5 mi.^{2}. Information regarding water bearing formations, groundwater level trends, groundwater storage, budget, and water quality is not available.

Potter Valley Groundwater Basin

The Potter Valley Groundwater Basin is the northernmost valley in the Russian River drainage basin. Potter Valley is northwest-trending, approximately 8 mi. long, up to 2 mi. wide, and situated in a structural depression formed in bedrock of the Franciscan Complex. The groundwater basin is generally defined by the areal extent of unconsolidated alluvial sediments but does include some areas of older valley-fill deposits, primarily along the western margin of the basin. The majority of the basin is bounded by bedrock of the Franciscan Complex. The valley drains to the south through the East Branch Russian River.

The primary water-bearing formation within Potter Valley is the alluvium. Terrace deposits and continental deposits are secondary in importance with respect to water bearing and yielding capacity. The Franciscan Complex that surrounds the majority of the valley is considered essentially non-water bearing. Groundwater storage in the Potter Valley Groundwater Basin is estimated to range from 9,000 ac-ft to 10,000 ac ft. The alluvium is generally about 40 to 60 ft. thick. The yield of wells installed in the alluvium typically range from 50 gallons per minute (gpm) to 75 gpm, and the maximum yield is about 100 gpm.

Terrace deposits are characterized by an abundance of silt and clay, although they may contain local lenses of poorly sorted sand and gravel. The subsurface thickness of these deposits is not well defined, but surface exposures are 10 to 30 ft. thick, and maximum thickness is possibly about 100 ft. Shallow wells that tap this deposit generally yield only a few gpm.

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The continental deposits are discontinuously exposed along the southern and western margins of the valley. The formation is poorly consolidated and not well exposed. In the northern part of the valley, these deposits are characterized by sandy silt and clay. Exposures in the southern part of the valley are characterized by gravel, friable silty sandstone, and mudstone, and concretions are common. The thickness beneath the valley is unknown but probably ranges from a few feet to several hundred feet. Well yields from this deposit are low but are sufficient for domestic purposes.

Groundwater in the Potter Valley Groundwater Basin is generally characterized by calcium magnesium bicarbonate or magnesium calcium bicarbonate types, and total dissolved solids ranges from 140 to 395 parts per million. The quality of water from all water bearing formations except the bedrock is excellent for irrigation use. Water for domestic use is considered to be hard to moderately hard.

The Potter Valley Groundwater Basin receives recharge from two sources: (1) precipitation and (2) applied water. The estimated groundwater recharge from these two sources is 18,187 ac-ft per year from precipitation and 8.157 ac-ft per year from applied water (Jacobs 2025).

Applied water is sourced as imported diverted water from the Eel River at Van Arsdale Reservoir through a diversion tunnel to the PG&E Powerhouse in Potter Valley. From the PG&E Powerhouse, applied water is diverted into three canals: (1) West Canal; (2) Potter Valley Powerhouse discharge canal; and (3) East Canal. The powerhouse discharge canal flows directly into the East Branch Russian River on the northern end of Potter Valley, and the East and West canals flow into the East Branch Russian River near the southern end of Potter Valley. The East Branch Russian River flows into Lake Mendocino southwest of Potter Valley.

DWR (2025) monitored groundwater levels from four shallow groundwater monitoring wells in the Potter Valley Groundwater Basin from the late 1960s until 2016. The well locations are shown on Map 2.2.3.6-11, and changes in groundwater elevations over time at each well are shown in Figure 2.2.3.6-1. Groundwater elevation at each well location fluctuated over time, but the overall groundwater elevation remained relatively constant during the monitoring period.

The DWR Well Completion Report Map Application (DWR 2024) identifies square-mile sections and provides well construction records of known groundwater wells within each section. Map 2.2.3.6-11 shows the density of water wells in the highlighted 1-mi.^{2} sections. The area shown on Map 2.2.3.6-11 includes an area that extends from Lake Pillsbury reservoir to the tributaries and confluence of White Creek, East Canal, and Mewhinney Creek at the southern end of Potter Valley that flow into the East Branch Russian River (identified as Analysis Area in Map 2.2.3.6-9).

Appendix 2.2.3.6-A provides a table that summarizes the unedited well construction records obtained from DWR (2024). Approximately 705 wells are located within the study area shown on Map 2.2.3.6-11. The wells in the study area are grouped by township, range, and section numbers. Information provided in Appendix 2.2.3.6-A includes the following: unedited assessor's parcel number (it is noted that assessor parcel number formats are not consistent), well use, date of installation, well depth, static water level at the time of installation, and well yield. It is noted that not all the information is available for all well locations.

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2.2.3.6.8 Mineral Resources

Mineral resources in the vicinity of the Project are shown on Map 2.2.3.6-12, which was developed using information available through the USGS MRDS (USGS 2015). Additional information about each occurrence shown on Map 2.2.3.6-12 is summarized in Table 2.2.3.6-3, which was also developed using information available in the MRDS. As indicated, chromium manganese and mercury occur in the vicinity of the Project, especially around Lake Pillsbury reservoir, with chromium being the most prevalent. These minerals are common in the Coast Ranges, especially in the Franciscan Formation. As indicated in Table 2.2.3.6-3, the development status of only one of these occurrences is categorized as a "producer," a manganese deposit located near the northwest end of Lake Pillsbury reservoir. An active (i.e., producing) sand and gravel quarry is present in the vicinity of Lake Pillsbury reservoir near the junction of Elk Mountain Road and Scott Dam Road, and an active stone and crushed rock quarry is present in the vicinity of Potter Valley.

2.2.3.6.9 Glacial Features

There are no glaciers or glacial features or deposits in the immediate vicinity of the Project. The nearest documented glacial deposits are located within the Snow Mountain volcanic complex, approximately 15 mi. southeast of Lake Pillsbury reservoir (Holway 1911).

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Cape Horn Dam

Van Arsdale Reservoir

diversion tunnel

Potter Valley Powerhouse

Potter Valley Groundwater Basin

Scott Dam

Lake Pillsbury reservoir

Gravelly Valley Groundwater Basin

Mendocino Co.

Lake Co.

Powerhouse Canal

East Canal

West Canal

East Branch Russian River

Russian River

Eel River

Welch Creek

Panther Creek

South Creek

Cedar Creek

Whitney Creek

Hale Creek

Salmon Creek

Mill Creek

Long Branch Creek

Cave Creek

Dutchfill Creek

Alder Creek

Trout Creek

Benmore Creek

Packsaddle Creek

Deer Creek

Salt Spring Creek

Rice Fork

Willow Creek

Salt Grade Creek

Bucknell Creek

Bevans Creek

Parramore Creek

Little Soda Creek

Burrtight Creek

Rock Creek

Adobe Creek

Busch Creek

Williams Creek

Mewhinney Creek

White Creek

Corral Creek

Boyes Creek

Fisher Creek

T18N R11W 18
T18N R11W 19
T18N R11W 20
T18N R11W 29
T18N R11W 30
T18N R11W 28
T18N R11W 27
T18N R11W 26
T18N R11W 23
T18N R11W 15
T18N R11W 11
T18N R10W 08
T18N R10W 09
T18N R10W 03
T18N R10W 02
T18N R10W 01
T18N R10W 12
T18N R10W 15
T18N R10W 22
T18N R10W 23
T18N R10W 28
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T18N R11W 32
T18N R11W 33
T18N R11W 34
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T17N R11W 27
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T16N R11W 06
T16N R11W 05
T16N R11W 04

PG&E Facility Location
County Boundary
Analysis Area
Groundwater Basin
Waterbody
Canal/Pipeline/Ditch
Intermittent Stream/River
Perennial Stream/River
California Department of Water Resources Monitoring Well Locations[1]

Domestic Well Location
- Actual Location
- Center of Section[2]

# of Wells within Section[3]
- >25
- >10 - 25
- 1 - 10

Watersheds (HUC8)
- Russian River
- Upper Cache
- Upper Eel River

T17N — Township
R11W — Range
15 — Section Number

Mount Diablo Baseline and Meridian

Notes:
[1]See Table 2.2.3.6-3 for groundwater elevation data.
[2] More than one well could be associated with this symbol.
[3] See Appendix 2.2.3.6-A for list of water wells in each section.

Well Data Sources:
- California Department of Water Resources Water Data Library Station Map: *https://wdl.water.ca.gov* (Accessed May 2025)
- California Department of Water Resources, Well Completion Report Map Application: *https://gis.water.ca.gov/app/wcr* (Accessed May 2024 and April 2025)
- Sustainable Groundwater Management Act Portal: *https://sgma.water.ca.gov/webgis* (Accessed April 2025)

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Map 2.2.3.6-11
Domestic Well Count Map

0 0.5 1 1.5 Miles

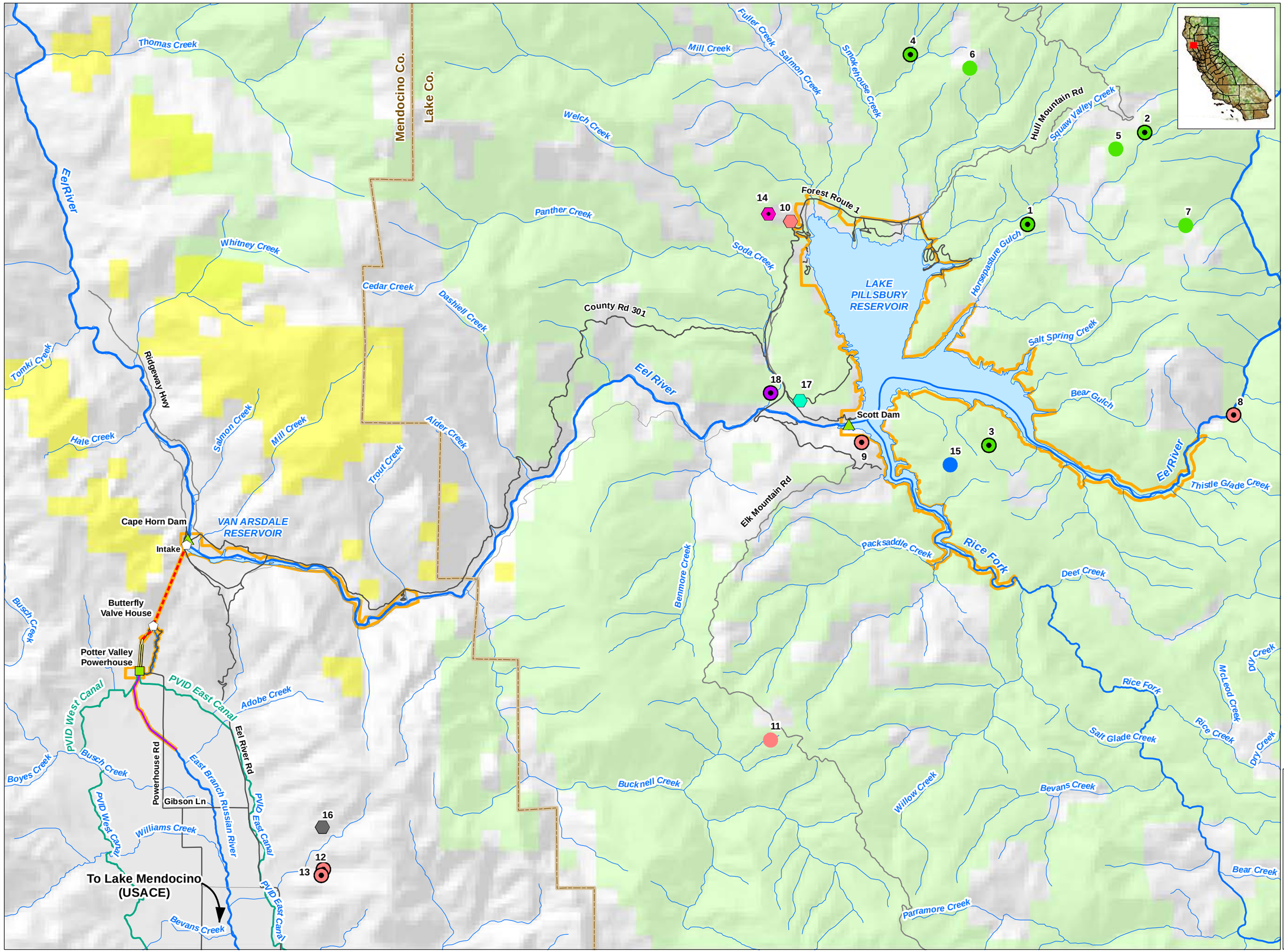
Projection: UTM Zone 11
Datum: NAD 83

Date: 6/17/2025

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Potter Valley Hydroelectric Project, FERC Project No. 77
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PG&E Project Facilities

- Powerhouse
- Dam
- Water Conveyance Feature
- Water Conduit
- Penstock
- Powerhouse Discharge Canal
- FERC Project Boundary

Other Features

- General Access Road
- Canal
- Watercourse
- Waterbody

Land Jurisdictions*

- U.S. Forest Service
- State of California
- Private (Blank)
- County Boundary

*SOURCE: BLM, 2016

Mineral Resources**

- Chromium
- Manganese
- Manganese, Silica
- Mercury
- Stone, Crushed/Broken
- Sand and Gravel, Construction
- Geothermal

Resource Status

- Occurrence
- Producer
- Past Producer
- Unknown

**SOURCE:
USGS, Mineral Resources Data System
https://mrdata.usgs.gov/mrds/

Mineral occurrences are summarized in Table 2.2.3.6-4

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Map 2.2.3.6-12

Mineral resources in the Project vicinity.

0 0.25 0.5 1 Miles

Projection: UTM Zone 10 N
Datum: NAD 83

Date: 6/23/2025

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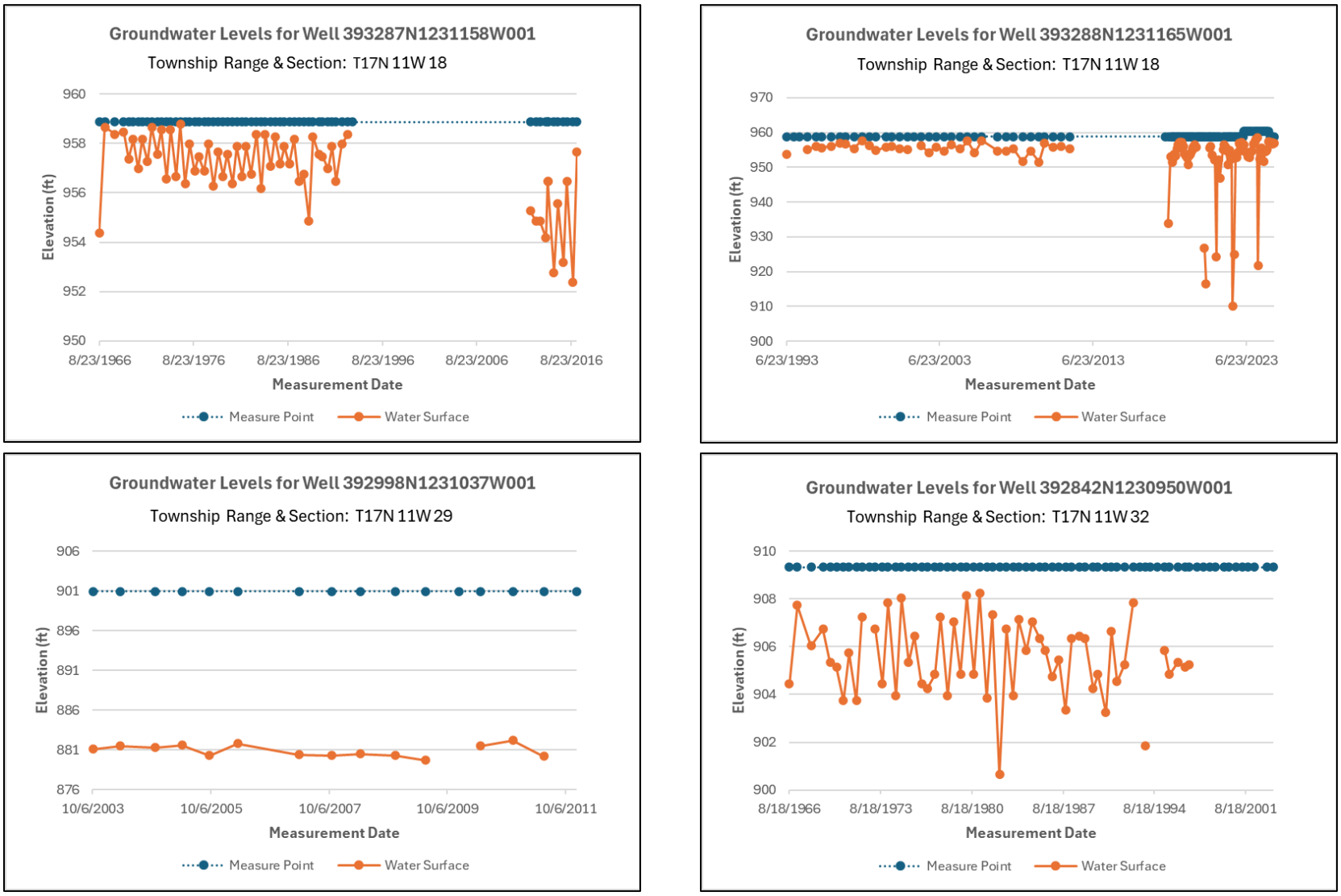


Figure 2.2.3.6-1. California Department of Water Resources water level monitoring stations.

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Table 2.2.3.6-3. Mineral occurrences in the vicinity of the Project.

Map ID	Site Name	County	Commodities (Primary / Secondary)	Ore or Other Material	Type	Development Status
1	Unknown	Lake	Chromium	Chromite (Ore)	Unknown	Occurrence
2	Cabbage Head Or Fir Root Ridge Claim	Lake	Chromium	Chromite (Ore)	Unknown	Occurrence
3	Unknown	Lake	Chromium	Chromite (Ore)	Unknown	Occurrence
4	Bull Mountain Lode	Lake	Chromium	Chromite (Ore)	Unknown	Occurrence
5	Cabbago Send	Lake	Chromium	–	Underground	Unknown
6	Hull Mountain Lodge	Lake	Chromium	–	Surface	Unknown
7	Unnamed Location	Lake	Chromium	–	Surface	Unknown
8	Long Shot Claim	Lake	Manganese / Chromium	–	Unknown	Occurrence
9	Cartwright Manganese Prospect	Lake	Manganese	Chert	Surface	Occurrence
10	Gravelly Valley	Lake	Manganese	–	Unknown	Producer
11	Black Rock	Lake	Manganese	–	Surface	Unknown
12	Hopper	Mendocino	Manganese	–	Unknown	Occurrence
13	Hopper Prospect	Mendocino	Manganese	–	Unknown	Occurrence
14	Gravelly Valley	Lake	Manganese, Silica	Chert, Psilomelane, Pyrolusite	Surface / Underground	Past Producer
15	Unnamed Location	Lake	Mercury	–	Underground	Unknown
16	Oberfeld Shale Quarry	Mendocino	Stone, Crushed / Broken	–	Surface	Producer
17	Soda Creek Bar	Lake	Sand and Gravel, Construction	–	Surface	Producer
18	Soda Spring	Lake	Geothermal	–	Geothermal	Occurrence

Source: USGS 2015

Note: – = Not applicable or unknown

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2.2.3.7 Geomorphology

This section describes the geomorphic processes in the vicinity of PG&E's Potter Valley Hydroelectric Project (Project). This section is focused on sediment supply to the Project reservoirs and how continued operation of the Project alters sediment transport processes and channel morphology.

For the purposes of this document, the study area includes Lake Pillsbury reservoir, its inflowing tributaries, the Eel River downstream to the Eel River estuary, including the Cape Horn Dam and Van Arsdale Reservoir, and the East Branch Russian River from the Potter Valley Powerhouse tailrace downstream to Lake Mendocino (approximately 11 RM).

2.2.3.7.1 Information Sources

This section was prepared using the following public information sources:

- Planning documents and study reports analyzing the feasibility of removing Scott Dam and Cape Horn Dam (Stillwater Sciences 2021a, 2021b; Stillwater Sciences et al. 2021a, 2021b);
- Stream inventory reports and stream condition inventories (CDFG 1995, 1997, 1998a, 1998b; MNF 2014, 2015);
- Watershed analysis reports for the Upper Main Eel River and Lake Pillsbury reservoir basin (Brooks et al. 1984; MNF 1995);
- Lake Pillsbury reservoir bathymetric survey reports (PG&E 2016, 2017, 2024);
- Sediment reports for Lake Pillsbury reservoir, Van Arsdale Reservoir, and the Eel River basin (Brown and Ritter 1971; PG&E 2005; Porterfield and Dunnam 1964);
- Upper Main Eel River and tributaries (including Tomki Creek, Outlet Creek, and Lake Pillsbury reservoir) TMDLs for sediment and temperature (U.S. Environmental Protection Agency [USEPA] 2004);
- North Coast Erosion and Sediment Control Pilot Project, Tomki Creek Watershed (Mendocino County Resource Conservation District 1983);
- Helicopter reconnaissance of Eel River from Scott Dam to Outlet Creek (PG&E 2012); and
- Fisheries study results conducted for the Project in 1980 (VTN 1982).

2.2.3.7.2 Geomorphic Setting

The Eel River is the third-largest watershed in California, draining 3,684 mi.^{2}, with a mean annual discharge of 6.5 million ac-ft. Major sub-basins of the Eel River are the main Eel River (1,477 mi.^{2}), the Middle Fork Eel River (753 mi.^{2}), the North Fork Eel River (283 mi.^{2}), the South Fork Eel River (690 mi.^{2}), and the Van Duzen River (428 mi.^{2}) (see Figure 2.2.2-2). The upper Eel River, which is the 78-mi.-long reach of the Eel River from its headwaters to just upstream of the confluence with the Middle Fork Eel River, originates on the slopes of Bald Mountain at an elevation of approximately 6,739 ft. above msl and drains 688 mi.^{2}. From its headwaters, the Eel

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River flows in a southerly direction for 23 mi. before turning westward and flowing into Lake Pillsbury reservoir. The river descends an average of 200 fpm (3.8 percent) in this reach.

The Eel River (153 mi.^{2}) and Rice Fork (96 mi.^{2}) enter Lake Pillsbury reservoir, as do other smaller tributaries including Salmon Creek (16.2 mi.^{2}), Smokehouse Creek (13.9 mi.^{2}), Squaw Valley Creek (8.8 mi.^{2}), Horsepasture Gulch (2.1 mi.^{2}), and Salt Spring Creek (2.2 mi.^{2}). The total drainage area at Scott Dam is 289 mi.^{2}. Downstream of Lake Pillsbury reservoir, the Eel River flows 12 mi. westward to Van Arsdale Reservoir, with an average slope of approximately 29 fpm (0.5 percent). The total drainage area at Cape Horn Dam is 349 mi.^{2}. Downstream from Van Arsdale Reservoir, the Eel River turns northwest, descending an average of 16 fpm (0.3 percent) to its confluence with the Middle Fork Eel River located 55 mi. downstream (Brown and Ritter 1971). Tomki Creek (64 mi.^{2}) and Outlet Creek (162 mi.^{2}) are major tributaries between Scott Dam and the Middle Fork Eel River confluence. The Eel River flows another 119 mi. to the ocean with a gradient of 7 fpm (0.14 percent). Three major tributaries, the North Fork Eel, South Fork Eel, and Van Duzen rivers, and numerous smaller tributaries enter along the way.

The Northern Coast Range in the vicinity of the Eel River is predominantly composed of the Franciscan Complex, consisting of three structurally separated belts: the Eastern, Central, and Coastal belts (Jayko et al. 1989). The Central belt, which underlies much of the Eel River Watershed between the South Fork Eel River confluence near Weott and the Middle Fork Eel River confluence near Dos Rios, consists of a Late Jurassic to Middle Cretaceous argillaceous mélange matrix encompassing blocks and slabs of sandstone and shale turbidite sequences (McLaughlin et al. 2000). The Eel River canyon dissecting the Central belt between approximately Alderpoint and Dos Rios is especially prone to landslides in the form of large earthflow complexes (Brown and Ritter 1971; Mackey and Roering 2011). Upstream of Dos Rios, the Upper Main Eel River Watershed is underlain by Franciscan terrain, Franciscan schist, and Cretaceous marine rocks. These geologic terrains are generally more stable, with less sediment production than areas downstream of Dos Rios. The portion of the Upper Main Eel River Watershed between Outlet Creek and Cape Horn Dam is most susceptible to mass wasting (Brown and Ritter 1971). Upstream of Cape Horn Dam, unstable areas prone to mass wasting (e.g., landslides and steep inner gorges) constitute 16.4 percent of the watershed area, and soils with a high erosion hazard rating constitute 40.3 percent of the area (MNF 1995).

Sediment Supply and Load

Sediment Supply

USEPA added the Upper Main Eel River to California's 303(d) impaired water list in 1992 due to elevated sedimentation and temperature. TMDLs for sediment and temperature were established for the Upper Main Eel River in 2004 (USEPA 2004). The TMDL concluded that approximately 13.3 million cubic yards (cy) of sediment was delivered to the upper Eel River between 1940 and 2004, equating to an average annual delivery rate of 302 cy per mi.^{2} per year. About 47 percent of the total sediment delivery during the period originated from undifferentiated Franciscan terrain (58 percent of watershed area), and about 25 percent originated from Franciscan schist terrain (21 percent of watershed area). The primary sources of sediment (94 percent of the total delivery) were large erosion features (e.g., shallow debris slides, debris flows, gullies, and streambank

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erosion) unrelated to earthflows. About 33 percent of the total sediment delivery was related to human disturbance (primarily associated with roads and timber harvest). By comparison, human disturbance as a percent of total sediment delivery was reported as 52 percent in the lower Eel River Watershed (USEPA 2007) and 46 percent in the South Fork Eel River watershed (USEPA 1999), which suggests that the relative impact of management-related sediment delivery is lower in the Upper Main Eel River Watershed than elsewhere in the Eel River Watershed.

Sediment Load

The Eel River has the highest recorded average suspended sediment load per unit area of any river of its size or larger in the conterminous United States (Lisle 1990). During the 10-year period from 1958 to 1967, the Eel River at Scotia (3,113 $mi.^2$) discharged an average suspended load of about 31,390,000 tons per year (10,084 tons per $mi.^2$ per year [t $mi.^{-2}$ y^{-1}]) (Brown and Ritter 1971). The high erosion and sediment transport rates have been attributed to a combination of rapid uplift and tectonic deformation, erosive bedrock, high seasonal rainfall and intense storm events, and anthropogenic disturbance (e.g., forest management, road construction, and agriculture). The Upper Main Eel River above the Middle Fork Eel River confluence (drainage area 1,705 $mi.^2$) contributed about 6.6 percent (2,938 t $mi.^{-2}$ y^{-1}) of the annual suspended load at Scotia during the 1958–1967 period. The upper watershed has a smaller load compared to other parts of the watershed, due primarily to more competent geology, less extensive land use change, and sediment trapping in Lake Pillsbury reservoir (see discussion of reservoir sedimentation below).

2.2.3.7.3 Reservoir Sedimentation

Scott Dam Area

Lake Pillsbury Reservoir Sediment Volume

Sediment accumulation in Lake Pillsbury reservoir reflects sediment supplied from the Upper Main Eel River source area and can be used to estimate average annual sediment delivery. The original 94,400-ac-ft storage capacity of Lake Pillsbury reservoir in December 1921 was reduced by 7,620 ac-ft (8.1 percent) by May 1959 (Porterfield and Dunnam 1964). Sediment delivery between December 1921 and May 1959 was about 316,000 t y^{-1} (1,097 t $mi.^{-2}$ y^{-1}), of which 94 percent was deposited within the reservoir (Brown and Ritter 1971). Storage capacity in Lake Pillsbury reservoir was further reduced to 80,700 ac-ft in 1984 (Brooks et al. 1984 in MNF 1995), resulting in a 14.5 percent reduction in the storage capacity since 1921. Sediment delivery between 1959 and 1984 was about 373,200 t y^{-1} (1,296 t $mi.^{-2}$ y^{-1}).

On December 12, 2004, FERC approved PG&E's bathymetric survey plan for Lake Pillsbury reservoir required by Article 55 of PG&E's amended license for the Project. The plan specified that PG&E would conduct bathymetric surveys of Lake Pillsbury reservoir every 10 years, beginning in 2005. The 2005 bathymetric survey indicated a 20.6 percent reduction in storage capacity since 1921. Sediment delivery between 1984 and 2005 was about 417,000 t y^{-1} (1,448 t $mi.^{-2}$ y^{-1}). Bathymetric surveys of Lake Pillsbury reservoir were conducted again in 2015 and 2016, and survey results were submitted to FERC (PG&E 2016, 2017), and in 2023 (PG&E 2024). Table 2.2.3.7-1 and Figure 2.2.3.7-1 show the change in the total storage capacity (volume) of Lake Pillsbury reservoir over time. The reservoir still has approximately 73 percent

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of its original storage capacity based on results from the 2023 survey (PG&E 2024). The slight increase in capacity shown between 2005 and 2015–2016 may be the result of improvements in equipment and techniques between the surveys rather than a true reduction in storage capacity.

Table 2.2.3.7-1. Lake Pillsbury reservoir storage capacity over time.

Year	Volume (ac-ft)	% of Original Capacity
1921	94,400	100
1959	86,780	92
1984	80,700	85
2005	74,993	79
2015–2016	76,876	81
2023	69,871	73

Note: ac-ft = acre-feet

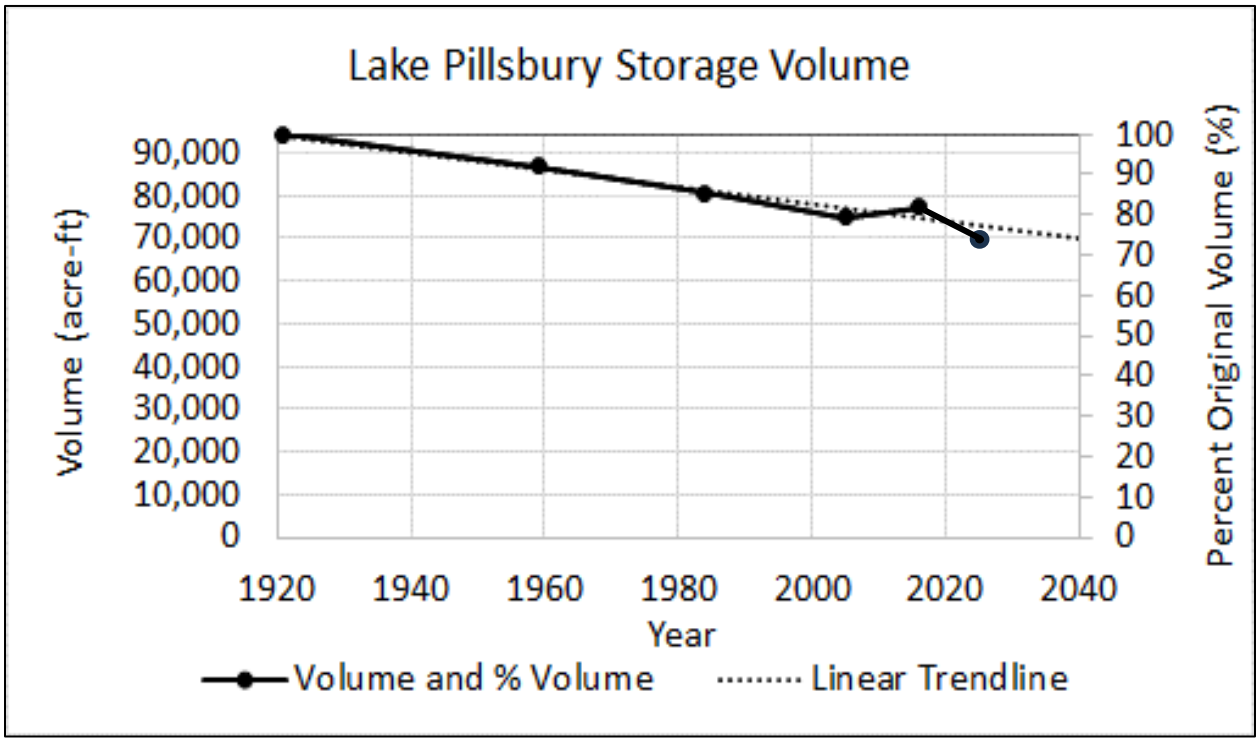


Figure 2.2.3.7-1. Lake Pillsbury reservoir total storage capacity by year.

Potter Valley Hydroelectric Project, FERC Project No. 77
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Stillwater Sciences et al. (2021a) georeferenced a PG&E map with 10-ft. contours from 1922 and compared it with a 2015 bathymetry digital terrain model to estimate the total volume of sediment stored within Lake Pillsbury reservoir. The difference in maximum water surface elevation of 1,828.3 ft. (NGVD29 or 1,831.2 ft. NAVD 88) from both the 1922 and 2015 sources resulted in an estimate of 20.5 million cy of stored sediment. Because the 20.5-million-cy estimate does not account for sediment storage upstream of the 1922 and 2015 mapping boundaries at the head of the reservoir, this value was rounded up to a final estimated sediment volume of 21 million cy within Lake Pillsbury reservoir (Stillwater Sciences et al. 2021a). It is estimated that 1.82 million cy (about 15 percent) of the 21 million cy is deposited in the inundated areas of Salmon/Smokehouse creeks, Squaw Valley Creek, and Horsepasture Gulch (Stillwater Sciences 2021b).

Lake Pillsbury Reservoir Sediment Texture

Two primary sources exist for determining the grain size distribution of sediment in Lake Pillsbury reservoir: Porterfield and Dunham 1964 and Geosyntec 2020. Porterfield and Dunnam (1964) used sediment density probing and bathymetric survey analysis to conclude that reservoir sedimentation was greatest in the upper reaches of the Eel River and along Rice Fork with observed spatial differences in sediment texture. Relatively coarse sediment deposits 9 to 18 ft. thick occurred in the upper reaches, whereas the downstream portion of the reservoir was a relatively uniform 3- to 5-ft.-thick deposit of predominantly silt and clay (Porterfield and Dunnam 1964, as cited in Geosyntec 2020).

The locations of the Geosyntec (2020) sediment core composite samples are shown in Volume II, Section 2.2.3.6, Geology and Soils (Map 2.2.3.6-9), for Lake Pillsbury reservoir. Geosyntec (2020) reported that sediment within Lake Pillsbury reservoir is primarily silt and clay in which six of nine composite samples had 90 percent or greater silt and clay content and two others exceeded 75 percent (PS-03 and PS-08).

Only one of the samples (PS-07) collected in the mainstem Eel River in the upstream end of the reservoir was predominantly sand and gravel (Geosyntec 2020). Geosyntec (2020) encountered a hard surface at three of its sample sites (PS-03, PS-07, and PS-08) and attributed this to consolidation of previously deposited sediments. Stillwater Sciences et al. (2021a) noted that the USGS and Geosyntec sediment samples were from shallow cores and neither provided a comprehensive assessment of all accumulated sediment in Lake Pillsbury reservoir.

Stillwater Sciences (2021a) estimated that sand made up 34 percent of the 21 million cy within Lake Pillsbury reservoir, or about 7.1 million cy (5.7 million tons). The estimate is based on a 34 percent sand fraction from Porterfield and Dunnam (1964) and an average bulk density of 1,590 pounds/cy. Over the 93-year period of Scott Dam operation (1923–2015), the long-term average annual sand supply to Lake Pillsbury reservoir is 61,000 tons/year (Stillwater Sciences [2021b]), which based on drainage area translates roughly to 37,500 tons/year from the Eel River and 23,500 tons/year from the Rice Fork.

Based on the assumption that gravel is typically about 5 to 10 percent of total sediment production, which is primarily composed of sand, silt, and clay, Stillwater Sciences (2021b) estimated approximately 2 million cy of gravel is deposited in Lake Pillsbury reservoir. Importantly,

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Stillwater Sciences (2021b) also stated that inadequate information exists to reasonably understand the volume and grain size distribution of gravel deposited in Lake Pillsbury reservoir because neither USGS nor Geosyntec collected samples from the upper reservoir gravel deposits (top-set deposit) (Figure 2.2.3.7-2). The gravel deposits are most likely concentrated at least 1 RM upstream of Scott Dam on the Rice Fork and 2 RM upstream of the dam on the mainstem Eel River (Stillwater Sciences 2021b). As depicted on Figure 2.2.3.7-2, this spatial trend of relatively coarse top-set sediment deposits primarily occurring in the upper portion of the reservoir and finer sediment deposits (bottom-set) extending farther downstream to the dam at a lower elevation is commonly observed behind dams (Geosyntec 2020).

The remaining portion of sediment in Lake Pillsbury reservoir, 11.9 million cy, or 56 percent, is assumed to be silt and clay.

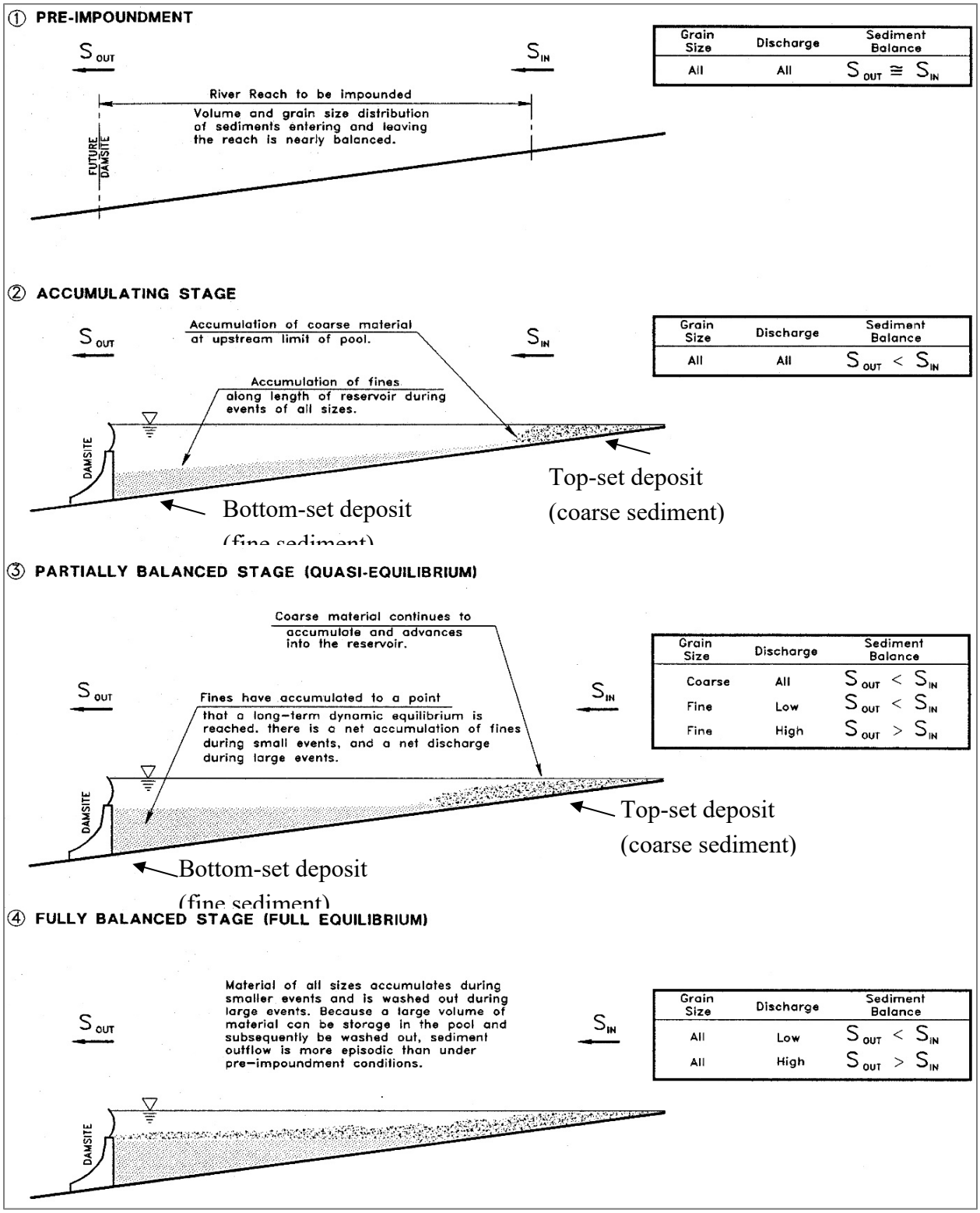
Cape Horn Dam Area

Van Arsdale Reservoir Sediment Volume

Van Arsdale Reservoir has a surface area of approximately 106 acres at a normal maximum water surface elevation of 1,494.3 ft. The gross storage capacity of Van Arsdale Reservoir was originally 1,457 ac-ft, with a usable capacity of 1,140 ac-ft. Accumulation of sediment over time has resulted in significant loss of reservoir capacity. Based on the most recent bathymetric and topographic surveys conducted in 2002 and 2006, the current reservoir capacity is less than 390 ac-ft, indicating that 1.7 million cy of sediment has accumulated behind the dam (PG&E 2006; McMillen Jacobs Associates 2021).

In response to FERC's concerns about coarse sediment deposition in the vicinity of the intake to the diversion tunnel and associated fish screen at Cape Horn Dam, PG&E evaluated sedimentation in Van Arsdale Reservoir in the early 2000s (PG&E 2005). The study analyzed reservoir sediment characteristics, sediment transport, and estimated sediment yield to the impoundment. Results of the study suggested that filling of the reservoir with coarse sediment (predominantly) has resulted in a low sediment accumulation (trap) efficiency, with most incoming sediment transported through the impoundment and past Cape Horn Dam. PG&E (2005) reported that Van Arsdale Reservoir was functioning as a Stage 3 reservoir that was partially balanced (in quasi-equilibrium) but was actively progressing toward a Stage 4 reservoir that is fully balanced (in full equilibrium, where sediment in equals sediment out) (Figure 2.2.3.7-2).

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Source: PG&E 2005

Figure 2.2.3.7-2. Stages of reservoir sedimentation development after dam construction.

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Historically, PG&E dredged the reservoir to maintain storage capacity, but it eventually ceased dredging because of the high cost and frequent deposition of new sediment (Stillwater et al. 2021a). Fine gravel (3 to 6 mm) is transported through the impoundment during annual flow events, and medium gravel (8 to 16 mm) is transported through the reservoir during 2- to 5-year return flows (PG&E 2005). PG&E estimated that minimum coarse sediment deposition rates averaged approximately 5,000 t y^{-1} (81 t $mi.^2$ y^{-1}) and minimum total sediment yield (i.e., coarse and fine) to the impoundment ranged from 407 to 814 t $mi.^{-2}$ y^{-1}. These minimum estimates assume that bedload was deposited in the reservoir during high-flow events that occurred during 1993, 1995, 1997, and 1998; reservoir sediment deposits are approximately 10 to 20 percent of the total load and have a density of 1.17 tons per cubic meter; and sediment delivered to the impoundment was supplied from the 98-$mi.^2$ source area downstream of Scott Dam. The report indicated that Soda Creek, located approximately 10 mi. upstream of Cape Horn Dam, is a major source of coarse sediment delivered to Van Arsdale Reservoir. As part of the study, PG&E (2005) evaluated alternatives to managing sedimentation in Van Arsdale Reservoir, including sediment pass-through and submerged flow training structures designed to transport sediment away from the diversion intake structure.

Van Arsdale Reservoir Sediment Texture

The locations of the Geosyntec (2020) sediment samples are shown in Volume II, Section 2.2.3.6. Geology and Soils (Map 2.2.3.6-10) for Van Arsdale Reservoir. The reservoir sediment near the dam is predominantly sand and gravel based on one composite sample (PS-11) collected by scraping the coarse-grained sediments from the surface (Geosyntec 2020).

It is possible finer-grained sediment deposits occur directly behind Cape Horn Dam, but sampling of the area was not possible due to access limitations and safety concerns. Most of the reservoir was noted to have no visible fine sediments but rather a streambed composed of gravel, cobble, and boulders (Geosyntec 2020). The coarseness of the sediment is indicative of the reservoir's small storage area (low trap efficiency) and likely occurs because gravel and finer sediment currently is transported through the reservoir and into the Eel River downstream of Cape Horn Dam (Stillwater Sciences et al. 2021a).

Eel River Sediment Texture

The channel substrate of the Eel River between Cape Horn Dam and Scott Dam has become coarser than pre-dam conditions due to trapping of sediment in Lake Pillsbury reservoir and a reduction in supply of finer-grained sediment (Geosyntec 2020).

2.2.3.7.4 Channel Morphology

Stream channel morphology and sedimentation in the Eel River Watershed is closely linked to stochastic hillslope processes and high-flow events that produce and transport fluvial sediment (Lisle 1982). A December 1964 flood increased the incidence of landsliding and resulted in greatly widened channels (Brown and Ritter 1971; Kelsey 1977) with reduced bar-pool bed topography (Lisle 1982). On the Upper Main Eel River, the 1964 flood increased channel bed elevations by 2 ft. just upstream of the confluence with the Middle Fork Eel River (Brown and Ritter 1971). Tomki Creek widened, lost much of its riparian cover, and lost many deep pools (Mendocino County Resource Conservation District 1983, as cited in USEPA 2004). Aggradation in Soda

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Creek resulted in a braided channel morphology in the half-mile upstream of its confluence with the Eel River, creating a potential barrier to upstream fish migration during some flows. Channels in the watershed typically recover from these large events over long periods (i.e., decades) of subsequent exposure to smaller discharges that remobilize and sort stored sediment (Janda and Nolan 1979; Kelsey 1980; Lisle 1981, 1990; Nolan and Marron 1985). In some reaches, channel patterns and flood deposits along the higher channel margins may persist until floods of equal or greater magnitude occur (Kelsey 1977; Lisle 1981).

Various approaches have been used to classify the Upper Main Eel River into reaches based on generalized geomorphic characteristics. An instream flow study conducted in 1980 segmented the Upper Main Eel River from the Outlet Creek confluence to Scott Dam into six reach types based on channel form and tributary confluences (VTN 1982). A subsequent instream flow study in 1987 segmented the river between Scott Dam and Outlet Creek into three reaches (Scott Dam to Cape Horn Dam, Cape Horn Dam to Tomki Creek, and Tomki Creek to Outlet Creek) based on hydrologic nodes (SEC 1987). Most recently, the upper Eel River between Scott Dam and Outlet Creek was broadly characterized into geomorphic reaches based on confinement (i.e., channel and valley widths) and valley landforms (i.e., floodplains, river terraces, alluvial fans, and bedrock controls) (PG&E 2012). The river channel was generally described as occupying a relatively narrow valley with little floodplain development. Six intra-canyon valleys were identified where the channel is locally wider and bordered by terraces and alluvial fans. From upstream to downstream, these intra-canyon valleys include Soda Creek, Lauder Flat, Van Arsdale Reservoir, Heartstorie Camp, Marshalls Cabins, and Emandal Resort.

CDFW described physical habitat characteristics in stream inventories for Soda Creek (CDFG 1998a), Benmore Creek (CDFG 1998b), Tomki Creek (CDFG 1997), and Outlet Creek (CDFG 1995). Additional information on general geomorphic conditions in tributary channels is included in the 1995 watershed analysis report for the Upper Main Eel River Watershed (MNF 1995) and in stream condition inventories conducted by the MNF in Benmore Creek (MNF 2014 [unpublished data]) and Soda Creek (MNF 2015 [unpublished data]). PG&E included physical habitat metrics for some channel reaches in its Potter Valley Project Monitoring Program.

Eel River and Tributaries within Lake Pillsbury Reservoir

The Eel River and its tributaries within Lake Pillsbury reservoir are buried under approximately 21 million cy of impounded sediment. The depth of sediment deposition varies throughout Lake Pillsbury reservoir.

Mainstem Eel River Upstream of the Rice Fork

Comparison of the 1921 pre-dam contours with 2015 bathymetric data within Lake Pillsbury reservoir shows much of the mainstem Eel River (i.e., 17,000 ft. upstream of Scott Dam) channel is buried under approximately 35 ft. of sediment (California Trout et al. 2021). Sediment depth is approximately 10 ft. throughout a 2,000-ft.-long reach located 2,000 to 3,000 ft. upstream of Scott Dam.

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Rice Fork

Of the historical stream branches entering Lake Pillsbury reservoir, the depth of trapped sediment is greatest in Rice Fork. Comparison of the 1921 pre-dam contours with 2015 bathymetric data shows that the historical Rice Fork channel is buried under approximately 50 ft. of mobile sediment in an 11,000-ft.-long reach upstream of Scott Dam (California Trout et al. 2021).

Salmon Creek

The depth of accumulated sediment is lower in the tributaries within the Gravelly Valley[1] portion of Lake Pillsbury reservoir than in the mainstem Eel River or Rice Fork. Comparison of the 1921 pre-dam contours with the 2015 bathymetric data shows much of the historical Salmon Creek channel from Scott Dam upstream at least 15,000 ft. is buried under approximately 10 ft. of mobile sediment (California Trout et al. 2021).

Squaw Valley Creek

Comparison of the 1921 pre-dam contours with the 2016 bathymetric data shows that Squaw Valley Creek is buried under approximately 10 ft. of mobile sediment for about 3,500 ft. upstream of its confluence with the mainstem Eel River and under about 10 ft. or less for another 6,000 ft. upstream (Stillwater Sciences 2021b).

Horsepasture Gulch

Comparison of the 1921 pre-dam contours with the 2016 bathymetric data shows Horsepasture Gulch is buried under approximately 15 to 20 ft. of mobile sediment for about 1,700 ft. upstream of its confluence with the mainstem Eel River and under about 5 ft. or less for another 1,300 ft. upstream (Stillwater Sciences 2021b).

Eel River – Scott Dam to Cape Horn Dam

Downstream of Scott Dam, the Eel River flows 12 mi. westward to Van Arsdale Reservoir. This reach has three distinct reach breaks. For the first 2.5 mi., the Eel River has a slope of 0.33 percent. The river then becomes steeper for the next 4 mi. with a slope of 0.80 percent. The final 5.5-mi.-long reach has a slope of 0.18 percent. The sediment impounded upstream of Cape Horn Dam reduces the channel slope (based on thalweg elevations from cross-section surveys performed in 2020–2021, as cited in Stillwater Sciences 2021b). Scott Dam includes a 3-ft. by 5-ft. sluice tunnel with a sluice outlet at an approximate elevation of 1,812 ft. (PG&E local datum or 1,733.2 ft. National Geodetic Vertical Datum of 1988 [NAVD88]) (McMillen Jacobs Associates 2021). The sluice outlet has not been operable for many years and was abandoned, as it is buried under approximately 8 ft. of silt (McMillen Jacobs Associates 2021). The trapping of sediment behind Scott Dam has reduced the bedload sediment supply from upstream of the dam to the 12-mi.-long reach downstream to Cape Horn Dam. The channel morphology of the 12-mi.-long reach is typical of rivers downstream of large dams that substantially regulate flow and sediment. Channel substrate is coarser than it would be without Scott Dam in place, and vegetation is denser, which

[1] The area near the northern shores of Lake Pillsbury reservoir.

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contributes to confinement of the channel and restriction of channel meandering into pre-dam floodplain areas (Stillwater Sciences et al. 2021b).

Soda Creek, which has a drainage area of 13.5 mi.^{2}, enters from the north approximately 1.1 mi. downstream of Scott Dam. Farther downstream, Bucknell Creek, which has a drainage area of 18.2 mi.^{2}, enters the Eel River from the south. The Eel River upstream of Soda Creek has a channel bed dominated by coarse sediment and bars with dense riparian vegetation. These conditions restrict the river's potential to meander within its pre-dam floodplain (Stillwater Sciences et al. 2021b). The input of flow and sediment from Soda Creek creates a more dynamic channel in which the river has large alluvial bars where it is not confined within a narrow canyon. Downstream from Soda Creek, the Eel River enters a canyon that limits opportunities for sediment storage in bars and channel meandering. For approximately the first 5 mi. downstream of Scott Dam, the active channel of the Eel River is about 170 ft. wide. It then narrows to approximately 100 ft. from 5 to 11 mi. downstream of Scott Dam before widening to about 180 ft. as the river enters Van Arsdale Reservoir (based on observations from 2016 and 2017 aerial photographs, as cited in Stillwater Sciences et al. 2021b). Near Van Arsdale Reservoir, the canyon widens, sediment transport potential decreases, and sediment from Soda Creek and other tributaries deposits to form bars that can be colonized by vegetation to create floodplain areas (Stillwater Sciences et al. 2021b).

Eel River – Cape Horn Dam to Middle Fork Eel River

Downstream from Van Arsdale Reservoir, the Eel River turns northwest, descending for about 37 mi. at an average channel slope of 0.29 percent to its confluence with the Middle Fork Eel River (based on thalweg elevations from cross-section surveys performed in 2020–2021, as cited in Stillwater Sciences 2021b). Stillwater Sciences et al. (2021b) hypothesized that most sediment supplied to the Eel River by Soda Creek and other smaller tributaries is transported through Van Arsdale Reservoir and over Cape Horn Dam based on the presence of active bars on the reservoir's inside bend and concrete abrasion on the east side of the dam. The input of additional sources of sediment to the Eel River downstream of Cape Horn Dam from tributaries creates an alluvial bar morphology in the river. Although riparian encroachment is observed at some locations, the river transitions to lightly vegetated, or vegetation-free, bars formed of boulders, cobbles, and gravel with increased sediment mobility (Stillwater Sciences et al. 2021b).

The effect of flow regulation and reduced sediment supply at Scott Dam on the geomorphic processes of the Eel River diminishes with distance downstream from the dam. With the flow and sediment contributions from Tomki Creek (4 mi. downstream of Cape Horn Dam and 16 mi. downstream of Scott Dam) and other tributary inputs, such as Outlet Creek (30 mi. downstream of Cape Horn Dam), the signature of Scott Dam on the Eel River's geomorphic processes is difficult to detect downstream of the confluence with the Middle Fork Eel River (Stillwater Sciences et al. 2021b). The active channel width of the Eel River in the Cape Horn Dam to Middle Fork Eel River reach typically ranges between 100 and 250 ft. (based on observations from 2016 and 2017 aerial photographs, as cited in Stillwater Sciences 2021b).

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Eel River – Middle Fork Eel River to Estuary

The Middle Fork Eel River drains 753 mi.^{2}, which is a larger drainage area than that of the upper Eel River upstream of the Middle Fork (688 mi.^{2}). It is a major contributor of flow and sediment to the mainstem Eel River that further diminishes the effects of flow regulation and sediment supply reduction created by Cape Horn Dam and Scott Dam.

Several other principal tributaries enter the mainstem Eel River before it reaches the ocean. The North Fork Eel River (283 mi.^{2}) enters approximately 22.9 mi. downstream of the Middle Fork, and the average channel slope in the Middle Fork to North Fork Eel River reach is about 0.24 percent. About 40.5 mi. upstream of the estuary, the South Fork Eel River (690 mi.^{2}) enters the Eel River, and 27.0 mi. farther downstream is the confluence with the Van Duzen River (428 mi.^{2}), located about 13.5 mi. upstream of the estuary. The average slope in the North Fork to South Fork Eel River reach is 0.15 percent, in the South Fork to Van Duzen River reach, the average slope is 0.07 percent, and from the Van Duzen River to the ocean the average slope is 0.05 percent.

The exceptionally high sediment yield from the watershed (Lisle 1990) is apparent in the extensive sediment bars that are nearly continuous along the river channel. At low flow, the river is typically a single-thread (sometimes multi-thread as the channel splits around mid-channel bars), sinuous channel flowing between extensive bedload deposits. Minimal riparian vegetation is observed along the low-flow channel or on sediment bars, which indicates a dynamic channel with frequently occurring floods capable of scouring riparian vegetation.

About 11 mi. upstream of the estuary, the Eel River transitions into an "anabranching" channel pattern characterized by multiple channel threads flowing around vegetated islands, and the slope of the river is nearly flat as it enters the Pacific Ocean.

Recent Restoration Projects

Several restoration projects have recently been implemented in the lower Eel River. Table 2.2.3.7-2 lists these recent projects and provides a summary of the restoration activities, size of the projects, and implementation years. The locations of these projects, identified by the Site No. in Table 2.2.3.7-2, are shown on Map 2.2.3.7-1.

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Table 2.2.3.7-2. Recent restoration projects in the lower Eel River.

Site No.	Project Title	Lead Agency	Description	Size/ Length	Start and Completion Date/Phase
1	Russ Creek and Centerville Slough Restoration Project	Humboldt County Resource Conservation District	Project actions include reestablishing the Centerville Slough tidal system by constructing a new Centerville Slough main channel and tributaries subject to full tidal influence, reestablishing hydraulic connectivity between Centerville Slough and upland stream channels, and constructing a system of set-back levees to protect adjacent agricultural lands from tidal flooding, Eel River flooding, and dune overwash.	1,480 acres	Planning and design; implementation to occur in 2025 with bulk in 2026; 2024–2027
2	Cannibal Island Restoration Project	CDFW	The project will enhance and reconnect full tidal exchange to approximately 500 acres of former tidal marsh habitat to promote recovery and maintenance of tidal marsh habitats and resiliency to sea level rise.	795 acres	Implementation 2024/2025–ongoing
3	Eel River Arundo Eradication Phase 4	CDFW	Project actions include eradication of *Arundo donax* from at least eight sites in the Eel River Watershed.	37 mi.	2025–2027
4	NRCS WRP 6691041301DRH	Central Valley Joint Venture	Restored and reestablished palustrine wetlands and emergent freshwater marsh.	135.9 acres	2018
5	NRCS ACEP-WRE 5491041401GL0	Central Valley Joint Venture	Restored and reestablished palustrine wetlands and emergent freshwater marsh, including the acquisition of marsh and forested riparian land.	47.62 acres	2020
6	NRCS ACEP-WRE 5491041401GJF	Central Valley Joint Venture	Restored and reestablished palustrine wetlands and emergent freshwater marsh.	83.73 acres	2018

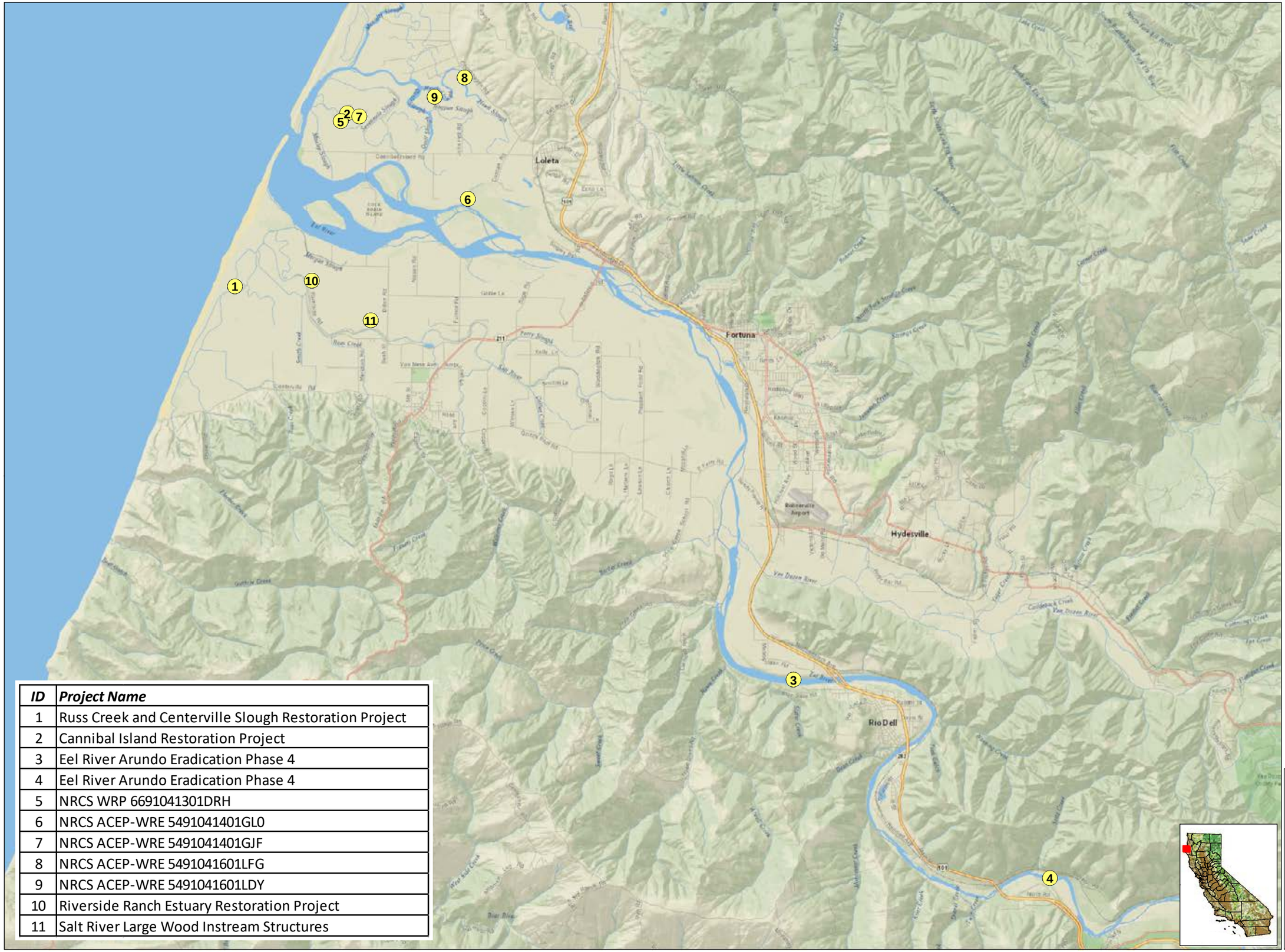
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Site No.	Project Title	Lead Agency	Description	Size/ Length	Start and Completion Date/Phase
7	NRCS ACEP-WRE 5491041601LFG	Central Valley Joint Venture	Restored and reestablished palustrine wetlands and emergent freshwater marsh. Three acres of the project included upland acquisition for preservation and protection of the restored wetland and marsh.	15.72 acres	2020
8	NRCS ACEP-WRE 5491041601LDY	Central Valley Joint Venture	Restored and reestablished palustrine wetlands and emergent freshwater marsh, including acquisition of land.	267.6 acres	2018–2023
9	Riverside Ranch Estuary Restoration Project	Humboldt County Resource Conservation District	Project activities included two levee breaches to restore estuarine juvenile rearing habitat in the Salt River. Project created approximately 19,800 linear ft. of interior slough channel and 50 acres of estuarine area.	268 acres	2011–2014
10	Salt River Large Wood Instream Structures	Humboldt County Resource Conservation District	Installed 16 large wood structures along 2,200 ft. of the newly constructed Salt River channel.	0.42 mi.	2005–2016

Sources: OPR 2024; California Wetlands Monitoring Workgroup 2024; NOAA 2024; California Trout et al. 2024

Notes: ACEP-WRE = Agriculture Conservation Easement Program-Wetland Reserve Easement
CDFW = California Department of Fish and Wildlife
WRP = Wetland Reserve Project

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Legend

Restoration Project

ID	Project Name
1	Russ Creek and Centerville Slough Restoration Project
2	Cannibal Island Restoration Project
3	Eel River Arundo Eradication Phase 4
4	Eel River Arundo Eradication Phase 4
5	NRCS WRP 6691041301DRH
6	NRCS ACEP-WRE 5491041401GL0
7	NRCS ACEP-WRE 5491041401GJF
8	NRCS ACEP-WRE 5491041601LFG
9	NRCS ACEP-WRE 5491041601LDY
10	Riverside Ranch Estuary Restoration Project
11	Salt River Large Wood Instream Structures

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PG&E Potter Valley Project
FERC Project No.77

Map 2.2.3.7-1

Lower Eel River restoration project locations.

0 1 2 Miles

Projection: UTM Zone 10 N
Datum: NAD 83

Date: 6/5/2025

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East Branch Russian River

Limited information is available to describe geomorphic processes in the East Branch Russian River. In general, the river is of low gradient, dropping 24 fpm (0.4 percent gradient) over the approximately 11-mi. reach from the Potter Valley Powerhouse to the ordinary high-water mark of Lake Mendocino. Along this reach, the river runs through the agriculture lands of Potter Valley before entering an open canyon area above Lake Mendocino. A series of check dams within the valley portion of this reach were installed historically to control stream erosion/downcutting. Through Potter Valley, riparian habitat occurs as a corridor approximately 100 to 200 ft. wide.

2.2.3.7.5 Lake Pillsbury Reservoir Shoreline Erosion

Lake Pillsbury reservoir's licensed normal maximum water surface elevation is 1,910 ft. (PG&E local datum). Due to a better understanding of the seismic risks associated with Scott Dam, as an interim risk reduction measure, PG&E established a 10-ft. restriction on the maximum reservoir operating level. The maximum water surface elevation under existing conditions with the variance is 1,900 ft. (FERC 2023).

Steeper shorelines around Lake Pillsbury reservoir consisting of unconsolidated soils and/or sediments typically experience varying degrees of erosion related to the tractive force of wind-generated or boat-generated waves. PG&E typically uses an elevation of 1,861.7 ft. (10,000 ac-ft) as a minimum storage level to avoid the potential for bank failure, impacts to Project facilities and operations, and release of sediment-laden water to downstream reaches. See Section 2.2.3.6, Geology and Soils for additional discussion of slope stability in the reservoir.

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2.2.3.8 Land Use

This section describes the existing land uses in the vicinity of PG&E's Potter Valley Hydroelectric Project (Project).

This section first provides setting information for each of the four study regions: (1) Scott Dam Area, (2) Cape Horn Dam Area, (3) Eel River Watershed, and (4) Russian River Watershed. The setting section is followed by a summary of the pertinent land management plans and policies that govern land uses within and adjacent to the FERC Project boundary. A discussion of wildfire history and fuel management practices is provided at the end of this section.

2.2.3.8.1 Information Sources

This section was prepared primarily using the following public information sources:

- California Department of Transportation's (Caltrans') Scenic Highway Mapping System (Caltrans 2024);
- CDFW Designated Wild and Heritage Trout Waters (CDFW 2024);
- Lake County General Plan (Lake County 2008);
- Mendocino County General Plan (Mendocino County 2020);
- National Wild and Scenic Rivers (W&SR) System website (National WS&R System 2024);
- U.S. Census Bureau population data (Census Bureau 2024);
- USFS MNF LRMP (MNF 1995);
- USFS MNF's Motor Vehicle Use Map, South Central Map and Insets (MNF 2017); and
- Wilderness.net – Snow Mountain Wilderness (Wilderness Connect 2024).

2.2.3.8.2 Scott Dam Area

The Scott Dam Area includes Scott Dam, Lake Pillsbury reservoir, and the surrounding recreation facilities. Lake Pillsbury reservoir, the main storage reservoir for the Project, is formed behind Scott Dam, located on the Eel River in Lake County. According to U.S. Census Bureau population estimates, the population of Lake County was 68,024 based on the 2022 American Community Survey (U.S. Census Bureau 2024).

Scott Dam is a concrete structure that spans the width of the Eel River, with a maximum height of 130 ft. and a total length of 805 ft. Most of the land submerged below the high-water mark by Lake Pillsbury reservoir is owned by PG&E. However, most of the land surrounding Lake Pillsbury reservoir is public land managed by the MNF (see Map 2.2.3.8-1). With a surface area of approximately 2,225 acres under normal operating conditions and 29 mi. of shoreline (PG&E 2015), Lake Pillsbury reservoir is the largest body of water in the MNF. It provides a variety of reservoir-based recreation opportunities such as boating, windsurfing, fishing, and swimming.

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The Scott Dam Area can be accessed from the south via Elk Mountain Road (County Road 301, Forest Service Road M1), from the west via Eel River Road (Forest Service Road M8), and from the northeast via Forest Service Road M6. The area is also accessible from the north via a dirt road called Hull Mountain Road (Forest Service Road M1) and other designated dirt roads that are part of the USFS transportation system. A gravel landing strip on the north end of Lake Pillsbury reservoir, operated by USFS but open to the general public, enables access by air.

County Land Use Designation

According to the Lake County General Plan land use designation map, nearly the entire north half of Lake County, including most of the Scott Dam Area and land along the Eel River, is designated as either "public land" or "agriculture." The land along the north end of Lake Pillsbury reservoir is designated as "resource conservation."

2.2.3.8.3 Cape Horn Dam Area

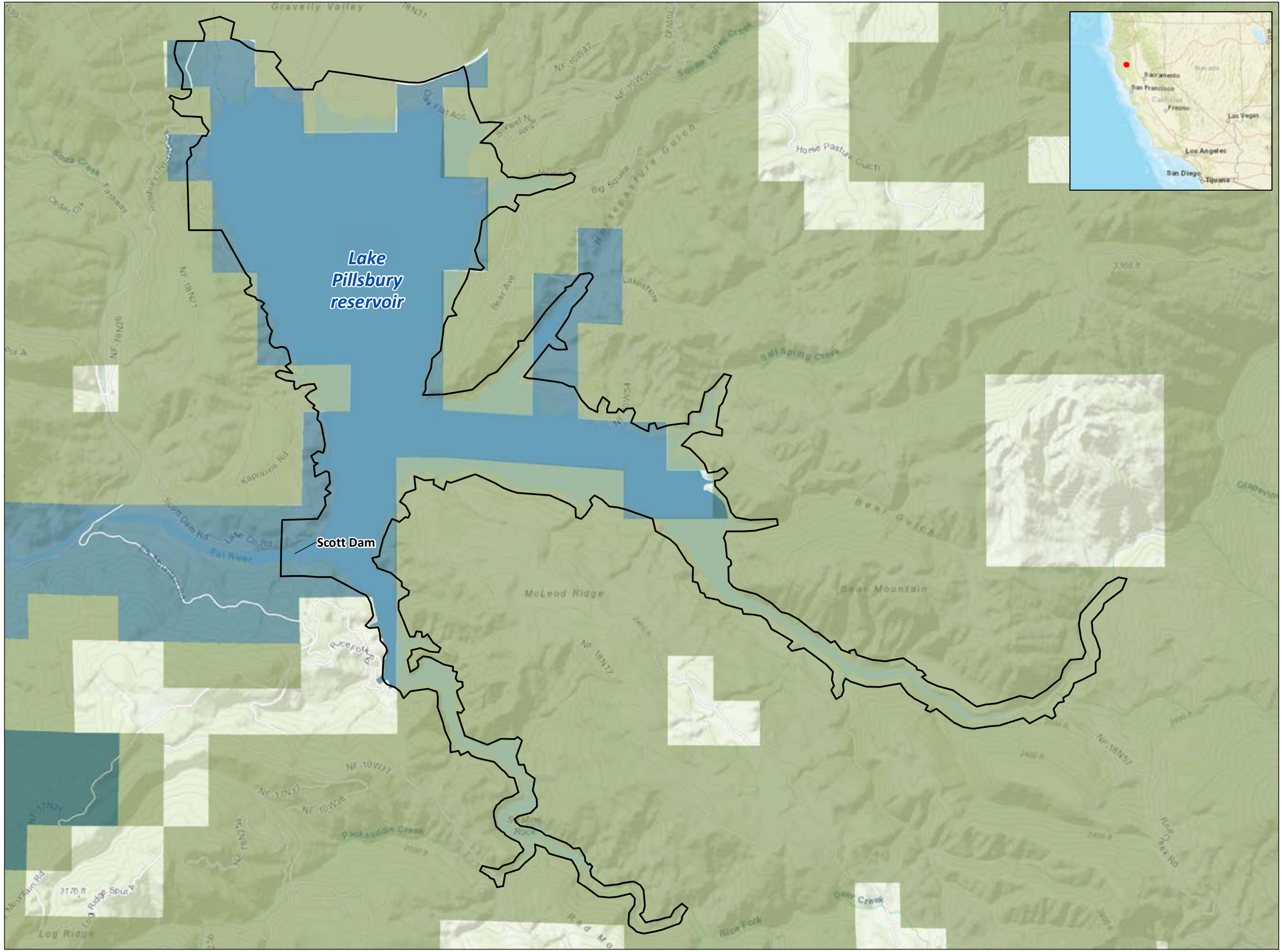
The Cape Horn Dam Area includes Cape Horn Dam and Van Arsdale Reservoir. Water captured and stored in Lake Pillsbury reservoir is released into the Eel River and then captured again in Van Arsdale Reservoir, an approximately 65-acre reservoir formed behind Cape Horn Dam, located within Mendocino County. Water captured in Van Arsdale Reservoir is then conveyed through a tunnel and penstock system to the Potter Valley Powerhouse, which is located in the Russian River Watershed and discussed below. According to U.S. Census Bureau population estimates, the population of Mendocino County was 91,145 based on the 2022 American Community Survey (U.S. Census Bureau 2024).

The Eel River between Lake Pillsbury reservoir and Van Arsdale Reservoir flows primarily through PG&E-owned property and intermittent parcels of public land managed by the MNF (see Map 2.2.2-4). Van Arsdale Reservoir is located outside the boundaries of the MNF. The land underlying and surrounding Van Arsdale Reservoir is primarily owned by PG&E and other private parties. Van Arsdale Reservoir is primarily accessible via East Side Potter Valley Road/Eel River Road.

County Land Use Designation

According to the Mendocino County land use policy map, nearly the entire county is designated as "forest land," "range land," or "public land." Van Arsdale Reservoir, the Potter Valley Powerhouse, and associated conveyance facilities are located in an area designated as "public service." According to the general plan, the public service classification is "applied to lands presently being used for major public service facilities and to land appropriately reserved for expansion or construction of new public service facilities" (Mendocino County 2020). Residential use in areas classified as public service is limited to a single caretaker dwelling per ownership.

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FERC Boundary

Land Ownership*

PG&E

Forest Service

Private

Note: All land within the map extent is within Lake County.

*Data Source(s):
Lake County, ESRI, BLM, BoR, DoD, NPS, USFWS, USFS, USGS
(accessed via ArcGIS Online 4/28/2025)

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FERC Project No. 77

Map 2.2.3.8-1

Land ownership in the vicinity of Lake Pillsbury reservoir.

0 1,000 2,000 3,000 Feet

Projection: UTM Zone 10
Datum: NAD 83

Date: 6/5/2025

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2.2.3.8.4 Eel River Watershed

The Eel River Watershed is located entirely in the Northern Coast Range and is characterized by steep and heavily forested terrain, with minimal development. It covers a large area of Lake County, Mendocino County, Glenn County, Humboldt County, and Trinity County. The Eel River Watershed and sub-watersheds are described in detail in Section 2.2.2 and graphically depicted on Map 2.2.2-2. The Project dams and reservoirs are located toward the upper end of the Eel River Watershed. Map 2.2.3.8-2 displays the land ownership in the area surrounding Van Arsdale Reservoir.

Downstream of Van Arsdale Reservoir to the Pacific Ocean, the Eel River runs through primarily privately owned land, with some small and intermittent federal- and state-owned parcels. Therefore, public access and development opportunities along the Eel River downstream of Van Arsdale Reservoir are limited. Beginning 100 yards downstream of Cape Horn Dam to its mouth near Fortuna, the Eel River and its four main tributaries (Middle Fork Eel, North Fork Eel, South Fork Eel, and Van Duzen River) are designated as W&SR, reflecting the relatively undeveloped nature of the watershed.

2.2.3.8.5 Russian River Watershed

Water captured in Van Arsdale Reservoir is diverted and conveyed to the Potter Valley Powerhouse, which is located in the Russian River Watershed, just north of a predominately agricultural community known as Potter Valley (Map 2.2.2-1). The powerhouse building is a steel-frame structure approximately 101 ft. long by 53 ft. wide, containing three generating units. The three generating units discharge into individual concrete channels, joining into a common channel approximately 60 ft. downstream of the powerhouse. The Potter Valley Powerhouse Switchyard is located adjacent to the powerhouse. After generating power, water is discharged via canal into the East Branch Russian River or into irrigation canals used by the PVID to provide irrigation water to farmers in the Potter Valley. Per the Mendocino County General Plan, most of Potter Valley is classified as “agriculture 40ac,” a designation that supports agricultural land uses in the valley.

The Russian River Watershed is less than half the size of the Eel River Watershed and drains an area of approximately 1,484 $mi.^2$. The Russian River Watershed extends within portions of Lake County, Mendocino County, and Sonoma County. The watershed is rural in character and features year-round river flow and hilly or mountainous terrain in the upper reaches. Irrigated agriculture, including orchards and vineyards, are found in the Project vicinity.

Releases from the powerhouse are a source of water in the East Branch Russian River and for local water users. The water that remains in the East Branch Russian River is captured in Lake Mendocino (Section 2.2.3.1, Water Use and Hydrology), which is administered by the USACE for flood protection but also stores water used by Sonoma Water.

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2.2.3.8.6 Land Use and Management in the Project Vicinity

The primary Project facilities and land ownership are shown on Map 2.2.2-4. A list of the Project facilities in the Scott Dam Area is provided in Table 2-1, and a list of the Project facilities in the Cape Horn Dam Area is provided in Table 2-2.

Land use and management activities on private land in the Scott Dam Area and Cape Horn Dam Area must be consistent with land management objectives and policies outlined in the Lake County General Plan (Lake County 2008), the Mendocino County General Plan (Mendocino County 2020), and related county ordinances. In addition, the Scott Dam Area, including Lake Pillsbury reservoir, is within the boundaries of the MNF. Therefore, land use and management within the Scott Dam Area must be consistent with the goals, direction, and prescriptions contained in the MNF LRMP. An overview of the Lake County General Plan, the Mendocino General Plan, and the MNF LRMP is provided in the following subsections.

Lake County General Plan and Ordinances

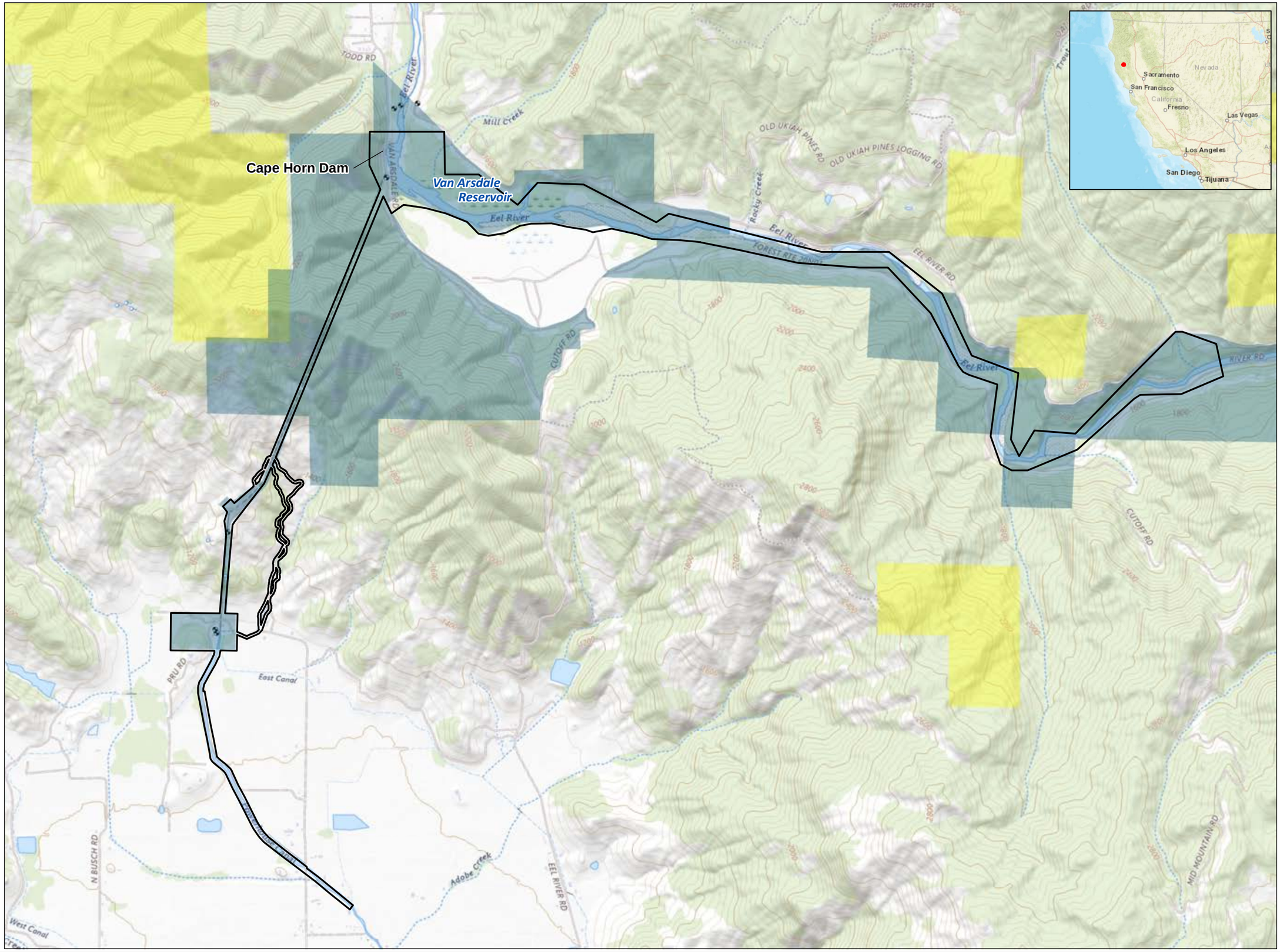
The Lake County General Plan was adopted in 2008 and provides a framework to guide long-term management of natural resources and development in Lake County. The general plan includes a land use designation map, which defines allowable land uses throughout the county. As noted previously, most of the area surrounding Lake Pillsbury reservoir and along the Eel River is designated as either "public land" or "agriculture," and the land along the north end of Lake Pillsbury reservoir is designated as "resource conservation." Section 3.0 of the general plan addresses population density and building intensity standards for each of these land use designations. Generally, these three designations allow for very low development densities. For example, the standard residential density for areas with an "agriculture" designation is one dwelling unit per 40 acres, and the standard residential density for areas with a "resource conservation" designation is one dwelling unit per 20 to 40 acres. Residential density standards for public land are not specified. Development on private land in the Scott Dam Area must conform to these standards.

Activities on private land and waters in the Project vicinity are also subject to various Lake County codes and ordinances, including the following ordinance that specifically pertains to the Project:

> *Section 15-5.2. (Ord. No. 452, § 1, 1963). No person shall operate or permit to be operated any motorboat in excess of five (5) nautical miles per hour in …. (a) All that portion of the Eel River tributary to Lake Pillsbury, lying southerly of the south line of the north half of the north half of Section 19, Township 18 North, Range 9 West, M.D.B.&M.*

In addition, all water bodies in Lake County, including Lake Pillsbury reservoir, are subject to the provisions of Lake County's Invasive Mussel Prevention Program.

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FERC Boundary

Land Ownership*

PG&E

State

Private

Note: All land within the map extent is within Mendocino County.

*Data Source(s):
Medocino County, BLM National Surface Management Agency (SMA)
(accessed via ArcGIS Online 6/2/2025)

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Map 2.2.3.8-2

Land ownership in the vicinity of Van Arsdale Reservoir.

0 500 1,000 1,500 Feet

Projection: UTM Zone 10
Datum: NAD 83

Date: 6/5/2025

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Mendocino County General Plan and Ordinances

The Mendocino County General Plan was adopted in 2009, and several elements of the plan were updated in 2020 (Development Element and Resource Element) and 2021 (Coastal Element). The general plan provides a framework to guide long-term management of natural resources and development within Mendocino County. The Mendocino County General Plan includes a land use policy map, which classifies allowable land uses throughout the county. According to the land use policy map, the Cape Horn Dam Area, including Van Arsdale Reservoir, the Potter Valley Powerhouse, and associated conveyance facilities, are located in an area designated as "public service." Most of Potter Valley is classified as "agriculture 40ac," a designation that supports agricultural land uses in the valley.

Aside from the general ordinances that are applicable throughout Mendocino County, the Mendocino County Code of Ordinances does not appear to contain any provisions specific to Van Arsdale Reservoir or the Project facilities.

Mendocino National Forest Land and Resource Management Plan

The Scott Dam Area is located within the boundaries of the MNF. The MNF manages public lands under its jurisdiction in accordance with the MNF LRMP. The MNF LRMP was adopted in 1995 and amended in 2007 after the Snow Mountain Wilderness Area (located within the MNF) was expanded in 2006 under the Northern California Coastal Wild Heritage Wilderness Act of 2006. Among other things, the LRMP establishes "the management direction and associated long-range goals and objectives for the MNF" (MNF 1995). The LRMP includes goals, objectives, direction, and prescriptions used to guide land management activities within the MNF, with respect to desired existing and future conditions.

The MNF is divided into 43 management areas (MAs), which are defined by various factors, including administrative boundaries, watershed boundaries, and special areas. In addition to containing general forest-wide management direction, the LRMP contains specific management direction for each MA. The Scott Dam Area lies within MA #11 – Lake Pillsbury. Management direction for this MA outlined in the LRMP is identified below:

- Manage all bald eagle nest sites as recommended in the Pacific Bald Eagle Recovery Plan and the Lake Pillsbury Bald Eagle Habitat Management Plan.
- Analyze and coordinate the development, management, and use of the Lake Pillsbury Basin.
- Emphasize providing quality water-oriented recreation opportunities in a manner consistent with the protection of bald eagles. Expand opportunities in response to anticipated demand. Coordinate all expansion with PG&E and FERC.
- Where applicable to NFSL, implement watershed improvements identified by the Lake Pillsbury Basin Sediment Task Force to control sediment inflow to Lake Pillsbury reservoir. Also undertake improvements identified in the Forest Watershed Improvement Needs inventory.

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- Emphasize stabilizing serpentine areas along the shoreline as well as the banks of the Eel River and the Rice Fork of the Eel River at their inlets to the reservoir to help reduce turbidity.
- Reduce conflicts between off-highway vehicle (OHV) users and other recreationists through trail designation, administrative controls, and revision of the forest OHV plan.
- Concentrate efforts to inform users about resource protection, fire prevention, and campground regulations. Prioritize law enforcement efforts in this area.
- Analyze opportunities for the development of watchable wildlife areas and wildlife habitat interpretation for the public.
- Provide surfaced road access from Van Arsdale Reservoir to Lake Pillsbury reservoir.
- Evaluate the potential effects of use and expansion of the air strip on bald eagles. If found compatible, locate a qualified permittee to operate the airstrip within 5 years or close it to further use.
- Maintain the permit for a private resort on the reservoir for boat rentals, fuel, and so on. Continue to permit the summer home tract.
- Do not issue a grazing permit in this area.

Additional information regarding this MA and the two contiguous MAs (MA #10 – Ericson Ridge and MA #12 – Skeleton Glade) is available in the1995 LRMP and 2007-01 LRMP Amendment.

Mendocino National Forest Travel Management

The use of roads and trails on NFSL is managed by the MNF. All roads and trails in the MNF that are designated as open to motorized travel are shown on motor vehicle use maps, which also display uses allowed by vehicle class (highway-legal vehicles, vehicles less than 50 in. wide, and motorcycles) and seasonal allowances. Routes not shown on the motor vehicle use maps are not open to public motor vehicle travel. Road use designations in the Project vicinity are shown on MNF Motor Vehicle Use Map, South Central Map and Insets (MNF 2017).

2.2.3.8.7 Land Use and Management within the FERC Project Boundary

The Project and the locations of the primary Project facilities are shown on Map 2.2.2-3, and jurisdictional boundaries are shown on Map 2.2.2-4. Within the current FERC Project boundary, land ownership consists of:

- PG&E = 2,307.47 acres
- USFS = 1,143.15 acres
- Private = 36.13 acres

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Land use within the FERC Project boundary is primarily hydropower generation and recreation, both of which are managed in accordance with the articles and conditions outlined in the Project license, associated management plans, and several special use authorizations (SUAs) and memoranda of agreement (MOAs) between PG&E and the MNF.

As described in Section 2.2.3.9, Recreation Resources, a variety of recreation facilities, including campgrounds, day-use areas, boat docks, resorts, and recreation residences are present in the vicinity of the Project, both within and outside the FERC Project boundary, with the Lake Pillsbury reservoir area being the most heavily developed. Most of the land inundated by Lake Pillsbury reservoir is owned by PG&E (Map 2.2.3.8-1). Therefore, Lake County, not the MNF, is responsible for regulating boating, fishing, and other watersports recreation on the reservoir (MNF 1995). The MNF manages land use on the NFSL that surrounds the lake.

All commercial recreation facilities and recreation residences located on PG&E-owned land are operated under lease or license agreements and/or permits issued by PG&E.

Existing Shoreline Buffer Zones

The FERC Project boundary provides a buffer zone around the Project reservoirs. These buffer zones help licensees ensure public access to the reservoirs' shorelines and waters and help protect the environmental, recreation, and aesthetic values of the Project reservoirs and their shorelines. Except for areas near Project infrastructure, where public access is restricted for safety and security reasons, PG&E does not limit access to Van Arsdale Reservoir or Lake Pillsbury reservoir.

Existing Shoreline Management Policies

There is no shoreline management plan for the Project. Non-Project uses and occupancy of Project shorelines are addressed through long-term leases or license agreements between PG&E and private parties who own land adjacent to Lake Pillsbury reservoir. Table 2.2.3.8-1 lists existing leases and licenses PG&E has issued (as of May 20, 2024) for non-Project use and occupancy of Project lands within the FERC Project boundary, grouped by geographic area.

Table 2.2.3.8-1. Existing leases/licenses issued by PG&E within the FERC Project boundary, Lake County (Lake Pillsbury area).

ID Number	Area	Use	Lessee/Licensee
2418-10-10018	Lake Pillsbury reservoir-West Shore	Campground	Lake Pillsbury Resort
2418-10-10014	Lake Pillsbury reservoir-West Shore	Campground and Boat Dock	Westshore Campers Association
2418-10-0203	Lake Pillsbury reservoir-East Shore	Log Booms	Lake Pillsbury Homesite Association
2418-10-0254	Lake Pillsbury reservoir-East Shore	Boat Docks	Lake Pillsbury Homesite Association

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ID Number	Area	Use	Lessee/Licensee
2418-10-0302	Lake Pillsbury reservoir-East Shore	Boat Ramp Facility	Lake Pillsbury Homesite Association
2418-10-0256	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2418-10-0183	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2418-10-10003	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2418-10-10008	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2418-10-0197	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2418-10-10016	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2418-10-10015	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2418-10-0181	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2418-10-0182	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2418-10-0186	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2418-10-0194	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2418-10-0188	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2418-10-10003	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2418-10-0202	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2418-10-0190	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2418-10-10006	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2417-11-0285	Powerhouse	Grazing/Agriculture	Private Property Owner
2417-11-0283	Powerhouse	Weather Station	USACE
2418-11-0057	Van Arsdale Dam Area	Install and maintain fish collection and employee housing	State of California
2418-11-0232	Trout Creek Campground	Memorial Plaque	CAL FIRE

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ID Number	Area	Use	Lessee/Licensee
2418-10-10004	Lake Pillsbury reservoir-Rice Fork Area	Boat Dock	Private Property Owner
2417-11-0178	Powerhouse	Weather Station	NOAA

Notes: The names of individual lessee/licensees and private property owners are not shown for privacy reasons.
CAL FIRE = California Department of Forestry and Fire Protection
NOAA = National Oceanic and Atmospheric Administration
USACE = U.S. Army Corps of Engineers

2.2.3.8.8 Specially Designated Areas

Specially designated areas in the vicinity of the Project are summarized below.

National Wild and Scenic River System

Project facilities are not located on river segments identified as eligible or suitable for inclusion in the National W&SR System. However, the Eel River from 100 yards downstream of Cape Horn Dam to its mouth and its four main tributaries (North Fork, South Fork, Middle Fork, and Van Duzen rivers) include segments designated as National W&SR. The Eel River and its tributaries were included in the National W&SR System in 1981 and together include 97 mi. of river that are classified as "wild," 28 mi. of river that are classified as "scenic," and 273 mi. of river that are classified as "recreational" (National W&SR System 2024). These segments are managed by BLM, California Resources Agency, Round Valley Indian Reservation, and USFS, depending upon jurisdiction. See Section 2.2.3.10, Aesthetic Resources, for additional detail regarding the Eel River's W&SR designations.

State-Protected River Segments

Project facilities are not located on river or stream segments designated as protected by the State of California. However, segments of the Eel River and its tributaries included in the National W&SR System are also included in the California W&SR System and are protected under the California Wild and Scenic Rivers Act by Public Resources Code §§ 5093.50-5093.70. Neither the Eel River and its tributaries nor the Russian River and its tributaries are designated as "wild trout waters" or "heritage trout waters" by CDFW (CDFW 2024).

National Trails System

The National Trails System (NTS) was established in 2009 under the National Trails System Act. It is composed of national recreation trails, scenic trails, historic trails, and connecting trails, all managed by the National Park Service (NPS). The NPS NTS database indicates there are no designated NTS trails in the vicinity of the Project (NPS 2024). The nearest NTS trails are located east of the Coast Range and end in the northern Central Valley.

Scenic Byways/Highways

The Caltrans Scenic Highway Mapping System indicates no officially designated, or eligible, state or county scenic highways are in the Project vicinity. In addition, there are no designated or eligible national scenic byways in the Project vicinity (Caltrans 2024).

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Wilderness Areas

The Project is not located within a designated wilderness area. The nearest wilderness area is the Snow Mountain Wilderness Area, 60,299 acres of land managed by the MNF, located approximately 10 to 15 mi. east of Lake Pillsbury reservoir (Wilderness Connect 2024). The Eel River bisects the western portion of the wilderness area before it enters Lake Pillsbury reservoir.

Regionally or Nationally Important Recreation Areas

With the exception of the specially designated areas discussed above, PG&E is not aware of any other nationally or regionally important recreation areas are in the vicinity of Lake Pillsbury reservoir. Developed recreation opportunities in the vicinity of the Project, as described further in Section 2.2.3.9, Recreation Resources, are concentrated around Lake Pillsbury reservoir and nearby in the MNF and at Lake Mendocino.

2.2.3.8.9 PG&E Land Conservation Easement

PG&E worked with the Pacific Forest and Watershed Lands Stewardship Council (Stewardship Council) to fulfill its commitment related to a 2003 bankruptcy settlement (Stewardship Council 2024). The bankruptcy settlement agreement requires that conservation easements include an express reservation of PG&E's right for continued operation and maintenance of hydroelectric facilities and associated water delivery facilities as well as PG&E's unequivocal ability to comply with any FERC license, FERC license renewal, or other regulatory requirements.

A conservation easement for 5,660 acres of PG&E-owned land, of which approximately 2,234 acres are within the FERC Project boundary, was recorded on June 28, 2022, to permanently protect beneficial public values on lands owned by PG&E (California Public Utilities Commission [CPUC] 2021).

2.2.3.8.10 Fire History, Fuels Management, and Fire Suppression

The Project is situated in a remote and sparsely populated area of the state, dominated by dense forests and prone to wildfires. Like other forested parts of the state, large wildfires have occurred in the Project vicinity. Major fires that have occurred in the Project vicinity since the mid-1900s are shown on Map 2.2.3.8-3, grouped by decade. This map is based on GIS data published by California Department of Forestry and Fire Protection (CAL FIRE) as part of the Fire and Resource Assessment Program (CAL FIRE 2024). Much of the Lake Pillsbury basin and surrounding forested areas are rated as "Very High" on CAL FIRE's Fire Hazard Severity Zone - FHSZ Map, consistent with most forested regions in the area (CAL FIRE 2025).

Wildfires occurring between 1920 and 2022 within 1 mi. of a Project facility are listed in Table 2.2.3.8-2. The August Complex Fire, which began on August 15, 2020, as a result of a lightning strike, is the largest fire to have occurred within 1 mi. of the Project facilities and is the largest wildfire in California since record-keeping began (USFS 2021). That fire began as a collection of smaller fires cause by lightning strikes from a tropical storm, and burned approximately 1,032,700 acres north of Lake Pillsbury reservoir, extending into portions of Mendocino, Humboldt, Trinity, Tehama, Glenn, Lake, and Colusa counties.

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Table 2.2.3.8-2. Wildfires within 1 mi. of Project facilities (1920 through 2022).

Fire Name	Fire Decade	Start Date	Containment Date	Acres Burned	Cause[1]
-	Unknown	N/A	N/A	769	Unknown/Unidentified
Boardman Ridge	1920	N/A	N/A	1,812	Miscellaneous
Pine Mtn	1930	N/A	N/A	1,741	Unknown/Unidentified
Salmon Creek	1930	N/A	N/A	8,049	Debris
Boardman	1940	N/A	N/A	19,510	Equipment Use
Jordan Flat	1940	N/A	N/A	11,797	Equipment Use
Ukiah Pine	1950	09/26/1954	N/A	319	Unknown/Unidentified
Round	1960	08/06/1966	N/A	20,964	Campfire
Benmore	1970	09/05/1971	09/05/1971	375	Campfire
Gravely	1970	07/14/1973	07/14/1973	83	Arson
Mendenhall	1980	09/01/1987	09/16/1987	65,468	Lightning
Soda II	1990	08/11/1998	08/13/1998	55	Arson
Ericson	2000	09/02/2003	09/04/2003	1.7	Lightning
Gravelly	2000	09/02/2003	09/03/2003	0.1	Lightning
Deer	2000	08/08/2005	08/17/2005	1,720	Equipment Use
Back	2000	06/20/2008	06/28/2008	1,566	Lightning
Skeleton	2010	09/11/2017	09/17/2017	88	Lightning
Redwood Valley	2010	10/07/2017	10/24/2017	36,523	Unknown/Unidentified
Ranch	2010	07/26/2018	09/18/2018	410,202	Miscellaneous
August Complex	2020	08/15/2020	11/10/2020	1,032,700	Lightning

Source: CAL FIRE 2024
N/A = not available

[1] Information does not specify differences between “Miscellaneous” and “Unknown/Unidentified.”

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Legend

- 1-Mile Buffer
- FERC Boundary

Fire Year - Decade*

- 1950s
- 1960s
- 1970s
- 1980s
- 1990s
- 2000s
- 2010s
- 2020s

*Source: CalFire - FRAP, May 2024



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Map 2.2.3.8-3

Fire history in the Project vicinity

0 1 2 Miles

Projection: UTM Zone 10 N
Datum: NAD 83

Date: 6/23/2025

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Fire Prevention and Suppression

In general, fire prevention and fuels management in the Project vicinity are the responsibility of USFS, CAL FIRE, and Lake and Mendocino counties. PG&E actively implements measures to prevent fires on Project lands and to help suppress fires, if necessary, in accordance with Article 27 from the FERC license and various internal PG&E standards, including the following:

- EMER-4102S (formerly TD-1464S) - Preventing and Mitigating Fires While Performing PG&E Work, which includes specific procedures that staff must implement when conducting utility work.
- ENV-8008P-01 - Preventing and Mitigating Wildfire at PG&E Managed Recreation Areas, which governs operation and maintenance procedures and public use and PG&E recreation facilities.

PG&E implements various measures to reduce fire risk, including actively maintaining vegetation in proximity to Project facilities in accordance with Article 27. All fire prevention measures are carried out in accordance with relevant state laws and regulations.

PG&E keeps basic fire suppression equipment in all company vehicles and at many Project facilities. Fire suppression equipment includes fire extinguishers and hand tools such as shovels, picks, Pulaski tools, mattocks, and McLeod rakes. Additional equipment for special projects is described in Project-specific fire plans developed in coordination with USFS. In addition, motorized equipment and vehicles have spark arrestors, preventing unintended fire ignition due to sparks.

In the event of a large wildfire in the region, water from Lake Pillsbury reservoir is drafted for wildfire suppression. Lake Pillsbury reservoir has provided a water resource to both state and federal firefighting agencies in recent years to combat wildfires in the region and serves as a water resource for firefighting operations. The land surrounding Lake Pillsbury reservoir is a Federal Responsibility Area and therefore under the jurisdiction of USFS. CAL FIRE coordinates with USFS and assists on incidents that threaten a State Responsibility Area or when requested by USFS. USFS consistently uses Lake Pillsbury reservoir and water downstream of Scott Dam to fight wildfires in the area (Moore 2023). Lake Pillsbury reservoir was used by both MNF and CAL FIRE in the recent past for incident response, including for the Mendocino Complex Fire in 2018 and the August Complex Fire in 2020 (Moore 2023; Tyler 2023). Water usage data from Lake Pillsbury reservoir were not collected by CAL FIRE from the recent Mendocino Complex and August Complex fires (Tyler 2023).

CAL FIRE uses all available water sources when responding to incidents in the greater Lake County region, including Lake Pillsbury reservoir and Clear Lake (Tyler 2023). Clear Lake is a much larger body of water and offers a more central location for use on incidents throughout the region (Tyler 2023). CAL FIRE recently expanded its aerial firefighting capabilities using the S-70i CAL FIRE FireHawk helicopter, which allows for larger amounts of water to be drawn from Clear Lake and delivered more quickly to incidents within the region (Tyler 2023). The MNF

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administers critical wildfire risk reduction projects in the area, including prescribed fire when conditions permit (Moore 2023).

PG&E awarded a $500,000 grant in 2024 to the Clear Lake Environmental Research Center (CLERC). PG&E's grant partners include the Northshore Fire Protection District, Lake County Fire Chiefs Association, California Fire Chiefs Association, Gordon and Betty Moore Foundation, and USFS. This grant marks the inception of PG&E's Holistic Wildfire Safety Collaborative in Lake County.

The grant provides financial support, innovative technology, and sustainable practices, focusing on three core areas:

1. Lake County Fire Resilience: In partnership with CLERC, PG&E is bolstering the Northshore Fire Protection District's Hogback Ridge Fuels Crew. This initiative is crucial in enhancing local firefighting capabilities and community safety.

2. Dynamic Fire Pathways Analysis: The grant supports the development of XyloPlan, an advanced tool in wildfire science. XyloPlan is instrumental in mapping wildfire pathways, thus informing strategic planning for Lake County's Community Wildfire Protection Plan. Using artificial intelligence, XyloPlan's Fire Pathways identifies risks, creates simulations and gauges a wildfire's route through a mapping platform that measures and maps out weather, topography, and vegetation that can become fuel for fire. The data represent a combination of satellite images and field observations assembled by USFS. Fire agencies can examine results from XyloPlan's Fire Pathways to determine areas where changes can be implemented to most effectively reduce fire danger.

3. Biomass Utilization: Embracing innovative technology, the Carbonator project transforms wood waste into biochar, a climate-positive substance. This not only addresses wildfire risks but also aids in agricultural productivity and environmental regeneration.

This is a holistic approach, encompassing proactive, science-based, and community-focused strategy to protect our environment and communities.

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2.2.3.9 Recreation Resources

This section describes the recreational resources in the vicinity of PG&E's Potter Valley Hydroelectric Project (Project).

This section provides general information about the recreation resources and opportunities in the vicinity of the Project and specific information about recreation opportunities and facilities associated with the Project. This information is presented for the following four Project regions (see Map 2.2.2-1): (1) Scott Dam Area, (2) Cape Horn Dam Area, (3) Eel River Watershed (including the upper Eel River and Rice Fork), and (4) Russian River Watershed (limited to the East Branch Russian River, upstream of Lake Mendocino).

2.2.3.9.1 Information Sources

This section was prepared primarily using the following information sources:

- 2021 *Statewide Comprehensive Outdoor Recreation Plan* (SCORP) (California Department of Parks and Recreation [CDPR] 2021);
- California Creeks whitewater boating web guide (Tuthill 2024);
- Camava campground use data, 2018 to 2023 (Camava 2024);
- FERC's 2024 *List of Comprehensive Plans* (FERC 2024);
- Form 80 recreation use reports for 2002, 2008, and 2014 (PG&E 2003, 2009, 2015);
- Survey on Public Opinions and Attitudes on Outdoor Recreation in California (SPOA) 2012, Complete Findings (CDPR 2014);
- USFS, MNF LRMP (MNF 1995); and
- Comments on PG&E's DSA (American Whitewater 2025a).

2.2.3.9.2 Scott Dam Area

The Scott Dam Area includes Scott Dam, Lake Pillsbury reservoir, and the surrounding recreation facilities. Lake Pillsbury reservoir, the main storage reservoir for the Project, is formed behind Scott Dam, located on the Eel River in Lake County. Recreation opportunities in the Project vicinity are concentrated around Lake Pillsbury reservoir, which inundates land primarily owned by PG&E but is surrounded by public land managed by the MNF, shown on Map 2.2.3.9-1.

Lake Pillsbury Reservoir

Lake Pillsbury reservoir is formed behind Scott Dam and under normal operating conditions has a surface area of approximately 2,225 acres and a shoreline that is 29 mi. long (PG&E 2015).

The MNF manages public lands under its jurisdiction in the Scott Dam Area (shown in Map 2.2.3.9-1), in accordance with the MNF LRMP. The MNF LRMP was adopted in 1995 and amended in 2007, when the Snow Mountain Wilderness Area (located within the MNF) was expanded in 2006

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under the Northern California Coastal Wild Heritage Wilderness Act of 2006. The MNF LRMP includes goals, objectives, direction, and prescriptions to guide land management activities within the MNF with respect to existing and future desired conditions.

The MNF is divided into 43 MAs, defined by various factors, including administrative boundaries, watershed boundaries, and special areas. In addition to containing a general forest-wide direction, the LRMP contains specific management prescriptions for each MA. The Scott Dam Area lies within MA #11 – Lake Pillsbury. Direction for MA #11 that specifically relates to recreation at Lake Pillsbury reservoir is as follows:

- Emphasize providing quality water-oriented recreation opportunities in a manner consistent with the protection of bald eagles. Expand opportunities in response to anticipated demand. Coordinate all expansion with PG&E and FERC.
- Reduce conflicts between OHV users and other recreationists through trail designation, administrative controls, and revision of the forest OHV plan.
- Concentrate efforts to inform users about resource protection, fire prevention, and campground regulations. Place priority on law enforcement efforts in this area.
- Analyze opportunities for the development of watchable wildlife areas and wildlife habitat interpretation for the public.
- Maintain the permit for a private resort on the lake for boat rentals, fuel, and so on. Continue to permit the summer home tract.

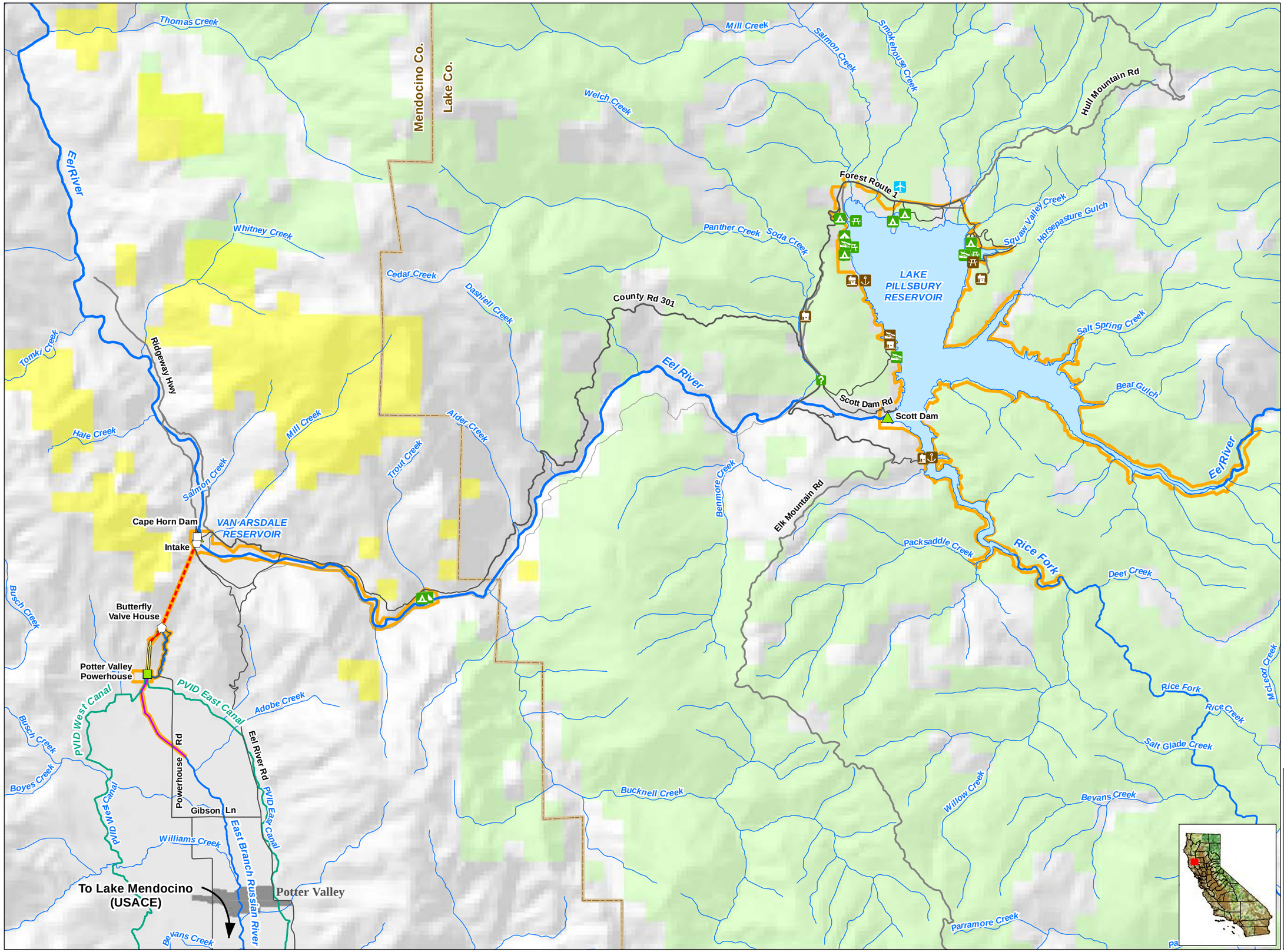
Additional information regarding this MA and the two contiguous MAs (MA #10 – Ericson Ridge and MA #12 – Skeleton Glade) is available in the 1995 LRMP and 2007-01 LRMP Amendment.

According to the MNF visitor use report (MNF 2016), in 2013 the MNF received an estimated 254,000 visits. Based on surveys conducted in 2013, nearly 60 percent of MNF visits were by people who live within 25 mi. of the forest (MNF 2016), indicating the MNF serves a largely local clientele. Because the MNF serves primarily local visitors, site visits tend to be short. Based on the 2013 survey results, the median visit duration to the MNF is about 90 minutes (MNF 2016), indicating the MNF is used mainly for day use.

Recreational Opportunities and Facilities

The Scott Dam Area provides a variety of recreational opportunities. Brief descriptions of the recreation facilities in the Scott Dam Area are provided in the following subsections.

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PG&E Project Facilities

- Powerhouse
- Dam
- Water Conveyance Feature
- Water Conduit
- Penstock
- Powerhouse Discharge Canal
- FERC Project Boundary

Project Recreation Features

- Boat Ramp
- Family Campground
- Group Campground
- Day Use Facility
- Information Kiosk

Private Non-Project Recreation Features

- Boat Launch
- Boat Dock
- Day Use Facility
- Resort, Camp, or Tract

Other Features

- Airstrip
- General Access Road
- Other Road
- Canal
- Watercourse
- Water Body

Land Ownership*

- U.S. Forest Service
- State of California
- Private (Blank)
- County Boundary

*SOURCE: BLM, 2022; CPAD, 2022

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PG&E Potter Valley Project
FERC Project No. 77

Map 2.2.3.9-1

Land ownership and recreation facilities.

0 0.5 1 Miles

Projection: UTM Zone 10 N
Datum: NAD 83

Date: 6/17/2025

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Lake Pillsbury Reservoir

Lake Pillsbury reservoir is the largest water body in the MNF and provides a variety of reservoir-based recreation opportunities such as boating, wind surfing, fishing, wildlife viewing, and swimming. There are a variety of developed Project recreation facilities in the immediate vicinity of Lake Pillsbury reservoir, including family campgrounds, group campgrounds, and day-use facilities that are open to the public, as well as non-Project private recreation resorts, camps, and residence tracts that provide overnight and day-use opportunities. Recreation facilities (Project and non-Project) in the immediate vicinity of Lake Pillsbury reservoir are shown in Map 2.2.3.9-2.

A variety of terrestrial wildlife are present in the area surrounding Lake Pillsbury reservoir (see Section 2.2.3.5, Wildlife Resources, for further information on these species). Hunting is permitted in the vicinity, and game species are regulated by CDFW (see Section 2.2.3.5 for listings of game birds and game mammals and hunting season dates); almost all public land within the MNF is open to hunting (USFS 2025). Elk hunting in the vicinity of Lake Pillsbury reservoir is located in CDFW Lake Pillsbury Elk Hunt Zone 6 (CDFW 2025).

Lake Pillsbury reservoir is a popular fishing destination and provides the greatest number of fishing days in the MNF (MNF 1995). Non-native game species in the reservoir include largemouth bass and bluegill; native game species include rainbow trout. CDFW stocks the lake with rainbow trout to supplement natural reproduction (MNF 1995). Based on records available through the CDFW Statewide Hatchery Database, CDFW stocked a total of 92,235 rainbow trout in Lake Pillsbury reservoir between 2002 and 2016.

As discussed in Section 2.2.3.3, Fish and Aquatic Resources, Lake Pillsbury reservoir is designated as mercury-impaired on the State of California's 303(d) list because of elevated mercury concentrations in fish, and OEHHA has issued advisories for rainbow trout, sunfish species, black bass species, and Sacramento pikeminnow (OEHHA 2025). A recent sediment investigation by the California State Coastal Conservancy (Geosyntec 2020) found that mercury concentrations in sediment samples collected throughout the reservoir were low (see Section 2.2.4.3, Water Quality, for additional discussion). Further, PG&E documented low levels of mercury and methylmercury concentrations in the water column in all Lake Pillsbury reservoir samples during seasonal and monthly sampling in 2018 (PG&E 2019). Mercury in the Eel River system can originate from natural geological deposits and anthropogenic sources (e.g., atmospheric deposition). Low levels of mercury in the environment can bioaccumulate in individual fish over time and can biomagnify in the foodweb (see Section 2.2.4.3, Water Quality, for additional discussion).

Campgrounds

The following five Project family campgrounds are located around the north end of Lake Pillsbury reservoir, within the Scott Dam Area:

- Fuller Grove Campground (23 sites);
- Navy Campground (20 sites);

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- Oak Flat Campground (18 sites);
- Pogie Point Campground (44 sites); and
- Sunset Point Campground (53 sites).

These Project campgrounds are located primarily on NFSL and are currently operated and maintained by a recreation management company under a concessionaire contract with PG&E.

Approximate opening and closure dates of recreation facilities are shown in Table 2.2.3.9-1. All family campgrounds identified above are typically open from mid-April through mid-September, with exceptions made for weather and maintenance activities. Oak Flat Campground is open year-round; potable water is provided during peak recreation season only. The campgrounds are operated on a first-come, first-serve basis with no reservations available.

In addition to the family campgrounds listed above, the Fuller Grove Group Campground is located at the northwest end of Lake Pillsbury reservoir and can accommodate a total of 50 persons at one time (PAOT). The campground is located on PG&E land and is currently operated and maintained by a recreation management company. As shown in Table 2.2.3.9-2, the campground is typically open from mid-April through mid-September. Reservations can be made through PG&E's recreation website (www.pge.com/recreation).

Fuller Grove Day Use Area and Boat Launch

This Project facility consists of a paved boat ramp and parking area located on the northwest end of Lake Pillsbury reservoir, between Fuller Grove Campground and Fuller Grove Group Campground. This facility is within the FERC Project boundary, on land owned by PG&E, and operated and maintained by a recreation management company. The Fuller Grove Day Use Area is open year-round; however, it closes when the water level is lower than that needed for safe use of the boat launch.

Pillsbury Pines Day Use Area and Boat Launch

Located on the northeast end of Lake Pillsbury reservoir, near Sunset Point Campground, this Project facility consists of a paved boat launch, parking, and picnic areas. This facility is within the FERC Project boundary, on land owned by PG&E, and operated and maintained by a recreation management company. The Pillsbury Pines Day Use Area is open year-round; however, it closes when water levels drop to a point when the boat launch can no longer be used safely.

Pogie Point Day Use Area

Located on the northwest end of Lake Pillsbury reservoir, within the boundary of Pogie Point Campground, this Project facility consists of a designated parking area, a kiosk, and a day-use area with picnic tables. This facility is located within the FERC Project boundary, primarily on NFSL, and is operated and maintained by a recreation management company. This facility is typically open from April 1 through mid-September.

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PG&E Project Facilities

- Dam
- FERC Project Boundary

Project Recreation Features

- Boat Launch
- Family Campground
- Group Campground
- Day Use Facility
- Information Kiosk

Private Non-Project Recreation Features

- Boat Launch
- Boat Dock
- Day Use Facility
- Resort, Camp, or Tract

Other Features

- Airstrip
- Access Road
- General Access Road
- Other Road
- Access Trail
- General Access Trail
- Hiking Trail
- ATV Trail
- 4WD Trail
- Gate

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PG&E Potter Valley Project

Map 2.2.3.9-2

Lake Pillsbury reservoir recreation facilities.

0 500 1,000 2,000 Feet

Projection: UTM Zone 10 N
Datum: NAD 83

Date: 7/16/2025

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Table 2.2.3.9-1. Project recreation facilities.

Facility Name	Location	County	Land Ownership	In FERC Project Boundary	Number of Sites	Vault Toilets	Capacity (PAOT)[1]	Reservations	Approximate Season[2]	Operation and Maintenance Responsibility
Family Campgrounds										
Fuller Grove Campground	Lake Pillsbury reservoir	Lake	USFS	Yes	23	2	138	Not reservable. Operated on a first-come, first-serve basis.	April 15–September 14	Operated and maintained by a recreation management company under a concessionaire contract with PG&E.
Navy Camp Campground	Lake Pillsbury reservoir	Lake	USFS	Yes	20	2	120	Not reservable. Operated on a first-come, first-serve basis.	April 15–September 12	
Oak Flat Campground	Lake Pillsbury reservoir	Lake	USFS	Yes	18	4	108	Not reservable. Operated on a first-come, first-serve basis.	Year-round	
Pogie Point Campground	Lake Pillsbury reservoir	Lake	USFS	Yes	44	4	264	Not reservable. Operated on a first-come, first-serve basis.	April 1–September 12	
Sunset Point Campground	Lake Pillsbury reservoir	Lake	USFS	Yes	53	7	318	Not reservable. Operated on a first-come, first-serve basis.	April 15–September 12	
Trout Creek Campground	Van Arsdale Reservoir	Mendocino	PG&E	Yes	15	2	90	Reservable through www.pge.com/recreation.	April 15–September 12	
Group Campgrounds										
Fuller Grove Group Campground	Lake Pillsbury reservoir	Lake	PG&E	Yes	1	1	50	Reservable through www.pge.com/recreation.	April 15–September 12 (or as reserved)	Operated and maintained by a recreation management company under a concessionaire contract with PG&E.
Trout Creek Group Campground (Consisting of 3 walk-in sites located adjacent to Trout Creek Campground)	Van Arsdale Reservoir	Mendocino	PG&E	Yes	1	0	18	Reservable through www.pge.com/recreation.	April 15–September 12	
Day-use Facilities										
Eel River Visitor Information Kiosk	Junction of Elk Mountain Road, Scott Dam Road, and Forest Service Road M6	Lake	USFS	No	NA	0	NA	NA	Year-round	Operated and maintained by a recreation management company under a concessionaire contract with PG&E.
Fuller Grove Day Use Area and Boat Launch	Lake Pillsbury reservoir	Lake	PG&E	Yes	NA	2	NA	NA	Open year-round. Launch availability depends on water level.	
Pillsbury Pines Day Use Area and Boat Launch	Lake Pillsbury reservoir	Lake	PG&E	Yes	NA	1	NA	NA	Open year-round. Launch availability depends on water level.	
Pogie Point Day Use Area	Lake Pillsbury reservoir	Lake	USFS	Yes	NA	1	NA	NA	April 1–September 12	
Lake Pillsbury Low Level Boat Launch	Lake Pillsbury reservoir	Lake	PG&E	Yes	NA	0	NA	NA	April 1–September 12	Maintained by Lake Pillsbury Resort under agreement with PG&E.

Notes: FERC = Federal Energy Regulatory Commission
NA = Not applicable.
PAOT = persons at one time
PG&E = Pacific Gas and Electric Company
USFS = U.S. Forest Service

[1] Capacity assumes 6 PAOT per site. Total capacity excludes host sites.
[2] Opening and closing dates may vary depending upon weather, maintenance activities, and other factors. The timing identified in this table is based on 2016 reservation system information.

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Table 2.2.3.9-2. Non-Project recreation facilities in the vicinity of the Project.

Facility Name	Location	County	Land Ownership	In FERC Project Boundary	Operation and Maintenance Responsibility	Notes
Private Recreation Facilities at or in the Vicinity of Lake Pillsbury Reservoir						
Lake Pillsbury Resort	Lake Pillsbury reservoir	Lake	USFS	Yes (portion)	Lake Pillsbury Resort	Private enterprise operated under agreement with USFS. Includes cabins, 38 campsites, a boat launch, and a "marina" consisting of boat slips, a gas dock, a marine store, and a dock. Bathroom, parking facility, boat launch, and campground are on PG&E land.
Lake Pillsbury Homesite Association	Lake Pillsbury reservoir	Lake	USFS	No	Lake Pillsbury Homesite Association	Located on a knoll on USFS land. Residents have long-term leases with the USFS. Boat docks are operated under agreements with PG&E.
Pine Point Day Use Area and Boat Launch (formerly known as Squaw Creek)	Lake Pillsbury reservoir	Lake	USFS	Yes	USFS	A small portion of this facility is located on PG&E land. This facility is primarily used by residents of the Lake Pillsbury Homesite Association.
Rice Fork Residence Tract	Lake Pillsbury reservoir	Lake	Private	No	Private residents	Privately owned summer vacation homes/cabins located on south arm of Lake Pillsbury reservoir. Boat docks are operated under agreements with PG&E.
Soda Creek Camp	Simmons Road	Lake	USFS	No	Private camp operated under USFS permit	
Westshore Camp	Lake Pillsbury reservoir	Lake	PG&E	No	Westshore Campers Association	Private, gated campground that is owned and operated by Westshore Campers Association. Used seasonally. No permanent residents. Operated by Westshore Campers Association under long-term lease agreement with PG&E. Boat docks are operated under agreement with PG&E.
Private Boat Launches and Docks (Operated under Agreements with PG&E)						
Lake Pillsbury Resort Boat Launch and Parking Facility for Public Use	Lake Pillsbury reservoir	Lake	PG&E	Yes	Lake Pillsbury Resort	Lake Pillsbury Resort may charge a fee for the public to use the boat launch and parking facilities.
Lake Pillsbury Homesite Association Boat Docks and Boat Launch	Lake Pillsbury reservoir	Lake	PG&E	Yes	Lake Pillsbury Homesite Association	Public access and use of the boat launch facility is allowed at no cost after closure of the public boat ramp facilities on Lake Pillsbury reservoir due to low water levels as long as it is usable without driving on the reservoir bed.
Rice Fork Residence Tract Boat Docks	Lake Pillsbury reservoir	Lake	PG&E	Yes	Rice Fork Residence Tract Owners	
Westshore Camp Boat Docks	Lake Pillsbury reservoir	Lake	PG&E	Yes	Westshore Campers Association	

Notes: FERC = Federal Energy Regulatory Commission
PG&E = Pacific Gas and Electric Company
USFS = U.S. Forest Service

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Lake Pillsbury Low-level Boat Launch

PG&E constructed this boat ramp in 2017 as required by Article 56 of the Project license. The new low-level boat launch is located within the FERC Project boundary on PG&E land just south of Lake Pillsbury Resort.

This Project facility is open from April 1 through mid-September. The boat ramp is operated and maintained by Lake Pillsbury Resort under an agreement with PG&E.

Existing Non-Project Recreation Facilities

As shown on Map 2.2.3.9-3, a variety of non-Project recreation facilities, including resorts, private camps, and private residence tracts, are located around Lake Pillsbury reservoir. Table 2.2.3.9-2 identifies non-Project recreation facilities in the vicinity of Lake Pillsbury reservoir and indicates whether the facility is located within the FERC Project boundary.

With the exception of Westshore Camp and a portion of the campground at Lake Pillsbury Resort, all of the non-Project recreation facilities in the vicinity of Lake Pillsbury reservoir are located on NFSL and are operated under long-term lease agreements with USFS. The Westshore Camp and a portion of the Lake Pillsbury Resort campground are located on PG&E land and are operated under agreement with PG&E.

Private boat docks and/or launches along the shoreline of Lake Pillsbury reservoir, within the FERC Project boundary, are located on land owned by PG&E. Non-Project uses and occupancy of Project shorelines are addressed through long-term lease or license agreements between PG&E and private parties. Table 2.2.3.8-1 lists existing leases and licenses PG&E has issued (as of May 20, 2024) for non-Project use and occupancy of Project lands within the FERC Project boundary, grouped by geographic area.

Hiking Trails

There are no hiking trails within the FERC Project boundary. However, as shown on Map 2.2.3.9-1, there are two hiking trails east of Lake Pillsbury reservoir. These non-Project trails are the Lakeshore Trail (FS 10W54) and the Sunset Nature Trail (FS 10W60).

Off-highway Vehicle Trails

The Lake Pillsbury reservoir area is a base for OHV use and provides opportunities for a variety of vehicle types, including motorcycles, all-terrain vehicles (ATVs), dune buggies, side-by-sides, and 4×4s. Travel on National Forest System roads in the Lake Pillsbury reservoir area is managed and controlled by the MNF pursuant to regulations contained in 36 CFR 212.51. According to the MNF, conflicts between OHV use and other recreation users are common throughout the year and frequently require law enforcement efforts (MNF 1995). As mentioned above, the MNF LRMP contains management direction aimed at reducing conflicts between OHV users and other recreationists (e.g., trail designations and administrative controls). Road and trail use designations

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in the Project vicinity are shown on the MNF Motor Vehicle Use Map – South Central Map and Insets (MNF 2017).

As indicated on Map 2.2.3.9-3, the MNF manages a variety of designated roads and trails in the vicinity of the Project, primarily along the north end of Lake Pillsbury reservoir. In general, these include roads open to highway-legal vehicles, roads open to all vehicles, and trails open to vehicles 50 in. wide or narrower. Most roads in the Project vicinity include seasonal and/or special vehicle designations to protect natural resources. All roads and trails open to motorized travel in the MNF are shown on motor vehicle use maps. Roads and trails not shown on the motor vehicle use maps are not open to public motor vehicle travel.

2.2.3.9.3 Cape Horn Dam Area

The Cape Horn Dam Area includes Cape Horn Dam, Van Arsdale Reservoir, the water diversion system between the Eel River and East Branch Russian River, and the Potter Valley Powerhouse. Van Arsdale Reservoir is located approximately 12 mi. downstream of Lake Pillsbury reservoir, outside the MNF.

Van Arsdale Reservoir

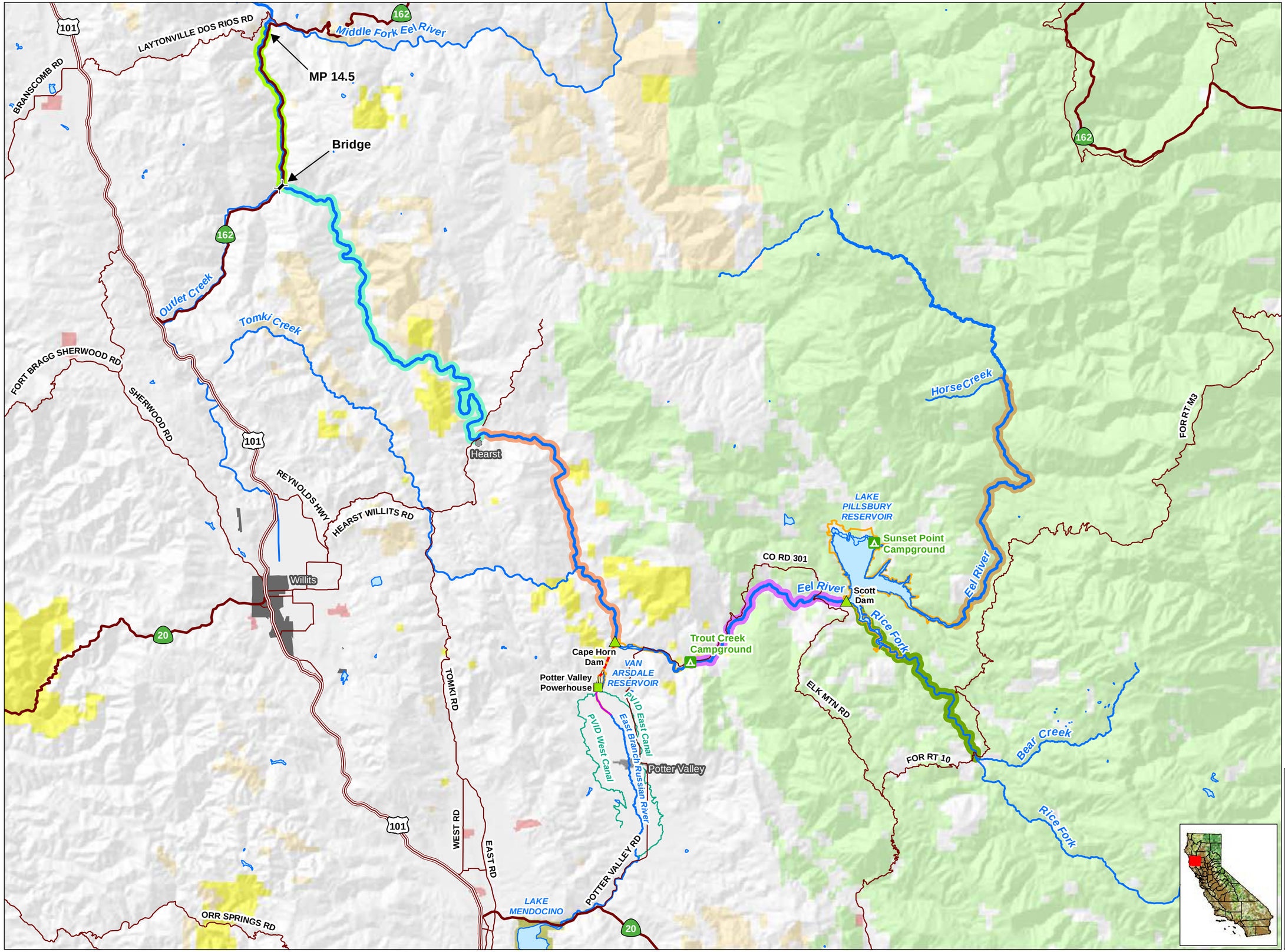
Van Arsdale Reservoir is formed behind Cape Horn Dam and under normal operating conditions has a surface area of approximately 65 acres and a 7-mi.-long shoreline (PG&E 2015). It is located on the Eel River, in Mendocino County, outside of the MNF.

The land underlying and surrounding the reservoir is primarily owned by PG&E and other private parties. According to studies conducted by PG&E and reported in the Revised Exhibit R for the Project (PG&E 1986), "private ownership of land adjacent to Van Arsdale Reservoir, poor soil conditions and limited potential to reconcile public safety requirement with Project operations, collectively reflect a high level of constraint for recreational development." As a result, recreation development in the Van Arsdale Reservoir area is limited to one family campground and one group campground located at the upper end of the reservoir.

Recreational Opportunities and Facilities

Recreational opportunities within the Cape Horn Dam Area are limited. The available facilities are summarized below.

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PG&E Project Facilities

- Powerhouse
- Dam
- Water Conveyance Feature
- Water Conduit
- Penstock
- Powerhouse Discharge Canal
- FERC Project Boundary

Other Features

- U.S. Highway
- State Highway
- Other Road
- Canal
- Watercourse
- Water Body

Land Ownership**

- U.S. Forest Service
- U.S. Army Corps of Engineers
- Bureau of Land Management
- Bureau of Indian Affairs
- State of California
- Private (Blank)

**SOURCE: BLM, 2022

Whitewater Runs on the Eel River

- Pillsbury Run
- Van Arsdale to Hearst Run
- Hearst Run
- Outlet Creek Run
- Upper Main Eel Run
- Rice Fork Run

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PG&E Potter Valley Project

Map 2.2.3.9-3

Whitewater boating runs on the Eel River.

0 0.5 1 2 Miles

Projection: UTM Zone 10 N
Datum: NAD 83

Date: 6/17/2025

C:\Users\kgabel\OneDrive - Stantec\gisnt\185706343\map\RecreationMaps\Map 2.2.3.9-3_Rec_WWRuns_EelRiver_17i11i_10.mxd

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Campgrounds

PG&E's Trout Creek Campground, which accommodates 15 sites, is located at the upper end of Van Arsdale Reservoir. The Trout Creek Group Campground is a walk-in, group campground that consists of three sites formerly part of the Trout Creek Campground. Trout Creek Group Campground accommodates a total of 18 PAOT. The campgrounds are located on PG&E land and are currently operated and maintained by a recreation management company under a concessionaire contract with PG&E. The grounds are typically open from mid-April through mid-September, with exceptions made for weather and maintenance activities. Trout Creek Campground has both first-come first-serve and reservable sites; reservable sites can be reserved through PG&E's recreation website (www.pge.com/recreation).

2.2.3.9.4 Eel River Watershed

The 196-mi.-long Eel River begins in the Coast Range, north and east of the Project, and generally flows northward through the Coast Range to the Pacific Ocean. The Project facilities are located near the headwaters of the Eel River. Scott Dam, located on the mainstem of the Eel River, forms Lake Pillsbury reservoir. Lake Pillsbury reservoir primarily captures water from two sources, the upper Eel River and the Rice Fork. Downstream of Scott Dam, the Eel River continues for approximately 168 mi. to the ocean. The mouth of the Eel River is located in Humboldt County, about 10 mi. south of the town of Fortuna, California. Four major tributaries—the North Fork Eel River, South Fork Eel River, Middle Fork Eel River, and Van Duzen River—enter the Eel River downstream of the Project.

Eel River Upstream of Lake Pillsbury Reservoir (Upper Eel River)

The Eel River originates on the southeast flank of Bald Mountain, located in the Yuki Wilderness. From its headwaters, the Eel River generally flows south through the Berryessa Snow Mountain Wilderness, before turning west and entering Lake Pillsbury reservoir near Bear Mountain (elevation 2,697 ft.). The Rice Fork originates on the northwest flank of Goat Mountain and generally flows northward for about 18 mi. through the Berryessa Snow Mountain Wilderness before entering Lake Pillsbury reservoir near Scott Dam. Before the construction of Scott Dam, the Rice Fork discharged directly into the Eel River.

The upper Eel River and the Rice Fork are both located entirely within the MNF, and both watercourses bisect steep and rugged terrain with limited road access, consisting entirely of unpaved USFS roads. Due to access constraints and the proximity of the Berryessa Snow Mountain Wilderness, recreation opportunities in the upper Eel River and Rice Fork watersheds are primarily limited to hiking, backpacking, fishing, and dispersed camping. Two primitive campgrounds are located near Lake Pillsbury reservoir—Thistle Glade Campground located on Thistle Glade Creek, a tributary to the upper Eel River, and Bear Creek Campground, located on Bear Creek, a tributary to the Rice Fork. Both the upper Eel River and the Rice Fork are boatable when natural river flow is available. Whitewater boating opportunities are described below.

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Eel River between Lake Pillsbury Reservoir and Van Arsdale Reservoir

Between Lake Pillsbury reservoir and Van Arsdale Reservoir, the Eel River primarily flows across privately owned land, with some parcels under the jurisdiction of the MNF (see Map 2.2.3.9-2). Recreational opportunities, use, and development along the Eel River between Lake Pillsbury reservoir and Van Arsdale Reservoir are limited, primarily due to the steep terrain and access issues, and no formal recreation sites exist.

Pursuant to CDFW regulations, fishing is not allowed on the Eel River between Cape Horn Dam and Scott Dam (CDFW 2024).

Eel River Downstream of Van Arsdale Reservoir

The Eel River from 100 yards downstream of Cape Horn Dam to its mouth and its four main tributaries (Middle Fork Eel, North Fork Eel, South Fork Eel, and Van Duzen River) are designated as W&SRs (see Section 2.2.3.8, Land Use, for discussion of the W&SR designation). Segments of the river bisecting public land are managed by BLM, California Resources Agency, and USFS, depending upon jurisdiction. The Round Valley Indian Reservation manages a segment that passes across its land.

Land downstream of Van Arsdale Reservoir bisected by the Eel River is primarily privately owned. For this reason, public access along the Eel River downstream of Van Arsdale Reservoir is limited.

Recreational Opportunities and Facilities

The available recreational opportunities and/or facilities are summarized below.

Whitewater Boating

The Eel River provides a variety of whitewater boating opportunities, especially during the spring and winter rainy season. The main whitewater boating runs on the Eel River both upstream and downstream of Lake Pillsbury reservoir are shown on Map 2.2.3.9-3 and are described in Table 2.2.3.9-3. The information depicted on the map and summarized in Table 2.2.3.9-3 was developed primarily during a whitewater boating focus group meeting that was held in 2018, augmented by information available on the California Creeks website (Tuthill 2024) and information provided by American Whitewater (2025a).

As summarized in Table 2.2.3.9-3, the runs on the Eel River below Scott Dam range from Class I to Class III+, enabling trip durations of one to several days. The main tributaries to the Eel River below Scott Dam are boatable, including some of the smaller creeks, depending upon skill level. Runs on the Middle Fork and South Fork Eel rivers are often combined with runs on the main Eel River, allowing for longer runs or reduced shuttle time. According to American Whitewater, the upper Eel River and the Rice Fork are also boatable during rainy periods or early season snowmelt but require relatively long paddles across Lake Pillsbury reservoir to reach a take-out (American Whitewater 2025a).

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Table 2.2.3.9-3. Whitewater boating runs on the Eel River.

Run Segment/ Run Name	Put In	Take Out(s)	Gradient	Approximate Length (mi.)	Duration (days)	Overall Rating[2]	Boatable Flow Range (cfs)	Notes[3]
Eel River[1]								
Upper Main Eel	Horse Creek Confluence	Lake Pillsbury reservoir (Sunset, Navy, or Fuller Grove campgrounds, Pillsbury Pines Day Use Area)	35–199 fpm	18 mi. (13 on river + about 5 mi. paddle on Lake Pillsbury reservoir)	1	IV–V	• 600–1,500	• Unique, beautiful canyon with fun rapids that can be done as a long day trip. • Can be extended upstream by putting in at M1 Road bridge, adding 2 mi. of steep whitewater. • Mandatory portage at Bloody Rock near RM 5. • Requires paddling 5 mi. across Lake Pillsbury reservoir to reach a take-out. • Following Scott Dam removal, boaters will need a new take-out location.
Rice Fork of Eel River	Road M10 near Bear Creek Confluence	Lake Pillsbury reservoir (informal boat access on left, access via Gravelly Valley Road)	31 fpm	9 mi. (7 on river + about 2 mi paddle on Lake Pillsbury reservoir)	1	II–III (V)	• 600–1,500	• A lesser-known upper fork of the Eel River that runs on rain and some early season snowmelt. • Most of the rapids are Class II, but there is a steeper section in the middle of this run that includes a IV+/V- rapid plus some Class III drops. • Requires paddling approximately 2 mi. across Lake Pillsbury reservoir to reach informal boat ramp take-out on PG&E land. • Following Scott Dam removal, boaters will need a new take-out location.
Eel River below Lake Pillsbury reservoir (Pillsbury Run)	Below Scott Dam, on right bank under Elk Mountain Road Bridge	Bucknell Creek, left bank; Trout Creek Campground; Eel River Road Bridge, right bank	23 fpm	5.7 mi. to Bucknell Creek 6.2 mi. to Trout Creek Campground 8.8 mi. to Eel River Road Bridge	1	III+ IV above 1,000 IV+ above 2,000	• Raft: (500) 900–3,000 • Hardshell kayak: 300–6,000 • Inflatable kayak: minimum 200	• Excellent run in October and November when flows are released from Lake Pillsbury reservoir. • Can extend run by taking out at Trout Creek Campground or Eel River Road Bridge, just above Van Arsdale Reservoir. • Known as “Pillsbury Run” (see Map 2.2.3.9-3). • Unpredictable and variable flow rates do not allow for commercial use. • Boaters refer to California Data Exchange Center website for inflow into Van Arsdale and outflow to Russian River diversion project to estimate if flows are suitable for boating. • Access issues at Benmore and Bucknell (e.g., boulders blocking access, security concerns).
Eel River above Hearst (Van Arsdale to Hearst Run)	Below Cape Horn Dam, or RM 155	Hearst Bridge over Eel River	Unknown	11.6 mi.	1	II–III	• Raft: 1,500–6,000 • Hardshell kayak: 1,000–6,000 • Inflatable kayak: 500–5,000	• Known as “Van Arsdale to Hearst Run” (see Map 2.2.3.9-3). • Unpredictable and variable flow rates do not allow for commercial use. • Boaters look at Dreamflows website for hourly outflow from Van Arsdale Reservoir to estimate if flows are suitable for boating. • Put-in location is very brushy.
Eel River below Hearst (Hearst Run)	Bridge near town of Hearst	Bridge at Outlet Creek confluence	16 fpm	18.5 mi.	1	II with Class III section	Raft and hardshell kayak: 500–8,000	• At flows below 2,000 cfs, run can be completed in 1 long day. At flows above 3,000 cfs, run can be completed in 4 hours or less. • Known as “Hearst Run” (see Map 2.2.3.9-3). • Boaters reference the California Data Exchange Center and Dreamflows website to view outflow from Van Arsdale Reservoir to estimate boating availability. • Put-in and take-out locations are on private property.

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Run Segment/ Run Name	Put In	Take Out(s)	Gradient	Approximate Length (mi.)	Duration (days)	Overall Rating[2]	Boatable Flow Range (cfs)	Notes[3]
Eel River above Middle Fork Confluence (Outlet Creek Run)	Highway 162 bridge over the Eel River	Highway 162 milepost 14.5, just above Middle Fork Eel River	20 fpm	6 mi.	1	III Harder at higher flows	• Raft: 500–20,000 • Hardshell kayak: 300–20,000	• One of the best Class III runs on the Eel River, but it does not see much use, except from locals, due to unpredictability of flow. • Can be run multiple times in one day. • Known as "Outlet Creek Run" (see Map 2.2.3.9-3). • Boaters reference the California Data Exchange Center and Dreamflows website to view outflow from Van Arsdale Reservoir and use their experience to estimate boating availability. • Take-out location is on private property.
Eel River below Middle Fork Confluence[4]	Dos Rios, near confluence of Middle Fork Eel River	Bridge crossing near town of Alderpoint (difficult access) or Fort Seward (easier access)	13 fpm	47 mi. to Alderpoint 53 mi. to Fort Seward	3 to 5	II with 6 Class III rapids	Raft: 1,500–10,000 Hardshell Kayak: 1,000–10,000 Inflatable Kayak: minimum 800	• Boatable in winter to early summer on rain or snowmelt.

[1] This table was developed primarily using information available at www.cacreeks.com (Tuthill 2024) and provided by American Whitewater (2025a).
[2] Overall rating based on international scale of difficulty.
[3] Notes from the 2018 whitewater boating focus group meeting are included in blue text.
[4] The Eel River below Middle Fork Confluence run segment is not shown in Map 2.2.3.9-3.

Notes: cfs = cubic feet per second
fpm = feet per mile
mi. = mile(s)
PG&E = Pacific Gas & Electric
RM = river mile(s)

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Eel River Visitor Information Kiosk

Located at the junction of Elk Mountain Road and Scott Dam Road, the Eel River Visitor Information Kiosk includes an information kiosk, parking area, and signage. Constructed in the early 1990s under an Individual Facility Agreement between PG&E and USFS, and executed on June 19, 1990, the kiosk is not within the FERC Project boundary, but is identified in PG&E's Revised Exhibit R (Amendment No. 1) for the Project, dated July 1986, and is considered a Project facility. This facility is open year-round.

2.2.3.9.5 Russian River Watershed

The Russian River Watershed extends within portions of Lake County, Mendocino County, and Sonoma County. The Russian River Watershed is less than half the size of the Eel River Watershed and drains an area of approximately 1,484 mi.^{2}. The discussion herein focuses on the East Branch Russian River, between the Potter Valley Powerhouse and Lake Mendocino.

The upper portion of the East Branch Russian River bisects Potter Valley, which is dominated by privately owned agricultural land. South of Potter Valley, the East Branch Russian River continues southwestward through mostly undeveloped, more heavily vegetated hills, and then along Highway 20 until it discharges into Lake Mendocino.

Recreational Opportunities and Facilities

The information about recreational opportunities along the East Branch Russian River discussed below was developed during a site visit conducted with interested stakeholders and during the whitewater focus group session, both conducted as part of the relicensing process in 2018. The site visit was conducted on October 24, 2018, to observe and discuss recreation-related conditions along the East Branch Russian River and to determine if minimum instream flows are conducive to angling, swimming, and wading. The meeting was attended by representatives from CDFW, PG&E, Sonoma Water, PVID, and members of the general public. A total of 10 sites were visited between the Potter Valley Powerhouse and Lake Mendocino.

Day-use Opportunities

Potter Valley is dominated by private agricultural land. Therefore, there are no developed recreation facilities along the East Branch Russian River between the Potter Valley Powerhouse and Highway 20. The nearest developed recreation facilities are Eastside Trailhead Parking, Kyen Campground, and Bushay Campground, all located on the north end of Lake Mendocino. Lake Mendocino, and the associated recreation facilities, are owned and operated by USACE.

In general, the group agreed that the recreation opportunities along the East Branch Russian River where it bisects Potter Valley are extremely limited owing to the presence of private property, steeply incised banks, and dense vegetation, all of which impede access. A limited amount of day use likely occurs at bridge crossings. Stream-based recreation is more prevalent along the lower East Branch Russian River, between the southern end of Potter Valley and Lake Mendocino, where access is available from Potter Valley Road. Conditions along the East Branch Russian River

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downstream of Potter Valley are more conducive to recreation, specifically angling, swimming, and wading. CDFW regularly stocks this section of the East Branch Russian River with trout, which likely draws anglers.

Whitewater Boating

According to information provided during the whitewater boating focus group and information available on www.americanwhitewater.org (American Whitewater 2025b), whitewater boating occurs along the East Branch Russian River Run, from Three Rock Falls to Lake Mendocino. According to American Whitewater, this run is a more of a "creek" run than a river run. The put-in is located immediately below Three Rock Falls, on East Side Road, 1 mi. north of Highway 20, and the take-out is located under the highway bridge where the river transitions to reservoir (American Whitewater 2025b). The run length is approximately 2.6 mi., with an estimated Class II to Class III difficulty rating. This run is supported by water diverted from the Eel River to the Russian River.

2.2.3.9.6 Current Recreation Use of Project Lands

Although no longer required by FERC, PG&E previously collected recreation use data and provided FERC with recreation use estimates for the Project every 6 years in conjunction with the Form 80 reporting cycle.[1] FERC required estimates for each "development," defined as "the portion of a project which includes: (a) a reservoir; or (b) a generating station and its specifically-related waterways." Accordingly, PG&E filed two Form 80s, one for Van Arsdale Reservoir and the other for Lake Pillsbury reservoir. PG&E's recreational use estimates for Van Arsdale Reservoir and Lake Pillsbury reservoir for Form 80 reporting years 2002, 2008, and 2014 are listed in Table 2.2.3.9-4.

[1] FERC eliminated the Form 80 reporting requirement by final rule effective March 28, 2019.

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Table 2.2.3.9-4. Estimated recreation use associated with the Project.

Report Year Ending	Summer Period	Number of Recreation Days[1]			
		Annual Total		Peak Weekend Average	
		Daytime	Nighttime	Daytime	Nighttime
Van Arsdale Reservoir Development[2]					
2002	4/26–9/5	500	2,000	20	215
2008	5/1–9/5	2,700	2,300	380	200
2014	5/1–11/15	1,705[3]	2,836	246	152
Lake Pillsbury Reservoir Development[2]					
2002	5/1–9/30	67,500	20,300	2,800	1,000
2008	5/1–9/5	35,000	21,500	3,300	750
2014	5/1–9/5	22,106	12,444	441	2,628

Notes:

[1] A "recreation day" is defined by FERC as "each visit by a person to a development for recreational purposes during any portion of a 24-hour period."

[2] A "development" is defined by FERC as "the portion of a project which includes: (a) a reservoir; or (b) a generating station and its specifically-related waterways."

[3] Form 80 reported 17,005 recreation days, but based on the data from previous years, this number appears to contain a typo and is presumed to be 1,705.

Nights camped per campground based on information collected by the recreation management company (PG&E's concessionaire) from 2018 through 2023 are listed in Table 2.2.3.9-5. As demonstrated in the tables, recreation use at Lake Pillsbury reservoir is substantially higher than at Van Arsdale Reservoir.

Table 2.2.3.9-5. Nights camped per Project campground, 2018–2023.

Campground	2018	2019	2020	2021	2022	2023
Trout Creek	162	377	150	777	644	701
Pogie Point	118	203	169	54	39	47
Fuller Grove	477	701	500	258	577	526
Fuller Grove Group	17	58	0	0	36	60
Oak Flat	755	1,206	561	994	1,028	1,067
Navy Camp	239	387	149	83	126	185
Sunset Point	986	1,300	853	731	1,132	1,579

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2.2.3.9.7 Current and Future Recreation Needs

Two state comprehensive plans and regional conservation and recreation plans address recreation in the Project area: the 2021–2025 SCORP, published in 2021, and USFS's MNF LRMP (MNF 1995), discussed below.

California Outdoor Recreation Plan and Related Reports

The SCORP is updated every 5 years and establishes priorities for grant funding to address needs for public outdoor recreation land throughout the state (CDPR 2021). The 2021 SCORP, which supersedes the 2015 SCORP, does not contain specific information regarding recreation use or trends in the Project area. However, the following two reports contain information relevant to the Project area:

- CDPR's 2012 SPOA (CDPR 2014); and
- *Outdoor Recreation in California's Regions 2013* (CDPR 2013).

The Project lies within CDPR's Northern California Planning Area. The CDPR's *Outdoor Recreation in California's Regions 2013* report (CDPR 2013) includes a variety of information about the Northern California Planning Area based on surveys conducted in 2010 and reported in the 2012 SPOA (CDPR 2014). For example:

- In 2010, the region had the lowest average median annual household income of residents by region statewide;
- In 2010, the region had a lower percentage of residents 49 years of age and under and a higher percentage who were 50 years of age and over;
- In 2060, the Northern California region is projected to have the lowest percentage of people aged 5 to 17 and the highest percentage of residents aged 65 and over; and
- The region faces economic challenges that can be addressed by creating outdoor recreation-related jobs and by stimulating outdoor recreation-related economic/business activity.

Mendocino National Forest Land and Resource Management Plan

The MNF LRMP provides management direction that reflects a variety of activities, allows for the use and protection of forest resources, and fulfills legislative requirements while addressing local, regional, and national issues. The LRMP describes the desired future of the MNF and provides forest-wide management direction and prescriptions for individual MAs. The LRMP applies to all NFSL administered by the MNF.

A portion of Lake Pillsbury reservoir is within the boundaries of the MNF (see Map 2.2.3.8-1), in MA #11. Land use and management in the vicinity of Lake Pillsbury reservoir, including recreation development, must be consistent with the goals, direction, and prescriptions associated with MA #11 and documented in the LRMP. As summarized in Section 2.2.3.8, Land Use, the MA description includes the management direction applicable to recreation in the Scott Dam Area, including all of Lake Pillsbury reservoir.

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2.2.3.9.8 References

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2.2.3.10 Aesthetic Resources

This section describes the aesthetic resources in the vicinity of PG&E's Potter Valley Hydroelectric Project (Project).

Specifically, this section provides background information on the applicable regulations governing scenic resources, visual resources management plans, and scenic designations with applicability to the Project followed by an overview of the existing visual conditions in each of the four Project regions: (1) Scott Dam Area, (2) Cape Horn Dam Area, (3) Eel River Watershed, and (4) Russian River Watershed.

2.2.3.10.1 Information Sources

The information presented in this section is primarily based on data from the following sources:

- Caltrans State Scenic Highway System Map (Caltrans 2024);
- Lake County General Plan (Lake County 2008);
- Mendocino County General Plan (Mendocino County 2020);
- National W&SR System's map of California (National W&SR System 2024); and
- USFS, MNF LRMP (MNF 1995).

2.2.3.10.2 Background Information

Applicable Regulations

The following provides a discussion of the federal, state, and local regulations that relate to aesthetic resources that may be applicable to one or more Project regions. Planned Project actions are primarily located in Lake and Mendocino counties, with portions of the Project also within the MNF (see Map 2.2.3.10-1); therefore, the applicable Lake County, Mendocino County, and MNF regulations are presented below.

Federal Regulations

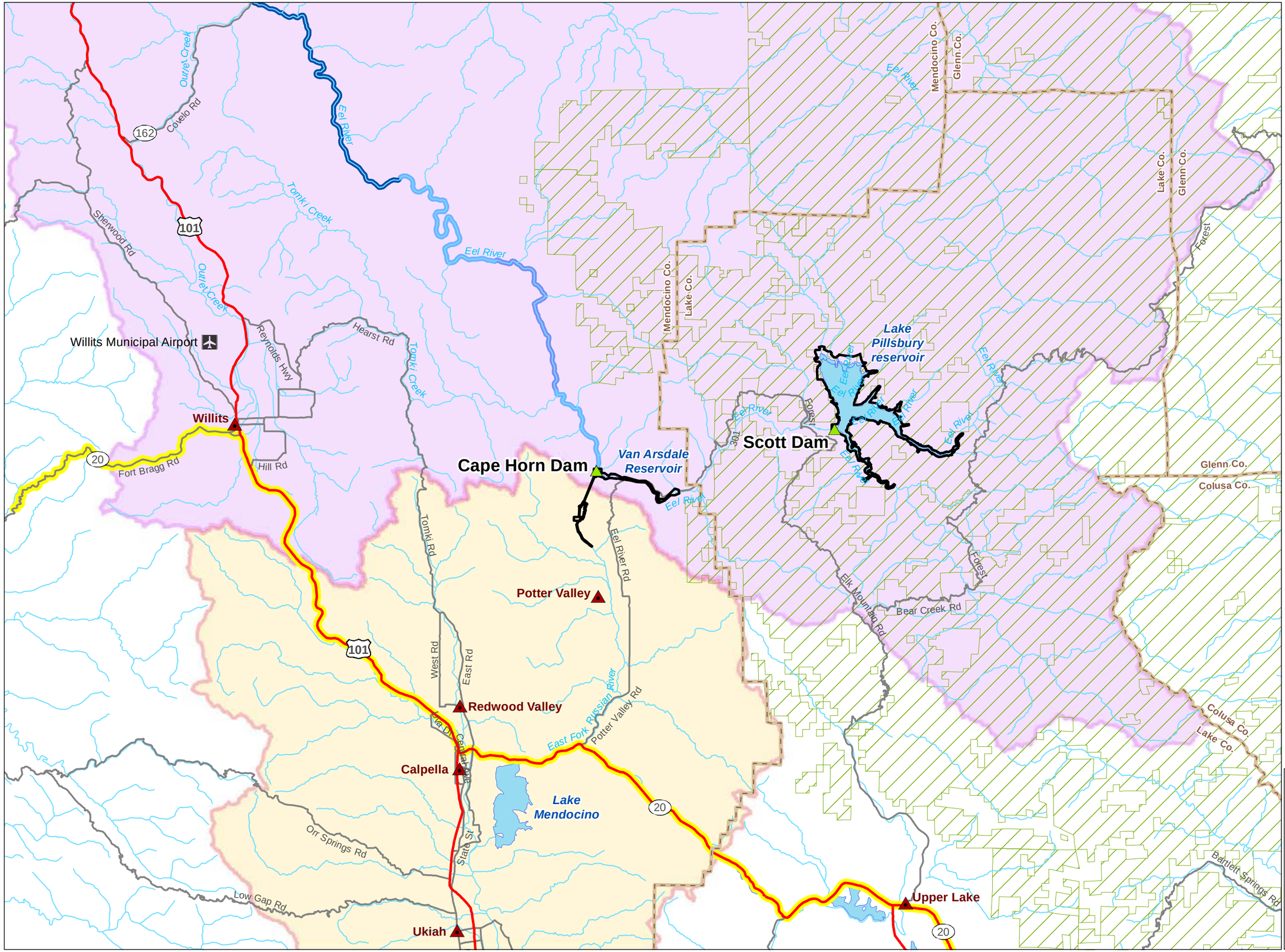
National W&SR System. The National W&SR System was created in 1968 to preserve rivers with outstanding natural, cultural, and recreational values in a free-flowing condition. There are three river classifications: "wild river areas" (generally free of impoundments and generally inaccessible), "scenic river areas" (generally free of impoundments with some accessibility), and "recreational river areas" (may contain some form of impoundment and are readily accessible).

The federal Wild and Scenic Rivers Act establishes specific criteria for each "outstandingly remarkable value" (ORV) that qualifies a river segment for protection. For an analysis of aesthetic resources, the relevant ORV is Scenery.

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PG&E Project Facilities

- Dam
- FERC Project Boundary

Other Features

- Freeway / Highway
- Local Roadway
- City / Town
- Eel River Watershed
- Russian River Watershed
- County Boundary
- Mendocino National Forest Lands

Protected Scenic Resources

- Designated Scenic Highway

National Wild & Scenic River System

- Recreational
- Scenic
- Wild

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PG&E Potter Valley Project
FERC Project No. 77

Map 2.2.3.10-1

Project area and protected scenic resources.

0 1 2 4 Miles

Projection: UTM Zone 10 N
Datum: NAD 83

Date: 6/17/2025

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River segments that have been designated with the Scenery ORV exhibit elements of landform, vegetation, water, color, and related actors resulting in an exemplary visual feature (NPS 2011). Within California, only 1.1 percent of the state's rivers qualify for protection under the National W&SR System (National W&SR System 2024).

The Eel River from 300 ft. downstream of the Cape Horn Dam[1] to the mouth at the Pacific Ocean, and several of its primary tributaries, is protected as part of the National W&SR System. Map 2.2.3.10-1 shows the locations of each designated Eel River segment. Table 2.2.3.10-1 identifies the specific classifications and ORVs that pertain to each designated Eel River segment.

Mendocino National Forest Land and Resource Management Plan. USFS has prepared an LRMP for the MNF, which includes management goals, objectives, and related direction for a variety of resources (MNF 1995). It is noted that the LRMP is only applicable to lands under the jurisdiction of USFS. This discussion focuses on the goals and objectives set forth in the LRMP that relate to aesthetic resources.

One of the goals presented in the LRMP is to maintain scenic quality along key travel corridors, key dispersed recreation areas, developed sites, and other highly scenic areas to provide a visually pleasing setting to complement current and protected recreation uses.

USFS protects aesthetic resources using an analytical model called the Visual Management System to establish visual quality objectives (VQOs) for forest management. The VQOs define theoretically acceptable limits of visual modification for particular areas within USFS lands and are classified according to the degree of inherent scenic attractiveness, visual variety, and viewer sensitivity level. The standards and guidelines for each VQO are described in Table 2.2.3.10-2.

State Regulations

California State Scenic Highway Program. California's State Scenic Highway Program was created by the State Legislature in 1963 to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. The State Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or are currently designated.

A highway may be designated as scenic depending upon how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view. Scenic corridors are lands that comprise scenic and natural features visible from designated highway rights-of-way.

[1] Note that the National W&SR System website refers to Cape Horn Dam as Van Arsdale Dam.

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Table 2.2.3.10-1. Designated National Wild and Scenic River segments on the Eel River and tributaries.

Beginning Point	End Point	W&SR System Classification	ORVs
Mainstem Eel River			
Eel River from 300 ft. below Cape Horn Dam	Eel River to confluence with Tomki Creek	Recreational	Fish
Eel River to confluence with Tomki Creek	Eel River to middle of Section 22, Township 19 North, Range 12 West	Scenic	Fish
Eel River to middle of Section 22, Township 19 North, Range 12 West	Eel River to boundary between Sections 7 and 8, Township 19 North, Range 12 West	Recreational	Fish
Eel River to boundary between Sections 7 and 8, Township 19 North, Range 12 West	Eel River to confluence with Outlet Creek	Wild	Fish
Eel River to confluence with Outlet Creek	Eel River to mouth at Pacific Ocean	Recreational	Fish
Middle Fork Eel River			
Middle Fork at southern boundary of Middle Eel-Yolla Bolly Wilderness	Eel River Ranger Station	Wild	Fish
Middle Fork Eel from the intersection of the river with the southern boundary of the Middle Eel-Yolla Bolly Wilderness Area	Middle Fork Eel to the Eel River Ranger Station	Wild	Fish, Recreation
Middle Fork Eel to the Eel River Ranger Station	Middle Fork Eel to Williams Creek	Recreational	Fish, Recreation
Middle Fork Eel to Williams Creek	Middle Fork Eel to southern boundary of the northern quarter of Section 25, Township 22 North, Range 12 West	Scenic	Fish, Recreation
Middle Fork Eel to southern boundary of the northern quarter of Section 25, Township 22 North, Range 12 West	Middle Fork Eel to boundary between Sections 4 and 5, Township 21 North, Range 13 West	Wild	Fish, Wildlife, Recreation
Middle Fork Eel to boundary between Sections 4 and 5, Township 21 North, Range 13 West	Middle Fork Eel to confluence with main Eel at Dos Rios	Recreational	Fish, Recreation

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Beginning Point	End Point	W&SR System Classification	ORVs
North Fork Eel River			
North Fork–Old Gilman Ranch	Forest boundary	Wild	Fish
North Fork Eel from the Old Gilman Ranch	North Fork Eel to the middle of Section 8, Township 24 North, Range 13 West	Wild	Fish
North Fork Eel from the middle of Section 8, Township 24 North, Range 13 West	North Fork Eel to boundary between Sections 12 and 13, Township 24 North, Range 14 West	Recreational	Fish, Recreation
North Fork Eel from the boundary between Sections 12 and 13, Township 24 North, Range 14 West	North Fork Eel to the confluence with the main Eel	Wild	Fish
South Fork Eel River			
South Fork Eel from the mouth of Section Four Creek near Branscomb	South Fork Eel to Horseshoe Bend	Recreational	Fish
South Fork Eel to Horseshoe Bend	South Fork Eel to the middle of Section 29, Township 23 North, Range 16 West	Wild	Fish
South Fork Eel to the middle of Section 29, Township 23 North, Range 16 West	South Fork Eel to confluence with main Eel near Weott	Recreational	Fish
Van Duzen River			
Van Duzen River from Dinsmore Bridge	Van Duzen River to the powerline crossing above Little Larribee Creek	Scenic	Fish
Van Duzen River to the powerline crossing above Little Larribee Creek	Van Duzen River to the confluence with the Eel River	Recreational	Fish

Source: National W&SR System 2024

Notes: ft. = feet
ORV = Outstandingly Remarkable Value
W&SR = wild and scenic river

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Table 2.2.3.10-2. U.S. Forest Service visual quality objectives standards and guidelines.

Standards	Guidelines
Preservation VQO	Manage wilderness with an emphasis on ecological processes, but allow for activities with low visual impacts, such as trails and trail-related improvements that are well-sited for maximum blending into the landscape. Manipulation of vegetation should appear to be natural within a year.
Retention VQO	**Foreground Distance Zone** – Manage vegetation for diversity of species common to the area, with a range of ages and site classes up to and including trees with old-growth characteristics. Normally, timber harvest openings will be limited to 1 acre. Uneven-aged silvicultural systems and special cutting methods are permitted. Impacts of management activities in highly visible foreground areas will be reduced through special treatments such as leaving residual vegetation, screening, reshaping timber harvest units, and disposing of logging slash. **Middleground Distance Zone** – Manage vegetation with a range of ages and size classes. Even-aged, uneven-aged, and special cutting may be applied. Normally, timber harvest openings will be limited to 10 acres; they will be screened and/or reshaped as necessary to maintain the characteristics of the natural landscape.
Partial Retention VQO	**Foreground Distance Zone** – Manage vegetation for a diversity of species common to the area, with a range of ages and size classes up to and including mature timber. Normally, timber harvest openings will be limited to 5 acres. Even-aged, uneven-aged, and special cutting may be applied. Impacts of management activities in highly visible foreground areas will be reduced through special treatments, as mentioned above in the discussion for the Retention VQO. **Middleground Zones** – Manage vegetation with a range of ages and size classes. In addition to visually sensitive areas, this VQO applies to late-successional reserves, former Rare II areas not allocated to the backcountry prescription, and areas designated as semi-primitive recreation opportunity areas. Other management and resource constraints on these areas will be more restrictive, and management for a Partial Retention VQO should not hinder management of these areas.
Modification VQO	**Foreground Distance Zone** – Manage vegetation with a range of ages and including small timber (size class 3). Normally, timber harvest opening will be limited to 20 acres. **Middleground and Background Distance Zones** – The even-aged silvicultural system will be applied.

Source: MNF 1995

Note: VQO = visual quality objective

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Boundaries of a scenic corridor are determined by the visible landscape as defined by topography, vegetation, viewing distance, and/or jurisdictional lines. Map 2.2.3.10-1 shows the locations of identified State Scenic Highways in the Project vicinity.

California W&SR System. The California W&SR Act was passed in 1972 and is intended to complement the National W&SR System in preserving designated rivers that possess extraordinary features.[2] Like the National W&SR System, under the California W&SR Act, river segments can be classified as "wild river areas," "scenic river areas," or "recreational river areas" depending on the level of development surrounding that segment. The classifications represent the existing level of shoreline development and are not a description of any particular extraordinary values identified for the potential or designated river segment. In other words, a classification of scenic means that the river segment is largely undeveloped; it does not mean that the river segment has a Scenery ORV designation. The Eel River and its major tributaries, including its tributary the Van Duzen River, is protected under the California W&SR Act (SWRCB 2017).

Regional Regulations

Lake County General Plan. The Open Space, Conservation, and Recreation Element of the Lake County General Plan includes goals and policies related to aesthetic resources that may be applicable to the Project (Lake County 2008). The relevant policies are copied below:

- **Goal OSC-2.** To preserve and protect existing viewsheds and visual quality found in the County.
- **Policy OSC-2.8: Scenic Viewpoints Along Roadways, Bikeways, and Pedestrian Trails.** Scenic viewpoints along roadways and multi-use trails should be provided where there are major views of specific features, such as Clear Lake, Mt. Konocti, or panoramic views of the countryside. Interpretative information should be provided at these points to help inform visitors and residents of the natural and cultural history of the county.
- **Policy OSC-2.11: Grading Impacts.** Humanmade slopes should be revegetated to reflect natural hillside conditions in the surrounding area, to the extent feasible and in accordance with the county's Grading Ordinance.
- **Policy OSC-2.15: Ridgeline Protections/Hilltop Protections.** The county shall develop an ordinance that provides guidelines for development on or near ridgelines and hilltops.

Mendocino County General Plan. The Resource Management Element of the Mendocino County General Plan includes goals and policies related to visual resources (Mendocino County 2020). The relevant policies are copied below:

- **Goal RM-14, Visual Character:** Protection of the visual quality of the County's natural and rural landscapes, scenic resources, and areas of significant natural beauty.

[2] A comparison between the National W&SR Act and the California W&SR Act is available online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/FOTR/for_28.pdf.

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- **Policy RM-130:** Support land trusts and similar organizations in identifying and protecting lands and corridors with significant resource, recreational or scenic values.
- **Policy RM-131:** Protect the scenic values of the county's natural and rural landscapes, scenic resources, and areas of significant natural beauty.
- **Policy RM-133:** Protect the outstanding values of designated river corridors within the State W&SR System by limiting land use and site development impacts (including grading and vegetation removal but not including regulated timber harvesting).
- **Policy RM-134:** Lakes, stream corridors, large reservoirs, and other water bodies have scenic values that shall be maintained or enhanced and restored when necessary.
- **Policy RM-135:** Maintain and enhance scenic values through development design principles and guidelines, including the following:
  - Development scale and design should be subordinate to and compatible with the setting.
  - Reduce the visual impacts of improvements and infrastructure.
  - Minimize disturbance to natural features and vegetation but allow selective clearing to maintain or reveal significant views.

2.2.3.10.3 Scott Dam Area

Scott Dam is a concrete structure that spans the width of the Eel River with a maximum height of 130 ft and a total length of 805 ft. Lake Pillsbury reservoir, created by Scott Dam, is the main storage reservoir of the Project. Lake Pillsbury reservoir is primarily on private property owned by PG&E and also within the boundaries of the MNF. With a surface area of approximately 1,875 acres under normal operating conditions with the gates open, and 29 mi. of shoreline (PG&E 2015), Lake Pillsbury reservoir is the largest lake in the MNF.

Lake Pillsbury reservoir provides a variety of reservoir-based recreation opportunities such as boating, wind surfing, fishing, and swimming. A variety of developed recreation facilities in the immediate vicinity of Lake Pillsbury reservoir, including family campgrounds, group campgrounds, and day-use facilities, are available to the public (Map 2.2.3.10-2). The Project recreation facilities are operated and maintained by a recreation management company through a concessionaire agreement with PG&E. However, private recreation resorts, boat launches, day-use facilities, and campgrounds provide overnight and day-use opportunities. In addition, the Lake Pillsbury reservoir area serves as a base for OHV use and provides non-Project recreational opportunities for a variety of vehicle types, including motorcycles, ATVs, dune buggies, side-by-sides, and 4×4s. Refer to Section 2.2.3.9, Recreation Resources, for additional information related to recreational resources in the Project vicinity.

The full-pool elevation of Lake Pillsbury reservoir provides views of large conifers and lower chaparral-type vegetation along the shoreline, surrounded by gradual to steep slopes. Typically, in the early June through July period, the lake level starts to draw down due to water releases to meet regulatory instream flow requirements and to support contractual water delivery requirements

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to the PVID. Over 500 acres of dewatered lakebed is exposed during this time (FERC 1978). The visual effect of the dewatered zone varies, depending upon the location from which the drawdown is observed and upon the elevation and position of the location, the time of day, and the length of time and frequency of the observation. During low water, features such as submerged trees and rocky outcrops within the lakebed, as well as the "bathtub ring" around the reservoir, may be dominant components of the visual experience. Under the current operation, full-pool conditions do not occur because the maximum water surface elevation is maintained at 10 ft. below full pool to reduce seismic risk. Therefore, under the current existing condition, the upper 10 ft. of shoreline is exposed. In general, the visual character of the Scott Dam Area may be defined as a forested landscape surrounding a central lake area with interspersed recreational facilities, minor roadways, and rural residences.

The Scott Dam Area is located within Lake County and the MNF. As a result, the area is subject to the Lake County rules and regulations described above, and to the goals, objectives, directives, and prescriptions contained in the MNF LRMP. USFS direction pertaining to visual resources in the vicinity of Lake Pillsbury reservoir is summarized below.

Wild and Scenic River Designations

The Scott Dam Area does not include any river segments that are included in the National or California W&SR systems (National W&SR System 2024).

Scenic Corridors

There are no state-designated scenic highway segments in the Scott Dam Area (Caltrans 2024). In addition, the Lake County General Plan does not identify any specific scenic corridors (Lake County 2008).

Mendocino National Forest Land and Resource Management Plan

As noted above, USFS protects aesthetic resources by establishing VQOs. The VQOs define theoretically acceptable limits of visual modification for particular areas within USFS lands and classify areas according to their degree of inherent scenic attractiveness, visual variety, and viewer sensitivity level. The VQO classifications for the region surrounding Lake Pillsbury reservoir, as established in the MNF LRMP, are presented in Map 2.2.3.10-2. In general, the shoreline area surrounding Lake Pillsbury reservoir is designated as Retention VQO. Lands beyond the immediate shoreline are designated as Preservation and Modified VQOs.

2.2.3.10.4 Cape Horn Dam Area

Water captured and stored in Lake Pillsbury reservoir is released into the Eel River and then captured in Van Arsdale Reservoir, which is formed by Cape Horn Dam. Van Arsdale Reservoir has a surface area of approximately 106 acres at the normal maximum water surface elevation of 1,494.3 ft. Van Arsdale Reservoir is operated as run-of-river and is kept at full pool. Fluctuations in reservoir elevation occur as a result of different flow levels in the Eel River, but not as a function of reservoir storage operations. The reservoir provides the elevation head required to divert water through the Van Arsdale Intake. Cape Horn Dam is 520 ft. long and consists of two main sections:

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an earth fill section and a concrete gravity overflow spillway section. At Cape Horn Dam, there is a pool-and-weir-type fish ladder that provides fish passage over the dam, allowing fish to utilize the Eel River and its tributaries between Cape Horn and Scott dams.

The ladder is roughly U-shaped, with one end opening at the west end of the dam crest and the other end opening into the river approximately 80 ft. downstream from the toe of the dam.

At Van Arsdale Reservoir, water is diverted and conveyed to the Potter Valley Powerhouse, located just north of predominantly agricultural Potter Valley. The Potter Valley Powerhouse building is a steel-frame structure, approximately 101 ft. long by 53 ft. wide, containing three generating units. The three generating units discharge into individual concrete channels, joining together into a common channel approximately 60 ft. downstream from the powerhouse. The Potter Valley Powerhouse Switchyard is located adjacent to the powerhouse.

The visual character of the Cape Horn Dam Area varies. Along the Eel River and Van Arsdale Reservoir, views afforded to motorists include conifers and chaparral-type vegetation, rural residences, and agricultural fields, and intermittent views of the waterway. The southwestern portion of the Cape Horn Dam Area is more developed, and public views are characteristic of a small agricultural town.

The Cape Horn Dam Area is located outside the MNF, entirely within Mendocino County, and, as a result, the area is subject to Mendocino County rules and regulations described above.

Wild and Scenic River Designations

As summarized in Table 2.2.3.10-1, the Eel River segment beginning at Cape Horn Dam to Tomki Creek is classified as a recreation river segment, meaning it contains some form of impoundment and is readily accessible. The ORV is Fish (National W&SR System 2024).

Scenic Corridors

There are no designated scenic highway segments in the Cape Horn Dam Area (Caltrans 2024). Additionally, the Mendocino County General Plan does not identify any specific scenic corridors (Mendocino County 2020).

2.2.3.10.5 Eel River Watershed

The primary Project facilities (dams, reservoirs, and diversion facilities) are located along the Eel River, and the Eel River Watershed includes the entire Scott Dam Area as well as the northeastern portion of the Cape Horn Dam Area (see Map 2.2.3.10-1). The Eel River Watershed is located entirely in the Northern Coast Range and is characterized by steep and heavily forested terrain with minimal development. The forest is dominated by mixed conifer stands, including ponderosa and Jeffrey pines, sugar pine, Douglas-fir, white fir, and incense cedar (MNF 1995).

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Visual Quality Objectives

Preservation (P)

Allows ecological changes only, with few exceptions.

Retention (R)

Provides for management activities which are not visually evident.

Partial Retention (PR)

Management activities remain visually subordinate to the characteristic landscape.

Modification (M)

Management activities may visually dominate the original characteristic landscape while remaining compatable with the natural surroundings.

NOTE:
Partial Retention VQO applies within developed recreation sites and when viewed as middleground from other managed viewsheds

USDA-FS Administrative Boundary

*SOURCE: USFS Region 5, 2016

Mill Creek
Salmon Creek
Smokehouse Creek
Welch Creek
Hull Mountain Rd
Panther Creek
Whitney Creek
Cedar Creek
Dashiell Creek
Forest Route 1
Gravelly Valley Landing Field
Squaw Valley Creek
Pogie Point Campground and Day Use Area
Oak Flat Campground
Fuller Grove Group Campground
Fuller Grove Day Use Area and Boat Launch
Fuller Grove Campground
Navy Campground
Sunset Point Campground
Pillsbury Pines Day Use Area and Boat Launch
Pine Point Day Use Area and Boat Launch
Westshore Camp
LAKE PILLSBURY RESERVOIR
Lake Pillsbury Homesite Association
Soda Creek Camp
Lake Pillsbury Resort, Marina, Dock and Boat Launch
Elk Mountain Rd
Salt Spring Creek
Lake Pillsbury Low Level Boat Launch
Eel River Visitor Information Kiosk
Scott Dam Rd
Bear Gulch
Scott Dam
Rice Fork Residence Tract
Eel River
Benmore Creek
Elk Mountain Rd
Packsaddle Creek
Rice Fork
Deer Creek
Hale Creek
Salmon Creek
Mill Creek
Alder Creek
Trout Creek
Ridgeway Hwy
Cape Horn Dam
VAN ARSDALE RESERVOIR
Intake
Eel River
Trout Creek Group Campground
Trout Creek Campground
Busch Creek
Butterfly Valve House
Potter Valley Powerhouse
PVID West Canal
PVID East Canal
Adobe Creek
Busch Creek
Powerhouse Rd
Eel River Rd
Boyes Creek
PVID West Canal
PVID East Canal
Gibson Ln
Williams Creek
East Branch Russian River
To Lake Mendocino (USACE)
Bevans Creek
McLeod Creek
Rice Fork
Rice Creek
Salt Glade Creek
Bucknell Creek
Willow Creek
Bevans Creek
Parramore Creek

PG&E Project Facilities

- Powerhouse
- Dam
- Water Conveyance Feature
- Water Conduit
- Penstock
- Powerhouse Discharge Canal
- FERC Project Boundary

Project Recreation Features

- Boat Ramp
- Family Campground
- Group Campground
- Day Use Facility
- Information Kiosk

Private Non-Project Recreation Features

- Boat Launch
- Boat Dock
- Day Use Facility
- Resort, Camp, or Tract

Other Features

- Airstrip
- General Access Road
- Other Road
- Canal
- Watercourse
- Water Body

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FERC Project No.77

Map 2.2.3.10-2

Mendocino National Forest adopted visual quality objectives.

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Projection: UTM Zone 10 N
Datum: NAD 83

Date: 6/17/2025

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The Eel River Watershed and sub-watersheds are depicted in Map 2.2.2-2 (in Section 2.2.2, General Description of the River Basin). The Eel River Watershed covers a large area in Lake County, Mendocino County, Glenn County, Humboldt County, and Trinity County and includes portions of the MNF. As a result, portions of the Eel River Watershed are subject to various county regulations, as well as the MNF VQO standards in areas under USFS jurisdiction.

Wild and Scenic River Designations

The Eel River from 300 ft. below Cape Horn Dam to the mouth at the Pacific Ocean is designated as a National W&SR. As summarized in Table 2.2.3.10-1, classifications vary by segment, with one section beginning at Tomki Creek classified as scenic, meaning it is generally free of impoundments with some accessibility. The ORV for all of the segments on the mainstem of the Eel River is Fish. The Scenery ORV does not apply to any segment on the mainstem of the Eel River.

Segments of the Eel River and its tributaries included in the National W&SR System are also included in the California W&SR System and are protected under the California W&SR Act of 1972 (Public Resources Code §§ 5093.50–5093.70).

Scenic Corridors

As depicted on Map 2.2.3.10-1, portions of Highway 101 and Highway 20 that extend through the Eel River Watershed are eligible for designation as scenic highway segments (Caltrans 2024).

2.2.3.10.6 Russian River Watershed

This discussion focuses on the northernmost portion of the Russian River Watershed where the Project is located. The southwestern portion of the Cape Horn Dam Area, including the Potter Valley Powerhouse, is located on the East Branch Russian River, in the northern Russian River Watershed (see Map 2.2.3.10-1).

The watershed is rural in character and features year-round river flow and hilly or mountainous terrain in the upper reaches. Irrigated agriculture, including orchards and vineyards, is found in the Project vicinity. The northern portion of the Russian River Watershed is subject to Mendocino County regulations.

Wild and Scenic River Designations

No part of the Russian River, including the East Branch Russian River, is included in the National or State W&SR systems (National W&SR System 2024).

Scenic Corridors

The Mendocino County General Plan does not identify any specific scenic corridors (Mendocino County 2020). However, as depicted on Map 2.2.3.10-1, the portions of Highway 101 and Highway 20 that extend through the northern Russian River Watershed are eligible for designation as scenic highway segments (Caltrans 2024).

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2.2.3.10.7 References

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2.2.3.11 Cultural Resources

The term "cultural resources" refers to built-environment resources (e.g., buildings, structures, objects, districts, landscapes) and archaeological resources. This section describes the existing environment for cultural resources within the Potter Valley Hydroelectric Project's (Project's) Cultural Resources Study Areas.

Included in this section are (1) a brief pre-European contact cultural chronology and historical overview of the area within and surrounding the FERC Project boundary; (2) a description of the three study areas for cultural resources: the FERC Project Boundary Cultural Resources Study Area, the Eel River Study Area, and the East Branch Russian River Study Area; (3) a summary of previous cultural resources studies; and (4) an inventory of previously recorded built-environment and archaeological resources that have been evaluated or require evaluation for listing in the National Register of Historic Places (NRHP).

The location of cultural resources is considered Confidential Information. A list of maps containing Confidential Information and contact information for requesting the maps are provided in Volume II, Section 2.2.3, Affected Environment.

2.2.3.11.1 Information Sources

The following sources were used in preparing this section:

- PG&E's Confidential Cultural Resources Database (CCRD);
- *Potter Valley Hydroelectric Project FERC Project No. 77 Relicensing Pre-Application* (PG&E 2017);
- Preliminary archaeological inventory of the area within the FERC Project boundary conducted by Browning Cultural Resources, Inc., prior to January 2019; on January 25, 2019, PG&E filed a notice with FERC stating they would no longer be relicensing the Project, and the inventory was not completed (PG&E 2019a);
- Preliminary built-environment inventory of the area within the FERC Project boundary conducted by Cardno, Inc., prior to January 2019; on January 25, 2019, PG&E filed a notice with FERC stating they would no longer be relicensing the Project,[1] and the inventory was not completed (PG&E 2019b);
- California Department of Transportation (Caltrans) Statewide Historic Bridge Inventory Update (Caltrans 2006);
- California Register of Historical Resources (Office of Historic Preservation 2024a);
- *Five Views: An Ethnic Historic Site Survey for California* (Office of Historic Preservation 1988);
- Built Environment Resources Directory (Office of Historic Preservation 2024b);

[1] FERC Accession No. 20190125-5100.

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- California Historical Landmarks (Office of Historic Preservation 2024c); and
- California Points of Historical Interest (Office of Historic Preservation 2024d).

2.2.3.11.2 Cultural Resources Study Areas[2]

In addition to the FERC Project Boundary Cultural Resources Study Area, the downstream reaches of the Eel and Russian rivers were included as study areas in the evaluation of the affected environment for cultural resources to account for the potential effects of sediment downstream of the dam after dam removal.

The boundaries of the three cultural resources study areas are described below and depicted in Maps 2.2.3.11-1 through 2.2.3.11-3:

- The FERC Project Boundary Cultural Resources Study Area encompasses the FERC Project boundary and a 0.5-mi. buffer (Map 2.2.3.11-1).
- The Eel River Study Area encompasses the Eel River downstream of Scott Dam to the Pacific Ocean including the Eel River estuary (the study area ends at the Pacific Ocean at the estuary because any sediments from dam removal will be flushed and deposited in the river prior to reaching the estuary mouth) and a 0.5-mi. buffer on either side of the Eel River (Map 2.2.3.11-2).
- The East Branch Russian River Study Area encompasses the East Branch Russian River to Lake Mendocino plus a 0.5-mi. buffer on either side of the East Branch Russian River (Map 2.2.3.11-3).

2.2.3.11.3 Pre-European Contact Archaeological Cultural Chronology[3]

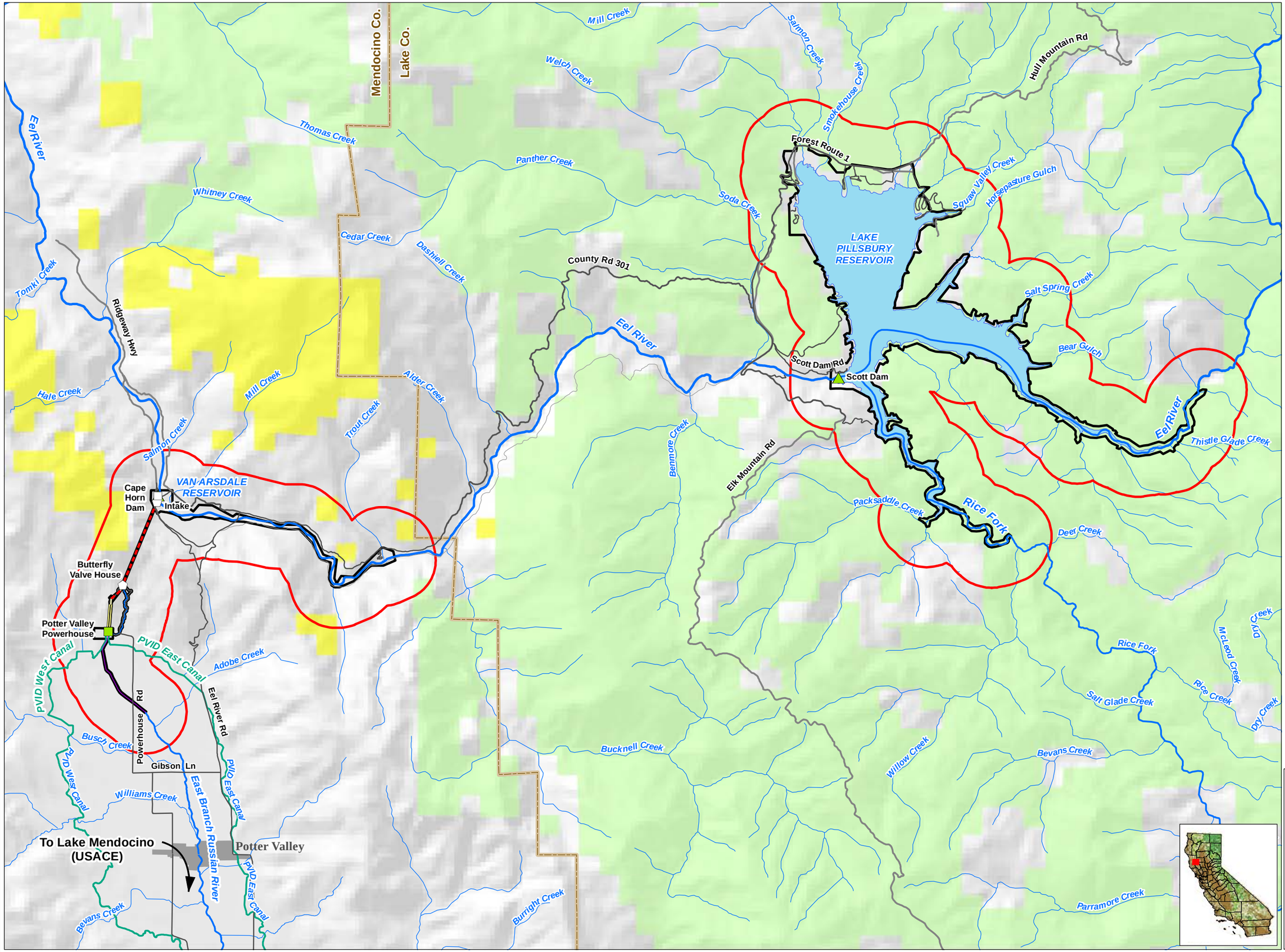
The following summarizes the general regional evolution of pre-European contact cultures through time. This summary is adapted from the Archaic-Emergent temporal sequence developed by Fredrickson (1974) and Hildebrandt et al. (2018), which summarizes chronologies researchers have developed over the past 50 years informed by archaeological dating technology and archaeological field data regarding the nature of Native California occupation during the pre-European contact period. It consists of a sequence of four periods, described in the following subsections.[4]

[2] An Area of Potential Effects (APE) pursuant to 36 CFR § 800.16(d) has not yet been defined. The APE and any revisions to the study areas will be developed in consultation with FERC, Tribes, stakeholders, and the State Historic Preservation Officer as part of compliance with Section 106 of the National Historic Preservation Act.

[3] The term "pre-European contact" as used here is synonymous with the term "prehistory," meaning the time prior to European contact with Indigenous groups of California. The term is used to avoid pejorative implications.

[4] These phases are academic constructs and do not necessarily reflect the views of Indigenous groups of California.

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PG&E Project Facilities

- Powerhouse
- Dam
- Water Conveyance Feature
- Water Conduit
- Penstock
- Powerhouse Discharge Canal
- FERC Project Boundary

Other Features

- General Access Road
- Other Road
- Canal
- Watercourse
- Waterbody
- Cultural Study Area

Land Ownership*

- U.S. Forest Service
- State of California
- Private (Blank)
- County Boundary

*SOURCE: BLM (2022), CPAD (2022)

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PG&E Potter Valley Project

Map 2.2.3.11-1

FERC Project Boundary Cultural Resources Study Area.

0 0.5 1 Miles

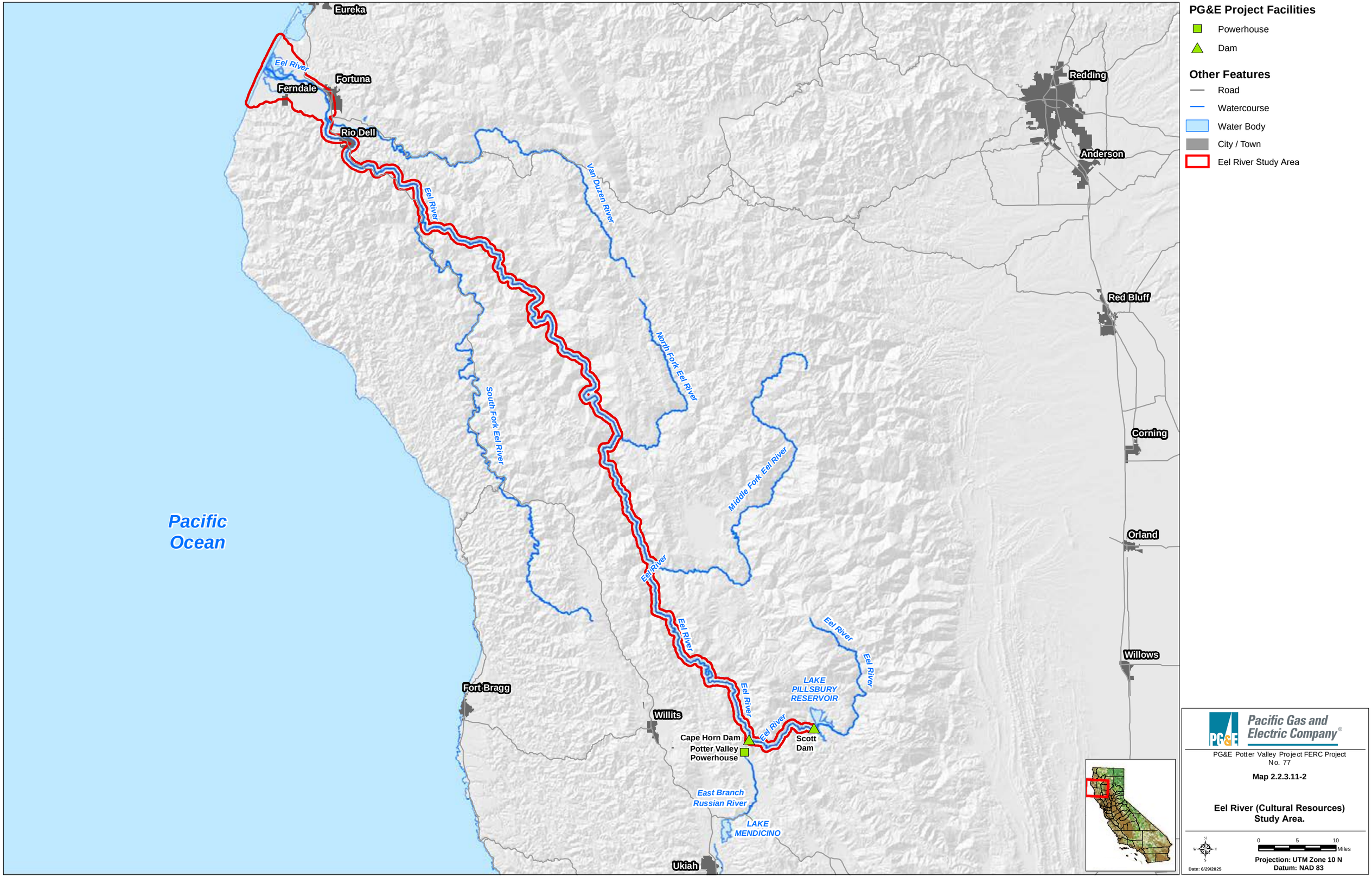
Projection: UTM Zone 10 N
Datum: NAD 83

Date: 6/29/2025

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PG&E Potter Valley Project FERC Project No. 77

Map 2.2.3.11-2

Eel River (Cultural Resources) Study Area.

0 5 10 Miles

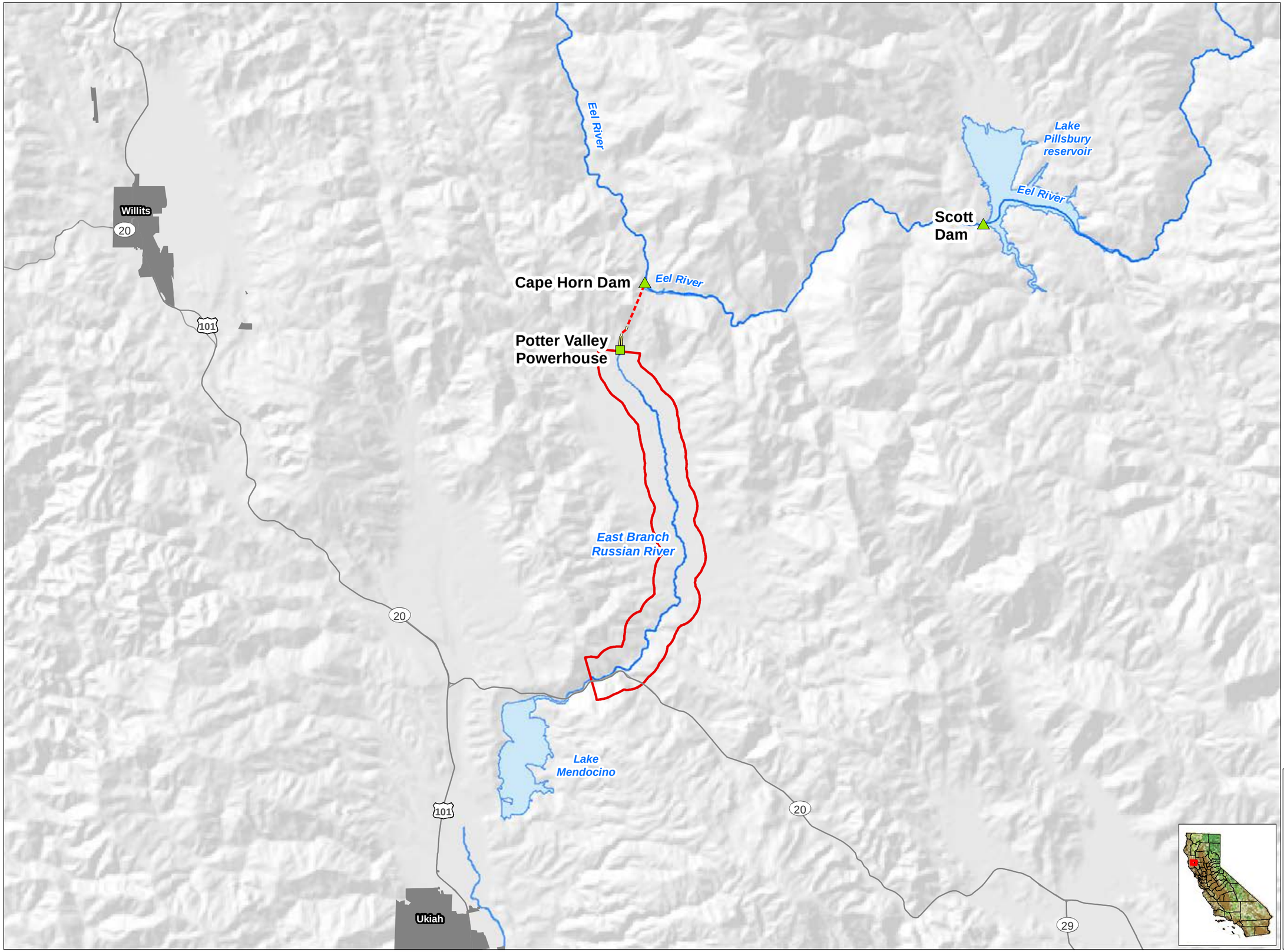
Projection: UTM Zone 10 N
Datum: NAD 83

Date: 6/29/2025

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PG&E Project Facilities

- Powerhouse
- Dam

Other Features

- Road
- Watercourse
- Water Body
- City / Town
- East Branch Russian River Study Area

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PG&E Potter Valley Project FERC Project No. 77

Map 2.2.3.11-3

East Branch Russian River (Cultural Resources) Study Area.

0 1 2 3 Miles

Projection: UTM Zone 10 N
Datum: NAD 83

Date: 6/29/2025

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Paleoindian Period (13400–10000 cal [BP])

Until relatively recently, most archaeologists believed that artifacts produced by Clovis people represented the oldest evidence of human occupation in North America. These artifacts typically include fluted projectile points, large bifaces, and a variety of formal flake tools.

There is one purported pre-Clovis site located near Northern California in south-central Oregon, located in the northwestern Great Basin on the margins of Summer Lake Basin, about 75 kilometers north of Lakeview, Oregon. The site is a deep stratified deposit that includes a lower component dating from about 14500 to 14100 calibrated years before present (cal BP [12400 to 12200 radiocarbon years BP]), which pre-dates the earliest estimates for Clovis by 800 years. This component includes Pleistocene megafauna, as well as bifaces, debitage, cordage, butchered bone, and human coprolites, the latter documented by the presence of human DNA. Multiple radiocarbon dates were obtained from the human coprolites (Hildebrandt et al. 2018).

Lower Archaic/Borax Lake Pattern (10000–6300 cal BP)

The Lower Archaic Period is characterized by the predominance of millingstone adaptation. Artifact assemblages appear to represent a mobile forager pattern of subsistence-settlement organization (Fredrickson 1974, 1994). Archaeological manifestations the Borax Lake Pattern have been discovered and studied throughout the interior of northwest California. Borax Lake Pattern sites extend from the Clear Lake Basin north into Humboldt and Trinity counties, with many located in upland habitats. The earliest Borax Lake Pattern materials dating between 10000 and 8500 cal BP are limited to flaked stone artifacts, including large, wide-stemmed points (square bases, some with fluting), ovoid flake tools, and thin bladelet flakes (Hildebrandt et al. 2018).

Middle and Upper Archaic/Mendocino Pattern (5000–1500 cal BP)/Houx Aspect of the Berkeley Pattern (3200–1200 cal BP)

The Middle Archaic Period is generally marked by the introduction of mortar and pestle technology and the assumed exploitation of acorns. Hunting appears to have become significantly more important compared with the Lower Archaic Period. Economic diversification and sedentism began to develop, accompanied by population growth and expansion (Fredrickson 1974, 1994).

An environmental change, with climate becoming generally cooler, marked the shift from the Middle to Upper Archaic periods, and lifestyles became more sedentary. Subsistence strategies shifted to focus on intensive processing and storage. Numerous small villages and the beginnings of a more complex society and economy characterize the end of this period (Fredrickson 1994).

The assemblages assigned to the Mendocino Aspect include chert-dominated side-notched, corner-notched, and concave-based dart points, handstones, and millingslabs; various types of flake tools and cobble tools; and, in some cases, a limited number of cobble mortars and pestles. Mendocino Aspect sites rarely have midden deposits or burials and appear to represent continuity of a residentially mobile adaptation through the Middle and Upper Archaic (Hildebrandt et al. 2018).

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Artifact assemblages of the Houx Aspect of the Berkeley Pattern are elaborate and include leaf-shaped (Excelsior) and stemmed projectile points, bone tool industry, many fishing-related implements (spears, harpoons, hooks, net sinkers), baked clay objects (including a few fragments of pottery), and a relatively high frequency of mortars and pestles. Basketry impressions obtained from baked clay, combined with changes in bone awl technology, appear to be linked to production of more varied types, ranging from tightly woven forms to loose-weave burden baskets. Site structure is also quite formalized and includes black midden deposits, well-defined house floors, and a variety of other residential features. This higher degree of sedentism appears to be based on a subsistence economy built around the intensive use of acorns, large terrestrial game, and fish (Hildebrandt et al. 2018).

Emergent Period/Augustine Pattern (1200 cal BP–Contact)

The Emergent Period represents the ethnographically documented cultures present at the time of European contact. Settlement patterns during the Emergent Period were based on the development of large central villages serving as political and economic centers, smaller associated villages, and specialized activity areas, status ascription, and social stratification observed in burial practice. New technology was also introduced during this period, notably the bow and arrow, which is evidenced in the archaeological record by small, dart-sized projectile points.

Archaeological sites dating to this period are common throughout the Northern Coast Range and include ritual sites, rock art panels, an increased occurrence of milling equipment (such as mortars and pestles), and moderate/large occupation sites marked by midden soils, dietary bone and shell, and a wide range of artifact types and marine shell beads suggesting a wide-ranging exchange system (Fredrickson 1974, 1994; King et al. 2016). These new artifacts were used as a medium of monetized exchange until Euro-American contact, representing social and economic integration previously unseen in the archaeological record for California.

The Augustine Pattern is represented by bow-and-arrow technology, shaped mortars and pestles, advanced fishing implements including harpoons, charmstones, *Olivella* sequin beads, clam shell disk beads, shell and steatite ornaments, tubular pipes, and large village sites composed of house pits, large semisubterranean dance houses and sweat lodges, and human burials.

See Volume II, Section 2.2.3.12, Tribal Resources, for the ethnographic, ethnohistoric context, and information on California Tribal groups known to have cultural ties or other interests in the vicinity of the Tribal resources study areas: FERC Project Boundary Study Area, Eel River Study Area, and East Branch of the Russian River Study Area.

2.2.3.11.4 Historical Overview

Mendocino was one of California's original 27 counties, delineated in 1850 by the California legislature. Although Russian and American trapping expeditions likely traveled through the present-day Potter Valley region beginning in the early nineteenth century, the first non-native people known to have settled in the general area were Sonoma County residents William and Thomas Potter and Mose Briggs. They first entered what would become known as Potter Valley in 1852, searching for the headwaters of the Russian River. While they established claims to lands

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within the valley, they did not settle there until 1853. By 1858, a number of families had established ranches in the area, and a sawmill was built to provide lumber for construction to a growing population. During most of the 1850s, the Potter Valley area and all of Mendocino County were subject to Sonoma County oversight since the population of Mendocino was considered too small to warrant its own government. However, by 1859, Mendocino County's population grew to a size that could support its own governing body, and the county seat was officially established in Ukiah.

Agricultural production, ranching, mining, and logging of the vast coastal redwood and fir stands constituted the foundation of Mendocino County's economy throughout the latter decades of the 1800s. A mining district was established in Potter Valley in 1863, although it never was a major producer of gold or other minerals. The county's greatest and longest-lasting resource has been its farming and ranching assets. Potter Valley today is a rich agricultural region with excellent soils, planted mostly in irrigated pastures, vineyards, and orchards (pears). Potter Valley supports many diverse farms and livestock ranches.

Lake County's land use and historical development is similar to Mendocino County's. While not one of California's original counties, Lake County was established early in California's history. In May of 1861, Lake County was formed by taking portions of surrounding Napa, Mendocino, and Colusa counties. Lakeport was designated as the county seat. Euro-American settlement had been growing steadily for several years, and farms, orchards, and ranches were well established along with a significant mining industry exploiting mercury, gold, and borax deposits.

During the 1860s, ranchers moved sheep, cattle, horses, and goats into the mountains in northern Lake County. Most of the grazing was seasonal, with herders intentionally burning the lush meadows in the late fall to encourage heavy spring grass growth. The first known Euro-American settlers, the McMath brothers in the present-day Lake Pillsbury reservoir area, obtained federal homestead patents in the 1860s. This led to the establishment of a thriving community. Roads were built into the once-remote region, and by the late 1860s the "town" of Gravelly Valley was well established. In later years, a shake (wood shingle) mill and a general store were built, along with a blacksmith shop, post office, hotel, and school. During the 1880s, the name of the settlement changed to Hullville. The exact location of the town is uncertain, but it was generally situated near the confluence of the Rice Fork of the Eel River and the Eel River, which is now under water in Lake Pillsbury reservoir.

Early Hydroelectric Generation History

Agriculture, lumber, mining, and other industries significantly contributed to the economic growth of Mendocino County. In addition, the development of hydroelectric power generation was a notable occurrence during the late-nineteenth and early-twentieth centuries. As technology evolved, transmission of electricity over hundreds of miles supported and made possible rapid commercial, residential, and infrastructure development. Engineering firms such as J.G. White & Company of New York, Byllsley & Company of Chicago, Ford, Bacon & Davis of New York, and others established offices in San Francisco and began power projects throughout Northern and Central California. During this time, local municipalities acquired water rights on major rivers for the purpose of developing hydroelectric power generation projects. One of these was the town of Ukiah, whose quest for electric power led to the development of the Project.

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Potter Valley Hydroelectric Project

In 1905, San Francisco entrepreneur and Mendocino County landowner W.W. Van Arsdale devised a plan to divert water from the Eel River to a hydroelectric power plant in Potter Valley in the Russian River Watershed. He proposed that if the town of Ukiah would agree to pay $1,000 a month for a set number of years, he would build the power plant and furnish continuous current 24 hours a day. The agreement that was reached between Ukiah and Van Arsdale led to the development of the Eel River Project.

George W. Scott of San Francisco, Van Arsdale's partner, and six other investors from San Francisco and Mendocino County incorporated the Eel River Power and Irrigation Company in February 1905. The company began work on the Eel River Project's first dam at Cape Horn within a few months. While the reservoir site was being cleared, construction crews worked on the powerhouse, a substation at Talmadge (just southeast of Ukiah), and a transmission line into Ukiah. The powerhouse went into operation on April 1, 1908, energizing the line to Ukiah that same day. To acquire additional funding, the Eel River Power and Irrigation Company was reorganized in February 1906, incorporating as the Snow Mountain Water and Power Company (Snow Mountain Co.). Additional backing from new investors Senator Charles N. Felton and E.S. Pillsbury raised the company's operating capital from $500,000 to $5 million.

Following the completion of the powerhouse, additional transmission and distribution lines were constructed throughout the area. By 1920, Van Arsdale Reservoir had silted to the point of reducing summer flow through a tunnel. In response, construction began on Scott Dam, 12 mi. upstream from the tunnel. Stone & Webster, a Chicago-based construction firm, completed Scott Dam in 1921 and inundated the site of the town of Hullville (Gravelly Valley). The reservoir created by Scott Dam greatly increased storage capacity for the Potter Valley Powerhouse and led to year-round operation.

Along with power, water sales were a consideration in the construction of Van Arsdale Reservoir and Lake Pillsbury reservoir. With a reliable source of water from the Eel River, the PVID was formed, and an agreement was reached between Snow Mountain Co. and the PVID to supply water to farmlands in the valley. Two main irrigation canals were constructed down the east and west sides of Potter Valley.

PG&E purchased Snow Mountain Co.'s assets in 1930. With the exception of alterations to the exterior of the powerhouse and various upgrades to improve system efficiency and reliability, in general, the overall electrical power generation system remains largely unchanged since its original construction.

2.2.3.11.5 CCRD Records Search and Information Sources Review

In June of 2024, a records search of PG&E's CCRD was conducted to identify cultural resources and studies within the FERC Project Boundary Cultural Resources Study Area, Eel River Study Area, and East Branch Russian River Study Area. The CCRD is a geospatial database of cultural resources records and reports maintained by PG&E. In addition to the CCRD, the inventories listed in Section 2.2.3.11.1 were reviewed for the three cultural resources study areas.

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Previous Studies

The records search of PG&E's CCRD identified 905 cultural resources studies conducted within the three cultural resources study areas dating from 1965 to 2024. A total of 129 studies have been conducted within the past 20 years (2005–2024) within the FERC Project Boundary (15 studies), Eel River (161 studies), and East Branch Russian River (9 studies) Study Areas. The locations of recent studies (2005–2024) are depicted in Volume IV, Maps 2.2.3.11-7 through 2.2.3.11-9, and the studies are listed in Appendix 2.2.3.11-A, Tables 2.2.3.11-A-1, 2.2.3.11-A-2, and 2.2.3.11-A-3.

Previously Recorded Resources

The records search of PG&E's CCRD identified 246 previously recorded resources—79 built-environment resources and 167 archaeological resources. The resources within each of the study areas are described below. Due to slight overlaps in the FERC Project Boundary Cultural Resources Study Area with the Eel River and East Branch Russian River Study Areas, some resources are mapped within more than one study area. However, these are only listed once in the previously recorded resource tables for the FERC Project Boundary Cultural Resources Study Area.

FERC Project Boundary Cultural Resources Study Area

The CCRD records search and information sources review identified 70 previously recorded resources within the FERC Project Boundary Study Area, the locations of which are shown in Volume IV, Maps 2.2.3.11-4a–d. They are listed in Tables 2.2.3.11-1 and 2.2.3.11-2 below.

Table 2.2.3.11-1. Previously recorded built-environment resources in the FERC Project Boundary Cultural Resources Study Area.

Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	Location	NRHP Evaluation Status
P-17-002427 No trinomial 05-08-54-0647	Historic-period built-environment	Swallow Rock Organization Camp/Cabin	Within FERC Project boundary	Unevaluated
P-17-002490 No trinomial No USFS number	Historic-period built-environment	Scott Dam	Within FERC Project boundary	Not eligible
P-23-001998 CA-MEN-2274H No USFS number	Historic-period built-environment	Cape Horn Dam (Van Arsdale Dam)	Within FERC Project boundary	Re-evaluation required
P-23-004695 No trinomial No USFS number	Historic-period built-environment	Potter Valley Powerhouse & Penstocks	Within FERC Project boundary	Not eligible
P-23-005838 No trinomial No USFS number	Historic-period built-environment	Potter Valley Penstock	Within FERC Project boundary	Recommended not eligible

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	Location	NRHP Evaluation Status
P-17-002980 CA-LAK-2288H No USFS number	Historic-period built-environment	Packsaddle Trail	Within FERC Project boundary	Unevaluated
P-17-002985 CA-LAK-2293H No USFS number	Historic-period built-environment	Abandoned main road, includes multiple line segments	Within FERC Project boundary	Unevaluated
P-23-006304 No trinomial No USFS number	Historic-period built-environment	Memorial monument “Billy W. M. Dawson”	Within FERC Project boundary	Unevaluated
P-23-006305 No trinomial No USFS number	Historic-period built-environment	Memorial monument “Terry Grizzly Adams”	Within FERC Project boundary	Unevaluated
P-17-0029634 CA-LAK-2280H No USFS number	Historic-period built-environment	Historic-period road grade linking Kapranos Road with Scott Dam work area	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated

Notes: FERC = Federal Energy Regulatory Commission
NRHP = National Register of Historic Places
USFS = U.S. Forest Service

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Table 2.2.3.11-2. Previously recorded archaeological resources in the FERC Project Boundary Cultural Resources Study Area.

Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	Location	NRHP Evaluation Status
P-17-001243 CA-LAK-1499 05-08-54-0372	Pre-European contact	Midden with lithic scatter	Within FERC Project boundary	Unevaluated
P-17-001244 CA-LAK-1500/H 05-08-54-0373	Pre-European contact/historic-period	Foundation; lithic scatter	Within FERC Project boundary	Unevaluated
P-17-001245 CA-LAK-1501/H 05-08-54-0374	Pre-European contact/historic-period	Lithic scatter; campground hearths; and road grades	Within FERC Project boundary	Unevaluated
P-17-001260 CA-LAK-1516 05-08-54-0363	Pre-European contact	Lithic scatter	Within FERC Project boundary	Unevaluated
P-17-001261 CA-LAK-1517/H 05-08-54-0371	Pre-European contact/historic-period	Lithic scatter with groundstone; platform feature and refuse concentrations	Within FERC Project boundary	Unevaluated
P-17-002882 CA-LAK-2234H 05-08-54-0668	Historic-period	Oak Flat Campground; campground hearth and concrete slab	Within FERC Project boundary	Unevaluated
P-17-002883 CA-LAK-2235/H 05-08-54-0669	Pre-European contact/historic-period	Pogie Point Campground, campground hearths; lithic scatter	Within FERC Project boundary	Unevaluated
P-17-002884 CA-LAK-2236H No USFS number	Historic-period	Road grade linking Scott Dam Concrete Batch Plant with Scott Dam work area	Within FERC Project boundary	Unevaluated
P-17-002885 CA-LAK-2237H No USFS number	Historic-period	Structure footings and refuse scatter	Within FERC Project boundary	Unevaluated
P-17-002886 CA-LAK-2238H No USFS number	Historic-period	Structure footing, rock alignments, and refuse deposit	Within FERC Project boundary	Unevaluated

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	Location	NRHP Evaluation Status
P-17-002975 CA-LAK-2283H No USFS number	Historic-period	Scott Dam south buttress excavation escarpment	Within FERC Project boundary	Unevaluated
P-17-002976 CA-LAK-2284H No USFS number	Historic-period	Foundations and features associated with the Scott Dam Concrete Batch Plant	Within FERC Project boundary	Unevaluated
P-17-002978 CA-LAK-2286 No USFS number	Pre-European contact	Lithic quarry	Within FERC Project boundary	Unevaluated
P-17-002981 CA-LAK-2289 No USFS number	Pre-European contact	Lithic scatter	Within FERC Project boundary	Unevaluated
P-17-002982 CA-LAK-2290H No USFS number	Historic-period	Historic-period camp	Within FERC Project boundary	Unevaluated
P-17-002983 CA-LAK-2291 No USFS number	Pre-European contact	Lithic scatter with chert and obsidian	Within FERC Project boundary	Unevaluated
P-23-000735 CA-MEN-798 No USFS number	Pre-European contact	Housepits, midden, and lithic scatter	Within FERC Project boundary	Unevaluated
P-23-000754 CA-MEN-817 No USFS number	Pre-European contact	Housepits, midden, and lithic scatter	Within FERC Project boundary	Unevaluated
P-23-000777 CA-MEN-840 No USFS number	Pre-European contact	Midden and lithic scatter	Within FERC Project boundary	Unevaluated
P-23-000778 CA-MEN-841/H No USFS number	Pre-European contact/historic-period	Lithic scatter; orchard, refuse scatter, well, and road grades	Within FERC Project boundary	Unevaluated
P-23-001022 CA-MEN-1099 No USFS number	Pre-European contact	Midden and lithic scatter	Within FERC Project boundary	Unevaluated
P-23-001039 CA-MEN-1117 No USFS number	Pre-European contact	Lithic scatter	Within FERC Project boundary	Unevaluated

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	Location	NRHP Evaluation Status
P-23-001061 CA-MEN-1155 No USFS number	Pre-European contact	Midden, housepits, groundstone, and lithics	Within FERC Project boundary	Unevaluated
P-23-001656 CA-MEN-1825/H 5085400135	Pre-European contact/historic-period	Lithic scatter with groundstone; historic-period rock walls and cribbed pit	Within FERC Project boundary	Unevaluated
P-23-001662 CA-MEN-1876 No USFS number	Pre-European contact	Lithic scatter with groundstone	Within FERC Project boundary	Unevaluated
P-23-001794 CA-MEN-2022 No USFS number	Pre-European contact	Village site with midden, lithics, groundstone, steatite, beads, and hopper mortar	Within FERC Project boundary	Unevaluated
P-23-006307 CA-MEN-3825H No USFS number	Historic-period	Concrete foundation, excavated pit, and wood pole	Within FERC Project boundary	Unevaluated
P-23-006308 CA-MEN-3826 No USFS number	Pre-European contact	Lithic scatter	Within FERC Project boundary	Unevaluated
P-23-006309 CA-MEN-3827 No USFS number	Pre-European contact	Three possible housepits	Within FERC Project boundary	Unevaluated
P-23-001468 CA-MEN-1581 No USFS number	Pre-European contact	Midden with lithic scatter	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-000431 CA-LAK-419 No USFS number	Pre-European contact	Midden and lithic scatter	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-000432 CA-LAK-420 No USFS number	Pre-European contact	Midden, housepit, lithic scatter	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-001116 CA-LAK-1335 5085400300	Pre-European contact	Lithic scatter with groundstone	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-001117 CA-LAK-1336 No USFS number	Pre-European contact	Lithic scatter	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	Location	NRHP Evaluation Status
P-17-001118 CA-LAK-1337 05-08-54-0311	Pre-European contact	Chert quarry and lithic scatter	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-001119 CA-LAK-1338 05-08-54-0312	Pre-European contact	Lithic scatter	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-001423 CA-LAK-1780 05-08-54-0581	Pre-European contact	Chert quarry	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-001425 CA-LAK-1854 05-08-54-0123	Pre-European contact	Lithic scatter and possible chert quarry	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-001797 CA-LAK-1674 05-08-54-0563	Pre-European contact	Lithic scatter	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-001880 CA-LAK-1771 05-08-54-0577	Pre-European contact	Lithic scatter	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-002007 No trinomial 05-08-54-0124	Pre-European contact	Lithic scatter	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-002155 CA-LAK-1993H 05-08-54-0646	Historic-period	Refuse deposit	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-002241 CA-LAK-2017 05-08-54-0561	Pre-European contact	Lithic scatter and possible chert quarry	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-002242 CA-LAK-2018 05-08-54-0562	Pre-European contact	Lithic scatter and possible chert quarry	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-002881 No trinomial No USFS number	Pre-European contact	Round house, housepits, midden, lithics, and groundstone	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-002887 CA-LAK-2239H No USFS number	Historic-period	Structure pad and debris	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-002973 CA-LAK-2281H No USFS number	Historic-period	Scott Dam Construction Camp - tent camp	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	Location	NRHP Evaluation Status
P-17-002974 CA-LAK-2282H No USFS number	Historic-period	Scott Dam Construction Camp - structure pads	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-002979 CA-LAK-2287 No USFS number	Pre-European contact	Franciscan chert quarry and lithic scatter	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-002984 CA-LAK-2292H No USFS number	Historic-period	Historic-period refuse deposit	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-23-001469 CA-MEN-1582 No USFS number	Pre-European contact	Lithic scatter	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-23-001471 CA-MEN-1584 No USFS number	Pre-European contact	Lithic scatter	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-23-002247 CA-MEN-2547 No USFS number	Pre-European contact	Pomo village site with extensive assemblage	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-23-002977 CA-MEN-1093 No USFS number	Pre-European contact	Midden with burials	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-23-006306 CA-MEN-3824H No USFS number	Historic-period	Historic concrete foundation with hearth, refuse scatter, and possible privy	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
P-17-000960 No trinomial 05-08-54-0179	Pre-European contact	Cobble collection and reduction area	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
4-Lak-S265 No primary number No trinomial No USFS number	Pre-European contact	Midden site with one housepit and possibly a second	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
4-Men-S586 No primary number No trinomial No USFS number	Pre-European contact	Dark midden	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	Location	NRHP Evaluation Status
4-Men-S591 No primary number No trinomial No USFS number	Pre-European contact	Flat bench with housepits and rock outcroppings	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated
MEN-ISO-07 No primary number No trinomial No USFS number	Pre-European contact	Modified flake tool isolate	Within 0.5-mi. buffer of FERC Project boundary	Unevaluated

Notes: FERC = Federal Energy Regulatory Commission
NRHP = National Register of Historic Places
USFS = U.S. Forest Service

Built Environment

Of the previously recorded resources, ten are built-environment resources; two of these have been determined not eligible for listing in the NRHP (P-17-002490 Scott Dam and P-23-004695 Potter Valley Powerhouse & Penstocks), one is recommended as not eligible (P-23-005838 Potter Valley Penstock), and six have not been previously evaluated. One resource, Cape Horn Dam (P-23-001998) requires revaluation due to the time that has elapsed since the previous evaluation and subsequent modifications to the dam.

Archaeological Resources

Sixty previously recorded archaeological resources were identified by the CCRD records search and information sources review, of which 40 are pre-European contact resources, 14 are historic-period resources, and 6 are multi-component resources. None of these previously recorded resources have been evaluated for listing in the NRHP.

Eel River Study Area

The CCRD records search and information sources review identified 159 previously recorded resources within the Eel River Study Area, the locations of which are shown in Volume IV, Maps 2.2.3.11-5a–y. They are listed in Tables 2.2.3.11-3 and 2.2.3.11-4 below.

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Table 2.2.3.11-3. Previously recorded built-environment resources in the Eel River Study Area.

Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-12-001315 CA-HUM-1040H No USFS number	Historic-period built-environment	Van Duzen River Bridge Caltrans Bridge No. 04-017L	Not eligible
P-12-000717 CA-HUM-726 No USFS number	Historic-period built-environment	Northwest Pacific Railroad (Humboldt portion)	Unevaluated
P-12-000918 No trinomial No USFS number	Historic-period built-environment	Scotia Bridge 27 Railroad Grade; THP #1-020-002 HUM (Bridge 27)	Unevaluated
P-12-000927 CA-HUM-1146H No USFS number	Historic-period built-environment	Monument Creek Railroad Grade	Unevaluated
P-12-003233 No trinomial No USFS number	Historic-period built-environment	State Route 254; Avenue of the Giants	Unevaluated
P-12-003312 CA-HUM-1589H No USFS number	Historic-period built-environment	Old Redwood Highway	Unevaluated
P-12-001218 No trinomial No USFS number	Historic-period built-environment	Mitchell House, two-story farmhouse	Unevaluated
P-12-001432 No trinomial No USFS number	Historic-period built-environment	Historic-period cemetery	Unevaluated
P-12-001219 No trinomial No USFS number	Historic-period built-environment	Dwelley House	Recommended eligible
P-12-002559 No trinomial No USFS number	Historic-period built-environment	Fernbridge Tractor and Equipment Co. industrial/commercial building	Unevaluated
P-12-002927 No trinomial No USFS number	Historic-period built-environment	Bridge 04-0076; George Leatherwood Memorial Bridge	Not eligible
P-12-003799 No trinomial No USFS number	Historic-period built-environment	Bridge 04-0014; Eel River Bridge and Overhead	Not eligible

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-23-004190 No trinomial No USFS number	Historic-period built-environment	Bridge 10C-0005; Dos Rios Bridge	Not eligible
P-23-006257 No trinomial No USFS number	Historic-period built-environment	Hartstone Bible Camp	Recommended not eligible
P-12-001354 CA-HUM-1206H No USFS number	Historic-period built-environment	Twin/Dinner/Killer Creek Railroad	Unevaluated
P-12-002086 CA-HUM-1330H No USFS number	Historic-period built-environment	Blue Label railroad grade	Unevaluated
P-12-002087 CA-HUM-1331H No USFS number	Historic-period built-environment	Pacific Lumber Company railroad grade; Old Jordan Creek Camp - Bear Creek Spur	Unevaluated
P-12-002126 No trinomial No USFS number	Historic-period built-environment	Nanning Creek railroad grade	Unevaluated
P-12-002127 No trinomial No USFS number	Historic-period built-environment	Railroad grade	Unevaluated
P-12-003170 CA-HUM-1499H No USFS number	Historic-period built-environment	HU-030; Overland Mail Route, old abandoned road	Unevaluated
P-23-002803 CA-MEN-2686H No USFS number	Historic-period built-environment	Mendocino Stagecoach grade	Unevaluated
P-12-002119 No trinomial No USFS number	Historic-period built-environment	Log cabin	Unevaluated
P-12-002593 No trinomial No USFS number	Historic-period built-environment	“Corduroy road” used for logging	Unevaluated
P-12-003861 No trinomial No USFS number	Historic-period built-environment	Fernbridge Rifle Range	Unevaluated
P-12-003908 No trinomial No USFS number	Historic-period built-environment	Shady railroad trestle	Unevaluated

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
RD02-1 No primary number No trinomial No USFS number	Historic-period built-environment	Road grade and fence	Unevaluated
RD02-2 No primary number No trinomial No USFS number	Historic-period built-environment	Road cut and steel tank	Unevaluated
RD02-4 No primary number No trinomial No USFS number	Historic-period built-environment	Raised roadbed or railroad grade	Unevaluated
FL41-3 No primary number No trinomial No USFS number	Historic-period built-environment	Old historic road	Unevaluated
P-12-000929 No trinomial No USFS number	Historic-period built-environment	Fortuna Ranger Unit Headquarters	Recommended eligible
P-12-001546 No trinomial No USFS number	Historic-period built-environment	1711 Market Street Jacob House	Not eligible
P-12-001547 No trinomial No USFS number	Historic-period built-environment	1940 Market Street Mattews House	Not eligible
P-12-001548 No trinomial No USFS number	Historic-period built-environment	1911 Market Street Parks Property	Not eligible
P-12-001549 No trinomial No USFS number	Historic-period built-environment	Starch Factory and Humboldt Creamery site	Not eligible
P-12-001550 No trinomial No USFS number	Historic-period built-environment	Ambrosini Property	Not eligible
P-12-001551 No trinomial No USFS number	Historic-period built-environment	Heinichen Property	Not eligible
P-12-001552 No trinomial No USFS number	Historic-period built-environment	Richardson Property	Not eligible

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-12-001553 No trinomial No USFS number	Historic-period built-environment	Clausen Home	Not eligible
P-12-002377 No trinomial No USFS number	Historic-period built-environment	Silva-Vevoda Ranch	Unevaluated
P-12-002412 No trinomial No USFS number	Historic-period built-environment	Humboldt County Fairgrounds	Recommended eligible
P-12-002539 No trinomial No USFS number	Historic-period built-environment	1014 Port Kenyon Rd.	Unevaluated
P-12-002540 No trinomial No USFS number	Historic-period built-environment	1409 Main St	Unevaluated
P-12-002541 No trinomial No USFS number	Historic-period built-environment	1391 Main St	Unevaluated
P-12-002542 No trinomial No USFS number	Historic-period built-environment	1373 Main St	Unevaluated
P-12-002543 No trinomial No USFS number	Historic-period built-environment	1353 Main St	Unevaluated
P-12-002544 No trinomial No USFS number	Historic-period built-environment	1345 Main St	Unevaluated
P-12-002545 No trinomial No USFS number	Historic-period built-environment	1331 Main St	Unevaluated
P-12-002546 No trinomial No USFS number	Historic-period built-environment	1319 Main St	Unevaluated
P-12-002547 No trinomial No USFS number	Historic-period built-environment	1311 Main St	Unevaluated
P-12-002548 No trinomial No USFS number	Historic-period built-environment	Wood Sidewalk, 1299-1345 Main Street	Not eligible

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-12-002555 No trinomial No USFS number	Historic-period built-environment	Alford Nielson House	Listed on the NRHP Date listed: 1/23/1986
P-12-002556 No trinomial No USFS number	Historic-period built-environment	1088 Port Kenyon Rd.	Recommended eligible
P-12-002928 No trinomial No USFS number	Historic-period built-environment	Scalvini Ranch	Recommended eligible
P-12-002929 No trinomial No USFS number	Historic-period built-environment	Sousa-Vevoda Ranch	Recommended eligible
P-12-002930 No trinomial No USFS number	Historic-period built-environment	Fuller Hamblin House	Unevaluated
P-12-002931 No trinomial No USFS number	Historic-period built-environment	Christiansen-Martin Ranch	Recommended eligible
P-12-002932 No trinomial No USFS number	Historic-period built-environment	Riverside Ranch	Unevaluated
P-12-002933 No trinomial No USFS number	Historic-period built-environment	Hamblin Farm equipment and blacksmith shop at Arlynda Corners	Unevaluated
P-12-002934 No trinomial No USFS number	Historic-period built-environment	Salladay-Bugbee Property	Unevaluated
P-12-002939 CA-HUM-1438H	Historic-period built-environment	Riverside Ranch dike and drainage system	Unevaluated
P-12-002941 No trinomial No USFS number	Historic-period built-environment	Channel improvement features	Unevaluated
P-12-003141 No trinomial No USFS number	Historic-period built-environment	Ferndale Union Highschool	Recommended eligible
P-12-003144 No trinomial No USFS number	Historic-period built-environment	Golden State Company Building	Unevaluated
P-12-003262 No trinomial No USFS number	Historic-period built-environment	Meridian Road tide gate	Unevaluated

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-12-003301 No trinomial No USFS number	Historic-period built-environment	East Littlefield Historic Buildings	Unevaluated
P-12-003573 No trinomial No USFS number	Historic-period built-environment	Connick Ranch – Scotia Gun Club Cabin/ditches and levees	Recommended not eligible
P-12-003731 No trinomial No USFS number	Historic-period built-environment	Fern Cottage Historic District	Listed on the NRHP Date listed: 1/7/1988
P-12-003920 No trinomial No USFS number	Historic-period built-environment	Utterly Blessed Milk Cave	Unevaluated

Notes: NRHP = National Register of Historic Places
USFS = U.S. Forest Service

Table 2.2.3.11-4. Previously recorded archaeological resources in the Eel River Study Area.

Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-17-000426 CA-LAK-414 No USFS number	Pre-European contact	Midden and lithic scatter	Unevaluated
P-17-000428 CA-LAK-416 No USFS number	Pre-European contact/historic-period	Midden with lithic scatter and collapsed historic-period structure	Unevaluated
P-17-000429 No trinomial No USFS number	Pre-European contact	Lithic scatter	Unevaluated
P-17-000430 No trinomial No USFS number	Pre-European contact	Midden and lithic scatter	Unevaluated
P-17-001010 CA-LAK-1183/H 05-08-54-0252	Pre-European contact/historic-period	Lithic scatter, square nail, and barbed wire	Unevaluated
P-17-001101 CA-LAK-1320 No USFS number	Pre-European contact	Lithic scatter	Unevaluated
P-17-001102 CA-LAK-1321 No USFS number	Pre-European contact	Lithic scatter, hammerstones, possible groundstone and midden	Unevaluated

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-17-001103 CA-LAK-1322 No USFS number	Pre-European contact	Lithic scatter	Unevaluated
P-17-001291 CA-LAK-1548 No USFS number	Pre-European contact	Lithic scatter	Unevaluated
P-17-001428 CA-LAK-1857 No USFS number	Pre-European contact	Lithic scatter with groundstone	Unevaluated
P-17-002977 CA-LAK-2285H No USFS number	Historic-period	PG&E cabin foundation	Unevaluated
Fuller Grove Campground Isolates No primary number No trinomial No USFS number	Pre-European contact	Isolates mapped with no documentation or description	Unevaluated
P-23-001655 CA-MEN-1824 No USFS number	Pre-European contact	Lithic scatter	Unevaluated
P-23-002984 CA-MEN-1124 No USFS number	Pre-European contact	“Antenna Flat Site”	Unevaluated
P-12-002079 No trinomial No USFS number	Historic-period	Remnants of Dobbyns Ferry including 6 wood pilings in Eel River	Unevaluated
4-Lak-S261 No primary number No trinomial No USFS number	Pre-European contact/historic-period	Midden deposit with “evidence of fallen down historic structure”; obsidian and silicate flakes	Unevaluated
Logan Spring No primary number No trinomial No USFS number	Historic-period	Two spring boxes	Unevaluated
P-12-000050 CA-HUM-983 No USFS number	Pre-European contact	Two petroglyphs on a boulder	Unevaluated
P-12-000332 CA-HUM-319 No USFS number	Pre-European contact	Chert lithic scatter	Unevaluated

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-12-001029 CA-HUM-139 No USFS number	Pre-European contact	Lithic scatter	Unevaluated
P-12-001956 No trinomial No USFS number	Historic-period	Water trough	Unevaluated
P-12-002063 No trinomial No USFS number	Pre-European contact	Chert biface isolate	Unevaluated
P-12-002088 No trinomial No USFS number	Historic-period	Remains of Old Jordan Creek Camp water tower	Unevaluated
P-12-002564 CA-HUM-1124H No USFS number	Historic-period	Bridge foundations and road grade of "Evans-Old Highway 101 Crossing"	Unevaluated
P-12-003532 No trinomial No USFS number	Historic-period	Machinery; heavy equipment drum	Unevaluated
P-12-003710 No trinomial No USFS number	Pre-European contact	Isolated medial fragment of a handstone with two utilized surfaces	Unevaluated
P-12-003826 CA-HUM-1727H No USFS number	Historic-period	Historic-period habitation refuse	Unevaluated
P-12-003827 No trinomial No USFS number	Historic-period	Dumped 1940s-era Oldsmobile	Unevaluated
P-12-003830 No trinomial No USFS number	Historic-period	Pre-1960 abandoned vehicle	Unevaluated
P-12-003930 CA-HUM-1760 No USFS number	Pre-European contact	"Summit THP Site 1"	Unevaluated
P-23-002553 CA-MEN-2917 No USFS number	Pre-European contact	Petroglyphs (cupules, lines, designs) on a boulder	Unevaluated
P-23-003966 No trinomial No USFS number	Pre-European contact	Isolated bowl mortar fragment	Unevaluated

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-23-003967 No trinomial No USFS number	Pre-European contact	Isolated Franciscan chert core	Unevaluated
P-23-005560 No trinomial No USFS number	Historic-period	Scattered homestead debris	Unevaluated
RD-02 Isolate G No primary number No trinomial No USFS number	Historic-period	Two apple trees and a bay tree	Unevaluated
RD-02 Isolate H No primary number No trinomial No USFS number	Historic-period	One apple tree	Unevaluated
Dean Creek Site; Dean Creek THP 1 No primary number No trinomial No USFS number	Historic-period	Railroad pilings and tin cans	Unevaluated
FL41-9 No primary number No trinomial No USFS number	Historic-period	Historic structural debris and refuse	Unevaluated
P-12-001510 CA-HUM-1340H No USFS number	Historic-period	Portions of a rock structure foundation	Unevaluated
P-12-001828 No trinomial No USFS number	Pre-European contact	Lithic scatter with groundstone	Unevaluated
P-12-002062 No trinomial No USFS number	Historic-period	Refuse, former site of railroad cars used for storage	Unevaluated
P-12-002118 No trinomial No USFS number	Pre-European contact	Chert quarry	Unevaluated
P-12-002454 CA-HUM-1233 No USFS number	Pre-European contact	Lithic scatter and habitation debris	Unevaluated
P-12-002311 No trinomial No USFS number	Historic-period	Historic-period habitation refuse	Unevaluated

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-23-000435 CA-MEN-437 No USFS number	Pre-European contact	Petroglyphs	Unevaluated
P-23-000469 CA-MEN-475 No USFS number	Pre-European contact	Petroglyphs	Unevaluated
P-23-000470 CA-MEN-476 No USFS number	Pre-European contact	Petroglyphs	Unevaluated
P-23-000509 CA-MEN-521 No USFS number	Pre-European contact	Midden with habitation debris and possible burials	Unevaluated
P-23-000736 CA-MEN-799 No USFS number	Pre-European contact	Housepits and midden with lithic scatter	Unevaluated
P-23-000737 CA-MEN-800 No USFS number	Pre-European contact	Midden deposit with lithics	Unevaluated
P-23-000738 CA-MEN-801 No USFS number	Pre-European contact	Housepit with midden deposit and lithics	Unevaluated
P-23-000739 CA-MEN-802 No USFS number	Pre-European contact	Midden deposit and lithics	Unevaluated
P-23-000740 CA-MEN-803 No USFS number	Pre-European contact	Midden deposit and lithics	Unevaluated
P-23-000741 CA-MEN-804 No USFS number	Pre-European contact	Housepits and midden with lithic scatter	Unevaluated
P-23-000747 CA-MEN-810 No USFS number	Pre-European contact	Midden with lithics	Unevaluated
P-23-000748 CA-MEN-811 No USFS number	Pre-European contact	Housepits with midden, lithics, and groundstone	Unevaluated
P-23-000749 CA-MEN-812 No USFS number	Pre-European contact	Midden with lithics and groundstone	Unevaluated

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-23-000750 CA-MEN-813 No USFS number	Pre-European contact	Midden with lithics	Unevaluated
P-23-001037 CA-MEN-1115 No USFS number	Pre-European contact	Lithic scatter	Unevaluated
P-23-001038 CA-MEN-1116 No USFS number	Pre-European contact	Lithic scatter and groundstone	Unevaluated
P-23-001040 CA-MEN-1118 No USFS number	Pre-European contact	Lithic scatter	Unevaluated
P-23-001041 CA-MEN-1119 No USFS number	Pre-European contact	Lithic scatter	Unevaluated
P-23-002116 CA-MEN-2411/H No USFS number	Pre-European contact/historic-period	Lithic scatter and historic-period homestead with orchard and debris	Unevaluated
P-23-002319 CA-MEN-2621 No USFS number	Pre-European contact	10 housepits with midden and artifacts	Unevaluated
P-23-002376 CA-MEN-2685 No USFS number	Pre-European contact	Lithic scatter with groundstone	Unevaluated
P-23-002422 CA-MEN-2736 No USFS number	Pre-European contact	Four housepits with midden and lithics	Unevaluated
P-23-002827 CA-MEN-2684 No USFS number	Pre-European contact	Midden with lithic scatter and groundstone	Unevaluated
P-23-003071 CA-MEN-1813 No USFS number	Pre-European contact	Lithic scatter	Unevaluated
P-23-003962 CA-MEN-3195 No USFS number	Pre-European contact	Lithic scatter with groundstone	Unevaluated
P-23-003963 CA-MEN-3196 No USFS number	Pre-European contact	Lithic scatter with groundstone	Unevaluated

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-23-003964 CA-MEN-3197 No USFS number	Pre-European contact	Lithic scatter with groundstone	Unevaluated
P-23-003965 CA-MEN-3198 No USFS number	Pre-European contact	Lithic scatter with groundstone	Unevaluated
P-23-005566 CA-MEN-3660 No USFS number	Pre-European contact/historic-period	Midden with lithic scatter; historic-period refuse	Unevaluated
P-23-005678 No trinomial No USFS number	Pre-European contact	Lithic scatter	Unevaluated
P-23-005740 No trinomial No USFS number	Pre-European contact/historic-period	Lithic scatter with groundstone, beads, and ceramic	Unevaluated
P-23-002919 CA-MEN-516 No USFS number	Pre-European contact	Temporary camp site	Unevaluated
P-53-000001 CA-TRI-1 No USFS number	Pre-European contact	Petroglyphs, housepits, midden, artifacts	Unevaluated
P-53-002233 No trinomial No USFS number	Pre-European contact	Six housepits, petroglyph, and midden	Unevaluated
P-23-000465 CA-MEN-471 No USFS number	Pre-European contact	Unknown; missing site record	Unevaluated
P-12-000162 CA-HUM-105 No USFS number	Pre-European contact	Midden	Unevaluated
P-12-000163 CA-HUM-106 No USFS number	Pre-European contact	Midden	Unevaluated
P-12-000170 CA-HUM-113 No USFS number	Unknown	Unknown	Unevaluated
P-12-000171 CA-HUM-114 No USFS number	Pre-European contact/historic-period	Shell midden and temporary fishing camp	Unevaluated

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-12-001027 CA-HUM-137 No USFS number	Pre-European contact	Midden with lithic scatter	Unevaluated
P-12-001028 CA-HUM-138 No USFS number	Pre-European contact	Midden with lithic scatter	Unevaluated
P-12-001030 CA-HUM-140 No USFS number	Pre-European contact	Lithic scatter	Unevaluated
P-12-002940 No trinomial No USFS number	Historic-period	Archaeological remains of ranching complex	Unevaluated
P-12-002942 No trinomial No USFS number	Historic-period	Concrete foundation	Unevaluated
P-12-003452 No trinomial No USFS number	Historic-period	Ocean Ranch house features	Unevaluated
P-12-003641 No trinomial No USFS number	Historic-period	Isolated bottle	Unevaluated
P-12-003782 CA-HUM-1713H No USFS number	Historic-period	Corral and barn features	Unevaluated

Notes: NRHP = National Register of Historic Places
USFS = U.S. Forest Service

Built Environment

Of the previously recorded resources, 68 are built-environment resources; of these, 2 are listed in the NRHP, 13 have been determined not eligible, 43 have not been previously evaluated for listing in the NRHP, and 10 are recommended eligible for listing in the NRHP.

Archaeological Resources

Ninety-one previously recorded archaeological resources were identified by the CCRD records search and information sources review, of which 60 are pre-European contact resources, 23 are historic-period resources, 7 are multi-component resources, and one is unspecified. None of these previously recorded resources have been evaluated for listing in the NRHP.

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East Branch Russian River Study Area

The CCRD records search and information sources review identified 17 previously recorded resources within the East Branch Russian River Study Area, the locations of which are shown in Volume IV, Maps 2.2.3.11-6a–c. They are listed in Tables 2.2.3.11-5 and 2.2.3.11-6 below.

Table 2.2.3.11-5 Previously recorded built-environment resources within the East Branch Russian River Study Area.

Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-23-003767 No trinomial No USFS number	Historic-period/built-environment	East Canal of PVID	Recommended not eligible

Notes: NRHP = National Register of Historic Places
PVID = Potter Valley Irrigation District
USFS = U.S. Forest Service

Table 2.2.3.11-6. Previously recorded archaeological resources within the East Branch Russian River Study Area.

Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-23-001249 CA-MEN-1354 No USFS number	Pre-European contact	Petroglyphs; two boulders and cupules	Unevaluated
P-23-001653 CA-MEN-1822 No USFS number	Pre-European contact	Midden with lithic scatter and groundstone	Unevaluated
P-23-000412 CA-MEN-390 No USFS number	Pre-European contact	Mehwinny Creek Village site, housepits with large depression and midden	Unevaluated
P-23-000436 CA-MEN-439 No USFS number	Pre-European contact	Midden site with lithics, groundstone, animal bones, and shell	Recommended eligible
P-23-000437 CA-MEN-440 No USFS #	Pre-European contact	Midden site with extensive, deep subsurface deposit	Unevaluated
P-23-000534 CA-MEN-583 No USFS number	Pre-European contact	Midden	Unevaluated

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Resource Identifier: Primary Number Trinomial USFS Number	Resource Type	Resource Description	NRHP Evaluation Status
P-23-000540 CA-MEN-589 No USFS number	Pre-European contact	Midden with lithic scatter	Unevaluated
P-23-002938 CA-MEN-548 No USFS number	Pre-European contact	Village site with midden, lithics, and groundstone	Unevaluated
P-23-002939 CA-MEN-549 No USFS number	Pre-European contact	Described as “village”	Unevaluated
P-23-002978 CA-MEN-1094 No USFS number	Pre-European contact	Midden	Unevaluated
P-23-002980 CA-MEN-1096 No USFS number	Pre-European contact	Midden	Unevaluated
P-23-002981 CA-MEN-1097 No USFS number	Pre-European contact	Midden with chert and deer bone	Unevaluated
P-23-003088 CA-MEN-1840 No USFS number	Pre-European contact	Midden with lithic scatter	Unevaluated
P-23-004337 CA-MEN-3340 No USFS number	Pre-European contact	Lithic scatter	Unevaluated
P-23-004338 CA-MEN-3341 No USFS number	Pre-European contact	Midden with lithic scatter and groundstone	Unevaluated
P-23-004469 CA-MEN-3368 No USFS number	Pre-European contact	Dense lithic scatter with groundstone	Unevaluated

Notes: NRHP = National Register of Historic Places
USFS = U.S. Forest Service

Built Environment

Only one previously recorded built-environment resource was identified in the CCRD records search and information sources review, P-23-003767 East Canal of PVID, which was recommended as not eligible for listing in the NRHP.

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Archaeological Resources

Sixteen previously recorded archaeological resources were identified by the CCRD records search and information sources, all of which are pre-European contact resources. One of these resources, P-23-000436, is recommended as eligible for listing in the NRHP.

2.2.3.11.6 References

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2.2.3.12 Tribal Resources

This section identifies California Indian Tribes (Tribes) known to have cultural ties or other interests in the vicinity of PG&E's Potter Valley Hydroelectric Project (Project) as well as the Eel River and the East Branch Russian River downstream of Project facilities that may be affected by implementation of the Proposed Action.

This section includes a brief ethnographic and ethnohistoric context for the Project Tribal resources study areas as well as contemporary Tribal uses and practices to identify information about Tribes, Tribal lands, and Tribal resources that could be affected by the proposed Project. This includes Indian Trust Assets (ITAs) and traditional cultural properties (TCPs), which are defined in Section 2.2.3.12.9.

2.2.3.12.1 Information Sources

Information presented in this section was collected from readily available information sources listed below. Any applicable information from PG&E's initial relicensing efforts is also reflected in this section. Archival research and Tribal interviews were not conducted for this effort.

- *A Cultural Resources Overview of the Berryessa Snow Mountain National Monument* (Hildebrandt et al. 2018);
- BLM General Land Office (GLO) Land Patent Search online database (BLM n.d.);
- BLM's *Northwest California Integrated Resource Management Plan* (King et al. 2016);
- Information provided by BLM, Bakersfield Field Office archaeologists by email dated January 10, 2017;
- Mendocino County, General Services Agency – Parcel Data (Mendocino County 2016);
- Native American Heritage Commission (NAHC) Sacred Lands File search and Tribal contacts database (2024);
- PG&E's CCRD;
- *Potter Valley Hydroelectric Project FERC Project No. 77 Relicensing Pre-Application Document* (PG&E 2017);
- *Potter Valley Tribe of Pomo Indians: A Cultural and Historical Overview* (DeGeorgey 2007);
- *The Ethnogeography of the Pomo and Neighboring Indians* (Barrett 1908);
- Tribal government websites;
- Tribal letters and comments received from Pinoleville Pomo Nation, Potter Valley Tribe, Round Valley Indian Tribes, and Wiyot Tribe after PG&E's submittal of the Initial Draft Surrender Application (IDSA) in December 2023 (Appendix 2.2.3.12-A); and
- U.S. Bureau of Indian Affairs (BIA) data (2017, 2024a, 2024b).

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2.2.3.12.2 Project Location and Overview

The Project is located on the Eel River and the East Branch Russian River in Mendocino and Lake counties, California, in the traditional territories and homelands of the Northern Pomo, Yuki, Cahto, Eel River Wailaki, North Fork Wailaki, Lassik, Lolangkok Sinkyone, Nongatl, Mattole, and Wiyot (Kroeber 1933). The Project is approximately 15 mi. northeast of the city of Ukiah. An overview of the major Project facilities is shown on Map 2.2.3.12-1.

2.2.3.12.3 Tribal Resources Study Areas

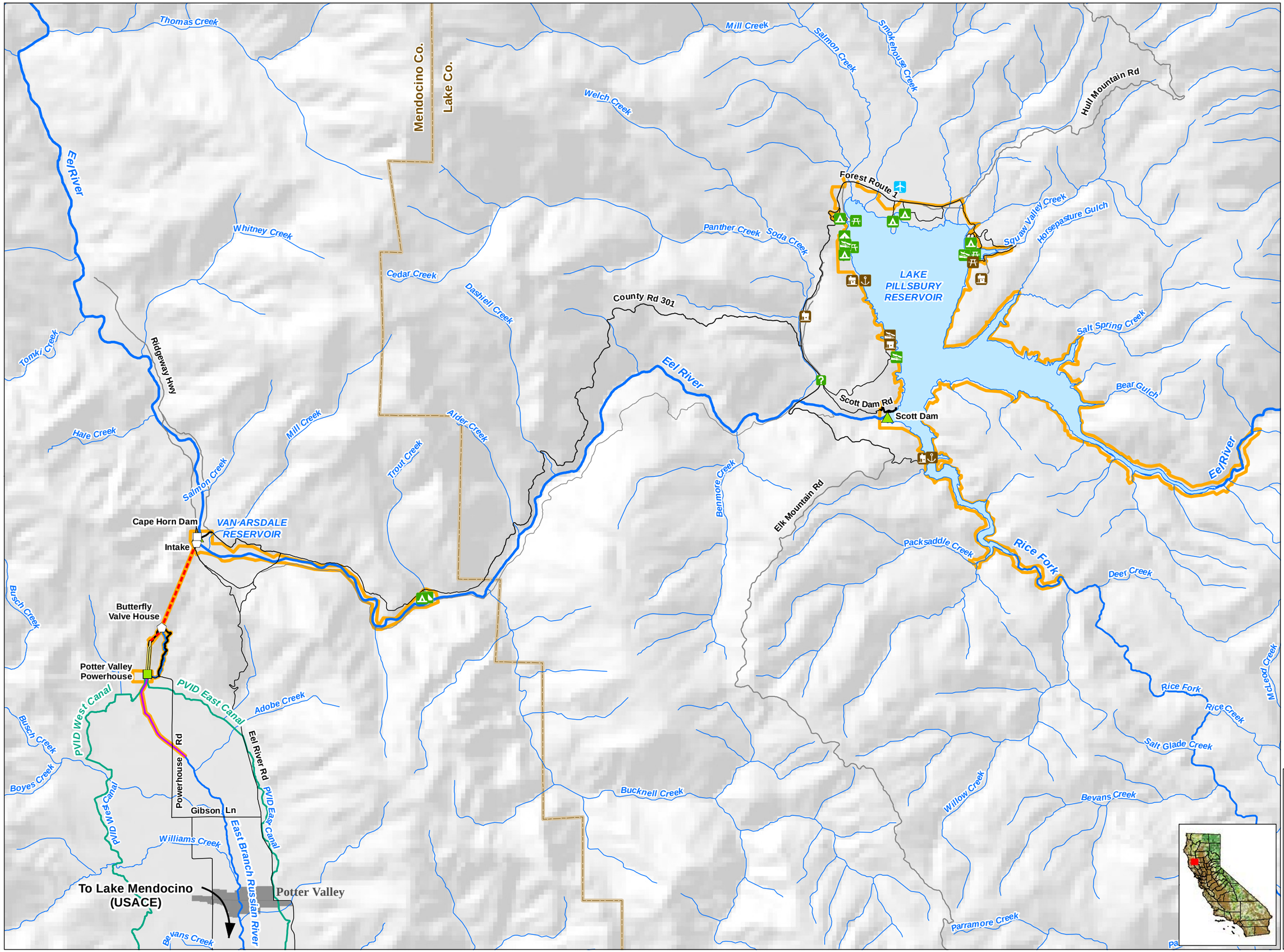
Three Tribal resources study areas were developed for the Surrender Application to describe the cultural and Tribal context for Tribal resources and interests that may occur within the FERC Project boundary and the downstream reaches of the Eel and East Branch Russian rivers.

The following Tribal resources study areas were used to develop the information presented in this section (see Map 2.2.3.12-2):

- FERC Project Boundary Tribal Study Area: FERC Project boundary plus a 5-mi. buffer;
- Eel River Tribal Study Area: Eel River downstream of Scott Dam to the Pacific Ocean including the Eel River estuary (the study area ends at the Pacific Ocean at the estuary because any sediments from dam removal will be flushed and deposited in the river prior to reaching the estuary mouth); and
- East Branch of the Russian River Tribal Study Area: East Branch Russian River from Potter Valley Powerhouse tailrace to Lake Mendocino, plus a 1-mi. buffer on either side of the river.

The FERC Project Boundary Tribal Study Area, where most of the potential direct and indirect effects from the Project may occur, includes a 5-mi. study buffer around the FERC Project Boundary to provide adequate context for understanding Tribal interests and resources. The study areas that include downstream reaches of the Eel and East Branch Russian rivers include a 1-mi. buffer on either side of the rivers to encompass any potential Tribal interests and resources that may be affected by downstream effects from decommissioning of the Project. An Area of Potential Effects (APE) has not yet been defined. The APE and any proposed revisions to the study areas will be discussed and developed in consultation with FERC, federal land management agencies, Tribes, stakeholders, and the State Historic Preservation Officer (SHPO) as part of Tribal resource studies, development of management plans, and compliance with the National Historic Preservation Act (NHPA) and other federal and state environmental laws and regulations.

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PG&E Project Facilities

- Powerhouse
- Dam
- Water Conveyance Feature
- Water Conduit
- Penstock
- Powerhouse Discharge Canal
- FERC Project Boundary

Project Recreation Features

- Boat Ramp
- Family Campground
- Group Campground
- Day Use Facility
- Information Kiosk

Private Non-Project Recreation Features

- Boat Launch
- Boat Dock
- Day Use Facility
- Resort, Camp, or Tract

Other Features

- Airstrip
- Access Road
- General Access Road
- Other Road
- Canal
- Watercourse
- Waterbody

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PG&E Potter Valley Project
FERC Project No. 77

Map 2.2.3.12-1

Project facilities and features.

0 0.5 1 Miles

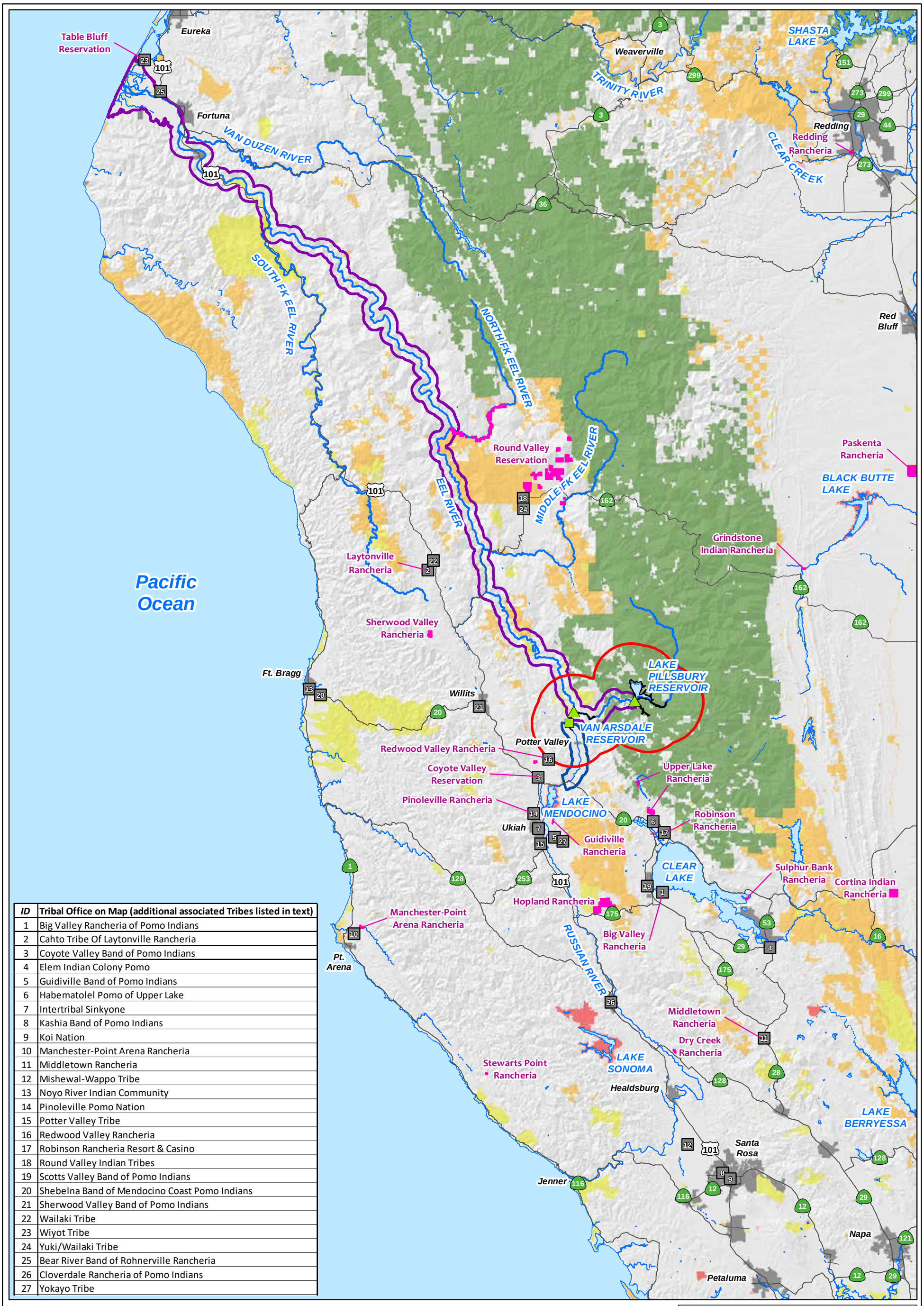
Projection: UTM Zone 10 N
Datum: NAD 83

Date: 7/15/2025

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ID	Tribal Office on Map (additional associated Tribes listed in text)
1	Big Valley Rancheria of Pomo Indians
2	Cahto Tribe Of Laytonville Rancheria
3	Coyote Valley Band of Pomo Indians
4	Elem Indian Colony Pomo
5	Guidiville Band of Pomo Indians
6	Habematolel Pomo of Upper Lake
7	Intertribal Sinkyone
8	Kashia Band of Pomo Indians
9	Koi Nation
10	Manchester-Point Arena Rancheria
11	Middletown Rancheria
12	Mishewal-Wappo Tribe
13	Noyo River Indian Community
14	Pinoleville Pomo Nation
15	Potter Valley Tribe
16	Redwood Valley Rancheria
17	Robinson Rancheria Resort & Casino
18	Round Valley Indian Tribes
19	Scotts Valley Band of Pomo Indians
20	Shebelna Band of Mendocino Coast Pomo Indians
21	Sherwood Valley Band of Pomo Indians
22	Wailaki Tribe
23	Wiyot Tribe
24	Yuki/Wailaki Tribe
25	Bear River Band of Rohnerville Rancheria
26	Cloverdale Rancheria of Pomo Indians
27	Yokayo Tribe

PG&E Project Facilities

- Powerhouse
- Dam
- FERC Boundary

Other Features

- Road
- Watercourse
- Water Body
- Federal American Indian Reservation/Rancheria
- Tribal Office/HQ Location (see table in map frame)

Tribal Resources Study Areas

- FERC Project Boundary Tribal SA: FERC Project boundary plus a 5-mile buffer
- East Branch of the Russian River Tribal SA: East Branch Russian River from Potter Valley Powerhouse tailrace to Lake Mendocino, plus a 1-mile buffer on either side of the river
- Eel River Tribal SA: Eel River downstream of Scott Dam to Pacific Ocean, plus a 1-mile buffer on either side of the river

Land Ownership (BLM 2021)

- Dept. of Homeland Security
- U.S. Dept. of Agriculture
- Dept. of the Interior
- Local Government
- State
- Private/Undetermined

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FERC Project No. 77

Map 2.2.3.12-2

Tribal resources study areas, land ownership, and Tribal offices/lands.

0 2.5 5 10 15 Miles

Projection: UTM, Zone 10 North
Datum: NAD 83

6/17/2025

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2.2.3.12.4 Ethnographic and Ethnohistoric Context

The following ethnographic and ethnohistoric context was developed utilizing readily available information listed in Section 2.2.3.12.1. The following sections provide context for potential Tribal resources within the Tribal resources study areas as well as the Tribes and Tribal groups that may have an interest in the Project (see Section 2.2.3.12.6).

Previous Ethnographic and Linguistic Studies (late 1800s to present)

The following ethnographic context was developed utilizing information from early ethnographic and ethnolinguistic fieldwork conducted between the late 1800s and the early to mid-1900s with Native American consultants in the Project region. Much of this work was developed by the Department and Museum of Anthropology at the UC, Berkeley, whose founding in 1901 launched a wave of ethnographic work on Native peoples and cultures of California. Published works from that time referenced in this section include those by Barrett (1908), Kroeber (1925), and Loud (1918).

S.A. Barrett's 1908 ethnographic report was based on fieldwork conducted at the turn of the twentieth century. Through the UC Berkeley program mentioned above, Phoebe A. Hearst compiled and produced notes and maps from this research in 1903, 1904, and 1906. Barrett's fieldwork was primarily ethnolinguistic in nature and focused on mapping the territorial reach of various Pomo dialects, noting the relationships between dialects as well as with other neighboring native ethnolinguistic groups and plotting the locations of past village and camp sites. The neighboring groups investigated in relation to the Pomo included the Yuki, Athabascan, and Wintun. Alfred L. Kroeber was the supervisor of Barrett's fieldwork. Kroeber was also a source of information on Yuki ethnolinguistic groups, while P.E. Goddard provided information on Athabascan groups; both were professors at UC Berkeley at the time (Barrett 1908). Kroeber produced descriptions and maps of the ethnographic, linguistic, and cultural landscape of this region in the *Handbook of the Indians of California* (1925), *Native Tribes, Groups, Dialects, and Families of California in 1770* (1933), and *Cultural and Natural Areas of Native North America* (1939). Additionally, the *Handbook of North American Indians, Volume 8*, on California (Heizer 1978) has specific chapters for each of the Tribes and Tribal groups within the study areas and Project vicinity.

More recent studies include Helen McCarthy's ethnographies of the MNF (1982) and North Coast Range (1985), which overlap with the Project area and Tribal resources study areas. Alex DeGeorgey (2007) provides an in-depth cultural and historical overview of the Potter Valley region and the Pomo. BLM's *Northwest California Integrated Resource Management Plan* (King et al. 2016) offers a summary of early ethnographic research and an overview of Tribal groups within the Project vicinity including the Modoc, Shasta, Wintu, Nomlaki, Chimariko, Tolowa, Yurok, Wiyot, Karok, Hupa, Southern Athabascan groups, Yuki, Northern Pomo, Konkow, Achumawi, Atsugewi, and Yana. Additionally, Hildebrandt et al. (2018) provide a relevant synthesis and overview of cultural resources for portions of the FERC Project Boundary Tribal Study Area. Other ethnographic and ethnohistoric information in this section has been summarized from previous cultural resources studies and reports within the Tribal resources study areas, specifically works by Pappas (2018) and Peabody (2012).

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Ethnographic Context from Early Ethnographic Studies

The Tribal resources study areas are known to have been inhabited by numerous California Indian ethnolinguistic groups, including (from south to north; see Map 2.2.3.12-3) the Northern Pomo, Yuki, Cahto, Eel River Wailaki, North Fork Wailaki, Lassik, Lolangkok Sinkyone, Nongatl, Mattole, and Wiyot (Barrett 1908; Kroeber 1933; Miller 1978). The Wiyot fall within the Northwest Coast Culture Area, whereas the Pomo, Yuki, Cahto, Wailaki, Lassik, Sinkyone, Nongatl, and Mattole fit within the California Culture Area, as defined in Kroeber's (1939) culture areas. The California Culture Area groups subsisted on a wider array of food sources than the Northwest Coast Culture Area groups, which relied more on marine and riverine resources. Groups within the Northwest Coast Culture Area were more sedentary, establishing permanent settlements along coasts and rivers, and were organized around the family unit. In contrast, those in the California Culture Area tended to be more mobile, having seasonal settlements, and were organized in tribelets (King et al. 2016). The following sections provide an overview of each of these ethnolinguistic groups. Descendants of these groups who live or are associated with their traditional homelands in the Project area are discussed in Section 2.2.3.12.7.

Pomo

Ethnogeography

There are seven recorded Pomo language families, consisting of unique dialects (Kroeber 1925). A portion of all the Tribal resources study areas falls within the territory of the Northern Pomo (see Map 2.2.3.12-3). The Northern Pomo held a wide-ranging territory in what is now Mendocino County, stretching 22 mi. along the coast and inland approximately 50 mi. to the northwest edge of Clear Lake (McLendon and Oswalt 1978). Most Northern Pomo tribelets occupied the valleys near the upper Russian River and upper Outlet Creek drainages, which extended north to the Eel River (Bean and Theodoratus 1978; Kroeber 1925).

Sociopolitical Organization

Pomo sociopolitical life was organized in tribelets or village communities, ranging in size from roughly 100 to 2,000 people and consisting of multiple "communal dwellings" (Kroeber 1925; Kunkel 1962; McLendon and Oswalt 1978:276). Tribelets generally had sociopolitical autonomy, with a chief or multiple chiefs presiding over each (Gifford 1926). Barrett (1908) stated that village leaders at the turn of the century were referred to as "captains" rather than chiefs, and they served mostly advisory roles. Kinship groups were organized bilaterally, and chieftain succession was often hereditary. Sometimes tribelets would band together for the purposes of controlling a large area of land or in response to warfare with neighboring groups (Kunkel 1962).

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PG&E Project Facilities

- Powerhouse
- Dam
- FERC Boundary

Other Features

- Non-Project Dam
- Road
- Watercourse
- Water Body

Tribal Resources Study Areas

- FERC Project Boundary Tribal SA: FERC Project boundary plus a 5-mile buffer
- East Branch of the Russian River Tribal SA: East Branch Russian River from Potter Valley Powerhouse tailrace to Lake Mendocino, plus a 1-mile buffer on either side of the river
- Eel River Tribal SA: Eel River downstream of Scott Dam to Pacific Ocean, plus a 1-mile buffer on either side of the river

Language Group

- Algic[2]
- Athapascan[2]
- Hokan[2]
- Penutian[2]
- Pomo[1]
- Yukian[3]

Ethnographic Sources*:
[1] DeGeorgey 2007
[2] King, Hilderbrandt, and Waechter. 2016
[3] Barrett 1908
[3] Miller 1978
* This map depicts general linguistic groups and does not necessarily represent the ancestral territories of these groups. A dashed line is used to depict potential overlapping or co-terminus boundaries between these groups.

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FERC Project No. 77

Map 2.2.3.12-3

Ethnolinguistic groups within the Tribal resources study areas and Project vicinity.

5/15/2025

0 5 10 15 Miles

Projection: UTM, Zone 10 North
Datum: NAD 83

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Subsistence

The Northern Pomo primarily occupied freshwater riverine areas with a wide range of animal and plant food sources but would also travel seasonally to the coast and make temporary encampments to fish and collect other seafood (e.g., seaweed, kelp, clams) (Bean and Theodoratus 1978). Each tribelet had claim to a tract of land, but certain food sources (e.g., trees, fishing sites) could be privately owned by a family (Barrett 1908; McLendon and Oswalt 1978). Plant-based food sources included acorn and lily bulbs—both food staples—along with buckeyes, wild grapes, berries, seeds, lettuce, clover, potatoes, tarweed, mule ears, buttercups, wild oats, grasses, and anise (Bean and Theodoratus 1978). Over 46 different plant types were collected by the Pomo in the springtime alone (DeGeorgey 2007). In addition to serving as food sources, plants were also used by the Pomo for producing various tools, such as baskets, cords, ropes, and nets. The Pomo practiced careful plant management, and their "harvesting techniques helped propagate the plants, fostering new growth and increasing the overall health of plants" (DeGeorgey 2007:11).

Individual and communal hunting was common. Animal-based food sources included deer, elk, antelope, small game (e.g., squirrels, rabbits), and various birds. Tools included baskets, mortars, pestles, bow and arrows, clubs, spears, and traps, for which raw materials were often collected in the late summer and early fall (DeGeorgey 2007).

Intergroup Trade

Trade relations with the neighboring Yuki, Cahto, Lake Miwok, Wappo, and Patwin were significant (McCarthy 1982 and 1985 in Hildebrandt et al. 2018). The Northern Pomo were central to a trade network across what is now Northern California, serving as middlemen between Tribal groups. Traded goods ranged from "food (e.g., fish and salt), manufactured goods (e.g., beads), and raw materials (e.g., shells and obsidian)" (Bean and Theodoratus 1978; Peabody 2012:2–6).

Yuki

Ethnogeography

Yuki ethnolinguistic groups inhabited the region within the Northern Coast Range, including Round Valley (north of the Project) and the drainages of the middle and upper Eel River within the FERC Project Boundary and Eel River Tribal Study Areas (refer to Map 2.2.3.12-2 and Map 2.2.3.12-3 and Figure 2.2.3.12-1) (Foster 1944; Kroeber 1925; Miller 1978). The elevation of Yuki territory ranged from less than 1,000 to over 7,000 feet, approximately. Residences and villages were aligned with drainages of the Eel River and its tributaries (McCarthy 1982 and 1985 in Hildebrandt et al. 2018). The Yuki had six primary subdivisions, which were divided based on minor dialect variations. Four of these subdivisions were located near the Project, including the *Ukomno'm,* located in Round Valley, the *Witukomno'm* or *Uksismulhatno'm,* located in Eden Valley, the *Ta'no'm* located near the Wailaki, and the *Onkolukomno'm,* located in Gravelly Valley (Lake Pillsbury reservoir) and the nearby drainage of the Eel River (Figure 2.2.3.12-1; Foster 1944 in Hildebrandt et al. 2018). The other two subdivisions were the *Huititno'm*, located in the Black Butte River drainage, and the *Suksaltatamno'm*, located in the upper Middle Fork Eel River (Hildebrandt et al. 2018).

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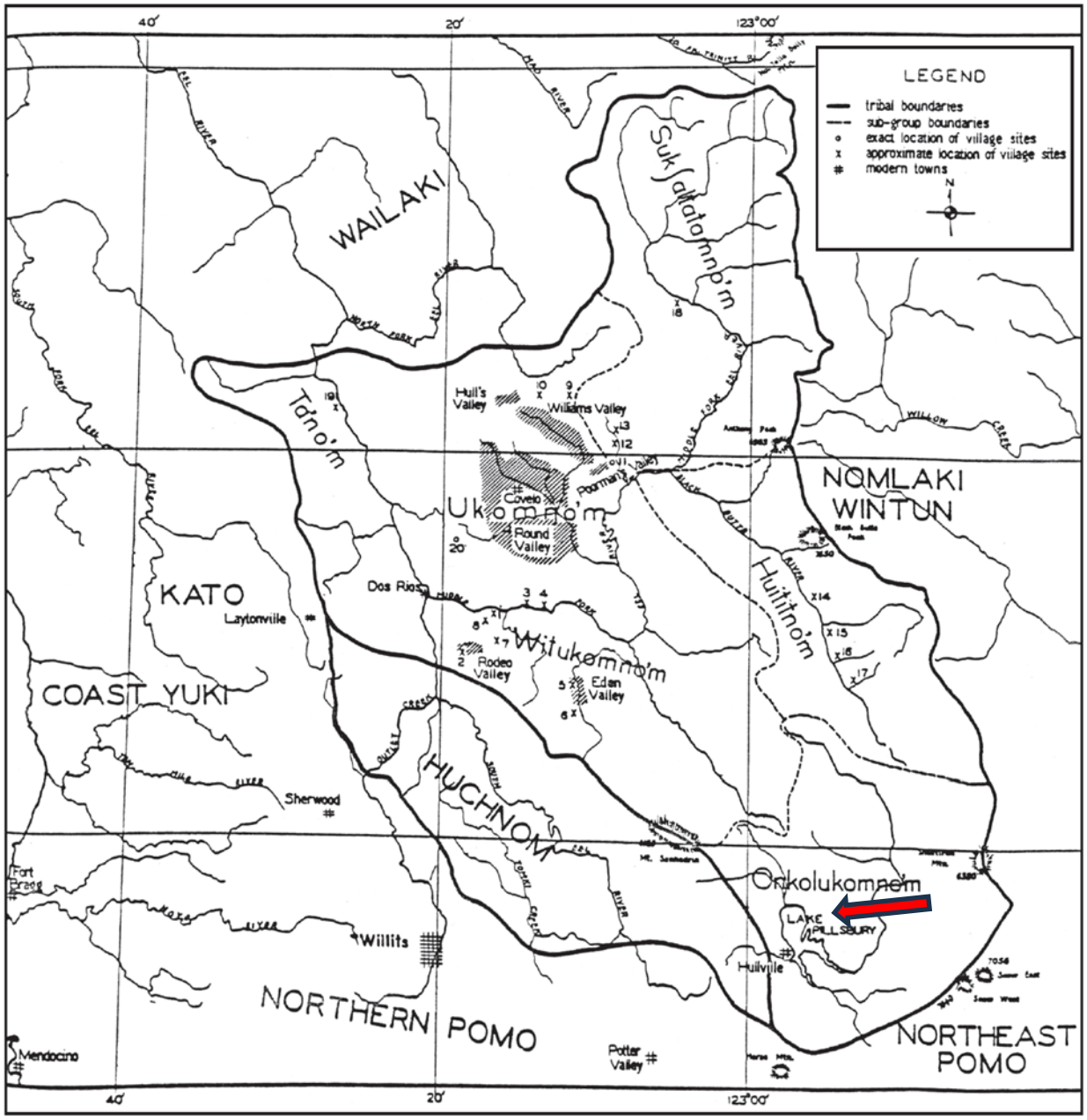


Figure 2.2.3.12-1. Yuki and Huchnom territories (Foster 1944); red arrow showing Lake Pillsbury reservoir.

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The area of the *Onkolukomno'm* is said to have been "a favorable location, but there are no survivors of the group and consequently little information on Rancherias in the vicinity" (Foster 1944:160 in Hildebrandt et al. 2018:89–91). Barrett (1908) reports that this area was also known as *nutc-ukom or niitc-iikom*, gravel-valley.

He reports that:

> *One informant, an old Yuki woman, born in Gravelly valley, gave nu'iikol as the name of the people formerly living in and about that valley, and it seems probable that this is a form of the word written by the whites 'Nome Cult' (the name of the government Indian farm established in Round valley in 1856, and later changed into a full reservation). The origin of the name is not known, but from the fact that nom, meaning west, occurs in Wintun, as no'mlaki, it is possible that the term came originally from that source*. (Barrett 1908:247)

Sociopolitical Organization

At the time of his fieldwork on the Yuki, Kroeber had not defined the term "tribelet" yet, so the number of Yuki tribelets is not as clear as in some other areas (e.g., Pomo). At that time, Kroeber used the term "political units." He estimated that the *Ta'no'm* had six political units, the *Ukomno'm* had three, the *Onkolukomno'm* likely had several, and the remaining subdivisions likely had one or two. Kroeber noted that "a dance house did not necessarily indicate a tribelet center for Yuki as it did in Pomo and Patwin territory" (Hildebrandt et al. 2018:89–91; Kroeber 1925, 1932). At the time of his fieldwork, Kroeber estimated the Yuki population to be roughly 2,000, but he noted that the number was likely conservative. This underestimation was confirmed by Cook, who estimated the population based on reported villages. Cook estimated the Yuki population to be 6,880 (Cook 1956; Hildebrandt et al. 2018; Kroeber 1925).

Subsistence

The Yuki maintained a seasonal migration pattern based on available food sources (King et al. 2016:104). Similar to the Hill Patwin and Nomlaki groups, the Yuki had "a gathering, hunting, and fishing economy" (Hildebrandt et al. 2018:92). The main difference for the Yuki/Huchnom was that they had access to plenty of salmon, so fishing was more readily available and significant to them than it was for their neighbors. The Yuki went on salmon runs three times per year, in the fall, winter, and spring. In the summer, the Yuki fished for trout, steelhead, and lamprey eel. The Yuki utilized gigging, netting, and weirs in their fishing practices. Fish processing included drying fish in the sun. Fishing was an important social practice. Families fished together on multi-day trips and shared their catch (Foster 1944 in Hildebrandt et al. 2018).

When occupying their winter village settlements, the Yuki subsisted on "acorns, pine nuts, hazelnut, peppernut, buckeye, and dried venison and fish," which had been acquired, processed, and stored leading up to the winter season (King et al. 2016:104). In the spring, they subsisted on available fresh foods (e.g., clovers, soaproot shoots, angelica roots). In late spring and into summer, winter villages were vacated, and seasonal camps were established as opportunities arose to collect and hunt more distant food sources (e.g., berries, seeds, deer, small game). In the fall, collecting, hunting, and fishing efforts, especially of acorn, pine nuts, deer, and salmon, increased in order to fill winter store houses

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(Goddard and Holson 1993; King et al. 2016). Six or more kinds of acorns were collected (e.g., tan oak, valley oak, and black oak). Acorn processing included "a basket hopper and slab mortar" for grinding; the acorn meal was then boiled to make soup or baked into bread (Hildebrandt et al. 2018:93). To leaven the bread, a particular kind of red earth was added to the dough. Subsistence strategies were gendered, such that men typically were hunters and fishers, while women were gatherers, and everyone collected acorns (Miller 1978).

Intergroup Trade

Trade relations among the Yuki were primarily internal (e.g., with the Huchnom) but also extended to the neighboring Pomo. Exported trade items mainly consisted of food and furs in exchange for beads, shells, magnesite, dentalia shells, seafood, and salt (King et al. 2016; Kroeber 1925; Miller 1978).

Cahto

Ethnogeography

Some argue that the Cahto are the southernmost ethnolinguistic group in the Athabascan language family, which includes the Wailaki, Sinkyone, Nongatl, and Lassik (Baumhoff 1958; Kroeber 1925; Myers 1978). The Cahto inhabited multiple valleys up to the drainages of the South Fork Eel River, resting between Yuki territory to the east, west, and south and Sinkyone and Wailaki territories to the north within the FERC Project Boundary and Eel River Tribal Study Areas (see Map 2.2.3.12-3) (Kroeber 1925; Myers 1978).

Sociopolitical Organization

Prior to Euroamerican contact, there were approximately 50 Cahto villages, each of which had a village headman or chief and maintained permanent settlements (Kroeber 1925; Myers 1978). Headman succession was generally hereditary, with leadership being passed on to sons. Leadership power was also granted to the elders, to whom the chief served as advisor and deferred when disagreements arose (Myers 1978).

Subsistence

Staple foods for the Cahto included acorns, tarweed seeds, and other plants, as well as deer, fish (especially salmon), black bears, cinnamon bears, and small game (e.g., minks, raccoons, moles, gophers, skunks, squirrels). A number of insects also served as food sources, including caterpillars, grasshoppers, bees, and hornets. Meat and fish were broiled or dried. Acorns were processed into bread and soups. Subsistence strategies were divided based on gender, with men typically hunting and fishing, while women gathered plant-based food sources. Everyone collected acorns. The Cahto were also known to travel west "to Coast Yuki territory . . . where they gathered shellfish and seaweed" (Myers 1978:244).

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Intergroup Trade

The Cahto engaged in trade relations with various neighbors, including the Lassik, Coast Yuki, Wailaki, Northern Wintun, and other northern Tribal groups. They supplied hazelwood bows, clam disk beads, and clothing in exchange for salt, seafood, dentalia, and dogs (Myers 1978).

Wailaki, Lassik, Sinkyone, Mattole, and Nongatl

Ethnogeography

The Wailaki, Lassik, Sinkyone, Mattole, and Nongatl ethnolinguistic groups are part of the southern Athabascan language family within the Eel River Tribal Study Area. Each spoke different dialects of the same language, although the Mattole may have had their own separate language. The Wailaki and Lassik had bordering territories. The western border of both groups stretched along the South Fork Eel River, east of the Shelter Cove Sinkyone territory. The eastern border of Wailaki territory stretched along the North Fork Eel River down to Hull's and Casoose creeks. The southern border ran down to Big Bend Creek, bordering Yuki territory (Elsasser 1978a; Kroeber 1925). The northern border of Lassik territory met the southern border of Nongatl territory (Elsasser 1978a).

The Sinkyone had two subgroups: a southern group, Shelter Cove (not in the Tribal resources study areas), and a northern group, Lolangkok (within the Eel River Tribal Study Area), which got its meaning from Bull Creek (Elsasser 1978a; Kroeber 1925). Small portions of Mattole and Nongatl territories fall within the Eel River Tribal Study Area. Mattole territory stretched along the Pacific Coast from its northern border near Bear River and inland down the upper North Fork River, west of Lolangkok Sinkyone territory, to Spanish Flat. Nongatl territory ran east of the Eel River near present-day Scotia down to Blocksburg and east to a stretch along the upper Mad River (Elsasser 1978a). See Map 2.2.3.12-3.

Sociopolitical Organization

These five southern Athabascan ethnolinguistic groups were sociopolitically organized around tribelets, which typically had a main settlement near a drainage area (Elsasser 1978a; King et al. 2016). The Wailaki are known to have had a large number of tribelets, 19, and named villages, 95. The Lassik had three tribelets, consisting of approximately 20 named villages. The Lolangkok Sinkyone subgroup consisted of two tribelets, with around 50 villages. It is estimated that the Mattole had two tribelets, which consisted of 60 villages. The Nongatl had six tribelets with around 35 villages.

Southern Athabascan tribelets were typically headed by a chief, most commonly male, who may have been elected based on accumulated wealth and/or patrilineal kinship. A nuclear family structure was prevalent among all five groups (Elsasser 1978a). Social stratification based on wealth was less prominent than in more northern groups (e.g., Yurok and Hupa) (Elsasser 1978a; King et al. 2016).

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Subsistence

Similar to Yuki groups, the southern Athabascan groups occupied semi-permanent settlements during winter and had increased residential mobility in warmer seasons (King et al. 2016; Kroeber 1925). The environment of these southern Athabascan groups—which included the northern portions of the Northern Coast Range mountains, a majority of the Eel River drainage system, and portions of the northern coastline—provided edible seeds, acorns, buckeye, manzanita, pine nuts, various berries, and other plant-based foods (Elsasser 1978a). Particularly in springtime, clover, angelica roots, and tubers were collected (King et al. 2016). Terrestrial animals, such as deer and elk, were among the primary inland food sources (Elsasser 1978a; King et al. 2016). Maritime fishing along the coast occurred but was not as prevalent as among more northern groups (King et al. 2016). The main bodies of the Eel River and the Mattole River were key sources of fish (e.g., salmon, trout), and, in some cases, simple weirs were used (Elsasser 1978a; King et al. 2016).

Trade

Intergroup trade was not prevalent. King et al. theorize that this may be due to "lower priority placed on the development of wealth and large world-renewal ceremonies, both of which required significant quantities of exotic materials" (2016:103).

Wiyot

Ethnogeography

Humboldt Bay was the center of Wiyot territory, which encompassed redwood forest, the oceanfront, the bay, and lower river drainages (Elsasser 1978b). Wiyot territory is in the westernmost portion of the Eel River Tribal Study Area. The Bear River Mountain ridge acted as the Wiyot territory's southern border and separated the Wiyot from their southern Mattole neighbors. The northern border was marked by the Little River. The western border lay at the coastline, and the eastern border was shared with the neighboring Whilkut and Nongatl groups (Elsasser 1978b; Loud 1918). See Map 2.2.3.12-3.

Sociopolitical Organization

Unlike their southern neighbors and similar to other northern groups, the sociopolitical life of the Wiyot was not organized around formal Tribes or clans (Elsasser 1978b). The Wiyot lacked "tribal-wide political" leadership, such as chiefs (King et al. 2016:102). Instead, the household was the primary socioeconomic unit. Like other northwest California groups, the Wiyot lived in "semi-subterranean plank houses" in permanent villages (King et al. 2016:101). Women and children lived in square or rectangular family houses, whereas men occupied sweathouses. Kinship was patrilineal. Social stratification based on wealth was prevalent (Elsasser 1978b; King et al. 2016). Wealth items included obsidian blades, deer skins, dentalium shell money, and privately owned property containing key resources (King et al. 2016).

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Subsistence

Although Wiyot territory consisted of a large portion of the coast, the Wiyot relied on food sources that could be acquired from the "still waters" of the bay and rivers and from prairies rather than the ocean (Elsasser 1978b:156). According to Loud (1918), the Wiyot stated they did not fish at the Little River; however, they likely did fish at the Eel and Mad rivers (Elsasser 1978b). The Wiyot collected plant-based foods, particularly wild potatoes, berries, and acorn (Loud 1918). Animal food sources were primarily fish, especially salmon, but also included deer, elk, small game, mollusks, and sea mammals, such as sea lions and beached whales (Elsasser 1978b). The Wiyot may have acquired acorns through trade with their southern Athabascan neighbors (Elsasser 1978b).

Ethnohistoric Context

The following discussion has been adapted from *Potter Valley Tribe of Pomo Indians: A Cultural and Historical Overview* (DeGeorgey 2007) and BLM's *Northwest California Integrated Resource Management Plan* (King et al. 2016); also see Appendix 2.2.3.12-A, which contains Tribal letters to PG&E. This section describes the arrival of Euroamericans to the ancestral territories of California Indians[1] discussed in the previous section and the impacts this had on their culture, lifeways, and resources. A brief overview of U.S. and state government policies regarding Tribal lands and rights is provided for context on where contemporary Tribes and Tribal members reside, own land, and have access to their traditional homelands and resources.

Beginning in the early nineteenth century, American, Russian, and English fur trappers arrived in this region and coastal areas in the Project vicinity in search of sea otter and other furs. The earliest fur trappers to settle along the north-bay coast were Russian fur traders. According to Winn (1986), "In March 1811, a large sailing ship carrying 25 Russian and eighty [sic] Alaskan natives came ashore, set up a temporary camp, and began building houses and a wooden stockade" (DeGeorgey 2007:43); this camp became Fort Ross, located approximately 100 mi. south of the Project. Local Kashaya Indians referred to the area as *Meteni*. Russians who came to the area hunted sea otter, grew wheat and other crops, and traded with Spanish in San Francisco. As a result of this influx of Russian fur trappers, by 1820, the sea otter population was depleted and local hunting became relatively unproductive. In 1833, John Work's expedition for the Hudson's Bay Company was one the first recorded interactions between whites and California Indians of Mendocino County (DeGeorgey 2007).

When the earliest Euroamerican settlers entered the Project area, the Spanish had already established governance over the southwestern portion of "Alta California" for several decades (DeGeorgey 2007). This was part of their expansionist plan "for missionaries to establish missions and civilize the Indians, but also for soldiers to found frontier outposts and settlers to start farming communities" (Robinson 1948:33). Over time, approximately 21 missions were established throughout California. The northernmost outpost, Mission San Francisco Solano, was founded in

[1] The terms Native Americans, California Indians, Indians, Tribes, and Natives are used interchangeably in this section to describe the Indigenous peoples and groups living within the Project vicinity during Euroamerican invasion.

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Sonoma on July 4, 1823. From there, "the Spanish made expeditions into Sonoma, Mendocino, and Lake counties, and from these areas they captured Indians for the missions" (DeGeorgey 2007:44; see also Cook 1943). Numerous massacres occurred against the Pomo and Wappo people in the Clear Lake region (DeGeorgey 2007).

The Mexican government began issuing land grants under the jurisdiction of pueblos and presidios to a number of early settlers. By 1838, Mexicans had settled on Clear Lake. Salvador Vallejo established a large ranch in Big Valley. Cattle were brought to Vallejo's ranch, and Native men were captured and made to serve as ranch-hands. Native men who refused to become "laborers, vaqueros, and servants" were murdered. Others who were captured died of diseases brought by Europeans, such as smallpox and cholera, contributing to the rapid population decline of California Natives during this time (DeGeorgey 2007). By 1846, when California was annexed to the U.S., much of Alta California was still a Mexican territory, and the majority of "the population was of Mexican, Spanish, or Native American ancestry" (King et al. 2016:115).

In 1850, shortly after California became a U.S. state, Mendocino County was established. After that time, interactions between non-Natives and Natives became a regular occurrence in the area. Settlers began moving into abundant and rich environments cultivated for thousands of years by Native Californians to raise cattle, horses, and hogs. Problems quickly developed between the settlers and Natives. In 1850, California became a state and an act "for the Government and Protection of Indians" was passed by state legislature. This act allowed Natives, even children, to be arrested for being "vagrant[s]," and any local justice of the peace was then able to "hire" them out for labor, "effectively arranging for the sale of Indians into slavery. . . . This same act prohibited the conviction of any white man for an offense upon the testimony of an Indian" (DeGeorgey 2007:59).

The U.S. Congress appointed commissioners to negotiate treaties with the various Tribes to quell conflicts. In a short amount of time, 18 treaties were negotiated between the state and Tribes throughout much of California. These treaties established reservations, promised federal aid, and guaranteed the continuation of traditional hunting and fishing rights. However, the treaties were never ratified by the U.S. Senate, which received pressure from the California state government, which wanted to continue protecting the interests of settlers (DeGeorgey 2007).

The Indian reservation that was established in Mendocino encompassed 25,000 acres between the Noyo and Ten Mile rivers, where present-day Fort Bragg is located, approximately 66 mi. west of the Potter Valley Powerhouse. By mid-1856, hundreds of California Indians and Tribes relocated to the Mendocino Reservation, including Pomo, Yuki, and other Tribes extending to Eureka and Chico. This was followed by the creation of the Nome Cult Farm in Round Valley (north of the Project) in 1858 as "an administrative extension of the Nome Lackee Reservation" (DeGeorgey 2007:52). By 1860, California Indian groups were "periodically rounded up and 'driven' like cattle to the Nome Cult Farm from their various homelands in Northern California" (DeGeorgey 2007:53). Numerous Tribes were forcibly moved to Round Valley, including "the Yuki, the Northern Pomo of the Little Lake, Sherwood, and Potter Valleys, the Wappo from the Geyserville area, the Cahto of Laytonville, the Wailaki of southern Humbolt County, the Huchnom of northern Redwood Valley, the Yana and Yahi of Mill Creek, the Nomlaki of the Paskenta-Newville area, the Konkow Maidu from the Chico and Oroville area, and the Auchomowi or Pit River Tribes

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from Modoc and Shasta counties" (DeGeorgey 2007:53). Additionally, Pomo Indians from Mendocino and Lake counties were relocated to the Nome Cult Farm in Round Valley. These early reservations and rancherias[2] were strife with corruption and mismanagement. With thousands of California Indians forcibly relocated to reservations, continued brutality toward them, and the lack of aid from the California or U.S. governments, reservations quickly became places of "disease, starvation, cruelty, and anarchy" (DeGeorgey 2007:54).

During this time, between 1856 and 1860, the "Mendocino War" marked a period of intense violence against California Indians by settlers, who formed local militias, one being the Eel River Rangers (Jarbow 1859). The outcome of the "Mendocino War" included "the deaths of hundreds of Yuki and other Indian people in the Round Valley vicinity [. . .]; the 1860 massacre of nearly an entire Wyot village on Tuluwat (Gunther) Island in Humboldt Bay [. . .]; the near-annihilation of almost the entire Sinkyone tribe at Needle Rock on the Mendocino Coast [. . .]; and equally tragic events at Burnt Ranch on the Trinity River, Bloody Island in Clear Lake, and countless other locations" (King et al. 2018:122). When Tribes and Native people retaliated against attacks and massacres, white settlers convinced the U.S. military to protect them from Natives, resulting in "no fewer than 13 US military forts [being] established in northwestern California between 1850 and 1865" (King et al. 2018:123). From some of these forts, the U.S. military worked with white settlers and ranchers to attack Native camps and villages, forcing them to retreat into the mountain regions (King et al. 2018). Finally, in the late 1850s, the U.S. Army began assigning troops in the Mendocino area, including to Cape Mendocino, the Mendocino Reservation, and at the Nome Cult Farm in Round Valley, to "protect the Indians from extermination" (DeGeorgey 2007:55). However, the presence of the U.S. Army did little to deter whites from hunting, attacking, and murdering Natives (DeGeorgey 2007).

In 1862, the Homestead Act was passed:

> *[It] . . . allowed private individuals to file entry claims on public lands, and then over five years 'prove up' their entry by physically occupying and improving the land. In some cases, this included building a cabin and farming. After meeting the conditions set by the government, the individual could then receive a patent to the land, at which point it became their private property.* (Hildebrandt et al. 2018:111)

Federal Indian policy during the period from 1870 to 1900 marked a departure from earlier policies that were dominated by removal, treaties, reservations, and war. The Dawes Act was passed in 1887. This new policy focused specifically on breaking up reservations and Tribal lands by granting land allotments to individual Native Americans and encouraging them to take up agriculture. Native groups in the Project area also purchased land in 1879; one group bought a

[2] Passage of the General Allotment Act in 1887 opened part of the limited lands in California to non-Indian settlement. In 1905, the public was finally advised of the 18 unratified treaties. Citizens sympathetic to the economic and physical distress of California Indians encouraged Congress to pass legislation to acquire isolated parcels of land for homeless California Indians. Between 1906 and 1910, a series of appropriations were passed that provided funds to purchase small tracts of land in Central and Northern California for landless Indians of those areas. The land acquisitions resulted in what has been referred to as the Rancheria System in California (BIA 2024a).

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place near Ukiah that later became known as Pinoleville. Others lived where they could in Potter Valley, along the Eel River, or in other areas, with many provided for by the ranchers for whom they worked (DeGeorgey 2007).

Native people and groups continued in more or less the same lifestyle, many finding work in the hop fields and pear orchards or picking beans, with most enjoying a reputation for being good workers. They continued to move around with the seasons, working and going to the coast for seafoods as they had always done. Fish, meats, and acorns were still stored for winter. Other traditional foods were gathered. Women made baskets for sale to white collectors. Some of the descendants of Potter Valley people stayed in Potter Valley, while some lived in Ukiah Valley or other locations, moving about as was practical for each family. Some people who had been relocated to reservations in the 1850s moved back to their traditional homelands (DeGeorgey 2007).

The approaches of governmental agencies like BIA toward the Indian people in general were slowly evolving. In the 1930s, BIA began to make efforts to encourage Indians living on reservations and rancherias to organize themselves and run their own affairs. The Indian Reorganization Act (IRA) of 1934 was passed to "conserve and develop Indian lands and resources; to extend to Indians the right to form business and other organizations; to establish a credit system for Indians; to grant certain rights of home rule to Indians; to provide for vocational education for Indians; and for other purposes" (National Archives 2024). Although many Tribes accepted the provisions of the IRA, few California Tribes benefited economically from the IRA because of the continuing inequities in funding of federal Indian programs (BIA 2024a).

The BIA states that:

> *Beginning in 1944, forces within the BIA began to propose partial liquidation of the Rancheria system. Even the limited efforts to address the needs of California Indians at the turn of the century and again through passage of the IRA were halted by the federal government when it adopted the policy of termination. California became a primary target of this policy when Congress slated forty-one (41), California Rancherias for termination pursuant to the Rancheria Act of 1958.* (BIA 2024a)

Under the Rancheria Act of 1958 and Indian Termination Policy, Tribal governments under BIA were terminated and their rancheria lands distributed among the people assigned to the lots at the time of termination. Residents agreed because they were promised services such as sewer, water, roads, and education. However, these services were not provided, and the newly acquired private Indian lands were heavily taxed by the state and county. Under the direction of the California Indian Legal Society, lawsuits were brought against BIA by California Indians seeking restoration of their status. Potter Valley was included with 16 other Tribes in the *Tillie Hardwick et al. v. the United States of America et al.* case, which decided that those Tribes would become federally recognized once again and receive benefits from the federal government (Potter Valley Tribal Office, Tillie Hardwick file referenced in DeGeorgey 2007:64).

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Hydroelectric Development

The construction of the Project by the Eel Power and Irrigation Company began in 1905 to support farming businesses in the region by supplying inexpensive power to run flour mills, pumping plants, and farm machinery and storing and diverting water for irrigation. The dams greatly affected native migrating anadromous fish such as salmon, steelhead, and lamprey (see Volume II, Section 2.2.3.3, Fish and Aquatic Resources, for additional information on fish and aquatic species) as well as the already heavily impacted Tribal lifeways and food sources within the Eel and East Branch Russian rivers. In May 1908, 1 month after the power plant began operations, a spring run of lamprey worked their way upstream "into the powerhouse and vast numbers located themselves beneath the dynamos . . . and here they congregated to such an extent that the mass of wiggling eels was five feet deep" (Dispatch Democrat 1908).

Following the completion of the powerhouse, additional transmission and distribution lines were constructed throughout the area. By 1920, Van Arsdale Reservoir had silted to the point of reducing summer flow through a tunnel. In response, construction began on Scott Dam, 12 mi. upstream from the tunnel. Stone & Webster, a Chicago-based construction firm, completed Scott Dam in 1921 and inundated the site of the town of Hullville (Gravelly Valley). The reservoir created by Scott Dam greatly increased storage capacity for the Potter Valley Powerhouse and led to year-round operation; however, it inundated ethnographic villages such as *Onkolukomno'm* or *niitc-iikom* in Gravelly Valley.

Along with power, water sales were a consideration in the construction of Van Arsdale Reservoir and Lake Pillsbury reservoir. With a reliable source of water from the Eel River, the PVID was formed, and an agreement was reached between Snow Mountain Co. and the PVID to supply water to farmlands in the valley. Two main irrigation canals were constructed down the east and west sides of Potter Valley.

PG&E purchased Snow Mountain Co.'s assets in 1930. With the exception of alterations to the exterior of the powerhouse and various upgrades to improve system efficiency and reliability, in general, the overall electrical power generation system remains largely unchanged since its original construction.

2.2.3.12.5 Previously Documented Ethnographic Villages and Habitation Sites within the Study Areas

According to site predictive models developed by King et al. (2016) and ethnographic information from Barrett (1908), Foster (1944), Kroeber (1925), Loud (1918), and McCarthy (1982, 1985) there is a high probability for Tribal resources such as ethnographic villages, fishing sites, ceremonial areas, archaeological sites, buried archaeological sites and TCPs in all the Tribal resources study areas, especially the Eel River corridor as well as "Gravelly Valley (Lake Pillsbury reservoir) and the surrounding drainage of the South Eel River including the Rice Fork" (McCarthy 1982:60). Archaeological records and cultural reports downloaded from the PG&E CCRD (see Volume II, Section 2.2.3.11, Cultural Resources, for details of archaeological and built-environment resources) were reviewed to describe existing and probable ethnographic villages,

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and these are summarized below utilizing the cultural resources study areas, which differ slightly from the Tribal resources study areas.

Cultural Study Area: FERC Project boundary plus 0.5-mi. buffer

Site records and reports indicate the possibility of 12 habitation sites (possible ethnographic villages) in this portion of the Project area. Archaeological evidence across these sites consists of house pits, round houses, midden, lithic scatters, bone fragments, fire-cracked rock, groundstone, cooking stones, steatite, beads, hopper mortar, burials, and rock outcroppings. Known, named ethnographic village sites within this area include *Mumeme't* (confirmed in site records P-17-000431 and P17000432) and *Lil'kool* or *kalil'yakai* (Northern Pomo dialect name), which was located at a point about 0.25 mi. upstream from John Day's on the Eel River. Barrett suggests that the two Pomo villages *Uwului/me* and *Hunkati/tc* were located east of Salmon Creek, which indicates that they are likely submerged under present-day Lake Pillsbury reservoir (Barrett 1908: 333). There is also an unnamed Pomo village site (P-23-002247/CA-MEN-2547).

Cultural Study Area: Eel River downstream of Project to Pacific Ocean plus 0.5-mi. buffer on either side

Site records and reports suggest the possibility of 26 habitation sites (possible ethnographic villages) in this portion of the Project area. Some of these sites extend across both the FERC Project Boundary and Eel River Tribal Study Areas, including *Mumeme't* and *Lil'kool.* Archaeological evidence across sites within this area consists of house pits, round houses, midden, lithic scatters, bone fragments, fire-cracked rock, groundstone, cooking stones, steatite, beads, hopper mortar, burials, rock outcroppings, and petroglyphs.

Cultural Study Area: East Branch of the Russian River to Lake Mendocino plus 0.5-mi. buffer on either side

Site records and reports suggest the possibility of 11 habitation sites (possible ethnographic villages) in this study area. Archaeological evidence across sites within this area consists of house pits, midden, lithic scatters, animal bones, shell, groundstone, steatite, beads, hopper mortar, burials, habitation refuse, and petroglyphs. There are several sites thought to be associated with Pomo villages within the area, which have been mapped Barret (1908:333) and documented in the following site records: P-23-002247/CA-MEN-2547, P-23-002939/CA-MEN-549, P-23-004337/CA-MEN-3340, and P-23-004338/CA-MEN-3341.

2.2.3.12.6 California Indian Tribes

Fifty-one Tribes have been identified as having potential cultural ties and association to lands in the Tribal resources study areas (see Table 2.2.3.12-1). These were identified using a variety of sources including a recent NAHC response (NAHC 2024), review of Tribal government websites, BLM GLO Land Patent Search, BIA records, ethnographic records and maps, previous PG&E relicensing Tribal outreach and consultation meetings (2016–2018), and recent Tribal responses to PG&E's submittal of the IDSA.

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Tribes with possible cultural ties to the lands in the Tribal resources study areas are both federally recognized and non-recognized. A "federally recognized Tribe" is any Tribe, band, nation, or other organized Indian group or community of Indians (43 U.S. Code 1601 *et seq.*) that is recognized as eligible for the special programs and services provided by the United States (see e.g., 43 CFR Part 10.2[b][2]). Non-recognized Tribes and other California Indian groups still retain distinct identities and maintain long cultural ties with the Project vicinity and surrounding region.

Table 2.2.3.12-1. California Indian Tribes that may be affected by the Project.

Tribe	Contact	Contact Information/Address
Bear River Band of Rohnerville Rancheria	Josefina Frank	josefinafrank@brb-nsn.gov
Bear River Band of Rohnerville Rancheria	Melanie McCavour	thpo@brb-nsn.gov
Big Lagoon Rancheria	Virgil Moorehead	vmoorehead@earthlink.net
Big Valley Band of Pomo Indians of the Big Valley Rancheria	Flaman McCloud Jr.	chairman@big-valley.net
Big Valley Rancheria of Pomo Indians	Anthony Jack	ajack@big-valley.net
Big Valley Rancheria of Pomo Indians	Baltsuwin Brown	2726 Mission Rancheria Road, Lakeport, CA 95453
Blue Lake Rancheria	Jacob Pounds	jpounds@bluelakerancheria-nsn.gov
Cachil Dehe Band of Wintun Indians of the Colusa Indian Community	Wayne Mitchum Jr.	asmelser@colusa-nsn.gov
Cahto Tribe	Mary Norris	chair@cahtotribe-nsn.gov
Cahto Tribe	Kendra Campbell	secretary_treasurer@cahtotribe-nsn.gov
Cahto Tribe	Tasheena Sloan	vicechair@cahtotribe-nsn.gov
Cher-Ae Heights Indian Community of the Trinidad Rancheria	Amy Atkins-Kelley	aatkins@TrinidadRancheria.com
Cher-Ae Heights Indian Community of the Trinidad Rancheria	Garth Sundberg	gsundberg@TrinidadRancheria.com
Cher-Ae Heights Indian Community of the Trinidad Rancheria	Rachel Sundberg	rsundberg@TrinidadRancheria.com
Cloverdale Rancheria of Pomo Indians	Patricia Hermosillo	555 South Cloverdale Boulevard, Suite A Cloverdale, CA 95425
Cortina Rancheria – Kletsel Dehe Band of Wintun Indians	Charlie Wright	P.O. Box 1630 Williams, CA 95987
Coyote Valley Band of Pomo Indians	Richard Campbell	vc@coyotevalley-nsn.gov
Dry Creek Rancheria of Pomo Indians	Sherrie Smith-Ferri	sherries@drycreekrancheria.com
Elem Indian Colony Pomo Tribe	Agustin Garcia	16170D Main Street Lower Lake, CA 95457

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Tribe	Contact	Contact Information/Address
Elem Indian Colony Pomo Tribe	Kim Cole	16170D Main Street Lower Lake, CA 95457
Elk Valley Rancheria	Crista Stewart	cstewart@elk-valley.com
Elk Valley Rancheria	Dale Miller	dmiller@elk-valley.com
Elk Valley Rancheria	Kevin Mealue	kmealue@elk-valley.com
Elk Valley Rancheria	LaWanda Green	lgreen@elk-valley.com
Estom Yumeka Maidu Tribe of the Enterprise Rancheria	Glenda Nelson	info@enterpriserancheria.org
Estom Yumeka Maidu Tribe of the Enterprise Rancheria	Nelson Smith	nelsons@enterpriserancheria.org
Grindstone Rancheria of Wintun-Wailaki	Ronald Kirk	P.O. Box 63, Elk Creek, CA 95939
Guidiville Rancheria of California	Bunny Tarin	admin@guidiville.net
Habematolel Pomo of Upper Lake	Danielle Cirelli	dcirelli@hpultribe-nsn.gov
Habematolel Pomo of Upper Lake	Hope Marcks	hmarcks@hpultribe-nsn.gov
Habematolel Pomo of Upper Lake	M. Marcks	mmarcks@hpultribe-nsn.gov
Habematolel Pomo of Upper Lake	Robert Geary	rgeary@hpultribe-nsn.gov
Habematolel Pomo of Upper Lake	Lisa Deas	ldeas@hpultribe-nsn.gov
Habematolel Pomo of Upper Lake	Jaclyn Ley	jley@hpultribe-nsn.gov
Hoopa Valley Tribe	Keduescha Lara-Colegrove	hvp.thpo@gmail.com
Hoopa Valley Tribe	Ryan Jackson	chair@hoopa-nsn.gov
Hoopa Valley Tribe	Silis-chi-tawn S. Jackson	hupamuseum@gmail.com
Hopland Band of Pomo Indians	Sonny Elliott	sjelliott@hoplandtribe.com
Hopland Band of Pomo Indians	Ramon Billy	thpo@hoplandtribe.com
InterTribal Sinkyone Wilderness Council	Hawk Rosales	info@sinkyone.org
Karuk Tribe	Alex Watts-Tobin	atobin@karuk.us
Karuk Tribe	Russell Attebery	battebery@karuk.us
Karuk Tribe	Bill Tripp	btripp@karuk.us
Kashia Band of Pomo Indians of the Stewarts Point Rancheria	Anthony Macias	anthony@stewartspoint.org
Kashia Band of Pomo Indians of the Stewarts Point Rancheria	Dino Franklin Jr.	dino@stewartspoint.org
Kashia Band of Pomo Indians of the Stewarts Point Rancheria	Jessica Chaves	jessica@stewartspoint.org

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Tribe	Contact	Contact Information/Address
Kashia Band of Pomo Indians of the Stewarts Point Rancheria	Vaughn Pena	vaughn@stewartspoint.org
Koi Nation of Northern California	Dino Beltran	dbeltran@koination.com
Koi Nation of Northern California	Darin Beltran	kn@koination.com
Koi Nation of Northern California	Robert Morgan	robmorgan@koination.com
Koi Nation of Northern California	Rob Morgan	robs_norcal@yahoo.com
Manchester Band of Pomo Indians of the Manchester Rancheria	Tisha Jones	tisha.jones@mpapomotribe.org
Melochundum Band of Tolowa Indians	Tribal Representative	P.O. Box 388, Fort Dick, CA 95538
Mishewal-Wappo Tribe of Alexander Valley	Christi Gabaldon	1tektekh@gmail.com
Mishewal-Wappo Tribe of Alexander Valley	Scott Gabaldon	scott@g4firearms.com
Nor-Rel-Muk Wintu Nation	John Hayward	cybersonnyhayward@icloud.com
Nor-Rel-Muk Wintu Nation	Cyndie Childress	NRMWintu@gmail.com
Nor-Rel-Muk Wintu Nation	Tracy Foster-Olstad	tfoster-olstad@ncidc.org
Noyo River Indian Community	Tribal Representative	P.O. Box 91, Fort Bragg, CA 95437
Paskenta Band of Nomlaki Indians	Monique Hernandez	THPO@paskenta.org
Pinoleville Pomo Nation	Zhao Qiu	zhaoq@pinoleville-nsn.gov
Potter Valley Tribe	Michelle Lee	michelle@thecirclelaw.com
Potter Valley Tribe	Jason Lee	jason@thecirclelaw.com
Potter Valley Tribe	Salvador Rosales	pottervalleytribe@pottervalleytribe.com
Potter Valley Tribe	Representative	waterresources@pottervalleytribe.com
Potter Valley Tribe	Gregg Young	pvtepadirector@pottervalleytribe.com
Pulikla Tribe of Yurok People (formerly Resighini Rancheria)	Fawn Murphy	fawn.murphy@resighinirancheria.com
Pulikla Tribe of Yurok People (formerly Resighini Rancheria)	Kathy Dowd	kathy.dowd@resighinirancheria.com
Pulikla Tribe of Yurok People (formerly Resighini Rancheria)	Megan Rocha	megan.rocha@resighinirancheria.com
Pulikla Tribe of Yurok People (formerly Resighini Rancheria)	Moonchay Dowd	moonchay.dowd@resighinirancheria.com
Pulikla Tribe of Yurok People (formerly Resighini Rancheria)	Shaunna McCovey	shaunna.mccovey@resighinirancheria.com
Quartz Valley Indian Community	Harold Bennett	tribalchairman@qvir-nsn.gov
Redding Rancheria	Jack Potter	jack.potter@reddingrancheria-nsn.gov

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Tribe	Contact	Contact Information/Address
Redding Rancheria	Lillie Lucero	lillie.lucero@reddingrancheria-nsn.gov
Redding Rancheria	Tracy Edwards	tracy.edwards@reddingrancheria-nsn.gov
Redwood Valley or Little River Band of Pomo Indians	Debra Ramirez	rvrsecretary@comcast.net
Robinson Rancheria Band of Pomo Indians	Eddie J. Crandall	tavilabasket@yahoo.com
Robinson Rancheria of Pomo Indians	Beniakem Cromwell	bcromwell@rrcbc-nsn.gov
Robinson Rancheria of Pomo Indians	Tribal Administrator	P.O. Box 4015, Nice, CA 95464
Round Valley Indian Tribes	Joseph Parker	jparker@rvit.org
Round Valley Indian Tribes	Andrea Hilton	andrea@mcbainassociates.com
Round Valley Indian Tribes	Curtis Berkey	cberkey@berkeywilliams.com
Round Valley Indian Tribes	Erica Costa	ecosta@berkeywilliams.com
Round Valley Indian Tribes	Lewis Whipple	lwhipple@council.rvit.org; secretary@council.rvit.org
Round Valley Indian Tribes	Nikcole Whipple	nikcolewhipple@gmail.com
Round Valley Indian Tribes	Scott McBain	scott@mcbainassociates.com
Round Valley Indian Tribes	Scott Williams	swilliams@berkeywilliams.com
Round Valley Indian Tribes	Douglas Hutt	treasurer@council.rvit.org
Round Valley Indian Tribes	Carlino Bettega	vicepresident@council.rvit.org
Round Valley Indian Tribes	Paula Britton	77826 Covelo Road, Covelo, CA 95428
Round Valley Indian Tribes	Stephanie Britton	77826 Covelo Road, Covelo, CA 95428
Round Valley Indian Tribes Round Valley Reservation / Covelo Indian Community	James Russ	jruss@rvit.org; tribalcouncil@rvit.org
Scotts Valley Band of Pomo Indians	Shawn Davis	shawn.davis@sv-nsn.gov
Scotts Valley Band of Pomo Indians	Joann Wright	1005 Parallel Drive, Lakeport, CA 95453
Shasta Indian Nation	Sami Jo Difuntorum	culture@shastaindiannation.org
Shasta Nation	Roy Hall	10808 Quartz Valley Road, Fort Jones, CA 96032
Shebelna Band of Mendocino Coast Pomo Indians	Charlie Fales	19101 Olsen Lane, Fort Bragg, CA 95437
Sherwood Valley Rancheria Band of Pomo Indians	Hazel Ramirez	hramirez.chairwoman@sherwoodband.com
Sherwood Valley Rancheria of Pomo	Valerie Stanley	svrthpo@sherwoodband.com
Wailaki Tribe	Louis Hoaglin Sr.	P.O. Box 684, Laytonville, CA 95454
Winnemem Wintu Tribe	Caleen Sisk	caleenwintu@gmail.com

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Tribe	Contact	Contact Information/Address
Winnemem Wintu Tribe	Mark Miyoshi	markmwinnemem@gmail.com
Winnemem Wintu Tribe	Stephanie Clark	sclarke@volkerlaw.com
Wintu Tribe of Northern California	Shawna Garcia	garciawintu@gmail.com
Wintu Tribe of Northern California	Cindy Hogue	Hogue1hogue@gmail.com
Wintu Tribe of Northern California	Jeremy Hogue	jhogue1999@gmail.com
Wintu Tribe of Northern California	Melissa Rogers	norcalmelissa@hotmail.com
Wintu Tribe of Northern California	Wade McMaster	wintu.tribe1@gmail.com
Wiyot Tribe	Audrey Jackson	ajackson@wiyot.us
Wiyot Tribe	Parker Vassel	pvassel@wiyot.us
Wiyot Tribe	Tiffany Douglas	Tdouglas@wiyot.us
Wiyot Tribe	Marisa McGrew	marisa@wiyot.us
Wiyot Tribe	Brian Mead	Brian@wiyot.us
Wiyot Tribe	Michelle Vassel	michelle@wiyot.us
Wiyot Tribe	Marnie Atkins	secretary@wiyot.us
Wiyot Tribe	Ted Hernandez	ted@wiyot.us
Yocha Dehe Wintun Nation	James Kinter	jkinter@yochadehe.gov
Yocha Dehe Wintun Nation	Leland Kinter	lkinter@yochadehe.gov
Yocha Dehe Wintun Nation	Anthony Roberts	thpo@yochadehe.gov
Yocha Dehe Wintun Nation	Yvonne Perkins	thpo@yochadehe.gov
Yokayo Tribe	Chairperson	P.O. Box 362, Talmage, CA 95481
Yuki/Wailaki	Deborah Hutt	debb_hutt@yahoo.com
Yurok Tribe	Joe James	jjames@yuroktribe.nsn.gov
Yurok Tribe	Rosie Clayburn	rclayburn@yuroktribe.nsn.us
Yurok Tribe	Michael Belchik	mbelchik@yuroktribe.nsn.us

Federally Recognized Tribes

The following 38 federally recognized Tribes (listed in alphabetical order) may have an interest in the Project. Unless noted otherwise, the description of each Tribe, their ancestral land, and interests and traditional uses of the Tribal resources study areas is provided in their own words from their respective websites and other online research as cited:

- **Bear River Band of Rohnerville Rancheria**: "The Tribe was originally established in 1910 as a home for homeless, landless Native American Indians. In 1958, Rohnerville Rancheria was one of 44 tribes terminated by the Rancheria Act. In 1983, the Bear River Band of the Rohnerville Rancheria, along with 16 other California tribes, regained its

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federal recognition status through the Tillie-Hardwick case. While the U.S. granted federal recognition to our Tribe as a result of the lawsuit, it did not provide the Tribe with compensation for the land, resources, right and heritage/culture that was taken. . . . Due to the newness of the Bear River Band of the Rohnerville Rancheria as a federally recognized Indian Tribe, services provided by the Tribe to its members are limited. It is the direction of the Tribe to secure grants to develop and expand programs such as education, health, social services, housing, employment, economic development and cultural rejuvenation" (Bear River Band of the Rohnerville Rancheria 2021). The Tribal office is located within the Eel River Tribal Study Area near Fernbridge.

- **Big Lagoon Rancheria**: consists of Yurok and Tolowa. They are located in Humboldt County, California, and their Tribal headquarters is in Arcata [north of the Project].
- **Big Valley Band of Pomo Indians of the Big Valley Rancheria**: "are descendants of the Xa-Ben-Na-Po Band of Pomo Indians that historically have inhabited the Clear Lake area [south of the Project] for over 11,800 years" (Big Valley Band of Pomo Indians n.d.).
- **Blue Lake Rancheria**: is currently located "near the cities of Eureka and Arcata, 5 mi. inland from the Pacific Coast, along California Highway 299 [north of the Project]. Within the aboriginal territory of the Wiyot people, the Blue Lake Rancheria was founded in 1908 as a 'refuge for homeless Indians.' The Tribe was terminated in 1958 under the Rancheria Act and then reinstated to federal recognition status in 1983. Since then, the Tribe has made a concerted effort to rebuild. Today, the Tribe has 100 acres of land in trust and thriving economic enterprises that support hundreds of local jobs, government operations and programs, economic diversification, resilience and sustainability efforts, environmental protection, and a wide array of social services" (Blue Lake Rancheria 2024).
- **Cachil Dehe Band of Wintun Indians of the Colusa Indian Community**: In 1941 when the Constitution for the Cachil DeHe Band of Wintun Indians of the Colusa Indian Community was ratified, they "resided in the heart of the Northern California's agricultural land on an 80-acre Reservation. The original site stretched along the bountiful Sacramento River, about 4 mi. north of the City of Colusa on Highway 45. Two years later, the Tribe's land base increased with an additional 210 acres just 1 mi. south of the original Reservation. It is at the secondary located where the current Colusa Casino and the Cachil DeHe Village complex stand today" (Colusa Indian Community Council 2013). This area is located south and east of the Project.
- **Cahto Tribe**: "The name Cahto (Kato) means loosely 'People of the Lake' or 'Lake People,' and refers to an ancient lake shore where parts of the Cahto people once lived, although we, the inhabitants of the six villages of the Long Valley, called ourselves the Tlokyáhan, or 'Grass People'" (Cahto Tribe at Laytonville 2024). The Cahto Tribe is currently located in Laytonville, west of the Eel River Tribal Study Area and northwest of the FERC Project Boundary Tribal Study Area.
- **Cher-Ae Heights Indian Community of the Trinidad Rancheria**: "For thousands of years the Yurok, Wiyot and Tolowa people have lived in the coastal redwood forest region of Northern California. . . . Year-round ceremonies were, and continue to be, central to the Yurok, Wiyot and Tolowa culture bringing families and villages together to give thanks,

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heal and pray. The Trinidad Rancheria [located north of the Eel River Tribal Study Area] was established in 1906 by U.S. Congress. . . . In 1908, sixty acres of land along U.S. Highway 101 in Humboldt County were purchased for Indians living along the Northern California Coast. The existing Rancheria is within the aboriginal territory of the Yurok people and includes many sacred and culturally significant areas" (Trinidad Rancheria 2024a). "Trinidad Rancheria purchased the Trinidad Harbor [north of the Eel River Study Area] in January 2000. Since the purchase, the Tribe has worked hard to mitigate hazardous waste and remove toxic materials left behind by previous commercial operations, and other sources of pollution such as used oil, hydraulic fluid, creosote and pollutants that affect groundwater and the Trinidad Bay" (Trinidad Rancheria 2024b).

- **Cloverdale Rancheria of Pomo Indians**: "The Cloverdale rancheria was created in 1921 when the U.S. government federally recognized the Tribe and deeded 27.5 acres on the southern edge of Cloverdale to the homeless, landless numbers. . . . The federal government enacted the Rancheria Act of 1958, which transferred tribal communal property into private ownership, thereby destroying all cultural and tribal affiliations. Under this process of 'Termination' Cloverdale, and 43 other Rancherias in California, were eliminated. . . . Tillie Hardwick, a Pomo Indian woman, led a class action lawsuit against the United States government on behalf of 16 illegally terminated Rancherias . . . which reinstated the federal recognition of all illegally terminated Rancherias, including the Cloverdale Rancheria" (Cloverdale Rancheria 2024). The Cloverdale Rancheria is located within the Russian River watershed south of Lake Mendocino and the East Branch of the Russian River Tribal Study Area.
- **Cortina Rancheria – Kletsel Dehe Band of Wintun Indians**: "The Kletsel Dehe Wintun Nation is located in southwestern Colusa County [northeast of the Project]. The Nation's population at present stands at 249 tribal citizens. . . . The Kletsel Dehe Wintun Nation's historical territory encompassed much of southwestern Colusa County totaling more than 200 $mi.^2$ of oak forests, chaparral, foothills, canyons, creeks, springs, and parts of valley plains. . . . The Nation identifies by its traditional name of Kletsel Dehe which means Home of the Ground squirrel Tribe, and by the specific name of Kletwin which means Ground Squirrel People, as well as more general names such as Wintun, Patwin and Hill-Patwin. The Nation recognizes thirteen traditional villages that once comprised the villages of Kletwin Peoples including: Klet, Ko-Te-Nah, Nik-me, Shoo-Koo-ee, Ke-der Hlab-be, Loo-Kus, Bah-kah-'Hhlab-be, Cho-Che, Wi-Ko'Sel, Oo-Le, Mun-Maht-Lah, To-e-de-he, and Yakut" (GovServ n.d.; Kletsel Dehe Band of Wintun Indians 2024).
- **Coyote Valley Band of Pomo Indians**: ". . . located in the heart of Mendocino County, Redwood Valley [just west of the FERC Project Boundary and East Branch of the Russian River Tribal Study Areas]. The reservation is approximately 82.36 acres of trust land. . . . Nestled in the foothills alongside the east fork of the Russian River, Coyote Valley was one of several valleys running along the river's many branches" (Coyote Valley Band of Pomo Indians 2024a, 2024b).
- **Dry Creek Rancheria of Pomo Indians**: "The Dry Creek Rancheria Band of Pomo Indians is one of more than 20 independent communities that comprise the Pomo people. Ancestors of the Pomo people lived in the area of Sonoma, Mendocino and Lake counties

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thousands of years ago. Descendants of the early Pomo people continue as a Tribe in the Alexander Valley, and today are known as the Dry Creek Rancheria Band of Pomo Indians [located south of the Clear Lake, south of the Project]. The hunting/gathering Pomos in the Dry Creek area historically used regional plants and game for food, including clams, fish and abalone collected on trips to the coast during summer. But their primary food source was acorns, which were gathered, stored, and processed throughout the season. . . . The rancheria occupies 75 steep acres between Healdsburg and Geyserville off Highway 128 — a sliver of the Tribe's historic land. Major ancestral Tribal lands containing gravesites, former villages, and sites for gathering the sedge used in basket weaving were flooded by water from the Warm Springs Dam and Lake Sonoma in 1983" (Dry Creek Rancheria Band of Pomo Indians 2024).

- **Elem Indian Colony of Pomo Tribe**: "(Po) is pulling earth the sound (Mo) means earths holes. Therefore, the word Pomo derived from people pulling earth from holes to build and have tools for trade and survival. The Elem/Pomo of Southeastern Lake County [south of the Project] is the oldest cultural site of all the Pomo Nations. As there is about 23 Pomo Tribes of Northern California covering the three Counties of Lake, Mendocino, and Sonoma. There are seven of these Pomo Tribes in Lake County alone and they still have different dialects and some the same or similar" (Elem Indian Colony 2024).
- **Elk Valley Rancheria**: "Our ancestors have lived in the Pacific Northwest, in what is now Southern Oregon and Northern California since time immemorial [north of the Project]. The Gold Rush era of the 1850's was a time of rapid and cataclysmic change for Tribes in this region. Massacres took place at several villages, along with diseases that decimated the local Indian population. Despite such upheaval and great loss of life, our culture has survived. Today, our community is thriving. During the last two decades, there has been a strong revival of our language and cultural practices. Many of our traditions have been passed down from one generation to the next and continues to be an important part of our culture today" (Elk Valley Rancheria 2023).
- **Estom Yumeka Maidu Tribe of the Enterprise Rancheria**: ". . . based in Oroville [east of the Project], our rich history, dedication to our community's growth, and commitment to future generations mean our Tribal Administration and various programs are set up for success. Spanning from childcare and education, to gaming and environmental protection, our team is available to support our members in any way we can" (Estom Yumeka Maidu Tribe 2024).
- **Grindstone Rancheria of Wintun-Wailaki**: are a Wintun-Wailaki Tribe located in Glenn County. They do not have an active website. Their Tribal offices are located east of the Project.
- **Guidiville Band of Pomo Indians**: are a Pomo Tribe located in Mendocino County. They do not have an active website. Their Tribal offices are located south of Lake Mendocino and south of the East Brach of the Russian River Tribal Study Area.
- **Habematolel Pomo of Upper Lake**: ". . . descend from four pre-contact Tribes known as the Xowalek, Danoxa, Yobotui and Kaiyao-Matuku. These four Tribes occupied the region

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of Upper Lake [south of the Project] since time immemorial. This area was known as Pomo Country" (Habematolel Pomo of Upper Lake 2024).

- **Hoopa Valley Tribe**: "The Hoopa Valley Tribe, are a Tribal Government dedicated to protecting and promoting the interests of the Hoopa Valley Indians, and cooperating and collaborating with Federal, State, and local Governments. Unlike most California Indians the Hupa tribe was never forced, by the government of the U.S., to move off their original lands. Most of the Hupa people live on the Hoopa Valley Indian Reservation [north of the Project]. A treaty signed in 1864 with the U.S. government recognized this 141-mi.^{2} area as belonging to the Hupa. . . . The 85,445-acre Hoopa Valley Reservation in Humboldt County is the largest Indian reservation in the State of California. The Hupa share it with some Karuk, Yurok, and other Indian tribes including descendants of Chilula, and Whilkut. Timber, farming, and livestock constitute the main economic activities, they maintain a strong tribal identity and sense of continuity with the past thanks, in part, to a continued presence in their homeland. They still practice many traditional customs, such as hunting, fishing, acorn gathering, basket and regalia making, and two World Renewal dances. Hupa language is still spoken, particularly by older people" (K'ima:w 2022).
- **Hopland Band of Pomo Indians**: "The traditional land of the Hopland Band of Pomo Indians is located in the Sanel Valley, and the surrounding areas [south of the Project] of what is now southeastern Mendocino County. This has been home to the Hopland People since the beginning of time. Sho-Ka-Wah or "east of the river" is the name of the people for themselves in the Central Pomo language" (Hopland Band of Pomo Indians 2024).
- **Karuk Tribe**: The Karuk Tribe ". . . still lives in its ancestral homelands along the middle part of the Klamath River channel - roughly between Weitchpec and Seiad [north of the Project]. The Karuk Ancestral Territory spans 1,053,600 acres or 1,646 mi.^{2} (planar measurement). Since our treaties were not ratified by U.S. Congress, the Tribe was not granted a reservation in 1851 or in 1979. . . . In the Karuk language, the three main population centers have the ancient names of Panámniik for Orleans; Athithúfvuunupma for Happy Camp; and Kahtishraam for Yreka. . . . The Tribe currently has 3,751 Enrolled Tribal Members, making it the second-largest tribe in California. There are about 5,000 registered descendants" (Karuk Tribe 2020).
- **Kashia Band of Pomo Indians of the Stewarts Point Rancheria**: ". . . were the first inhabitants of the coastal Sonoma County area around Fort Ross [southwest of the Project]. The Kashia lived in lands that extended from the Gualala River in the North to Duncan's Point south of the Russian River. From the West, Kashia territory extended from the pacific coast over coastal mountain ranges down the Warm Springs Creek to the confluence of Dry Creek, thirty miles inland" (Kashia Band of Pomo Indians of the Stewarts Point Rancheria n.d.).
- **Koi Nation of Northern California (Lower Lake Rancheria)**: "For thousands of years, the Pomo Indians lived throughout North-Central California. Before colonization by Europeans, there were some 3,000 Pomo Indians living in the region, speaking one of three distinct languages. The ancestors of the Koi Nation, who were part of the Southeastern Pomo people, lived on the island village of Koi in Clear Lake [south of the Project]. They

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subsisted on an abundance of fish and game along with a variety of native vegetation" (Koi Nation of Northern California 2024).

- **Manchester Band of Pomo Indians**: ". . . formerly named the 'Manchester Band of Pomo Indians of the Manchester-Point Arena Rancheria,' is a federally recognized Tribe of Pomo Indians in California. The Tribe is a community of Pomo Native Americans who are native to Northern California. The Aboriginal Bokeya society transformed into the contemporary Manchester Band of Pomo" [which is located southwest of the Project] (Native Ministries International 2022a).
- **Paskenta Band of Nomlaki Indians**: "The Nomlaki people have lived on the same northern California lands for generations. We have raised children and buried loved ones here, hunted and gathered for our survival, and built shelters all throughout this region. We've spoken the Nomlaki language and traded with many other northern California tribes living across the forests and distant mountains. . . . Like other Tribes, we all lived freely until our contact with Europeans, which brought disease, death, and destruction. . . . The Paskenta Band Restoration Act extended federal re-recognition and restored our Tribal rights and privileges . . . we once again exercised jurisdiction over our lands and people and negotiated to contract with the federal government for health, education, and other services. Four years later, we bought back 2,000 acres of our aboriginal land near Corning [east of the Project]. . . . Our people's resiliency in the face of so much historical trauma continues to inspire our hopeful future" (Paskenta Band of Nomlaki Indians 2024).
- **Pinoleville Pomo Nation**: "The roots of the Pinoleville Tribe go back to Potter Valley, a lush, abundant area called Be-lo-kai, meaning verdant valley [located within the FERC Project Boundary and East Branch of the Russian River Tribal Study Areas]. . . . In 1878, a large group of Potter Valley Pomos left the Round Valley Reservation and purchased 51 acres of land on the north side of Ukiah [south of the Project]. It was called ke-buk ke-bul, but soon came to be known as Pinoleville" (Pinoleville Pomo Nation 2020a, b).
- **Potter Valley Tribe**: consists of Pomo people in Mendocino County who were "previously known as the Little River Band of Pomo Indians and Potter Valley Rancheria of Pomo Indians of California. The Tribe is descended from the first-known inhabitants of Potter Valley which the Pomo called Ba-lo Kai" (Native Ministries International 2022b). The Potter Valley region is located within the FERC Project Boundary and East Branch of the Russian River Tribal Study Areas (Potter Valley Tribe 2025).
- **Pulikla Tribe of Yurok People (formerly Resighini Rancheria)**: "The Tribal Citizens of the Pulikla Tribe of Yurok People remain on the lands and waters where our ancestors have survived since noohl hee-kon (the beginning). This includes the lower Klamath River and tributary watersheds, high country, coast and lagoons along the Pacific Ocean, and the ocean off this coastline west to the horizon [north of the Project]. Our identity and cultural lifeways are inextricably tied to this place. Here, our ancestors resided in numerous villages and lived from what the earth provided. Each village has its own geographical boundaries, as well as members and descendants with traditional ownership to certain places, such as fishing holes, mussel rocks, and acorn gathering areas. . . . Tribal citizens continued to practice traditional fishing, hunting and gathering activities both on Tribal land and at our usual and accustomed

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places throughout our ancestral territory. Fishing on the Klamath River and small tributaries, hunting and gathering from the mountains, and fishing and gathering from the coast continued to occur." The Tribal Constitution was amended in 2024 and, the Tribe is "now known as Pulikla Tribe of Yurok People" (Pulikla Tribe of Yurok People n.d.).

- **Quartz Valley Indian Community**: "The Quartz Valley Indian Community of the Quartz Valley Reservation of California . . . is located in rural western Siskiyou County [north of the Project]. The Tribe is one of two federally recognized Tribes in Siskiyou County. . . . Tribal membership is 397 as of February 2023. . . . Its original membership was drawn from Shasta and Karuk culture groups. . . . The reservation consists of approximately 210 acres, comprised mostly of trust land with some fee parcels. It is in a sub-valley of agricultural Scott Valley (ranching, farming, logging/forestry, recreation), about 10 mi. from Fort Jones (pop. 653 in 2020) and 12 mi. from Etna" (Quartz Valley Indian Community 2024).
- **Redding Rancheria**: "In 1922 the Bureau of Indian Affairs purchased the land that is now considered the Redding Rancheria [located northeast of the Project]. The purpose of this purchase was to provide a place for homeless Indians to camp and live. . . . Our Rancheria was unique because it included Indians from not just one tribe but Indians of Pit-River, Wintu and Yana descent. Prior to the purchase of the land by the government for Indian homes, many Indians gathered in the area to fish for salmon in Clear Creek." The Redding Rancheria is active in cultural preservation including pow wow dance and drum classes, basket weaving, reclaiming Tribal baskets and artifacts, and hosting a Big Time and ceremonial Bear Dance. The Redding Rancheria operates the Win-River Resort and Casino (Redding Rancheria 2024).
- **Redwood Valley Little River Band of Pomo Indians**: (Redwood Valley Rancheria) is "located in Redwood Valley in Mendocino County [within the FERC Project Boundary Tribal Study Area and near the East Branch of the Russian River Tribal Study Area]. For several thousand years the Tribe's ancestors lived along the West Fork of the Russian River, located north of Calpella, CA. The Tribe interacted with other Pomo Tribes located within the Russian River watershed, the Eel River watershed, and Tribes found along the coasts of the Clearlake and the Pacific Ocean" (Redwood Valley Little River Band of Pomo Indians 2024).
- **Robinson Rancheria of Pomo Indians of California**: consists "of Eastern Pomo people in Lake County, California. As the original inhabitants of California's beautiful Clearlake [south of the Project] and volcano Mt. Konocti, our land is at the heart of our culture and heritage" (Robinson Rancheria 2020).
- **Round Valley Reservation / Covelo Indian Community**: "Round Valley has been the heart of the Yuki territory 'since time began.' The Yuki have lived on their ancestral homeland (stretching from Humboldt Bay to the upper Russian River area) for over 10,000 years prior to other Tribes immigrating into California." The Eel River remains central to the cultural identity of the Round Valley Indian Tribes. "The Yuki are thought to be the original Paleo-Indians of California. 162 years ago, neighboring Tribes were forced into Round Valley. By language family, the confederated Tribes of the Round Valley Indian Reservation are: Yuki: Yukian Family; Pit River: Hokan Family; Pomo: Hokan Family; Nomlacki: Penutian Family; Concow: Penutian Family; Wailacki:

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Athabascan Family" (Round Valley Indian Tribes n.d.). The Round Valley Reservation lands are within the Eel River Tribal Study Area, and the reservation is located just north of the FERC Project Boundary Tribal Study Area.

- **Scotts Valley Band of Pomo**: ". . . is a landless Tribe with a current membership of nearly 300 Tribal members. The Tribal offices are located in the City of Lakeport, Lake County and the City of Concord in Contra Costa County . . ." [south of the Project] (Scotts Valley Band of Pomo Indians n.d.).
- **Sherwood Valley Band of Pomo**: "Sherwood Valley Rancheria is located within Aboriginal homelands we have used and occupied since time immemorial. Our homeland extends from approximately the Hwy 101 corridor, through the Redwood Forests, on to the Coast. As the original stewards of this land we retain original usufructuary rights to protect the land, air, water, and food sources upon our homeland. . . . Sherwood Valley Rancheria was established under Secretarial Order in 1909 [located west of the Eel River Tribal Study Area]. Sherwood Valley is the successor in interest to ownership of the Mendocino Indian Reservation, established by Act of Congress on March 3, 1853" (Sherwood Valley Band of Pomo Indians n.d.).
- **Tolowa Dee Ni' Nation**: "The contemporary Tolowa are citizens and governed under the Tolowa Dee-ni' Nation and with various federally recognized nations and tribes throughout the Pacific Northwest including: The Elk Valley Rancheria, The Resighini Rancheria, The Big Lagoon Rancheria, The Trinidad Rancheria, The Confederated Tribes of Siletz Oregon, The Yurok Tribe, The Blue Lake Rancheria, The Bear River Rancheria and The Hoopa Valley Reservation" (Del Norte County Historical Society n.d.).

  "Their Taa-laa-waa-dvn (Tolowa-Ancestral-Land) lays along the Pacific Coast between the watersheds of; Wilson Creek and Smith River in California and the Winchuck, Chetco, Pistol, Rogue, Elk and Sixes Rivers, extending inland up the Rogue River throughout the Applegate Valley in Oregon. . . . [This region is north of the Project.] Living in their ancient ancestral home of Genesis with the K'vsh-chu and Lhuk, the Tolowa Dee-ni' continue to pursue a livelihood. The Tolowa Dee-ni': support education, language, and health; continue ceremony and to procure food; acquire land and art; pursue economic development and social programs; and defend sovereignty . . ." (Tolowa Dee Ni' Nation n.d.).
- **Wiyot Tribe**: "Wiyot people have lived in the Humboldt Bay region for thousands of years. The North Coast of California is rich with abundant terrestrial, riverine, estuarine, and marine resources. . . . Since time immemorial, the Wiyot people have lived along Shou'r (the Pacific Ocean) and around Wigi (Humboldt Bay). Until the onset of settler-colonialism in the 1850s they have lived in reciprocal relationship with over 40 mi. of coastline, extending inland about 10 mi., living in balance with the plants, animals, earth, water, and air across multiple ecosystems and watersheds. Today, this unceded ancestral territory is marked by the negative effects of decades of extractive practices around fur, minerals, timber, fishing, water diversion, and more recently, real estate speculation. This has left the region to face increasing economic inequality alongside environmental degradation and destabilization. Dishgamu Humboldt was created to address these challenges and help restore balance to Wiyot ancestral territory - now a collection of highly

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interdependent yet disparately governed cities and towns, as well as the population center of Humboldt County and the northern California coast. Our deeply rooted environmental knowledge and territorial-scale perspective make us uniquely equipped to address the scale and complexity of the challenges before us" (Wiyot Tribe n.d.a., n.d.b.). The Wiyot Tribal offices are located at Table Bluff Rancheria just north of the Eel River Tribal Study Area.

- **Yocha Dehe Wintun Nation**: "Since time immemorial, our people have lived on lands today known as Yolo, Solano, Colusa, Lake and Napa Counties [south and east of the Project]. Centered in Yolo County's Capay Valley, our Northern California homeland is at the heart of our culture and heritage" (Yocha Dehe Wintun Nation 2024).
- **Yurok Tribe**: "The Yurok (Oohl) Tribe is California's largest Native American Tribe with nearly 6,500 enrolled members [located north of the Project]. We have long been celebrated as great fishermen, eelers, basket weavers, canoe makers, storytellers, singers, dancers, healers, and strong medicine people. As stewards of the land, our way was to never overharvest but to always ensure the sustainability of our food supply for future generations" (Yurok Country 2023).

  "The mission of the Yurok Tribe is to exercise the aboriginal and sovereign rights of the Yurok People to continue forever our Tribal traditions of self-governance, cultural and spiritual preservation, stewardship of Yurok lands, waters and other natural endowments, balanced social and economic development, peace and reciprocity, and respect for the dignity and individual rights of all persons living within the jurisdiction of the Yurok Tribe, while honoring our Creator, our ancestors and our descendants." The Yurok Tribe is active in revegetation and fisheries restoration along the recently undammed segment of the Klamath River (Yurok Tribe 2024).

The following 13 non-federally recognized Tribes and Tribal groups may also have an interest in the Project. Unless noted otherwise, the description of each Tribe below is provided in their own words from their respective websites:

- **Intertribal Sinkyone Wilderness Council**: ". . . is a Tribal non-profit consortium comprised of ten federally recognized Northern California Tribal Nations with cultural connections to the lands and waters of traditional Sinkyone and neighboring Tribal territories. . . . The Sinkyone Council grew from the deep intergenerational connections of this region's Indigenous Peoples with their sacred lands and waters, and from the inspiring efforts of activists, Tribal community members and others to halt logging of Sinkyone's remnant old growth rainforest, protect declining salmon and other native species, promote healing, and re-vitalize the Tribes' cultural relationships with lands and waters of the Sinkyone region. . . . Member Tribes of the Sinkyone Council consist of the Cahto Tribe of Laytonville Rancheria, Coyote Valley Band of Pomo Indians, Hopland Band of Pomo Indians, Pinoleville Pomo Nation, Potter Valley Tribe, Redwood Valley Little River Band of Pomo Indians, Robinson Rancheria of Pomo Indians, Round Valley Indian Tribes, Scotts Valley Band of Pomo Indians, and Sherwood Valley Rancheria of Pomo Indians" (InterTribal Sinkyone Wilderness Council 2024b, 2024c).

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Sinkyone Council and its member Tribes are actively involved in numerous Tribal resource protection and revitalization programs near the Eel River Tribal Study Area including:

- Enacting stronger measures to protect kelp and seaweed from the increasing pressures of commercial harvesting, climate change, pollution, and other devastating impacts.
- "The Council was instrumental in the establishment of California's network of Marine Protected Areas (MPAs), the second largest network of its kind in the world. Due to activism and advocacy by the Council and many others, the California Fish and Game Commission in 2012 approved a first-of-its-kind regulation protecting Tribal traditional fishing, gathering, harvesting, and other cultural practices within specific MPAs, without imposition of the new restrictions applying to non-Tribal commercial and recreational harvesters. . . . The Sinkyone Council, Tolowa Dee-ni' Nation, Wiyot Tribe, and Cher-Ae-Heights Indian Community of Trinidad Rancheria co-authored and published a paper for the North Coast's MPA Baseline regarding Tribal Traditional Knowledge of culturally significant marine species and ecosystems, which summarizes the results of their research conducted between 2014 and 2017. The first of its kind, this project contributes a highly relevant and groundbreaking study that utilizes Traditional Knowledge to develop a baseline characterization for key nearshore marine habitats and provides significant cultural-historical context for that baseline" (InterTribal Sinkyone Wilderness Council 2024b).
- ". . . protection of a vital but threatened Eel River tributary and cultural landscape within Cahto Tribal Territory. The Cahto Tribe and many others oppose a timber harvest operation planned for the watershed, which would irreparably harm critically important coho salmon populations and habitat, the redwood ecosystem, and many cultural values of the Cahto Tribe" (UC Law San Francisco 2024).

  "In December 2021, an important Land Back achievement was reached when a 523-acre area of coast redwood forestland was returned to the InterTribal Sinkyone Wilderness Council through donation by Save the Redwoods League. Designated by Sinkyone Council as Tc'ih-Léh-Dûñ (meaning 'Fish Run Place' in Sinkyone language), the land contains nearly 200 acres of old-growth redwood and critical habitat for imperiled species including marbled murrelet, coho salmon and steelhead trout. Part of the responsibility we as Indigenous Peoples have is to honor and safeguard these relatives who, like our peoples, have been here for many thousands of years" (InterTribal Sinkyone Wilderness Council 2024a).

- **Melochundum Band of Tolowa Indians**: No Tribal website or online information found. "The name 'Tolowa**'** is derived from *Taa-laa-welh* (*Taa-laa-wa*), a Yurok and Wiyot name from the Algonquian language for the capitol of *Yan'-daa-k'vt.* Their autonyms are dee-ni' and xvsh, meaning 'person" or 'human being.' In the political sense they are the dee-ni', which means 'to be a citizen'" (Del Norte County Historical Society n.d.). The Tolowa are located on the California–Oregon border, near the Smith River, north of the Project.
- **Mishewal-Wappo Tribe of Alexander Valley**: is "headquartered . . . in Windsor [south of the Project] and is the last remaining Wappo Tribe in existence. The Tribe now claims 357 enrolled members, all lineal descendants of 10 families who lived on the reservation

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in 1935." They are actively "asking the federal government to restore their federal status, benefits and historic land rights" (AAA Native Arts 2024a).

- **Nor-Rel-Muk Wintu Nation**: "The Nor Rel Muk Wintu Nation's traditional homeland lies in the headwaters of the South Fork of the Trinity River, in Trinity County, California [north of the Project]. Approximately half of the Tribe's 1,000 members still live near their ancestral lands in Trinity and Shasta Counties. Nor Rel Muk Wintu members from across the state gather annually over Memorial Day weekend, to participate in Wintu songs, dances, and traditional crafts" (Alliance for California Traditional Art 2024).
- **Noyo River Indian Community**: is located in Mendocino County near Fort Bragg, west of the Project. A Tribal website was not found.
- **Shasta Indian Nation**: "The Shasta Indian Nation is comprised of people who came from the villages of Kikacéki, a reach of Klamath River as well as Scott Valley and Shasta Valley [north and east of the Project]. . . . The wilderness of northwestern California and southwestern Oregon has been, and still is, the traditional homeland of the Shasta Indian people. Most traditional Shasta villages were located along the Klamath, Shasta, Salmon, and Scott Rivers, and their tributaries. The major structures of a Shasta village included the dwelling house (umma), a 'big house' (okwa-umma), the sweat house (wukwu), and the menstrual hut (wapsahuumma). Each village was integrated into a larger band, each led by a headman" (Shasta Indian Nation 2024a, 2024b).
- **Shasta Nation**: No Tribal information was found online.
- **Shebelna Band of Mendocino Coast Pomo Indians**: "We are Shebelna Pomo. We use this name because we believe it is the original name of our ancestor's band. Our ancestors indicated that we were Shubuldano and our lands were Shabaltino" (Shebelna Band of Mendocino Coast Pomo Indians n.d.). The Shebelna are currently located near Fort Bragg, west of the Project.
- **Wailaki Tribe**: A web search did not locate specific information or a Tribal website; however, some Wailaki live on the Round Valley Reservation north of the Project as well as on the Sugar Bowl Rancheria (Lakeport County, south of the Project). "Other California Southern Athapaskans also live among and have become mixed with Athapaskan Hupa or with other groups" (AAA Native Arts 2024b). The Bear River Band of Rohnerville Rancheria (Humboldt County, north of the Project) is home to some Southern Athapaskans (United Indian Health Services 2023).
- **Winnemem Wintu Tribe**: "The Winnemem Wintu are a traditional Tribe who inhabit our ancestral territory from Buliyum Puyuuk (Mt. Shasta) down the Winnemem Waywaket (McCloud River) watershed [northeast of the Project]. . . . In our language, Winnemem Wintu translates to Middle Water People, as the Winnemem Waywaket (McCloud River) is bounded by the Nomtipom Waywaket (Upper Sacramento River) to the west and the Pit River to the east. . . . When the Shasta Dam was constructed during World War II, it flooded our home and blocked the salmon runs. The Nur, or salmon, are an integral part of our lifeway and of a healthy Winnemem Waywaket watershed. As salmon people and middle

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water people, we advocate for all aspects of clean water and the restoration of salmon to their natural spawning grounds" (Winnemem Wintu Tribe n.d.a., n.d.b.).

- **Wintu Tribe of Northern California**: "operate the Toyon-Wintu Center, a 501(c)(3) non-profit corporation. We represent the direct descendants of the Original Indigenous people known as the Wintu" [generally located northeast of the Project] (Wintu Tribe of Northern California 2024). Their federal recognition was lost, and they are working on reinstating their federal status.
- **Yokayo Tribe**: a Tribal Facebook page states: "The Yokayo Tribe of Indians are a small non-federally recognized Tribe located southeast of Ukiah [south of the Project] on their private Tribal property since before 1880" (Facebook 2024a).
- **Yuki/Wailaki Tribe**: A web search did not locate specific information or a Tribal website; however, a Facebook search found members of this Tribal group and Tribal members of the Round Valley Tribe participating in a traditional redwood canoe launch on the Eel River on June 1, 2024 (Facebook 2024b).

2.2.3.12.7 Tribal Lands

Tribal lands are defined as all lands within the boundaries of an Indian reservation and all dependent Indian communities (36 CFR Part 800.16[x]) and any lands held in trust for any Tribe by BIA. There are no Tribal lands that meet this definition located within or adjacent to the FERC Project boundary (BIA 2017, 2024b). BIA lands held in trust for the Round Valley Reservation are located along the Eel River Tribal Study Area downstream of the Project (GLO records).

2.2.3.12.8 Access Agreements

PG&E does not maintain access agreements with any Tribes in or within 0.25 mi. of the FERC Project boundary.

2.2.3.12.9 Tribal Resources and Interests

In addition to ethnographic villages and archaeological sites, contemporary Tribal resources, practices, and interests have been outlined for each Tribe in Section 2.2.3.12.6 and are further discussed in this section. Proposed Project activities could potentially affect Tribal resources by affecting those qualities that make these resources eligible for inclusion in the NRHP or that hold significant cultural value.

Three main categories of Tribal resources include:

- **Tribal places**, which are locations associated with the ancestral past and places related to current gathering and/or hunting practices or other resource types.
- **TCPs**, which are places or properties that are eligible for inclusion in the NRHP based on their associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community. National Register Bulletin No. 38, *Guidelines*

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for Evaluating and Documenting Traditional Cultural Properties,[3] defines a TCP as "as one that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1998:1). Examples provided in National Register Bulletin No. 38 include:

  - A location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world;
  - A location where Native American religious practitioners have historically gone, and are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural rules of practice; or
  - A rural community whose organization, buildings and structures, or patterns of land use reflect the cultural traditions valued by its long-term residents.

- **Cultural Landscapes**, which are defined as large-scale properties (districts) often consisting of multiple elements and features that when linked form an interconnected place (Advisory Council on Historic Preservation 2016). They are embedded with multigenerational cultural and historical meaning by the peoples who have traveled and used them. In addition to physical components such as archaeological resources, plants, animals, rivers, meadows, waterfalls, viewsheds, and mountain peaks, non-visible aspects of spirituality, story, memory, and audio or olfactory aspects of places are often important to how they are defined. Cultural Landscapes are often TCPs.

Tribal government resources, which are Indian reservations, rancherias, colonies, Indian ITAs,[4] and allotments.

During previous relicensing efforts, PG&E reviewed files and databases maintained by the NAHC and BIA to determine whether any TCPs or Tribal government resources have been identified within or in the immediate vicinity of the FERC Project boundary. This initial search resulted in

[3] Bulletin 38 is currently under revision, and the revised draft now uses the term "Traditional Cultural *Places*," in keeping with contemporary Tribal usage and to be consistent with the National Register of Historic *Places* (NPS 2023). The current status of the Bulletin 38 revision can be found at: ParkPlanning – National Register Traditional Cultural Places Bulletin Update (nps.gov). The revised Bulletin 38, currently in its second round of review, notes that the revision has "no change from previous versions of the TCP Bulletin in the definition of a TCP or how one is identified, documented, and evaluated for inclusion in the National Register" (NPS 2023).

[4] ITAs are defined by BLM (2007:1) as ". . . land or a natural resource held by the Federal Government in trust, or that is restricted against alienation, for Indian Tribes, individual Indians or Alaska Natives." ITAs are, therefore, legal interests in property held in trust by the U.S. for Indian Tribes or individual Native Americans. The U.S. Secretary of the Interior, acting as the trustee, holds many assets in trust. ITAs can cover real property, physical assets, or intangible property rights. They may be lands, including reservations and public domain allotments; minerals; water rights; and claims, just to name a few. While most ITAs are on reservations, they may also be found off-reservation. ITAs cannot be sold, leased, or otherwise alienated without the U.S. government's approval. They may also be identified as historic properties (i.e., a cultural resource listed on or determined eligible for listing on the NRHP); however, an ITA is a land management/ownership status, while status as a historic property reflects its significance relative to the NRHP. ITAs can include historic properties (either as a TCP or as an archaeological site or district), but the ITA itself is not a historic property.

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no documented TCPs or Tribal government resources being identified within or in the immediate vicinity of the FERC Project boundary. Additionally, the NAHC response did not identify any documented sacred lands within or adjacent to the FERC Project boundary. These results do not confirm that there are no TCPs or sacred lands within the Tribal resources study areas—often, TCPs are not recorded or registered with the NAHC and are identified through implementation of a Tribal resources or ethnographic study, which involves research, interviews, and fieldwork. Based on a review of the ethnographic and ethnohistoric context, review of cultural resource reports and archaeological site records, and feedback received from Tribes during relicensing efforts and in response to the IDSA, there is a high probability of Tribal places and TCPs being present within the Tribal resources study areas.

2.2.3.12.10 Potential Tribal Issues and Concerns

General Tribal issues and concerns received when PG&E was initially relicensing the Project and after PG&E submitted the IDSA in December 2023 included access to the Eel River, fish flows, fish passage, restoring Native fisheries, and potential effects to ceremonial plants and culturally important fish species, including Central California Coast coho, California Chinook, Central Coast steelhead, Pacific lamprey, and green sturgeon. Additional potential issues and concerns include effects to ethnographic village sites and archaeological resources, water quality and water allocations, invasive species management, Land Back initiatives and environmental justice, protection of Tribal traditional fishing, gathering, harvesting, and other cultural practices, and inclusion of Tribal consultation, Traditional Ecological Knowledge (TEK), co-stewardship agreements, and Tribal monitoring during Project planning, construction, decommissioning, and restoration activities. Some of these concerns were brought forth at the Tribal and agency outreach meeting that PG&E hosted on February 15, 2024, to discuss the development of the Draft Surrender Application and Decommissioning Plan.

PG&E submitted an IDSA in November 2023 to Tribes[5] and stakeholders and the DSA on January 31, 2025. Letters have been received from the Habematolel Pomo of Upper Lake, Pinoleville Pomo Nation, Potter Valley Tribe, Round Valley Indian Tribes, and Wiyot Tribe. Tribal comments and concerns are summarized below by Tribe (listed in alphabetical order), Tribal outreach activities are listed in Table 2.2.3.12-2, and letters are provided in Appendix 2.2.3.12-A.

Habematolel Pomo of Upper Lake

The Habematolel Pomo of Upper Lake replied to the DSA that the Project is within the aboriginal territory of the Tribe, and they have concerns that the Project could impact known cultural resources (letter to PG&E dated March 3, 2025).

[5] Big Valley Rancheria of Pomo Indians, Cahto Tribe, Coyote Valley Band of Pomo Indians, Elem Indian Colony of Pomo Indians, Guidiville Band of Pomo Indians, Habematolel Pomo of Upper Lake, Hopland Band of Pomo Indians, InterTribal Sinkyone Wilderness Council, Kashia Band of Pomo Indians of the Stewarts Point Rancheria, Laytonville Rancheria, Lower Lake Rancheria, Manchester-Point Arena Rancheria, Middletown Rancheria, Mishewal-Wappo of Alexander Valley, Noyo River Indian Community, Pinoleville Pomo Nation, Potter Valley Tribe, Redwood Valley Rancheria of Pomo, Robinson Rancheria Band of Pomo Indians, Round Valley Indian Tribes, Scotts Valley Band of Pomo Indians, Shebelna Band of Mendocino Coast Pomo Indians, Sherwood Valley Rancheria Band of Pomo Indians, Wailaki Tribe, Wiyot Tribe, and Yuki/Wailaki.

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Pinoleville Pomo Nation

The Pinoleville Pomo Nation replied to the IDSA regarding the following requests and concerns:

- Letter to PG&E dated December 13, 2023:
- Tribe requests transparency of Joint Powers of Authority on restructuring the water allocation and costs.
- Tribe requests Russian River Watershed Tribal participation on Joint Powers of Authority board.
- The Tribe is concerned about:
  - Future water allocations for Tribes being restricted.
  - Future water rates being increased to unmanageable levels.
  - Lack of an environmental impact study on the upper Russian River fishery and ecosystem.
  - Impacts on threatened-with-extinction Central California Coast coho, California Chinook, and Central Coast steelhead.
  - Economic and environmental planning to adapt to changing climate.
  - Downstream impacts on water quality and quantity.
  - Watershed-based planning for water conservation.
  - Russian River fishery restoration.

Potter Valley Tribe

The Potter Valley Tribe has submitted letters in response to the IDSA and DSA. Their primary concerns include the following:

- Transfer of Project lands
- Consultation regarding the Project
  - (Letter to PG&E dated December 22, 2023): "Our primary comment to the decommissioning plan is that it does not address disposition of the land PG&E retained that was not identified as within the FERC project boundaries. The interplay between the Stewardship Council process and this Plan, in conjunction with the CPUC's Tribal Land Return Policy, requires this Plan to be specifically discussed with the Potter Valley Tribe, not just with an email - we need to meet in person with PG&E to discuss the impact of the Plan on the Tribe and its adjacent land."

Round Valley Indian Tribes (RVIT)

The RVIT has submitted letters in response to the IDSA and DSA. Their primary concerns and comments include:

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- Letters [2] to PG&E dated December 22, 2023:
  - Tribe supports removal of both Scott Dam and Cape Horn Dam with site restoration to pre-Project conditions and a free-flowing Eel River and fishery restored to support naturally reproducing, self-sustaining and harvestable native anadromous fish populations.
  - Consultation and collaboration with the Tribe.
  - Tribe requests studies to inform the decommissioning plan and potential indirect effects of sediment transport and deposition downstream once Scott Dam is removed. Tribe requests a collaborative approach with Tribes, PG&E, FERC, and resource agencies that include the following topics:
    - Decommissioning plan and dam removal process
    - Sediment management
    - River restoration
    - Restoration of former inundation zone of Lake Pillsbury reservoir and Van Arsdale Reservoir
    - Invasive species management
    - Aquatic species management
    - Protection of cultural and archaeological resources
    - Tribal beneficial uses and Tribal water rights
    - California Assembly Bill No. 1936, Chapter 478
    - Environmental justice
    - Tribal consultation

- Additional comments from letter to PG&E dated March 3, 2025:
  - "Support PG&E's proposal to conduct additional studies to assure decision-makers have a thorough and accurate understanding of Tribal histories, cultures, connections to the Eel River and concerns."
  - Tribal Resources Study that "draws from varied sources will ensure thoroughness and accuracy, and, equally important, will include unique Tribal perspectives on their history and culture."
  - "National Register of Historic Places (NRHP) should take into account the Tribes' unique perspective on the role of tribal resources in the way of life, economy and culture of the Tribes' community."
  - Inclusion of "Traditional Tribal Knowledge (sometimes called Traditional Ecological Knowledge), which is a reliable source of information about Tribal connections to lands and rivers and their place in Tribal cosmologies and culture."

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Wiyot Tribe

The Wiyot Tribe submitted letters in response to the IDSA (letter to PG&E, no date) and DSA (letter to PGE&E, no date). Their primary concerns include the following:

- The Tribe's ancestral lands and waters encompass the lower mainstem Eel River and are some of the last to see the water that has flowed from the headwaters. For a truly free-flowing Eel River, Scott Dam and Cape Hom Dam must go, and the NERF should not be approved.
- Critical migration and spawning period for Pacific lamprey, coho salmon, and steelhead trout in the Eel River.
- Fish passage, water conveyance, river flows and sediment releases during and after dam removal.
- Restoration of former inundation zone in Lake Pillsbury reservoir and Van Arsdale Reservoir.
- Plan for restoration activities.

Table 2.2.3.12-2. Tribal outreach activities.

Date	Type / Purpose
November 17, 2023	PG&E distributed an IDSA in November 2023 to Tribes and stakeholders.
January 18, 2024	PG&E met with agencies and Tribal representatives to provide an overview of the Project and PG&E goals, discuss the surrender process and schedule, provide updates to the application, provide stakeholder comments received, and solicit input on the Proposed Action and alternatives.
February 14, 2024	PG&E met with interested Tribal representatives and members to provide an overview of the IDSA and Decommissioning Plan and the license surrender process.
February 15, 2024	PG&E hosted a meeting to discuss the development of the DSA and Conceptual Decommissioning Plan.
March 2024 to September 2024	PG&E refined development of the Project description and identified study areas for environmental and cultural and Tribal resources.
May 31, 2024	PG&E sent a letter to all interested parties informing them of the extension for time request for the final DSA to be submitted to FERC in January 2025 and the final surrender application to be submitted to FERC in July 2025.
September 9, 2024	PG&E hosted a technical outreach meeting to provide an update on PG&E's application, including the surrender application process, Proposed Action timeline, and application content; effects analysis approach; and potential effects and proposed environmental protection measures.
September 11, 2024	Received Native American contacts and information on whether any sacred land files were present for the Tribal resources study areas from the NAHC.
October 11, 2024	PG&E sent letters to additional Tribes identified by the NAHC describing the Project, cultural and Tribal resources study areas, summary of surrender application outreach activities, and timeline moving forward.

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Date	Type / Purpose
January 31, 2025	PG&E sent the Draft License Application to Tribes listed in Table 2.2.3.12-1.
March 21, 2025	PG&E and Potter Valley Tribe meeting.

2.2.3.12.11 References

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2.2.3.13 Socioeconomic Resources

This section describes the existing socioeconomic conditions in the vicinity of PG&E's Potter Valley Hydroelectric Project (Project).

Specifically, the section describes potentially affected socioeconomic values and social groups, population levels and trends, employment and income levels and trends, and the local tax base. Socioeconomic conditions in the region are influenced by the availability and quality of natural resources in the area, including water supply and quality, land, fish and wildlife, and recreational opportunities.

2.2.3.13.1 Information Sources

The socioeconomic information presented in this section draws from the following data sources:

- California Department of Finance county population projections (California Department of Finance 2023, 2024);
- County websites and reports for Humboldt and Sonoma counties (Bohn et al. 2023; County of Humboldt 2023; Rivera 2023);
- Economic studies of the commercial fishing and recreation/tourism industries (California Sea Grant 2024; Dean Runyan Associates 2023; Hackett et al. 2009);
- Local newspaper articles and Friends of the Eel River reports (Bacher 2011; Huetti 2023);
- U.S. Bureau of Economic Analysis (BEA) data (BEA 2024);
- U.S. Census Bureau data (U.S. Census Bureau 2018–2022);
- Water district service area data (Sonoma Water 2024; Valley of the Moon Water District 2016); and
- Comments received from stakeholders on the ongoing license surrender process.

2.2.3.13.2 Description of the Study Area

The study area for socioeconomic resources is four Northern California counties: Lake, Mendocino, Sonoma, and Humboldt counties. Scott Dam and Lake Pillsbury reservoir are located in Lake County, while Cape Horn Dam and Van Arsdale Reservoir are located in Mendocino County. Van Arsdale Reservoir was formed by Cape Horn Dam in 1907 and Lake Pillsbury reservoir by Scott Dam in 1921. Water diverted for hydroelectric generation by the Project to the East Branch Russian River has the ancillary effect of enhancing instream flows for fish and wildlife and increases the water supply for agricultural, municipal, and industrial uses in portions of Mendocino and Sonoma counties and other entities.[1] Further, Eel River flows downstream of the

[1] The Sonoma Water conveyance system also supplies water from the Russian River system to various entities. These entities are not included in this analysis because it is not known the extent to which diversions from the Project benefit these water users.

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Project support water-based recreation, tourism, and fish and wildlife–related socioeconomic uses and values, primarily in Mendocino and Humboldt counties.[2] As such, water-related socioeconomic conditions and values in each of these four counties are described.

2.2.3.13.3 Overview of Potentially Affected Socioeconomic Values and Affected Social Groups

Socioeconomics refers to attributes of the human environment, specifically the demographic, social, and economic characteristics of an area and its population. Potentially affected socioeconomic values are broadly defined to include measures of social or economic well-being related to how people use and interact with natural resources, the environment, and each other. This includes resource uses and values related to agriculture, recreation, water supply, energy production, aesthetics, species abundance and preservation, quality of life, and public health. The relationship between the Project and potentially affected resources, social groups, and socioeconomic values is summarized in Table 2.2.3.13-1.

As described in Table 2.2.3.13-1, potentially affected socioeconomic values include economic opportunity (local jobs and income), government fiscal stability (tax revenues and expenditures), recreation value, energy reliability and costs, water reliability and costs, aesthetic values, community way of life, and the social and cultural value to people of preserving species and habitats. The associated potentially affected social groups include farmers/farmworkers, conservationists, recreationists/tourists, tourism/recreation industry workers, tribes, urban/suburban water users, and local residents. An individual may be a member of multiple social groups.

2.2.3.13.4 Population and Affected Social Groups

Map 2.2.3.13-1 provides an overview of the population density in the study area and identifies the four study area counties, Project features, and waterways downstream of Project dams (highlighted in dark pink). Map 2.2.3.13-2 depicts the census block groups located within the study area. Table 2.2.3.13-2 summarizes the 2022 population in the study area, as well as growth since 2010 and projected growth by 2050. As of July 1, 2022, the total study area population is estimated at 783,737 people, distributed as follows: 62 percent in Sonoma County, 17 percent in Humboldt County, 12 percent in Mendocino County, and 9 percent in Lake County. Over 40 percent of study area residents live in the cities of Santa Rosa, Petaluma, Eureka, Arcata, Ukiah, and Clearlake (the largest urban center in the study area is Santa Rosa, with 23 percent of the study area population). The remaining 60 percent of study area residents live in towns with fewer than 60,000 residents and in unincorporated areas. Since 2010, the populations of Humboldt, Mendocino, and Sonoma counties have grown by approximately 4 percent or less, well below the state average of 7 percent. However, the population of Lake County has grown slightly faster at a rate of 6 percent. The four-county study area population is projected to decline by 9 percent by 2050.

[2] The Eel River also flows through the very southwestern corner of Trinity County but there are few people inhabiting areas near the Eel River in Trinity County, so this county is not included in the socioeconomic study area.

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Table 2.2.3.13-1. Relationship between potentially affected resources, socioeconomic values, and social groups.

Socioeconomic Value (Social Groups)	Key Resources	Description
Tribal cultural and subsistence values (tribes)	Cultural resources, fish/wildlife, vegetation, water	Numerous tribes are in the study area. Cultural resources, fish and wildlife resources, and natural landscapes are closely associated with many different cultural and spiritual traditions as well as with tribal community identity (Bacher 2011). Chinook salmon and other fish resources are particularly important to tribal cultures, communities, and livelihoods in the North Coast region (California Sea Grant 2024).
Economic opportunities (farmers/ farmworkers, tourism workers/ proprietors, anglers, commercial fishing, local residents)	Agriculture/land use, commercial fishing, recreation, aesthetics, fish/wildlife	Water resources are used for out-of-stream consumptive uses such as agriculture, residential, and municipal uses, as well as for instream recreation/aesthetic/habitat conditions important to the recreation and tourism industries and the commercial fishing industries, and associated employment and income. The management of water in the study area is a key determinant of economic opportunities in terms of employment and income-generation potential. Mendocino County Russian River Flood Control & Water Conservation Improvement District and Sonoma Water have water rights to divert and use water stored in Lake Mendocino on the East Branch Russian River. Specific to agricultural economic opportunity, the East Branch Russian River provides irrigation water to the PVID in Mendocino County and to irrigators in the Russian River basin in Sonoma County, supporting employment and income associated with agricultural irrigation. There are seven port-based fishing communities in Humboldt and Mendocino counties within the study area: Trinidad, Eureka, Fields Landing, Shelter Cove, Fort Bragg, Albion, and Point Arena. The value of commercial salmon fishing in the study area is influenced by the abundance of salmon. Historically, the region supported an active salmon fishery; this fishing industry has been adversely affected by dwindling stocks and restrictions on salmon harvesting (California Sea Grant 2024). Water-based reservoir (Van Arsdale Reservoir, Lake Pillsbury reservoir, Lake Mendocino, and Lake Sonoma) and river (Eel River, Russian River) recreation and aesthetics attract tourists who spend money at local businesses and outfitters, supporting the local economy. Further, recreation opportunity attracts and retains residents, further supporting the local economy.

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Socioeconomic Value (Social Groups)	Key Resources	Description
Recreation value (recreationists, local residents)	Recreation, vegetation, aesthetics, fish/wildlife	Study area residents and tourists derive value from diverse recreation activities in the study area (including those in and around Lake Pillsbury reservoir, Van Arsdale Reservoir, Lake Mendocino, the Eel River, and the Russian River). As described in Volume II, Section 2.2.3.9, Recreation Resources, recreation activities include swimming, lake boating, whitewater boating, fishing, wind surfing, hiking, camping, and off-highway vehicle use. Recreationists and the socioeconomic value of recreation in the study area are influenced by the abundance and diversity of recreation opportunities, aesthetics, and fish and wildlife populations.
Energy costs and reliability (local residents)	Water, energy	Historically, the Project facilities generated hydroelectric power for PG&E. In 2019, PG&E determined that relicensing the Project would be contrary to the interests of its electric rate payers, and the Project has not generated electricity since 2021. Water diverted by the Project to the East Branch Russian River to generate hydroelectric power is then abandoned by the Project and is subsequently used downstream by the City of Ukiah Electric Utility Department to generate hydropower at the Mendocino Hydro Plant, which has a capacity of 3.5 megawatts.[3]
Local government fiscal stability (local residents)	Aesthetics, agriculture/land use, recreation, public safety	Local governments provide public services for local residents, many of which are funded through property and sales taxes. Property tax collections in the study area are determined by levy rates and property values; property values in turn are influenced by the level of economic activity in the region and the desirability of property (which may be affected by such factors as aesthetics, water availability and cost, and recreation opportunity). In particular, waterfront property values and homes with views of water bodies typically have price premiums related to aesthetic amenities and associated higher property taxes.

[3] According to the California Energy Commission, the only other hydropower plant in Sonoma or Mendocino County is the Warm Springs hydropower plant at Lake Sonoma operated by Sonoma Water (California Energy Commission 2025).

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Socioeconomic Value (Social Groups)	Key Resources	Description
Species/habitat intrinsic value (conservationists)	Fish/wildlife, vegetation, water	Habitat for fish and wildlife species and improvement in water quality in the study area, including the Eel River and the Russian River, is important to many stakeholders and conservation organizations in the study area, reflecting the value of species and habitats to these stakeholders. Local residents and conservation groups have expressed interest in preservation and restoration actions in the study area. For example, the Eel River Watershed Restoration and Conservation Program aims to restore aquatic habitat and species in the Eel River, with a focus on Chinook and coho salmon, steelhead, Pacific lamprey, and green sturgeon (California Trout 2022). As an example, in the Russian River basin, the National Fish and Wildlife Foundation invested more than $6 million between 2009 and 2020 in its Russian River Coho Program, which works to restore coho in the basin (National Fish and Wildlife Foundation n.d.).
Urban/suburban water reliability/cost (local residents)	Water	Project diversion of water from the Eel River to the Russian River basin for hydroelectric power generation has the ancillary benefit of enhancing downstream urban and suburban water supplies, including for residential, industrial, and agricultural uses. Water diverted by the Project to the East Branch Russian River flows from the East Branch Russian River into Lake Mendocino. Water in the Russian River, including water released from Lake Mendocino, is diverted and delivered by Sonoma Water to contractors that distribute water for public safety, domestic, commercial, and industrial purposes. In the Eel River basin, the Eel River is a major water source and recharges the groundwater basins that are the primary source of the basin's water supplies (Water Education Foundation n.d.).
Aesthetic value (local residents, recreationists, tourists)	Water, fish/wildlife, vegetation, land use	The views of water bodies and surrounding landscapes can enhance the aesthetic enjoyment of visitors and residents of the study area as well as enhance the value of residential and commercial properties located near water bodies. Views of lakes and rivers, riparian vegetation, and associated open space (including views of the Eel River, Russian River, Lake Mendocino, Van Arsdale Reservoir, and Lake Pillsbury reservoir and surrounding landscapes) are often particularly valued by tourists, property owners/local residents, and recreationists.

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Socioeconomic Value (Social Groups)	Key Resources	Description
Community way of life (local residents)	Agriculture/land use, recreation, aesthetics, fish/wildlife, water, cultural resources	Community way of life is influenced by recreation opportunities, economic opportunities, natural and cultural resources, water reliability, and the ability to maintain traditional farming and fishing practices and lifestyle.
Public safety (local residents, tourists, recreationists)	Water	Water resources in the region are used for fire suppression and to protect public safety. Lake Pillsbury reservoir serves as an emergency water resource for firefighters, though California Department of Forestry and Fire Protection relies on Clear Lake more frequently (Huetti 2023). The Eel River and the Russian River are also used as water resources for fire suppression.

Notes: PG&E = Pacific Gas & Electric
PVID = Potter Valley Irrigation District

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Del Norte Co.
Siskiyou Co.
Shasta Co.
Trinity Co.
Humboldt Co.
Eel River
Tehama Co.
Butte Co.
Glenn Co.
Mendocino Co.
Lake Pillsbury reservoir
Scott Dam
Cape Horn Dam
Van Arsdale Reservoir
Lake Mendocino
Colusa Co.
Lake Co.
Sutter Co.
Pacific Ocean
Russian River
Yolo Co.
Napa Co.
Sonoma Co.
Solano Co.
Marin Co.
Contra Costa Co.
Alameda Co.

☆ PG&E Dam Location
County Boundary
Watercourse
Waterbody
Affected Watercourse/Waterbody

2022 Population by Census Tract*
< 2000
2001 - 3000
3001 - 4000
4001 - 5000
5001 - 6000
6001 - 7000
7001 - 8000
*Source: U.S. Census Bureau

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PG&E Potter Valley Project
FERC Project No. 77

Map 2.2.3.13-1

Census tract populations in proximate counties.

5/15/2025

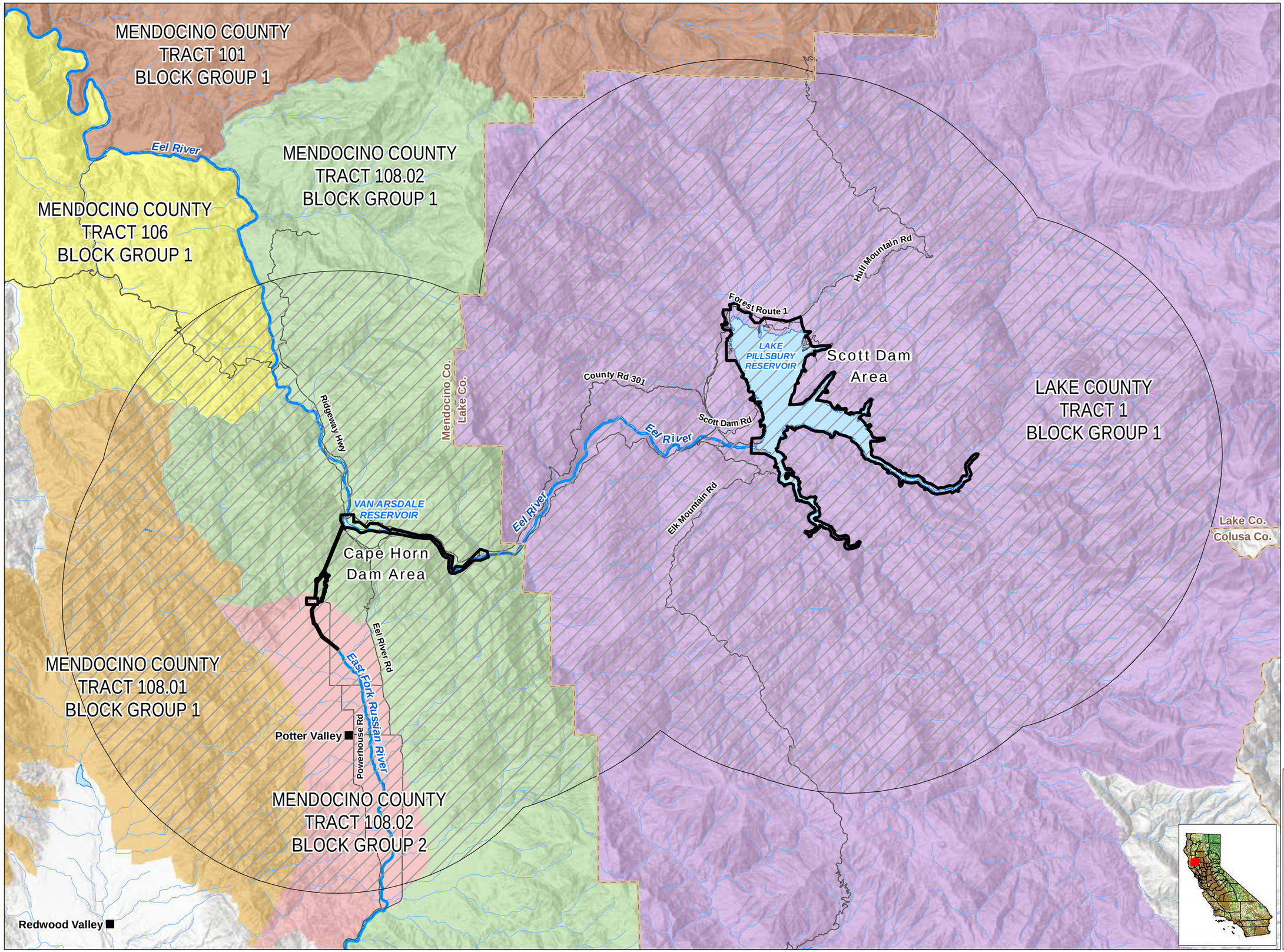
0 5 10 15 20 25 Miles

Projection: UTM, Zone 10 North
Datum: NAD 83

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Legend

- Project Region / FERC Project Boundary
- Roadway
- Water Body
- County Boundary
- 5-Mile Buffer

Census Tract / Block Group*

- Lake Co., Tract 1, Block Group 1
- Mendocino Co., Tract 101 Block Group 1
- Mendocino Co., Tract 106 Block Group 1
- Mendocino Co., Tract 108.01 Block Group 1
- Mendocino Co., Tract 108.02 Block Group 1
- Mendocino Co., Tract 108.02 Block Group 2

*Data Source: U.S. Census Bureau

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Map 2.2.3.13-2

Census block groups identified within the study area.

0 1 2 Miles

Projection: UTM Zone 10 N
Datum: NAD 83

Date: 6/23/2025

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Table 2.2.3.13-2. Study area populations over time.

Area	2010 Population	2018 to 2022 Population	Projected 2050 Population	% Growth (2010–2022)	% Projected Growth (2022–2050)
California	36,637,290	39,356,104	40,049,519	7%	2%
Study Area					
Humboldt County	133,058	136,132	121,539	2%	-10.7%
American Indian Areas[1]	4,451	3,627	–	-19%	–
American Indian or Alaska Native Population	10,877	11,576	–	6%	–
City of Eureka	26,954	26,519	–	-2%	–
Eel River Watershed: CT 111	4,723	4,563	–	-3%	–
Eel River Watershed: CT 112	3,431	3,842	–	12%	–
Eel River Watershed: CT 116	3,310	3,905	–	18%	–
City of Arcata	17,100	18,536	–	8%	–
Lake County	64,371	68,024	67,065	6%	-1.4%
American Indian Areas[2]	564	1,078	–	91%	–
American Indian or Alaska Native Population	2,847	4,278	–	50%	–
Lake Pillsbury, Cape Horn Dam: CT 1	3,164	3,529	–	12%	–
Mendocino County	87,487	91,145	89,697	4%	-1.6%
American Indian Areas[3]	2,008	1,737	–	-13%	–
American Indian or Alaska Native Population	5,676	6,444	–	14%	–
City of Ukiah	15,942	16,496	–	3%	–
Hopland, Census-Designated Place	874	1,025	–	17%	–
Population in Potter Valley Irrigation District[4]	~1,000	~1000	–	0%	–

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Area	2010 Population	2018 to 2022 Population	Projected 2050 Population	% Growth (2010–2022)	% Projected Growth (2022–2050)
Eel River Watershed: CT 101	2,617	2,842	–	9%	–
Eel River Watershed: CT 102	3,355	3,173	–	-5%	–
Eel River Watershed: CT 106.02	(part of larger CT)	4,421	–	-	–
East Russian River/Eel River CT 108.01 (near Lake Mendocino)	6,108	5,908	–	-3%	–
Near Van Arsdale Reservoir, Cape Horn Dam, and Russian River, Eel River Watersheds): CT 108.02	1,915	1,548	–	-19%	–
Lake Mendocino: CT 109	4,683	5,568	–	19%	–
Lake Mendocino: CT 117	4,240	4,691	–	11%	–
Sonoma County	474,047	488,436	434,406	3%	-11.1%
Stewarts Point American Indian Area	130	169	–	30%	–
American Indian or Alaska Native Population	10,699	15,802	–	48%	–
Santa Rosa City[5]	162,647	178,221	–	10%	–
Petaluma[5]	56,689	59,682	–	5%	–
Rohnert Park[5]	40,521	44,461	–	10%	–
Windsor[5]	25,760	26,320	–	2%	–
Cotati[5]	7,073	7,545	–	7%	–
Sonoma[5]	10,292	10,702	–	4%	–
Russian River Watershed: CT 1539.05	(part of larger CT)	3,410	–	–	–
Russian River Watershed: CT 1541	4,754	3,717	–	-22%	–
Russian River Watershed: CT 1542.01	3,782	3,656	–	-3%	–

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Area	2010 Population	2018 to 2022 Population	Projected 2050 Population	% Growth (2010–2022)	% Projected Growth (2022–2050)
Near Lake Sonoma: CT 1542.02	5,906	6,544	–	11%	–
Near Lake Sonoma: CT 1543.04	2,541	2,010	–	-21%	–
Near Lake Sonoma: CT 1540	2,787	2,294	–	-18%	–
Total Study Area	**758,963**	**783,737**	**712,707**	**3%**	**-9.1%**

Sources: California Department of Finance 2023, 2024; U.S. Census Bureau 2011, 2018–2022; Valley of the Moon Water District 2016

Notes: – = Data not available.

[1] Note that estimates of small populations can have margins of error greater than or equal to the actual estimate. Such is the case for many of the smaller tribes included in these estimates. Humboldt County includes Big Lagoon, Blue Lake, Hoopa, Rohnerville, Table Bluff, Trinidad, and Yurok American Indian Areas.

[2] Includes Big Valley, Middletown, Robinson, Sulphur Bank, and Upper Lake American Indian Areas.

[3] Includes Coyote Valley, Guidiville, Hopland, Manchester-Point Arena, Pinoleville, Redwood Valley, Round Valley, and Sherwood Valley American Indian Areas, plus Potter Valley population served (Potter Valley Tribe 2022).

[4] Population is an estimate based on PVID's reported 390 farmers, which remained the same between 2011 and 2024, the assumption of one farmer per household, and Mendocino County's average number of persons per household, according to the 2010 American Community Survey 1-year estimates and the 2018–2022 American Community Survey 5-year estimates published by the U.S. Census Bureau.

[5] There are towns that receive drinking water from Sonoma Water, with this supply partially reliant on the water diverted by the Project to the East Branch Russian River for hydroelectric production and then subsequently abandoned by the Project (Sonoma Water 2024).

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In addition to population at the county level, Table 2.2.3.13-2 identifies other population areas within the study area:

- Residents living near the 2,280-acre Lake Pillsbury reservoir, formed by Scott Dam. Over 3,000 people in Lake County live in Census Tract (CT) 1, which surrounds the reservoir. The reservoir in this region supports recreation and tourism, is an aesthetic amenity, and serves as an emergency water resource for firefighters, though California Department of Forestry and Fire Protection relies on Clear Lake more frequently (Huetti 2023).
- Communities living along or near the Eel River. The Eel River supports the economy, community identity, and lifestyle of the region by providing recreation opportunities, scenic resources, fish and wildlife resources, and water supply. In Mendocino County, communities living near the Eel River include approximately 18,000 people (CT 101, CT 102, CT 106.02, CT 108.01, and CT 108.02), while in Humboldt County they include approximately 12,000 people (CT 111, CT 112, and CT 116).
- Tribes in the region have deep cultural and spiritual connections to the region's waterways, fisheries, and other natural resources and landscapes. Some tribes have reserved water and fishing rights in the study area. As shown in Table 2.2.3.13-3, American Indian Areas in the study area have a total population of approximately 6,611, of which over half reside in Humboldt County. The population of all individuals identifying as American Indian or Alaska Native, alone or in combination with other races, was estimated by the U.S. Census Bureau to be 38,100 in the study area in the period 2018 to 2022.
- Communities living along or near the East Branch Russian River, the Russian River, or Lake Mendocino. These local communities depend on these water bodies for fishing, recreation, and water supplies for drinking water, irrigation, and commercial activities.
  - Farmers and ranchers in PVID irrigate with water from the Eel River basin that is diverted through the Project facilities for hydroelectric production and has the ancillary benefit of providing the majority of PVID's water supply for irrigation (PVID 2008). Within its 6,900-acre district boundary, PVID serves 390 members, irrigating approximately 4,900 acres. Assuming one farmer per household and an average household size of 2.57 people (Mendocino County average according to the U.S. Census Bureau for 2018 to 2022), approximately 1,000 people may live in the households irrigated by PVID.
  - Communities adjacent to and downstream from Lake Mendocino rely on water supplies from Lake Mendocino, which is partly supplied by abandoned Project water. Water from Lake Mendocino supports drinking water and water for public safety, commercial, and industrial purposes for 30,000 people in Mendocino County, including about 12,000 in the vicinity of Lake Mendocino, 1,000 in Hopland, and 16,500 in Ukiah (Inland Water and Power Commission 2023). The communities of Cloverdale, Geyserville, and northern Healdsburg in Sonoma County, with approximately 14,000 people (CT 1541, CT 1542.01, and CT 1542.02) also depend on water from Lake Mendocino.

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- Farmers and winemakers between Lake Mendocino and into northern Sonoma County use irrigation water supplied from water diverted by the Project to the East Branch Russian River and abandoned by the Project after its use in hydroelectric generation in the Project powerhouse.
- Communities farther south and west are also supported by water supplies from the Russian River after its convergence with Dry Creek. Water is distributed to communities by Sonoma Water.

2.2.3.13.5 Employment and Income

Table 2.2.3.13-3 summarizes key indicators of employment, income, and educational attainment in each of the study area counties and compares the county data to the state level data. Data highlighted in red indicate lower average economic and educational attainment in counties in the study area compared to the state average. The data in Table 2.2.3.13-3 highlight that Humboldt, Lake, and Mendocino counties have higher unemployment and poverty, lower median income, and generally lower levels of educational attainment than elsewhere in the study area and the state (the exceptions are that Humboldt County has a slightly higher proportion of adults with a high school degree than the statewide average). In contrast, Sonoma County has lower levels of poverty and unemployment and higher levels of income and educational attainment than elsewhere in the study area and the state.

This section presents information on the levels of employment and income supported in different economic sectors in the study area. In particular, the section focuses on employment and income in the following industries, which are particularly reliant on water supplies and water management:

- **Outdoor recreation and tourism,** which is influenced by the availability and quality of water-based recreation and tourism and recreationally important fish and wildlife;
- **Commercial fishing**, which is influenced by the abundance of commercially important fish species such as salmon;
- **Farming and ranching** in the Russian River basin, particularly areas in Mendocino and Sonoma counties that rely on water diverted by the Project from the Eel River to the East Branch Russian River for hydroelectric use that has an ancillary benefit as an irrigation water source, and in the Eel River basin in areas that rely on groundwater recharge from the Eel River; and
- **Other economic sectors**, since water supply reliability or cost can influence commercial or industrial businesses, quality of life, and the ability of communities in the study area to retain and attract residents and businesses.

In addition to being sources of employment and income, farming/ranching, fishing, and tourism associated with outdoor recreation are also important to community way of life and identity in the study area.

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Table 2.2.3.13-3. Key employment, income, and educational attainment characteristics in California and counties within the study area, 2018–2022.

Statistic	California	Humboldt County	Lake County	Mendocino County	Sonoma County
Unemployment Rate	6.40%	9.20%	10.40%	9.10%	5.20%
Poverty Rate	12.10%	19.80%	16.60%	16.20%	8.90%
Children in Household Receiving Public Assistance	24.20%	29.50%	36.20%	24.60%	14.20%
Median Income	$91,905	$57,881	$56,259	$61,335	$99,266
Percent of Population 18+ with High School Degree	85.10%	86.2%	65.3%	73.9%	88.8%
Percent of Population 25+ with Bachelor's Degree	35.90%	31.1%	18.2%	24.0%	37.8%

Source: U.S. Census Bureau 2018–2022 (data collected during the period from 2018 to 2022): Tables DP03, B09010, B15001, S1502, S1701, and B19083.

Note: Cells shaded in red indicate values with a higher unemployment, poverty, or public assistance rate or lower median income or educational attainment rate in counties in the study area compared to the state average.

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The BEA provides data by economic sector on income and employment for both workers and proprietors. Table 2.2.3.13-4 summarizes BEA economic data for 2022 by county. Federal and state agency reporting of employment and income do not present employment and income data for tourism/recreation as it is not a distinct economic sector; similarly, commercial salmon fishing employment and income is not disclosed by federal and state agencies to protect confidentiality of businesses and individuals. Therefore, tourism-specific data were obtained from a study of the economics of tourism in California prepared for Visit California (Dean Runyan Associates 2023), and commercial salmon fishing industry-specific data were obtained from a 2009 study of the economics of California's commercial fisheries prepared for the California Department of Fish and Wildlife (Hackett et al. 2009). Table 2.2.3.13-4 highlights the relative contribution of the agricultural, tourism/recreation sectors, commercial fishing, and other economic sectors in each county in the study area based on these data sources. The data in Table 2.2.3.13-4 are for 2022 for all sectors except commercial fishing; the data for commercial salmon fishing are from 2006 (with labor income from 2006 inflated to 2022 dollars in Table 2.2.3.13-4 for consistency). Due to recent restrictions on commercial salmon fishing in the study area resulting from low salmon abundance, the income and employment supported by this sector in more recent years are likely much lower than the data presented from 2006.

Table 2.2.3.13-4. Farm and recreation/tourism employment and labor income in the study area, 2022.

County/Sector	Employment (Full- and Part-time Jobs)	Labor Income[1]
Humboldt County		
Farmworkers/Proprietors[2]	1,477	$90,175,000
Recreation/Tourism Sectors[3]	5,960	$258,000,000
Salmon-Related Commercial Fishing[4]	31	$1,080,000
Other Sectors	66,255	$4,035,075,000
Total	73,723	$4,384,330,000
% Farm-Related[2]	2%	2%
% Recreation Tourism-Related[2]	8%	6%
% Salmon Commercial Fishing-Related[4]	0%	0%
Lake County		
Farmworkers/Proprietors[2]	815	$13,947,000
Recreation/Tourism Sectors[3]	1,820	$61,000,000
Other Sectors	22,706	$1,250,603,000
Total	25,341	$1,325,550,000
% Farm-Related[2]	3%	1%
% Recreation Tourism-Related[3]	7%	5%
Mendocino County		
Farmworkers/Proprietors[2]	1,670	$39,814,000
Recreation/Tourism Sectors[3]	5,740	$231,000,000

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County/Sector	Employment (Full- and Part-time Jobs)	Labor Income[1]
Salmon-Related Commercial Fishing[4]	100	$1,218,000
Other Sectors	41,450	$2,577,444,000
Total	48,960	$2,849,476,000
% Farm-Related[2]	3%	1%
% Recreation Tourism-Related[3]	12%	8%
% Salmon Commercial Fishing-Related[4]	0%	0%
Sonoma County		
Farmworkers/Proprietors[2]	5,945	$192,033,000
Recreation/Tourism Sectors[3]	21,150	$931,000,000
Salmon-Related Commercial Fishing[4]	48	$990,000
Other Sectors	285,002	21,774,223,000
Total	312,145	$22,898,246,000
% Farm-Related[2]	2%	1%
% Recreation Tourism-Related[3]	7%	4%
% Salmon Commercial Fishing-Related[4]	0%	0%
Study Area		
Farmworkers/Proprietors[2]	9,907	$335,969,000
Recreation/Tourism Sectors[3]	34,670	$1,481,000,000
Salmon-Related Commercial Fishing[4]	98,729	$29,640,633,000
Other Sectors	460,169	$31,457,602,000
Total	9,907	$335,969,000
% Farm-Related[2]	2%	1%
% Recreation Tourism-Related[3]	8%	5%
% Salmon Commercial Fishing-Related[4]	0%	0%

Sources: Bureau of Economic Analysis 2024; Dean Runyan Associates 2023; Hackett et al. 2009.

Notes:

[1] Labor income includes wages and salaries, supplements to wages and salaries, and proprietor income.

[2] Based on 2022 farmworker statistics from the California Employment Development Department (2023) and the 2022 Census of Agriculture (National Agricultural Statistics Service 2024); the farm-related employment and income may be underestimated.

[3] There is no recreation/tourism sector in BEA county-reported data. Included here are data from a Dean Runyan Associates (2023) study of the direct employment and earnings supported by tourism spending in the study area counties.

[4] Data on commercial fishing are not included in BEA county-reported data. Included here is Highland Economics' analysis of data from a 2009 study (using 2006 data) commissioned by the California Department of Fish and Wildlife on the economic structure of the commercial fishing industry in California, including ex-vessel revenue by fishery and average direct employment and labor income supported per million in ex-vessel revenue. The data presented here are from 2006 for the following fisheries: salmon, salmon/albacore, and salmon/crab. Labor income values are inflated from 2006 to 2022 dollars using the Gross Domestic Product Implicit Price Deflator.

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As shown in Table 2.2.3.13-4, BEA data indicate that direct farm-related employment (including farmworkers and farm proprietors, some of whom may be part-time farmers) may account for approximately 2 percent of total employment in the study area and 1 percent of total labor income. In Mendocino County, farm sector employment represents approximately 3 percent of county employment. Agricultural production supports employment not just in the agricultural sector, but also in many supporting industries that provide seed, machinery, processing, and professional services to the agricultural sector. Further, in addition to employment and income opportunities, many farm proprietors and workers derive enjoyment from a rural, agricultural lifestyle and also benefit from being able to support their livestock animals through on-farm forage production.

A California study of the economics of tourism (Dean Runyan Associates 2023) estimated that in 2022 spending by visitors to study area counties totaled $2.75 billion and supported approximately 28,710 jobs and $1.22 billion in income in such sectors as accommodation, food services, transportation, and retail. This study concluded that the local recreation and tourism economy may directly support approximately 8 percent of employment and 5 percent of income in the study area in these sectors (see Table 2.2.3.13-4). Direct jobs supported by the tourism and recreation-related economy is particularly important in Mendocino and Humboldt counties as a proportion of the local economy, supporting 12 percent and 8 percent of employment, respectively, in these two counties (this compares to approximately 5 percent of total California jobs directly supported by tourism and recreation). Further, the natural resources that support the recreation industry also support the general quality of life and retention/attraction of residents to the region, which also contributes to the local economy.

Available data on commercial salmon fishing in the study area indicate that it has recently constituted a very small fraction (less than 0.5 percent) of the employment or income in each study area county. Historically, the region supported an active salmon fishery; the Eel River was once the third-largest producer of Pacific salmon and steelhead in California (NOAA 2017). This fishing industry has been adversely affected by dwindling stocks and restrictions on salmon harvesting (California Sea Grant 2024). The California commercial ocean salmon season was closed in 2023 and is closed again for 2024; the only other years closures have occurred were 2008 and 2009. Closures are due to a combination of factors affecting salmon abundance throughout California and Oregon. Commercial fishing boats based in Northern California are affected by salmon abundance locally and elsewhere on the Pacific Coast as the commercial fleet often travels to other parts of the state or Oregon to catch fish (Alexander 2024). For many communities in the region, particularly tribal communities, fishing opportunities are important not just for livelihood but also for subsistence and cultural identity (California Sea Grant 2024).

Table 2.2.3.13-5 provides an overview of the distribution of employment in all sectors of the study area economy. Service and trade sectors, particularly government, healthcare, and retail trade, constitute a large share of the economy in each study area county. The table also highlights sectors in green that contribute a higher percentage of employment in the study area than at the state level. Sectors particularly strong in the study area compared to the rest of the state include agriculture, forestry/fishing, construction, healthcare, and several sectors associated with tourism:

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accommodation and food services (including hotel casinos)[4] and retail trade. Sonoma and Mendocino counties also have strong manufacturing sectors.

Humboldt County's economy has historically been built on natural resource industries like timber production, manufacturing, dairy farming, cattle ranching, and fishing (Humboldt County 2017). While these traditional industries have declined over time, they still contribute to the county's economy. New industries have emerged that export more knowledge-based, specialty, and technology-driven products and services. Important industries today include forest products, tourism, fishing and aquaculture, education, research, dairy, specialty agriculture, information technology, arts/culture, and niche manufacturing. The industries with the greatest earnings in Humboldt County are government and government enterprises, providing 27.9 percent of all earnings, healthcare, providing 14.4 percent, and retail trade, providing 8.7 percent.

Similar to Humboldt County, the economy of Lake County is primarily driven by healthcare, tourism, and agriculture (Economic Forensics & Analytics 2018; Rural County Representatives of California, 2018). Lake County has a larger share of employment in sectors like healthcare, agriculture, and government compared to the statewide average. Conversely, it has a smaller share in sectors like information, finance, and transportation. The greatest proportions of earnings come from government (26.1 percent), healthcare and social services (21.4 percent), and retail trade (9.1 percent).

The Mendocino County economy includes agriculture, forestry, fishing, and tourism. Mendocino County's coastal regions are also home to a thriving wine industry, similar to Sonoma County. However, as in Humboldt and Lake counties, the greatest earnings are in government (20.3 percent), followed by healthcare and social services (13.3 percent) and retail trade (10.2 percent).

Sonoma County is known for its agricultural and wine production industries. Its top three industries by employment are retail trade, healthcare, and accommodation and food services. Manufacturing provides the highest share of earnings (8.4 percent), followed by healthcare and social services and government, each providing 7.8 percent of all earnings.

[4] Casino hotels are included in the accommodation and food services sector while non-hotel casinos are included in the arts, entertainment, and recreation sector.

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Table 2.2.3.13-5. Proportion of employment by sector in study area and comparison to statewide employment.

Economic Sector	Geographic Area					
	Humboldt County	Lake County	Mendocino County	Sonoma County	Study Area	California
Agriculture	2%	3%	3%	2%	2%	0.9%
Forestry, fishing, and related activities	2%	Not Disclosed	Not Disclosed	1%	1%	1%
Mining, quarrying, and oil and gas extraction	0%	Not Disclosed	Not Disclosed	0%	0%	0%
Utilities	Not Disclosed	1%	0%	0%	0%	0%
Construction	6%	7%	6%	7%	7%	5%
Manufacturing	4%	2%	6%	8%	7%	6%
Wholesale trade	2%	1%	2%	3%	3%	3%
Retail trade	11%	12%	12%	9%	10%	8%
Transportation and warehousing	Not Disclosed	3%	2%	3%	3%	6%
Information	1%	1%	1%	1%	1%	3%
Finance and insurance	3%	2%	2%	4%	4%	5%
Real estate and rental and leasing	5%	4%	5%	6%	5%	6%
Professional, scientific, and technical services	5%	4%	5%	8%	7%	9%
Management of companies and enterprises	1%	0%	0%	1%	1%	1%
Administrative and support and waste management and remediation services	4%	4%	5%	6%	6%	6%
Educational services	1%	1%	1%	1%	1%	2%
Healthcare and social assistance	14%	21%	13%	12%	13%	12%
Arts, entertainment, and recreation	2%	1%	2%	3%	3%	2%
Accommodation and food services	8%	6%	9%	8%	8%	7%
Other services (except public administration)	7%	7%	6%	6%	6%	6%
Government and government enterprises	20%	16%	14%	9%	12%	11%

Note: Not disclosed – BEA suppresses data when there are limited business establishments in a sector to avoid disclosure of confidential information
Cells shaded in green indicate values that contribute a higher percentage of employment in counties in the study area compared to the state average.

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2.2.3.13.6 Local Government Finance

Table 2.2.3.13-6 summarizes local government revenues by source for each county in the study area, including sales tax and lodging tax. Total tax revenues reflect the size of the counties' economies and populations, with Sonoma County revenues the highest, followed by Humboldt County. Property taxes as a percent of county revenue are highest in Lake (13 percent) and Sonoma (13 percent) counties, followed by Mendocino (11 percent) and Humboldt (5 percent) counties. Lodging taxes (transient occupancy tax) as a percent of county revenues are highest in Mendocino County (2 percent) and are less than 1 percent of revenues in the other three study area counties. In fiscal year 2022 to 2023, data on from the California State Controller's Office, in Lake County, the cities of Clearlake and Lakeport accounted for approximately 58 percent of total Lake County lodging taxes[5]; data from no other cities were reported for Lake County (California State Controller's Office 2024a; California State Controller's Office 2024b). In Mendocino County, in fiscal year 2022 to 2023, lodging taxes collected in the City of Ukiah accounted for nearly 18 percent of county lodging tax receipts.[6]

Table 2.2.3.13-6. County revenue sources by study area county, budget year 2023–2024.

Category	Humboldt	Lake	Mendocino	Sonoma
Intergovernmental Transfers (M $)	$372.13	$166.72	$218.40	$906.94
Sales Tax (M $)	$5.98	$4.20	$28.81	$27.32
Property Tax (M $)	$28.02	$30.50	$42.38	$314.41
Lodging Tax (M $)	$3.00	$1.01	$8.68	$20.29
Licenses, Permits, and Franchise Fees (M $)	$2.19	$3.85	$4.90	$36.36
Other Taxes (M $)	$48.90	$4.36	$23.47	$181.48
Other (M $)	$107.73	$18.75	$75.58	$967.56
Total County Revenue (M $)	**$567.95**	**$229.39**	**$402.22**	**$2,454.36**

Sources: Antie and Cubbison 2023; Bohn et al. 2023; County of Humboldt 2023; Moulton-Peters et al. 2023; Pyska et al. 2023; Rivera 2023

Note: M $ = million dollars

[5] Total Lake County transient occupancy tax collected in 2022-2023 was $974,719, of which $211,346 was collected in the City of Lakeport and $350,327 was collected in the City of Clearlake.

[6] Total Mendocino County transient occupancy tax collected in 2022-2023 was $8,089,756, of which $1,443,140 was collected in the City of Ukiah.

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2.2.3.13.7 References

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2.2.3.14 Air Quality

This section describes the air quality setting in the vicinity of PG&E's Potter Valley Hydroelectric Project (Project), FERC Project No. 77.

Specifically, this section provides background information regarding criteria air pollutants and ambient air quality standards. In addition, it describes the existing air quality setting and attainment status in each of the four Project regions: Scott Dam Area, Cape Horn Dam Area, Eel River Watershed, and Russian River Watershed (see Map 2.2.3.14-1).

2.2.3.14.1 Information Sources

The information presented in this section is primarily based on data and guidance from relevant air districts and public agencies, including the following:

- Bay Area Air Quality Management District's (BAAQMD's) current air quality plan (BAAQMD 2024);
- California Air Resources Board's (CARB's) published table of applicable California and National Ambient Air Quality Standards (NAAQS) CARB 2016);
- Lake County Air Quality Management District's (LCAQMD's) website (LCAQMD 2024);
- Mendocino County Air Quality Management District's (MCAQMD's) Particulate Matter Attainment Plan and published air quality setting information (MCAQMD 2005, 2024); and
- USEPA's published information on criteria pollutants and adopted NAAQS (USEPA 2024a, 2024b, 2024c).

2.2.3.14.2 Background Information

Applicable Regulations

Clean Air Act. The federal Clean Air Act (CAA) of 1970 and the CAA Amendments of 1971 required USEPA to establish NAAQS for six common air pollutants, known as criteria pollutants, with individual states retaining the option to adopt more stringent standards or to include other specific pollutants. Criteria air pollutants are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (measured both in units of smaller than 2.5 microns in diameter [$PM_{2.5}$] and smaller than 10 microns in diameter [PM_{10}]), and lead (Pb).

NAAQS are the levels of air quality considered safe, with an adequate margin of safety, to protect the public health and welfare. They are designed to protect "sensitive receptors," which includes people most susceptible to further respiratory distress such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. Healthy adults can typically tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed. The state of California has adopted California Ambient Air Quality Standards (CAAQS) that are

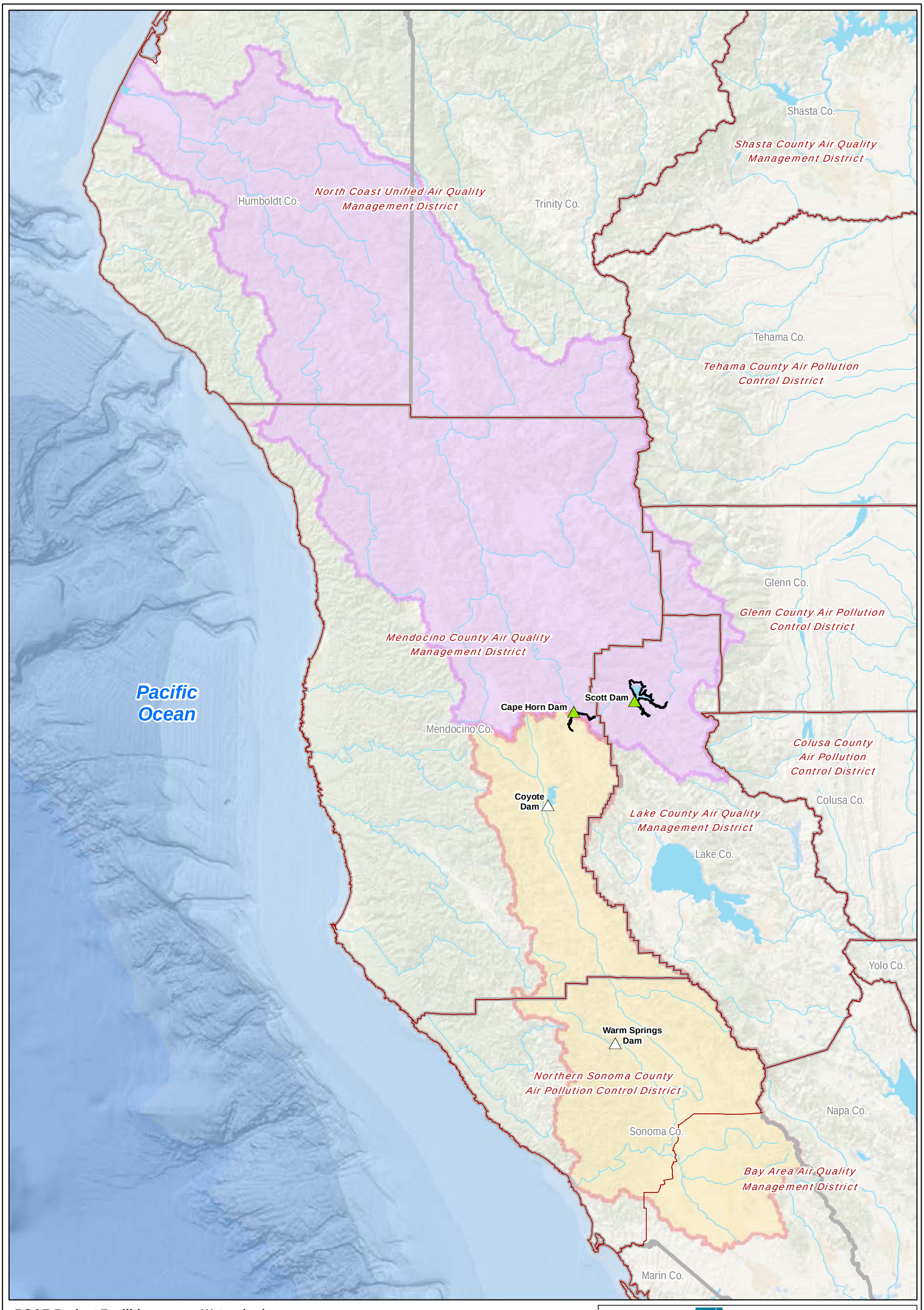
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equal to or more stringent than the NAAQS and include pollutants for which national standards do not exist. Table 2.2.3.14-1 presents the applicable NAAQS and CAAQS.

Criteria Pollutants

- **O_3.** The majority of ground-level O_3 is formed as a result of complex photochemical reactions in the atmosphere between reactive organic gases (ROGs), nitrogen oxides (NOx), and oxygen. ROGs and NOx are considered precursors to the formation of O_3, a highly reactive gas that can damage lung tissue and affect respiratory function. While O_3 in the lower atmosphere is considered a damaging air pollutant, O_3 in the upper atmosphere is beneficial, as it protects the Earth from harmful ultraviolet radiation (USEPA 2024a). ROG and NOx are both generated as byproducts of fossil fuel combustion.
- **CO.** CO is a colorless, odorless, poisonous gas produced by the incomplete combustion of fossil fuels. Elevated levels of CO can result in harmful health effects and may occur in areas with extensive traffic congestion and vehicle idling (USEPA 2024a).
- **NO_2.** NO_2 is a brownish, highly reactive gas primarily produced as a result of burning fossil fuels. NO_2 can also lead to the formation of O_3 in the lower atmosphere (USEPA 2024a).
- **SO_2.** SO_2 is primarily emitted from the combustion of coal and oil. High concentrations of SO_2 can aggravate existing respiratory and cardiovascular diseases in asthmatics and others who suffer from emphysema or bronchitis (USEPA 2024a).
- **PM.** Airborne PM is not a single pollutant, but rather is a mixture of many chemical species, including small droplets of liquid; dry, solid fragments; and solid cores with liquid coatings. PM is defined by diameter for air quality regulatory purposes. PM_{10} is inhalable into the lungs and can induce adverse health effects. $PM_{2.5}$ is fine particulate matter and constitutes a portion of PM_{10}. Emissions from combustion of gasoline, oil, and wood produce much of the $PM_{2.5}$ pollution found in outdoor air. In addition, the combustion of diesel fuel generates diesel particulate matter (DPM), 90 percent of which would be categorized as $PM_{2.5}$. PM_{10} includes fugitive dust from construction sites, landfills and agriculture, wildfires and brush/waste burning, industrial sources, wind-blown dust from open lands, pollen, and fragments of bacteria (USEPA 2024a).
- **Pb.** Sources of Pb include pipes, fuel, and paint, although the use of Pb in these materials has declined dramatically in recent years. Historically, a main source of Pb was automobile emissions. Fetuses and children are most susceptible to Pb poisoning, which can result in heart disease and nervous system damage. Through regulations, USEPA has gradually reduced the Pb content of gasoline, although Pb is still present in some airplane and helicopter fuels (USEPA 2024b).

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PG&E Project Facilities

- Dam
- FERC Boundary

Watersheds

- Eel River Watershed
- Russian River Watershed

Other Features

- Non-Project Dam
- Air District Boundary
- County Boundary

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PG&E Potter Valley Project
FERC Project No. 77

Map 2.2.3.14-1
Project regions, county lines, and air district boundaries.

0 5 10 15 20 25 Miles

Projection: UTM, Zone 10 North
Datum: NAD 83

6/17/2025

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Table 2.2.3.14-1. National and California Ambient Air Quality Standards.

Pollutant	Averaging Time	California Standards[1]	National Standards[2]	
			Primary	Secondary
Ozone (O_3)	8-hour	0.070 ppm (137 µg/m^3)	0.070 ppm (137 µg/m^3)	Same as Primary Standards
	1-hour	0.09 ppm (180 µg/m^3)	–	
Carbon monoxide (CO)	8-hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	–
	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
Nitrogen dioxide (NO_2)	Annual arithmetic mean	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary Standard
	1-hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m^3)	
Sulfur dioxide (SO_2)	Annual arithmetic mean	–	0.030 ppm (80 µg/m^3)	–
	24-hour	0.04 ppm (105 µg/m^3)	0.14 ppm (80 µg/m^3)	–
	3-hour	–	–	0.5 ppm (1,300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	–	–
Respirable particulate matter smaller than 10 microns in diameter (PM_{10})	Annual arithmetic mean	20 µg/m^3	–	Same as Primary Standards
	24-hour	50 µg/m^3	150 µg/m^3	
Respirable particulate matter smaller than 2.5 microns in diameter ($PM_{2.5}$)[3]	Annual arithmetic mean	12 µg/m^3	9.0 µg/m^3	15 µg/m^3
	24-hour	No Separate Standard	35 µg/m^3	Same as Primary Standards
Sulfates	24-hour	25 µg/m^3	–	–
Lead (Pb)	30-day average	1.5 µg/m^3	–	–
	Calendar quarter	–	1.5 µg/m^3	Same as Primary Standard
	Rolling 3-month average	–	0.15 µg/m^3	

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Pollutant	Averaging Time	California Standards[1]	National Standards[2]	
			Primary	Secondary
Hydrogen sulfide (H_2S)	1-hour	0.03 ppm (42 µg/m^3)	–	–
Vinyl chloride (chloroethene)	24-hour	0.01 ppm (26 µg/m^3)	–	–
Visibility reducing particles	8-hour	In 1989, the California Air Resources Board converted the general statewide 10-mi. visibility standard to instrumental equivalent, which is "extinction of 0.23 per kilometer."	–	–

Source: CARB 2016

Notes: – = no standard established
µg/m^3 = micrograms per cubic meter
mg/m^3 = milligrams per cubic meter
ppm = parts per million

[1] CO, SO_2 (1- and 24-hour), NO_2, O_3, PM_{10}, and visibility-reducing particles standards are not to be exceeded.
[2] Not to be exceeded more than once a year except for annual standards.
[3] On February 7, 2024, USEPA issued a pre-publication version of the Final Rule to lower the primary annual NAAQS for $PM_{2.5}$ from 12.0 µg/m^3 to 9.0 µg/m^3.

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Attainment Status

Pursuant to the federal CAA, USEPA has developed classifications for air quality. An area is designated as being in "attainment" if it is compliant with an applicable NAAQS; "nonattainment" if the levels exceed a particular NAAQS for a given pollutant; or "maintenance" if monitored pollutants have improved under an approved USEPA plan. There may also be areas for which there are insufficient levels of monitoring data, and these may be designated as "unclassified."

State Implementation Plan

A State Implementation Plan (SIP) is a collection of regulations and documents used by a state, territory, or local air district to implement, maintain, and enforce the NAAQS, show how a state will meet the NAAQS, and comply with the federal CAA. The CARB is the state agency for the State of California that has been delegated the authority to implement the SIP.

General Conformity Rule (40 CFR 51.850-860 and 40 CFR 93.150-160). Section 176(c) of the 1990 CAA Amendments contains the General Conformity Rule (40 CFR 51.850-860 and 40 CFR 93.150-160). The General Conformity Rule requires any federal agency responsible for an action in a nonattainment or maintenance area to determine that the action conforms to the applicable SIP. This means that federally supported or funded activities would not (1) cause or contribute to any new air quality standard violation; (2) increase the frequency or severity of any existing standard violation; or (3) delay the timely attainment of any standard, interim emission reduction, or other milestone.

For projects located in regions that are in attainment of the NAAQS, emissions of the pollutants that are in attainment are exempt from conformity analyses. USEPA has developed thresholds for criteria pollutants; if a project emits criteria pollutants at a rate less than the thresholds, then the project is not expected to interfere with the applicable SIP. A detailed analysis, called a formal conformity determination, is required for any actions that exceed these thresholds.

2.2.3.14.3 Scott Dam Area

The Scott Dam Area includes Scott Dam, Lake Pillsbury reservoir, and the surrounding recreation facilities. As shown on Map 2.2.3.14-1, the Scott Dam Area is located in northern Lake County, which is within the jurisdiction of the LCAQMD. The LCAQMD is responsible for issuing permits for major stationary sources of emissions and for regularly monitoring air quality in the county. Lake County is in attainment for all NAAQS and CAAQS and, as a result, has not adopted an air quality management plan (LCAQMD 2024).

2.2.3.14.4 Cape Horn Dam Area

The Cape Horn Dam Area includes Cape Horn Dam and Van Arsdale Reservoir. As shown on Map 2.2.3.14-1, this region is located within Mendocino County, which is within the jurisdiction of the MCAQMD. Specifically, the Cape Horn Dam Area is in the inland region surrounding the cities of Ukiah and Willits. This area is in attainment or unclassified for all NAAQS but is in non-attainment for the state PM_{10} standard.

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The primary sources of PM_{10} emissions include wood combustion, fugitive dust from construction, and vehicle emissions (MCAQMD 2024). The MCAQMD has adopted a Particulate Matter Attainment Plan to achieve attainment of the PM_{10} CAAQS (MCAQMD 2005).

2.2.3.14.5 Eel River Watershed

The Eel River Watershed includes the Eel River from Scott Dam to the Pacific Ocean and its tributaries. The Eel River Watershed covers a large area in Lake County, Mendocino County, Glenn County, Humboldt County, and Trinity County. See Table 2.2.3.14-2 for a summary of the attainment status in each county included in the Eel River Watershed.

As noted previously for the Scott Dam Area discussion, air quality within Lake County is regulated by the LCAQMD, and the county is in attainment for all NAAQS and CAAQS. Similarly, as described for the Cape Horn Dam Area discussion, air quality within Mendocino County is regulated by the MCAQMD, and the county is in attainment or unclassified for all NAAQS but does not achieve attainment for the state PM_{10} standard.

Air quality in Glenn County is regulated by the Glenn County Air Pollution Control District. Glenn County is in nonattainment for the state PM_{10} standard. Both Humboldt County and Trinity County are within the jurisdiction of the North Coast Unified Air Quality Management District (NCUAQMD). The NCUAQMD region is listed as attainment or unclassified for all NAAQS and CAAQS with the exception of the state 24-hour PM_{10} standard in Humboldt County only, which is in nonattainment.

2.2.3.14.6 Russian River Watershed

The Russian River Watershed includes the East Branch Russian River, Lake Mendocino, and the Russian River and extends within portions of Lake County, Mendocino County, and Sonoma County. See Table 2.2.3.14-2 for a summary of the attainment status in each county included in the Russian River Watershed.

As noted previously for the Scott Dam Area discussion, air quality within Lake County is regulated by the LCAQMD, and the county is in attainment for all NAAQS and CAAQS. Similarly, as described for the Cape Horn Dam Area discussion, air quality within Mendocino County is regulated by the MCAQMD, and the county is in attainment for all NAAQS, but does not achieve attainment for the state PM_{10} standard.

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Table 2.2.3.14-2. Attainment status of each Project region.

Project Region	County	Air District	Attainment Status
Scott Dam Area	Lake County	LCAQMD	• Attainment for all NAAQS and CAAQS
Cape Horn Dam Area	Mendocino County	MCAQMD	• Non-attainment for PM_{10} CAAQS • Attainment or unclassified for NAAQS and all other CAAQS
Eel River Watershed	Lake County	LCAQMD	• Attainment for all NAAQS and CAAQS
	Mendocino County	MCAQMD	• Non-attainment for PM_{10} CAAQS • Attainment or unclassified for NAAQS and all other CAAQS
	Glenn County	Glenn County Air Pollution Control District	• Non-attainment for PM_{10} CAAQS • Attainment for NAAQS and all other CAAQS
	Humboldt County	NCUAQMD	• Humboldt County is in non-attainment for PM_{10} CAAQS • Attainment or unclassified for NAAQS and all other CAAQS
	Trinity County		
Russian River Watershed	Lake County	LCAQMD	• Attainment for all NAAQS and CAAQS
	Mendocino County	MCAQMD	• Non-attainment for PM_{10} CAAQS • Attainment or unclassified for NAAQS and all other CAAQS
	Sonoma County	NoSoCo Air	• Attainment for all NAAQS and CAAQS
		BAAQMD	• Non-attainment for O_3, $PM_{2.5}$, and PM_{10} CAAQS • Non-attainment for O_3 and $PM_{2.5}$ NAAQS • Attainment or unclassified for all other NAAQS and CAAQS

Notes: BAAQMD = Bay Area Air Quality Management District
CAAQS = California Ambient Air Quality Standards
LCAQMD = Lake County Air Quality Management District
MCAQMD = Mendocino County Air Quality Management District
NAAQS = National Ambient Air Quality Standards
NCUAQMD = North Coast Unified Air Quality Management District
NoSoCo Air = Northern Sonoma County Air Pollution Control District

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Air quality within the northern portion of Sonoma County is regulated by the Northern Sonoma County Air Pollution Control District (NoSoCo Air), and the southern portion of Sonoma County is regulated by the BAAQMD. The NoSoCo Air region is in attainment of all NAAQS and CAAQS. The BAAQMD region is designated as nonattainment for state O_3, $PM_{2.5}$, and PM_{10} standards, as well as national O_3 and $PM_{2.5}$ standards. The 2017 Clean Air Plan is the BAAQMD's regional strategy for protecting public health and protecting the climate (BAAQMD 2024).

2.2.3.14.7 References

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2.2.3.15 Noise

This section describes the noise setting in the vicinity of PG&E's Potter Valley Hydroelectric Project (Project).

This section also provides background information on the fundamentals of noise and vibration analyses, relevant regulations, and the existing ambient noise environment in each of the four Project regions: (1) Scott Dam Area, (2) Cape Horn Dam Area, (3) Eel River Watershed, and (4) Russian River Watershed.

2.2.3.15.1 Information Sources

The information presented in this section is primarily based on data from the following sources:

- American National Standards Institute's (ANSI's) American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound (ANSI 2013);
- California Department of Transportation's (Caltrans') *Transportation Related Earthborne Vibrations* (Caltrans 2002);
- Caltrans' *Technical Noise Supplement Traffic Noise Analysis Protocol* (Caltrans 2013);
- Federal Transit Administration's *Transit Noise and Vibration Impact Assessment* (Federal Transit Administration 2006);
- Lake County's General Plan (Lake County 2008);
- Lake County's Code of Ordinances (Lake County 2012); and
- Mendocino County's *General Plan Update Environmental Impact Report* (County of Mendocino 2008).

2.2.3.15.2 Background Information

Fundamentals of Noise

Sound is mechanical energy transmitted by pressure waves over a medium such as air or water, while noise is generally defined as unwanted sound that annoys or disturbs people and potentially causes an adverse psychological or physiological effect on human health. Because noise pollution can interfere with human and wildlife activities, evaluation of noise is necessary when considering the environmental impacts of a project. Potential impacts to wildlife are discussed in Section 2.2.4.6, Wildlife Resources.

Sound requires a source, a transmission path, and a receiver, and is characterized by various parameters including the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level (SPL) is the most common descriptor used to characterize the volume of an existing sound level.

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The decibel (dB) scale is a logarithmic scale used to quantify sound intensity. However, it does not accurately describe how sound intensity is perceived by human hearing since the perceived loudness of sound is dependent upon many factors, including SPL and frequency content. The human ear is not equally sensitive to all frequencies in the entire sound spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called A-weighting, written as dBA and referred to as A-weighted decibels. There is a strong correlation between A-weighted sound levels and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. Table 2.2.3.15-1 summarizes typical A-weighted sound levels for different common noise sources.

Table 2.2.3.15-1. Typical A-weighted sound levels.

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	160	Instant perforation of eardrum*
	150	
Military jet takeoff*	140	
	130	Threshold of pain*
	120	
	110	Rock band
Jet flyover at 1,000 ft.	100	
Gas lawnmower at 3 ft.	90	
Diesel truck at 50 ft. at 50 mi. per hour		Food blender at 3 ft.
Noisy urban area, daytime	80	Garbage disposal at 3 ft.
Gas lawnmower, 100 ft.		
Commercial area	70	Vacuum cleaner at 10 ft.
Heavy traffic at 300 ft.	60	Normal speech at 3 ft.
Quiet urban daytime		Large business office
	50	Dishwasher in next room
Quiet urban nighttime		
Quiet suburban nighttime	40	Theater, large conference room (background)
Quiet rural nighttime	30	
		Library
	20	Bedroom at night, concert hall (background)
	10	
		Broadcast/recording studio
	0	
		Threshold of human hearing*

Source: Caltrans 2013, 2024
Notes: The noise level for items identified with an asterisk (*) is not A-weighted.
dBA = A-weighted decibels
ft. = feet
mi. = miles

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Human hearing, voices, and interior noise levels are typically in the range of 50 to 70 dBA (Caltrans 2013). With respect to how humans perceive changes in noise levels, a 1 dBA increase is imperceptible, a 3 dBA increase is barely perceptible, a 5 dBA increase is clearly noticeable, and a 10 dBA increase is subjectively perceived as approximately twice as loud (Caltrans 2013). These perceptions to changes in noise levels were developed by Caltrans on the basis of test subjects' reactions to changes in the levels of steady-state pure tones, or broadband noise, and to changes in levels of a given noise source.

For a point noise source, such as demolition equipment, sound attenuates at a rate of 6 dB per doubling of distance. For a line noise source, such as free-flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance. Atmospheric conditions including wind, temperature gradients, and humidity, can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound that travels over an acoustically absorptive surface, such as grass, attenuates at a slightly greater rate than sound that travels over a hard surface, such as pavement. For example, music from a portable speaker may be heard clearly by a receptor 100 ft. away when standing in an empty parking lot, whereas music played at the same volume may be indistinguishable by a receptor 100 ft. away when standing in a heavily vegetated and wooded area. The increased attenuation provided by absorptive surfaces is typically in the range of 1 to 2 dB per doubling of distance. Barriers, such as buildings and topography that block the line of sight between a source and receiver, also increase the attenuation of sound over distance (Caltrans 2013). In other words, sound levels that reach the receiver are reduced when buildings or other barriers are located between the source and receiver.

Demolition activities associated with the Project would generate noise, which would vary depending on the type of equipment used and the proximity of receptors. Table 2.2.3.15-2 presents typical noise levels generated from various types of construction equipment as measured 50 ft. away.

Fundamentals of Vibration

Similar to noise, vibration also involves a source, a transmission path, and a receiver. However, while noise is generally considered to be pressure waves transmitted through air, vibration is generally transmitted through the ground or structures. A person's perception of vibration depends on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system that is vibrating (i.e., vibrational resonance).

Vibration is measured in terms of acceleration, velocity, or displacement. This document considers vibration in terms of peak particle velocities (PPV) in inches per second (in/sec). Table 2.2.3.15-3 presents vibration levels and the associated effects on humans and structures.

Demolition activities associated with the Project would generate groundborne vibration from the operation of heavy equipment. As with noise, vibration levels would vary depending on the type of equipment used and the distance to receptors. Table 2.2.3.15-4 presents typical vibration levels from various types of construction equipment as measured from 25 ft. away.

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Table 2.2.3.15-2. Typical noise levels from construction equipment.

Type of Equipment	Typical Noise Level at 50 feet from Source (dBA)
Roller	74
Concrete vibrator	76
Saw	76
Backhoe	80
Air compressor	81
Compactor	82
Ballast tamper	83
Crane, mobile	83
Dozer	85
Grader	85
Loader	85
Jack hammer	88
Scraper	89

Source: Federal Transit Administration 2006

Note: dBA = A-weighted decibels

Table 2.2.3.15-3. Effects of continuous vibration on people and buildings.

Peak Particle Velocity (in/sec)	Effect on Humans	Effect on Buildings
0.006–0.019	Threshold of perception	Unlikely to cause damage of any type
0.08	Vibrations readily perceptible	Recommended upper level of vibrations to which ruins and ancient monuments should be subjected
0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of architectural damage to standard buildings
0.20	Vibrations annoying to people in buildings	Threshold at which there is risk of architectural damage to normal dwellings
0.4–0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at greater levels than normally expected from traffic; would cause architectural damage and possibly minor structural damage

Source: Caltrans 2002

Note: in/sec = inches per second

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Table 2.2.3.15-4. Typical vibration levels from construction equipment.

Type of Equipment	Typical Vibration Level at 25 ft. from Source (PPV in/sec)
Small bulldozer	0.003
Jack hammer	0.035
Loaded truck	0.076
Hoe ram	0.089
Large bulldozer	0.089
Vibratory roller	0.21
Impact pile driver	0.644

Source: Federal Transit Administration 2006

Notes: ft. = feet
in/sec = inches per second
PPV = peak particle velocities

Applicable Regulations

No state or federal regulations apply to community noise. Instead, noise is managed at a local level, typically in county general plans. While four Project regions have been identified, the noise analysis primarily addresses noise effects in two regions: Scott Dam Area and Cape Horn Dam Area. In particular, the noise analysis will focus on potential impacts to receptors that are located closest to planned Project actions near Scott Dam, Cape Horn Dam, along the Cape Horn Dam pumping infrastructure and powerhouse, and along haul truck routes that would be used by Project vehicles. The following provides a discussion of the applicable regulations to limit noise exposure and groundborne vibration at sensitive land uses. Planned Project actions that are expected to generate noise are located in Lake and Mendocino counties; therefore, the Lake County and Mendocino County regulations are included below.

Lake County

The Noise Element of the Lake County General Plan includes land use compatibility guidelines that establish maximum allowable noise exposure levels for various land use categories. For single-family residential uses, the normally acceptable community noise exposure level is up to 55 dBA. In addition, General Plan Policy N-1.7 requires that contractors implement noise reduction measures when construction occurs within 500 ft. of sensitive receptors (Lake County 2008). Lake County does not have a noise ordinance; however, loud noises can be regulated under County Code Chapter 13, Nuisances (Lake County 2012).

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Mendocino County

The Noise Element of the Mendocino County General Plan includes land use compatibility guidelines that establish maximum noise exposure level for various land use categories. For single-family residential uses, the normally acceptable community noise exposure level is up to 60 dBA. Similarly, the county's code of ordinances identifies exterior noise limit standards for certain zoning districts. For rural residential areas, nighttime noise is not to exceed 40 dBA for more than 30 minutes in any hour, and daytime noise is not to exceed 50 dBA for more than 30 minutes in any hour (County of Mendocino 2008). Mendocino County does not have a noise ordinance or established construction hours.

Ambient Noise Environment

The existing ambient noise environment in an area is characterized by the area's general level of development. Areas that are not urbanized are typically relatively quiet, although they may experience intermittent noise associated with agricultural and recreational equipment. Areas that are more urbanized are generally noisier as a result of roadway traffic, industrial activities, and other human activities. Ambient noise is often diurnal in character and diminishes at night. A summary of the primary contributors to the ambient noise environment is included for each Project region below.

Sensitive Receptors

Some land uses are more tolerant of noise than others. Schools, hospitals, churches, residences, and some recreational activities (bird watching, hiking, etc.) are considered to be more sensitive to noise intrusion than are commercial or industrial activities. The nearest sensitive receptors within each Project region are identified in Map 2.2.3.15-1 and Map 2.2.3.15-2 and summarized below.

2.2.3.15.3 Scott Dam Area

The Scott Dam Area includes Scott Dam, southwestern Lake Pillsbury reservoir, and the surrounding area (see Map 2.2.3.15-1). The Scott Dam Area region is rural in nature and is classified as Category 6, Very Quiet, Sparse Suburban, or Rural Residential Areas, per the ANSI classification system. According to ANSI, rural residential areas (Category 6), such as the Scott Dam Area, experience a typical daytime noise level of 40 dBA (ANSI 2013).

The ambient noise environment is primarily defined by vehicle traffic on area roadways, boat traffic on Lake Pillsbury reservoir, and water flows over Scott Dam. The nearest major roadway in the vicinity of the Project demolition area is Elk Mountain Road/County Road 301. In addition, aircraft flyovers associated with the Gravelly Valley Airport, north of Lake Pillsbury reservoir, contribute to intermittent increases in ambient noise. Specifically, the Gravelly Valley Airport serves an average of 83 takeoffs and landings per month (AirNav 2024). The runway is located approximately 2.4 mi. north of Scott Dam.

The sensitive noise receptors within the Scott Dam Area include scattered rural residences to the south and guests at Lake Pillsbury Resort and surrounding campsites to the north. Lake Pillsbury Resort is located approximately 4,400 ft. (0.8 mi.) north of Scott Dam. The nearest residence to the demolition area is located approximately 1,400 ft. (0.26 mi.) southwest of Scott Dam (see

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Map 2.2.3.15-1). Several roads, including County Road 301, Kapranos Road, Elk Mountain Road, Rice Fork Road, Gravel Cutoff Road, Logging Road (M8), Gage E2 Access Road, Scott Dam Road, Upper Scott Dam Access Road, and roads associated with the resort and residences, are located in the Scott Dam Area.

2.2.3.15.4 Cape Horn Dam Area

The Cape Horn Dam Area includes Cape Horn Dam and Van Arsdale Reservoir (see Map 2.2.3.15-2). The Cape Horn Dam Area is rural in nature and is classified as Category 5, Quiet Residential Areas, per the ANSI classification system (ANSI 2013). According to ANSI, quiet residential areas (Category 5), such as the Cape Horn Dam Area, experience a typical daytime noise level of 45 dBA (ANSI 2013).

The ambient noise environment is primarily defined by vehicle traffic on area roadways, noise from farm animals, agriculture/landscaping maintenance equipment noise, and noise associated with the Cape Horn Dam spillway. The primary roadways in the vicinity include Van Arsdale Road and Ridgeway Highway. The Potter Valley Powerhouse is currently inactive. The associated Potter Valley Powerhouse Helicopter Landing Site is used primarily for emergencies, one to three times per year. As a result, noise from the powerhouse and associated helicopter landing site does not contribute to the existing ambient noise environment.

The sensitive noise receptors within the Cape Horn Dam Area include rural residences along Van Arsdale Road and Ridgeway Highway. The nearest residence to Cape Horn Dam is located approximately 1,000 ft. to the east of the dam (see Map 2.2.3.15-2). Several roads are located in the Cape Horn Dam Area, including roads associated with the residences, Ridgeway Highway, Logging Road (M8), Van Arsdale Road, Eel River Road, Cutoff Road, Cape Horn Dam East Access Road, Intake Access Road, Penstock, Pipeline and Butterfly Valve House Access Road, and Powerhouse Main Access Road.

2.2.3.15.5 Eel River Watershed

The Eel River Watershed covers a large area of Lake County, Mendocino County, Glenn County, Humboldt County, and Trinity County (see Map 2-3). This discussion focuses on the southernmost portion of the Eel River Watershed (i.e., Southern Eel River Watershed) where the Project is located, and encompasses the entire Scott Dam Area and the northeastern portion of the Cape Horn Dam Area.

The Southern Eel River Watershed is heavily forested and rural in nature. The ambient noise environment is primarily defined by vehicle traffic on area roadways, with higher ambient noise levels in urbanized regions. The most significant roadway in the Eel River Watershed is Highway 101; however, Highway 101 does not extend through the Southern Eel River Watershed. The ambient noise environment varies regionally but generally would be described as a rural residential area (Category 6), with a typical daytime noise level of 40 dBA (ANSI 2013).

Sections 2.2.3.15.3 and 2.2.3.15.4 discuss the relevant sensitive receptors in the areas closest to Project facilities. See Table 2.2.3.15-1 for a summary of sensitive receptors in all Project regions.

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2.2.3.15.6 Russian River Watershed

The Russian River Watershed includes the East Branch Russian River, Lake Mendocino, and the Russian River and extends within portions of Lake County, Mendocino County, and Sonoma County (see Map 2.2.2-1). This discussion focuses on the northernmost portion of the Russian River Watershed (i.e., Northern Russian River Watershed), where the Project is located. This encompasses the southwestern portion of the Cape Horn Dam Area.

The Northern Russian River Watershed is heavily forested and rural in nature. The ambient noise environment is primarily defined by vehicle traffic on area roadways, with higher ambient noise levels in more developed regions including, but not limited to, the community of Potter Valley. The most significant roadways in the Russian River Watershed are Highway 101 and Highway 20; however, neither roadway extends through the Northern Russian River Watershed. The ambient noise environment varies regionally but generally would be described as a quiet residential area (Category 5), with a typical daytime noise level of 45 dBA (ANSI 2013).

Sections 2.2.3.15.3 and 2.2.3.15.4 discuss the relevant sensitive receptors in the areas closest to Project facilities. See Table 2.2.3.15-1 for a summary of sensitive receptors in all Project regions.

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PG&E Project Facilities

- Dam
- FERC Project Boundary

Other Features

- Sensitive Noise Receptor
- Access Road
- General Access Road
- Other Road
- Access Trail
- Gate

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Map 2.2.3.15-1

Scott Dam Area sensitive receptors.

0 250 500 1,000 Feet

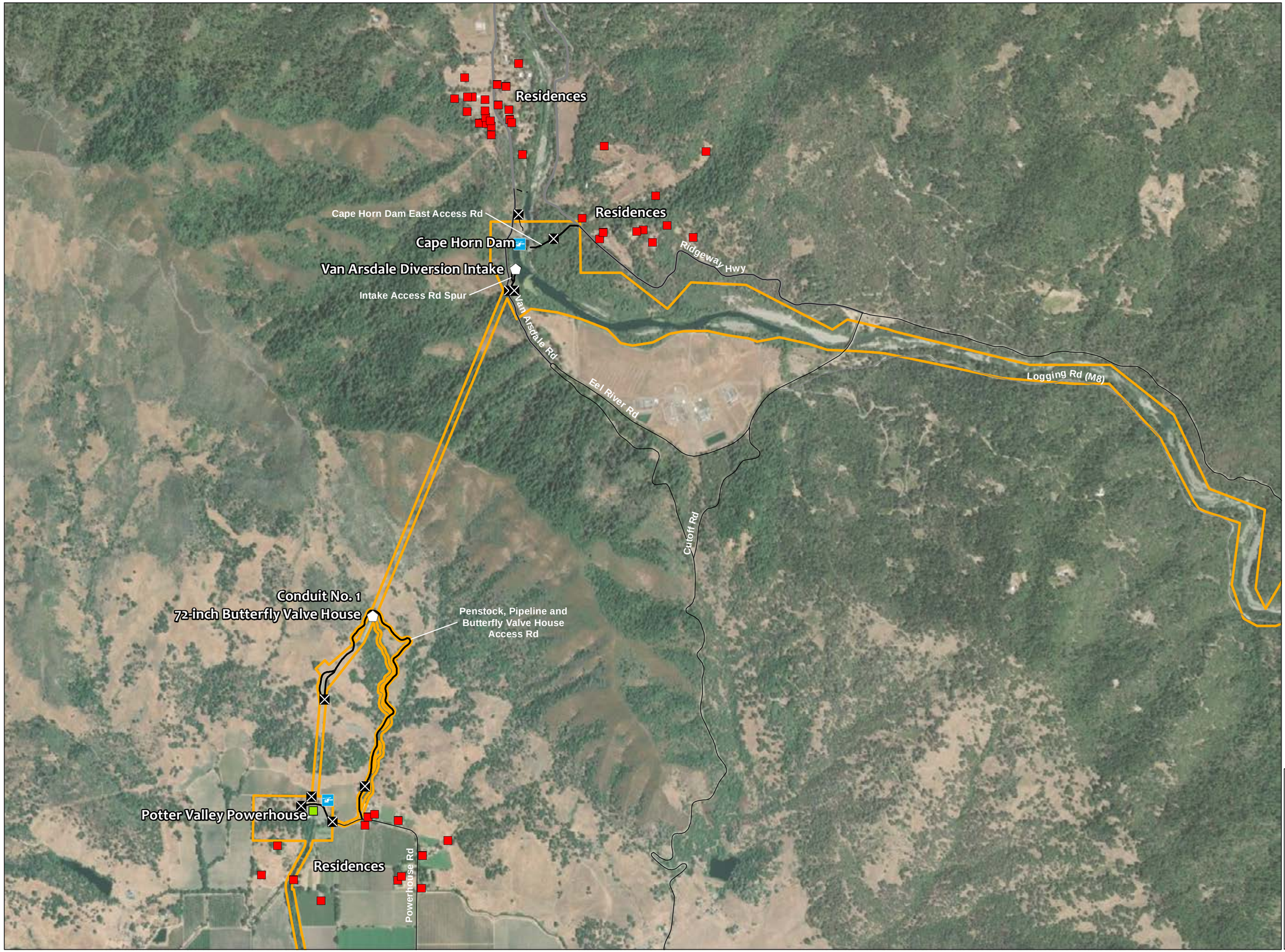
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PG&E Project Facilities

- Dam
- Powerhouse
- Water Conveyance
- Helicopter Landing Site
- FERC Project Boundary

Other Features

- Sensitive Noise Receptor
- Access Road
- General Access Road
- Other Road
- Access Trail
- Gate

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Map 2.2.3.15-2

Cape Horn Dam Area sensitive receptors.

0 250 500 1,000 1,500 2,000 Feet

Projection: UTM Zone 10 N
Datum: NAD 83

Date: 7/15/2025

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Table 2.2.3.15-5. Summary of existing noise environment and potential sensitive receptor locations for each Project region.

Project Region	Local Regulatory Authority	Typical Ambient Noise Level	Ambient Noise Environment Characteristics	List of Sensitive Receptors
Scott Dam Area	Lake County	40 dBA	• Vehicle traffic on area roadways • Boat traffic on Lake Pillsbury reservoir • Water flows over Scott Dam	• Scattered rural residences. The nearest residence to Scott Dam is located approximately 1,400 ft. southwest of the dam. • Guests at Lake Pillsbury Resort and surrounding campsites. Lake Pillsbury Resort is located approximately 4,400 ft. north of Scott Dam. • Residences along roads in the Scott Dam Area and access routes to the dam area.
Cape Horn Dam Area	Mendocino County	45 dBA	• Vehicle traffic on area roadways • Noise from farm animals • Agriculture/landscaping maintenance equipment noise • Noise associated with the Cape Horn Dam spillway	• Rural residences along Van Arsdale Road and Ridgeway Highway. The nearest residence to Cape Horn Dam is located approximately 1,000 ft. east of the dam. • Residences along roads in the Cape Horn Dam Area and access routes to the dam area.
Southern Eel River Watershed	Lake County and Mendocino County	40 dBA	• Vehicle traffic on area roadways • Boat traffic on Lake Pillsbury reservoir • Water flows over Scott Dam • Noise from farm animals • Agriculture/landscaping maintenance equipment noise • Noise associated with the Cape Horn Dam spillway	• Scattered rural residences. • Guests at Lake Pillsbury Resort and surrounding campsites. • Residences along Project access routes.
Northern Russian River Watershed	Mendocino County	45 dBA	• Vehicle traffic on area roadways • Noise from farm animals • Agriculture/landscaping maintenance equipment noise	• Rural residences north of Potter Valley. • Residences along Project access routes.

Notes: dBA = A-weighted decibels
ft. = feet

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2.2.3.15.7 References

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2.2.3.16 Traffic

This section describes the transportation setting in the vicinity of PG&E's Potter Valley Hydroelectric Project (Project), organized by each of the four Project regions: (1) Scott Dam Area, (2) Cape Horn Dam Area, (3) Eel River Watershed, and (4) Russian River Watershed.

The Transportation Study Area includes the Project area and its connected transportation system, including roads and trails. Transportation patterns in the overall Project area resemble those found in lightly populated rural communities in Northern California. The volume of traffic is greater near larger communities outside of the Project area. Predominant use of the rural roads in the area is by residents; recreational users; and agricultural and commodity trucks. Several paved and unpaved secondary roads provide access to the Project facilities, as summarized for each Project region below and depicted in Map 2.2.3.16-1, Map 2.2.3.16-2, and Map 2.2.3.16-3.

2.2.3.16.1 Information Sources

The information presented in this section is primarily based on data from the following:

- Lake County General Plan (Lake County 2008);
- Mendocino County General Plan (Mendocino County 2020); and
- USFS maps of the MNF (USFS 2024).

2.2.3.16.2 Background Information

Applicable Regulations

The traffic analysis focuses on potential impacts to transportation networks that are located closest to planned Project actions (i.e., along roadways that provide access to Scott Dam, Cape Horn Dam, and the Cape Horn Dam pumping infrastructure and powerhouse, and along haul truck routes that could be used by Project vehicles). Planned Project actions that may affect the transportation network are located in Lake and Mendocino counties; therefore, the applicable Lake County and Mendocino County regulations are included below.

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PG&E Project Facilities

- Dam
- FERC Project Boundary

Other Features

- Airport
- Access Road
- General Access Road
- Other Road
- Access Trail
- General Access Trail
- USFS Paved Road
- USFS Unpaved Road
- Hiking Trail
- Gate

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Map 2.2.3.16-1

Scott Dam Area roadways and trails.

0 500 1,000 2,000 Feet

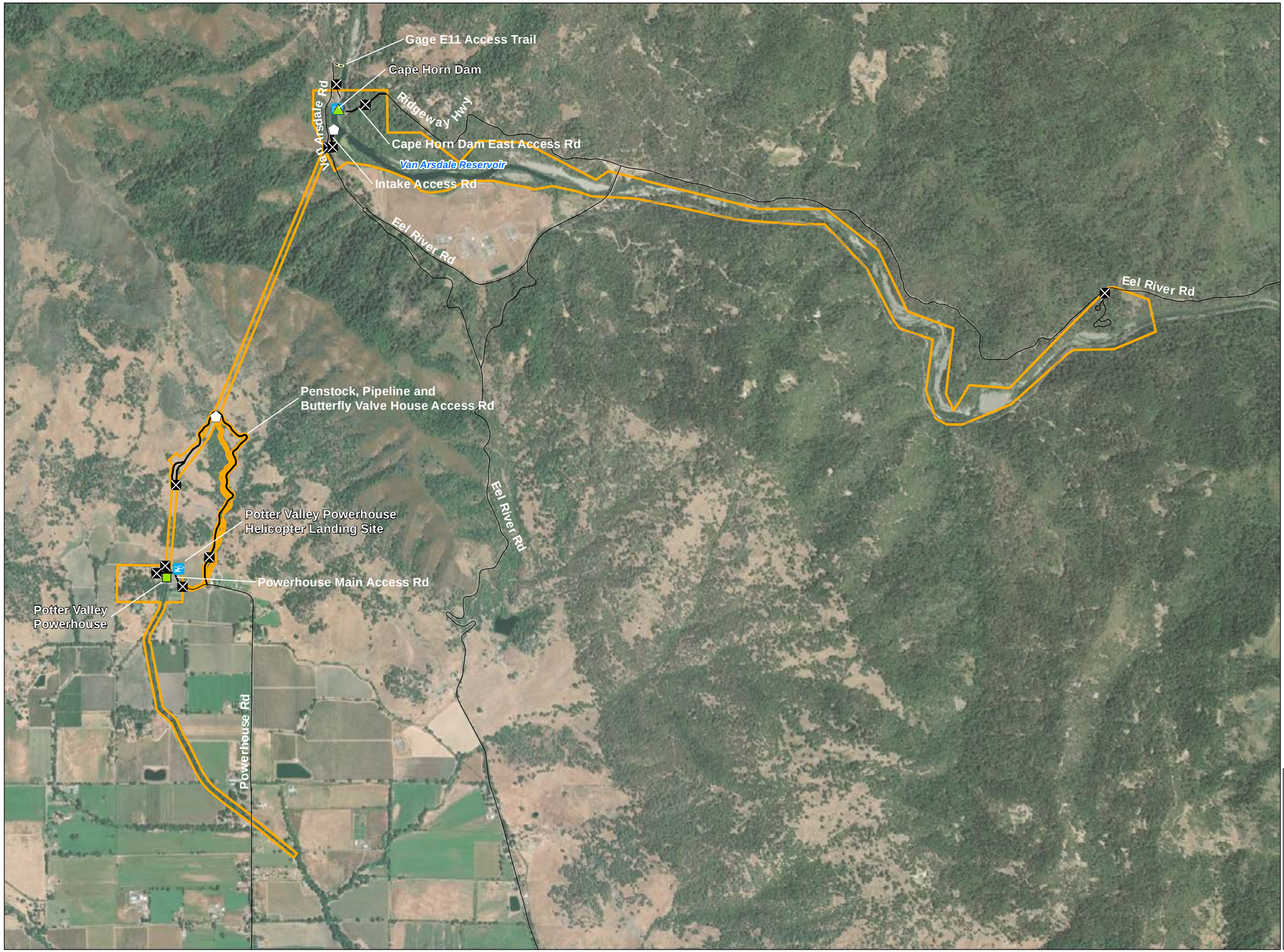
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PG&E Project Facilities

- Dam
- FERC Project Boundary

Other Features

- Access Road
- General Access Road
- Other Road
- Access Trail
- General Access Trail
- Gate

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Map 2.2.3.16-2

Cape Horn Dam area roadways and trails.

0 500 1,000 2,000 Feet

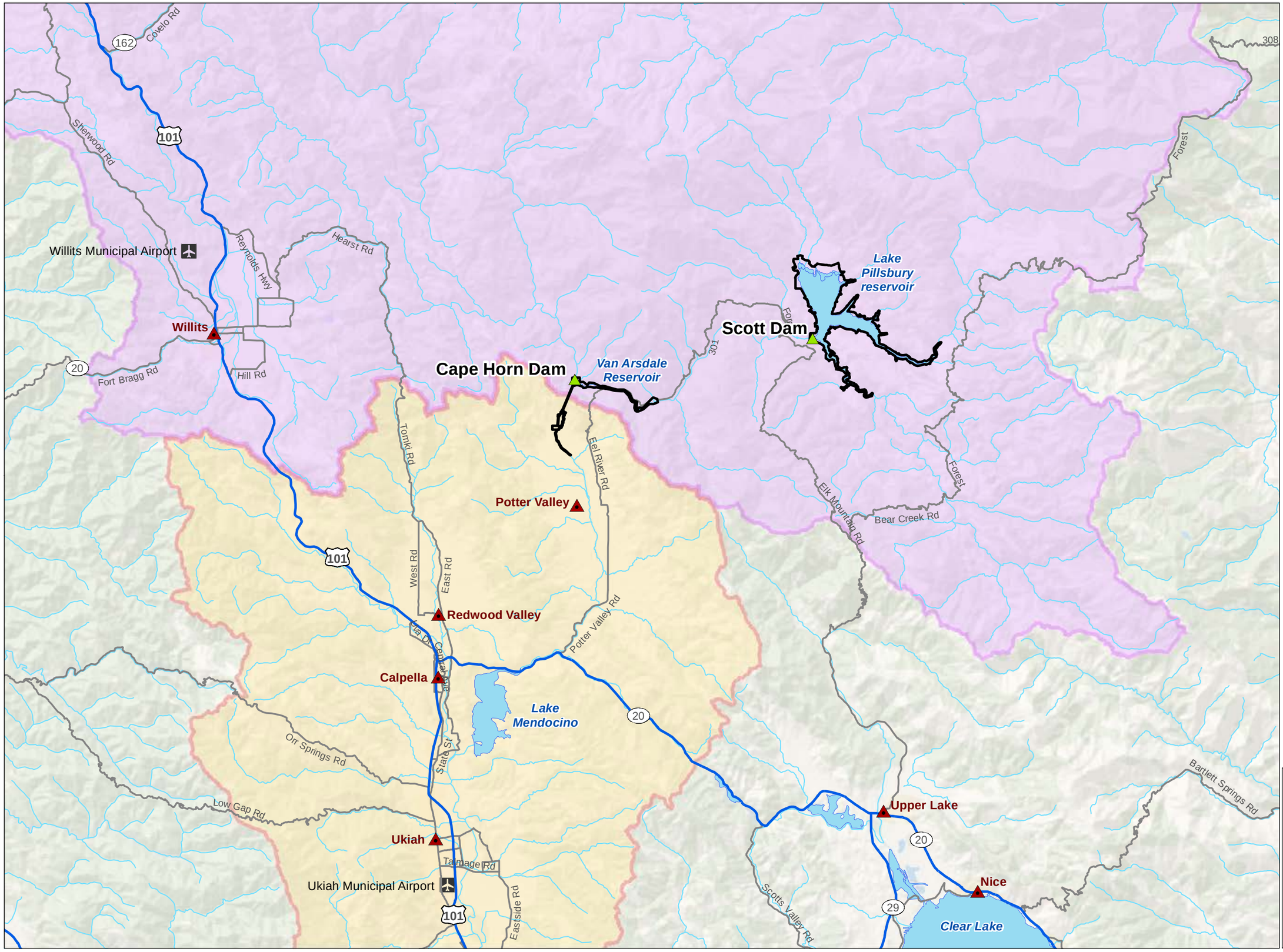
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PG&E Project Facilities

- Dam
- FERC Project Boundary

Other Features

- Freeway / Highway
- Local Roadway
- City / Town
- Eel River Watershed
- Russian River Watershed

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Map 2.2.3.16-3

Southern Eel River Watershed and northern Russian River Watershed roadways.

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Projection: UTM Zone 10 N
Datum: NAD 83

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Federal

U.S. Department of Transportation

The U.S. Department of Transportation (USDOT) is the federal agency that oversees transportation infrastructure across the country and addresses several modes of transportation, including aviation, automobiles, rail, and others. The Federal Highway Administration (FHWA), created in 1966, is the agency within USDOT that specializes in highway transportation. FHWA provides stewardship over the construction, maintenance, and preservation of national highways, bridges, and tunnels and establishes the regulations with which Caltrans must comply. Highway 101 and Highway 20, which extend through portions of the Project area (Map 2.2.3.16-3), would be subject to USDOT/FHWA regulations.

State

California Department of Transportation

Caltrans is responsible for planning, designing, constructing, and maintaining all state-owned and -operated roadways in the Project area. In addition, Caltrans is the agency that implements regulations established by FHWA. Any improvements or modifications to the state highway system must be approved by Caltrans. Caltrans has regulatory authority over Highway 101, which extends north/south through both the Eel River and Russian River watersheds, as well as Highway 20, which travels generally east/west through a portion of the Russian River Watershed.

Senate Bill 743

On September 27, 2013, Senate Bill (SB) 743 was signed into law. The legislature found that with the adoption of the Sustainable Communities and Climate Protection Act of 2008 (SB 375), the State of California had signaled its commitment to encourage land use and transportation planning decisions and investments that reduce vehicle miles traveled (VMT) and thereby contribute to the reduction of greenhouse gas (GHG) emissions, as required by the California Global Warming Solutions Act of 2006 (Assembly Bill 32). Generally, SB 743 moves away from using delay-based level of service[1] (LOS) as the metric for identifying a significant impact and instead uses VMT. The new criteria "shall promote the reduction of GHG emissions, the development of multimodal transportation networks, and a diversity of land uses" (PRC Section 21099(b)(1)). Consistent with SB 743, the traffic analysis considers VMT when determining potential impacts associated with the Proposed Action.

[1] LOS is a qualitative metric that is used to measure the performance of roadways and is based primarily on levels of vehicle congestion. LOS categories range from A to F, with A describing free-flowing vehicle traffic and F describing unacceptable congestion/stop-and-go traffic.

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Regional

Lake County

The Lake Area Planning Council (Lake APC) is the transportation planning agency for Lake County. The Lake APC has developed several regional plans that are applicable to the Project area, including the Regional Bikeway Plan (Lake APC 2011), Lake County Active Transportation Plan (Lake APC 2016), Vehicle Miles Traveled Regional Baseline Study (Lake APC 2020), and Regional Transportation Plan/Active Transportation Plan (Lake APC 2022).

The Transportation and Circulation Element of the Lake County General Plan also include goals and policies that may be applicable to the Project (Lake County 2008). The relevant policies are listed below:

- **Policy T-1.8. Level of Service.** *County maintained roadways should be improved and maintained to provide an adequate peak period Level of Service (LOS) of "C" or better for existing and anticipated traffic volumes if roadway upgrades are feasible, such as roadway widening, addition of lanes via re-striping, and other safety and operational improvements. The County shall allow a limited number of County roadway segments to operate at a level of service of "E" or better where improving the segments to LOS C are deemed infeasible due to cost, negative community and/or environmental impacts, and/or constructability issues. This "E" level of service for certain roadways shall not include any State Highway unless approved by Caltrans.*
- **Policy T-1.9. Truck Routes.** *To reduce heavy truck traffic in residential areas and near noise sensitive land uses, the County shall ensure truck routes are designated in a manner such that traffic noise impacts are minimized.*
- **Policy T-1.10. Construction Methods.** *The County shall utilize road construction methods that seek to reduce air, water, and noise pollution associated with road and highway development.*

Mendocino County

The Mendocino Council of Governments (MCOG) is the regional transportation planning agency for the Mendocino County region and has prepared a Regional Transportation Plan and Active Transportation Plan (2022 RTP) that was adopted in 2022. The 2022 RTP identified several short-range and long-range improvements to the roadway system and includes information on active public, aviation, maritime, rail, and Tribal transportation systems (MCOG 2022).

The Development Element of the Mendocino County General Plan includes policies related to transportation, roadway systems, and evacuation (Mendocino County 2020). The policies that may be applicable to the Project are listed below:

- **Policy DE-128:** *Ensure that transportation infrastructure accommodates the safety and mobility of motorists, pedestrians, bicyclists, and persons in wheelchairs.*

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- **Action Item DE-128.2:** *Develop and implement standards to ensure that roadways and other transportation infrastructure are restored to a safe condition after repair work, utility installation, or other activity.*
- **Policy DE-130:** *The County will coordinate with state and local agencies to ensure that transportation plans, standards, and improvements are consistent and compatible across jurisdictional lines.*
- **Policy DE-133:** *Consider community objectives and emergency evacuation constraints in prioritizing transportation improvements funding.*
- **Policy DE-138:** *The County supports the use of traffic calming techniques[2], where appropriate, to improve safety for motorists, bicyclists, pedestrians, and others. Special attention will be given to safety on roadways, which provide access for children to school.*
- **Policy DE-139:** *Support the construction or improvement of secondary neighborhood routes to alleviate congestion of the arterials and ensure effective evacuation access.*
- **Policy DE-141:** *Require all new development, redevelopment, or major renovation applying for discretionary approval[3] to comply with Cal Fire [California Department of Forestry and Fire Protection] requirements regarding ingress/egress issues to facilitate effective evacuation.*

2.2.3.16.3 Scott Dam Area

The Scott Dam Area includes Scott Dam, Lake Pillsbury reservoir, and the surrounding recreation facilities. The Project facilities in the Scott Dam Area are in a relatively remote area with limited road access (Map 2.2.3.16-1). Scott Dam is accessible by vehicle year-round, although public access across the crest of Scott Dam is not allowed. There are locked gates to prohibit unauthorized vehicle access to the roads that lead to the dam facilities. Unauthorized access to the dam is restricted by locked steel gates located on both abutments of the dam. A safety barrier consisting of a floating plastic buoy boom has been placed to restrict boating and swimming near the dam.

The public has access to recreation facilities within the Scott Dam Area. Lake Pillsbury reservoir can be accessed from the south via Elk Mountain Road/County Road 301, from the west via Eel River Road/Elk Mountain Road, and from the northeast via Hull Mountain Road/Forest Service Road M6. The reservoir is also accessible from other designated dirt roads that are part of the USFS transportation system. Hull Mountain Road is only open seasonally, from September through mid-May (USFS 2024). There are no marked bicycle facilities in the area.

[2] Traffic calming techniques refer to any measure or device that improves safety for motorists, cyclists, and pedestrians. These include, but are not limited to, full or half road closures, speed bumps, speed tables, traffic circles, raised intersections, and others.

[3] Discretionary approval refers to the process in which a public agency must exercise judgement to approve or deny a project. The Proposed Action will require discretionary approval from FERC, as well as any other public agencies involved (e.g., USACE, USFS).

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Roadways

The roadways that provide access to Scott Dam are described below and shown in Map 2.2.3.16-1:

- **Elk Mountain Road:** Elk Mountain Road is a public road that extends throughout Lake County, terminating in the south in the community of Upper Lake just north of Clearlake, along the western boundary of Lake Pillsbury reservoir, and to the west into Mendocino County, where the roadway is renamed Eel River Road. In the Project vicinity, Elk Mountain Road is a paved, two-lane roadway without lane markers or shoulders.
- **Kapranos Road:** Kapranos Road is a small and winding public roadway that connects Elk Mountain Road in the west to Lake Pillsbury Resort at the eastern terminus. Kapranos Road is unpaved and appears to accommodate two lanes of traffic.
- **Gage E2 Access Road:** Gage E2 Access Road is a narrow, unpaved private road off of Elk Mountain Road that terminates at the southern shore of the Eel River, west of Scott Dam. This private access road includes a security gate at the entrance and is exclusively used by PG&E.
- **Scott Dam Road:** Scott Dam Road is an unpaved, one-way road that connects Elk Mountain Road in the northwest, south of Kapranos Road, to the north side of Scott Dam. Scott Dam is accessible to the public for approximately 0.25 mi., after which access is limited by a series of security gates. This access road is exclusively used by PG&E.
- **Upper Scott Dam Access Road:** Upper Scott Dam Access Road refers to the unpaved eastern portion of Scott Dam Road and provides access to the northern side of Scott Dam. This access road, owned and exclusively used by PG&E, includes a security gate.

Trails

There are no public use hiking trails within the FERC Project boundary. However, there are two public use recreation trails in the Lake Pillsbury reservoir area: the Lakeshore Trail (FS 10W54) and the Sunset Nature Trail (FS 10W60). Parking for both trailheads is located east of Lake Pillsbury reservoir. In addition, the following trail provides access to the Project site.

- **Scott Dam Piezometers and Leakage Weirs Access Trail:** The Scott Dam Piezometers and Leakage Weirs Access Trail is an approximately 600-ft., packed dirt Project trail that provides pedestrian access to the south side of Scott Dam and, specifically, the piezometers and leakage weirs. The trail is privately owned by PG&E and is intended for use by PG&E only.

Transit

Public transit services in Lake County are provided by Lake Transit. The fixed service routes do not extend to the Project area and primarily provide access around Clear Lake and to the cities of Clearlake, Lakeport, and Ukiah (Lake Transit 2024).

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Aviation Facilities

The Gravelly Valley Airport, north of Lake Pillsbury reservoir, provides access to the Scott Dam Area by air. The airport, which provides one gravel landing strip, is owned by USFS but is open to the public. The Gravelly Valley Airport serves an average of 83 takeoffs and landings per month (AirNav 2024).

2.2.3.16.4 Cape Horn Dam Area

The Cape Horn Dam Area includes Cape Horn Dam and Van Arsdale Reservoir and is rural in nature. Cape Horn Dam is accessible by vehicle year-round, although public access across the crest of Cape Horn Dam is not allowed. There is a 6-ft.-high chain-link fence with barbed wire at the top mounted on outrigger to prohibit public access on both sides of Cape Horn Dam and its associated facilities. A safety barrier consisting of a floating plastic buoy boom is located upstream of the dam and fish ladder tailrace to restrict boating and swimming. There are no marked bicycle facilities in the Cape Horn Dam Area.

Van Arsdale Reservoir is accessible to the public via East Side Potter Valley Road/Eel River Road (Map 2.2.3.16-2).

Roadways

The primary roadways in the vicinity are described below and shown in Map 2.2.3.16-2:

- **Van Arsdale Road:** Van Arsdale Road is a paved, two-lane road that runs west of the Eel River, starting at Van Arsdale Reservoir. The road begins from Eel River Road in the south, extends northward for approximately 2 mi., and terminates in a dead end that provides access to residences.
- **Ridgeway Highway:** Ridgeway Highway is a paved, two-lane road without lane markers or shoulders that begins at Eel River Road to the southeast and extends northward, east of the Eel River. Ridgeway Highway eventually terminates after approximately 8 mi. at the Thomas Creek Trailhead.
- **Cape Horn Dam East Access Road:** Cape Horn Dam East Access Road is a short, gravel access road that connects Ridgeway Highway to the eastern side of Cape Horn Dam, including the leakage weirs, piezometers, and eastside storage building. This is an access road that is exclusively used by PG&E.
- **Intake Access Road:** Intake Access Road connects Van Arsdale Road to the western side of Van Arsdale Reservoir and several associated maintenance facilities, including the diversion intake, motor control building, and fish screen facility, among others. The road is gravel, and the entrance is gated. This is an access road that is exclusively used by PG&E.
- **Powerhouse Road:** Powerhouse Road is a paved, two-lane road without lane markers or shoulders that extends through northern Potter Valley, connecting Gibson Lane to the Potter Valley Powerhouse. Access to the powerhouse facility is blocked by a security gate.

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- **Powerhouse Main Access Road:** Powerhouse Main Access Road is the paved travel lane from Powerhouse Road and across the Potter Valley Powerhouse facility. This access road is exclusively used by PG&E.
- **Penstock, Pipeline and Butterfly Valve House Access Road:** This gravel access road extends northward from Powerhouse Road, along the penstock bypass channel, to the 72-in. butterfly valve house and across Tunnel No. 2, from where it travels southerly to the 60-in.-diameter gate valves at Penstock Nos. 1 and 2. This is an access road that is exclusively used by PG&E.

Trails

There are no public use hiking trails within the FERC Project boundary. The following private trail provides access to Project facilities:

- **Gage E11 Access Trail:** Gage E11 Access Trail is a 166-ft. Project trail that connects Van Arsdale Road to the Eel River north of Cape Horn Dam. The trail is privately owned by PG&E and is intended for use by PG&E only.

Transit

Public transit services are not provided within the Cape Horn Dam Area. Mendocino Transit Authority provides public transportation services within Mendocino County, but it does not provide access to the Project area. The public transit route closest to the Project is Route 20 – Willits/Ukiah (Mendocino Transit Authority 2024).

Aviation Facilities

The Potter Valley Powerhouse Helicopter Landing Site is available in the Cape Horn Dam Area, adjacent to the Potter Valley Powerhouse.

2.2.3.16.5 Eel River Watershed

The Eel River Watershed includes the Eel River from Scott Dam to the Pacific Ocean and its tributaries, the most prominent of which are the Middle Fork Eel River, North Fork Eel River, South Fork Eel River, and Van Duzen River. In addition, it includes the estuary where the Eel River discharges into the Pacific Ocean. The Eel River Watershed covers a large area of Lake County, Mendocino County, Glenn County, Humboldt County, and Trinity County. This discussion focuses on the southernmost portion of the Eel River Watershed, including the Scott Dam Area, along the Eel River, and the northeastern portion of the Cape Horn Dam Area, where Proposed Action activities would occur (Map 2.2.3.16-3).

The southern Eel River Watershed is rural in nature. The most significant roadway in the area is Highway 101. As of 2022, the segment of Highway 101 through the city of Willits experiences a maximum of 7,900 average daily vehicle trips (Caltrans 2024).

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2.2.3.16.6 Russian River Watershed

The Russian River Watershed includes the East Branch Russian River, Lake Mendocino, and the Russian River and extends within portions of Lake County, Mendocino County, and Sonoma County. Similar to the discussion of the Eel River Watershed (Section 2.2.3.16.5), this discussion focuses on the northernmost portion of the Russian River Watershed, including the southwestern portion of the Cape Horn Dam Area and northern Potter Valley, where Proposed Action activities would occur (Map 2.2.3.16-3).

The northern Russian River Watershed is rural in nature, and the most significant roadways in the area are Highway 101 and Highway 20. As of 2022, the segment of Highway 101 through Redwood Valley experiences a maximum of 24,000 average daily vehicle trips, and the segment of Highway 20 immediately east of Redwood Valley experiences a maximum of 11,500 average daily vehicle trips (Caltrans 2024). It is anticipated that haul truck traffic associated with the Proposed Action would travel along Highway 20 to Highway 101, southbound toward Ukiah.

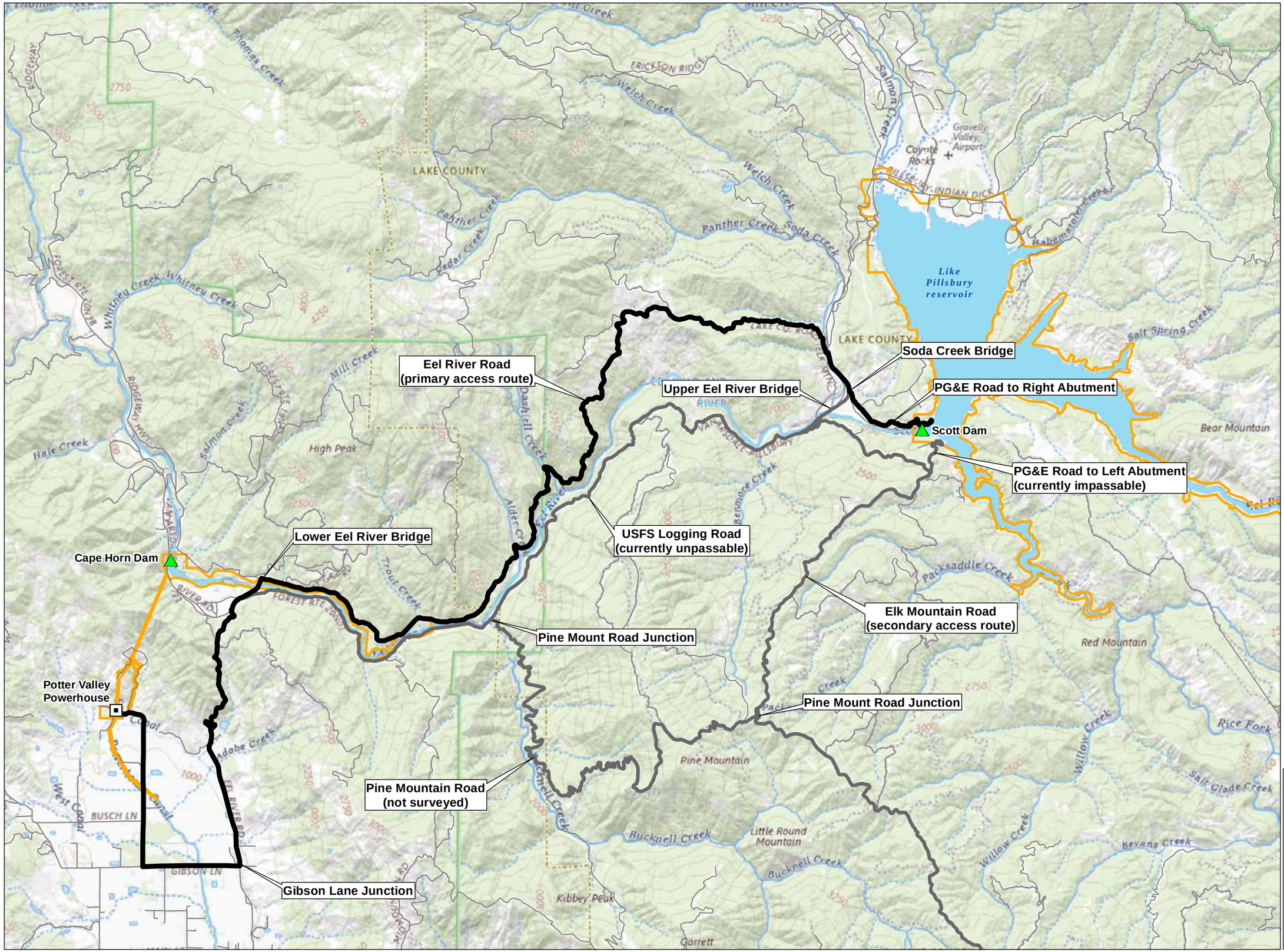
2.2.3.16.7 Emergency Evacuation Routes

In the event of an emergency at the Project facilities, Lake, Mendocino, Trinity, and Humboldt counties have the authority and responsibility for community notification and evacuation. PG&E operations personnel can respond to an emergency at Scott Dam within 45 minutes to 2 hours by vehicle and at Cape Horn Dam within 30 minutes to 2 hours by vehicle, year-round. During a dam safety incident if PG&E were delayed or unable to quickly respond at Scott Dam or Cape Horn Dam, USFS or Lake Pillsbury Fire Protection District may be able to provide surveillance and monitoring that could decrease incident response time. The access route to reach both Scott Dam and Cape Horn Dam in the event of an emergency is included in Map 2.2.3.16-4.

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PG&E Project Facilities

- Dam
- Powerhouse
- FERC Project Boundary

Other Features

- Primary Access Route
- Secondary Access Route
- Other Roads

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FERC Project No. 77

Map 2.2.3.16-4

Project emergency access routes.

0 0.5 1 1.5 Miles

Projection: UTM Zone 10 N
Datum: NAD 83

Date: 6/18/2025

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2.2.3.17 Marine Resources

This section describes marine resources, including rare, threatened, and endangered marine resources, potentially affected by PG&E's Potter Valley Hydroelectric Project (Project).

Only marine resources are discussed in this section, which include species and resources in intertidal, tidal, and oceanic habitats between the mouth of the Eel River estuary and the open ocean out to the Eel River Canyon headwall (referred to as the Marine Study Area). Section 2.2.3.3, Fish and Aquatic Resources, provides a discussion of estuarine fish and aquatic resources.

2.2.3.17.1 Information Sources

The information presented in this section was developed using existing data obtained from the following publicly accessible sources:

- CDFW CNDDB (CNDDB 2024) enhanced status reports, *Lower Eel River Basin Assessment* (CDFW 2010), and MarineBIOS website;
- NMFS/NOAA Fisheries EFH mapper, California Eelgrass Mitigation Policy (NOAA Fisheries 2014), Section 7 Protected Resources Application, Species Directory, and marine mammal stock assessment reports (Caretta et al. 2022, 2023);
- Ocean Biodiversity Information System Spatial Ecological Analysis of Megavertebrate Populations (OBIS-SEAMAP 2024) website for spatial densities of marine mammals, sea turtles, and cartilaginous fish;
- Pacific Fishery Management Council (PFMC) fishery management plans and their amendments, which include respective EFH descriptions; and
- Humboldt County General Plan Volume II: Eel River Area Plan of the Humboldt County Local Coastal Program (LCP), Eel River Area Plan definition of environmentally sensitive habitat areas (ESHAs) (County of Humboldt 2007).

2.2.3.17.2 Marine Study Area

The Marine Study Area includes intertidal, tidal, and oceanic habitats between the mouth of the Eel River estuary and the open ocean out to the Eel River Canyon headwall. The Marine Study Area is shown in Map 2.2.3.17-1.

2.2.3.17.3 Marine Physical Setting

The mouth of the Eel River is located within the Eureka littoral cell, which is bounded by Trinidad Head to the north and Cape Mendocino to the south. This cell is characterized by long, linear beaches; dune systems; and spits that have formed through the deposition of sand from the Eel, Mad, and Little rivers (Hapke et al. 2006). Sediments exit the mouths of these rivers and enter the Pacific Ocean during high-discharge events and ebb tides. From there, sediments are transported along the shoreline within the littoral cell by waves and currents.

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The wave climate along the Northern California coast is very energetic. The largest waves occur between November and February and average about 10 ft. in height, with waves exceeding 13 ft. for 20 percent of that time. Summer conditions bring smaller waves, with average wave heights of approximately 6 ft. During El Niño periods, winter waves are generally 1 to 4 ft. greater than the average winter waves (Hapke et al. 2006).

Sediment transport along the shoreline is governed by the direction of wave travel. Along the Pacific Coast, coastal storms tend to originate from the north to northwest, creating waves that travel in the south-to-southeast direction. During El Niño events, storms typically come from the west or southwest and cause waves to travel in the northern direction. However, along the Eureka littoral cell, due to its northeast shoreline orientation, the net sediment transport within the littoral cell is northward (Bodin 1982; Peterson et al. 2009).

The sediment within the Eureka littoral cell predominantly originates from the Eel River (Wheatcroft et al. 1997; Wheatcroft and Borgeld 2000; Warrick et al. 2015). This is due to the high volumes of rainfall, steep terrain, and logging activities occurring throughout the Eel River basin. Fine sediment carried by the Eel River exits to the ocean through coastal river plumes during discharge events and ebb tides. Increased sediment loads occur in the winter when rainfall volumes are high, which tends to coincide with winter storms originating from the south and seasonal downwelling that produce northerly currents. As a result, sediment exiting the mouth of the Eel River typically travels north toward Humboldt Bay.

Surveys conducted during the winter floods of 1996–1997 and 1997–1998 indicate that the Eel River plume exited the river mouth and traveled north, staying inshore of the 130-ft.-depth contour (Geyer et al. 2000). However, studies suggest that 40 to 75 percent of the sediment discharged by the Eel River settles out of the plume before reaching the entrance to Humboldt Bay (Geyer et al. 2000; Hill et al. 2000), indicating that the majority of sediment transported by the Eel River does not enter Humboldt Bay. However, based on the tidal plume dynamics of the Eel River, along with the large tidal exchange and tidal asymmetry of Humboldt Bay, some sediments may still be transported into Humboldt Bay during flood tides (Peterson et al. 2021). Some fine sediment exiting the mouth of the river will travel offshore to the Eel Canyon,[1] particularly during periods of high wave energy and low river discharge (Scully et al. 2003).

[1] A submerged oceanic canyon approximately 7 mi. offshore of the Eel River mouth.

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Pacific Ocean

Trinidad

101

McKinleyville

200

299

Arcata

255

101

Eureka

Myrtletown

Bayview

Cutten

Pine Hills

Humboldt Hill

101

Eel River Canyon

Fernbridge

Fortuna

Ferndale

101

Hydesville

36

Rio Dell

Scotia

Scotia Bridge

101

Cape Mendocino

Marine Study Area

Critical Habitat (NOAA Fisheries ESA)

- Chinook salmon (California Coastal ESU)
- Steelhead (Northern California DPS)
- Humpback whale (Central American and Mexico DPSs)
- Killer whale (Southern Resident DPS)
- Green sturgeon (Southern DPS)
- Steller sea lion

Notes:
1) Extent of critical habitat shown on map is confined to the Marine Study Area and watercourses within the Eel River watershed.
2) Watercourses depicted are from USGS topographic maps. Spatial accuracy varies depending on hydrologic and geomorphological changes over time.

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Map 2.2.3.17-1

Critical habitat (NOAA Fisheries ESA) within Marine Study Area.

0 1 2 4 Miles

Projection: UTM, Zone 10 North
Datum: NAD 83

6/18/2025

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2.2.3.17.4 Marine Habitats

Intertidal Zone

The intertidal zone includes sandy or rocky shoreline habitat between the high- and low-tide boundary. These tidal periods result in multiple intertidal zones to which species have adapted. These include the spray zone (a zone with almost no submergence), high intertidal, mid-intertidal, and low intertidal, which is the most submerged zone. The species that live in intertidal zones must tolerate being submerged and exposed to air for extended periods at different times of day or night.

Open Ocean

This habitat includes almost any part of the ocean that is not near the shoreline. It has many layers depending on water depth, each with unique marine life. Open ocean lies over the continental shelf in the epipelagic and mesopelagic zones, yet it does not include the seafloor itself. Farther from the continental shelf is the continental slope in the bathypelagic zone, the continental rise in the abyssopelagic zone, and the ocean basin. Beyond the ocean basin are trenches or canyons with water depths down to 36,100 ft. (11,003 m).

Benthic Zone

The benthic zone is the lowest level of the seafloor. It contains a collection of decayed matter and fine materials that have sunken and accumulated over time. It begins at the shoreline and continues to the deepest part of the ocean where there is little light penetrating from the surface. Benthos inhabit the seafloor sediments.

Critical Habitat

After a species receives an ESA listing designation, NMFS/NOAA Fisheries evaluates each species to determine whether any areas meet the critical habitat definition. If they do, these areas can be designated through the rulemaking process for the conservation of the listed species. Designated critical habitat within the Marine Study Area is provided in Table 2.2.3.17-1 and shown on Map 2.2.3.17-1.

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Table 2.2.3.17-1. Designated critical habitat within the Marine Study Area.

Designated Habitat	Description
Green sturgeon – Southern DPS (*Acipenser medirostris*)	Marine critical habitat for green sturgeon occurs in nearshore and offshore waters in the Marine Study Area (NOAA Fisheries 2021a).
Chinook salmon (*Oncorhynchus tshawytscha*)	Designated critical habitat for the California coastal Chinook salmon ESU occurs in the Marine Study Area (NOAA Fisheries 2005, 2021a, 2024).
Humpback whale (*Megaptera novaeangliae*)	Designated critical habitat for both the Mexico and Central America DPSs spans the coastline along Washington, Oregon, and California and occurs within the Marine Study Area (NOAA Fisheries 2021d).
Steelhead (*Oncorhynchus mykiss*)	Designated critical habitat for the Northern California steelhead DPS occurs within the Marine Study Area (NOAA Fisheries 2021b).
Steller sea lion (*Eumetopias jubatus*)	Critical habitat for Steller sea lions is present on and around Sugarloaf Island, approximately 20 mi. south of Humboldt Bay (NOAA Fisheries 2021a).
Southern Resident killer whale DPS (*Orcinus orca*)	NOAA Fisheries (2019) proposed critical habitat for the Southern Resident killer whale DPS from Puget Sound, Washington, to Point Sur, California, including the coasts of Humboldt, Mendocino, Sonoma, Marin, and San Francisco counties between depths of 20 and 656 ft. in the Marine Study Area. The critical habitat designation was finalized in 2021 (NOAA Fisheries 2021c).

Notes: DPS = distinct population segment
ESU = evolutionarily significant unit
ft. = foot/feet
mi. = mile(s)

The California Coastal Act governs development within the coastal zone of California through issuance of coastal development permits by the California Coastal Commission or a local government. The California Coastal Act delegates permitting authority to county governments through the creation of LCPs. Each LCP defines ESHAs unique to its program area. Generally, ESHAs consist of any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments (California Coastal Act Section 30107.5), including areas of special biological significance as identified by the SWRCB; rare and endangered species habitat identified by CDFW[2]; all coastal wetlands and lagoons; all marine, wildlife, and education and research reserves; nearshore reefs; tidepools; sea caves; islets and offshore rocks; kelp beds; indigenous dune plant habitats; and wilderness and primitive areas.

[2] Rare and endangered species as identified by CDFW and the California Fish and Game Commission.

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The Humboldt County Eel River Area Plan, in which the Marine Study Area is located, defines the following habitats as ESHAs:

- Rivers, creeks, and associated riparian habitats;
- Estuaries, sloughs, and wetlands;
- Rookeries for herons and egrets;
- Harbor seal pupping areas; and
- Critical habitats for rare or endangered species listed on state or federal lists.

Of these five ESHAs, only critical habitats for rare or endangered species overlap the marine environment. Critical habitat for the Southern DPS of green sturgeon (*Acipenser medirostris*), Chinook salmon (*Oncorhynchus tshawytscha*), Northern California steelhead (*Oncorhynchus mykiss*), Steller sea lion (*Eumetopias jubatus*), Mexico and Central America DPSs of humpback whale (*Megaptera novaeangliae*), and the Southern Resident killer whale (*Orcinus orca*) DPS occurs within the Marine Study Area (Table 2.2.3.17-1 and Map 2.2.3.17-1). These areas of critical habitat, therefore, receive additional protections under Humboldt County's LCP as ESHAs.

2.2.3.17.5 Marine Community

The following section describes the marine community in the Marine Study Area. Special-status anadromous fish, sea turtles, marine mammals, and federally managed fish species with their respective high-value habitats including critical habitat or EFH that are known to occur, or potentially occur, within the Marine Study Area are discussed within the relevant community description below.

Algae

Giant kelp (*Macrocystis pyrifera*) and bull kelp (*Nereocystis luetkeana*) are common along this stretch of coastline in the subtidal area. These large, brown algae species are depth-dependent, relying on the photic zone for growth in water depths to approximately 98 ft. (35 m) (CDFW 2021). As a result, they are limited to shallower nearshore waters in the intertidal and subtidal zones.

Eelgrass

Eelgrass (*Zostera marina*) is a seagrass that grows in beds in shallow, low-energy, nearshore marine and estuarine environments. Eelgrass habitat provides shelter for juvenile fish, stabilizes shorelines, and improves water quality. Turbidity can adversely affect eelgrass by slowing growth rates and reducing productivity. Eelgrass habitat possesses a special designation within EFH, a "Habitat of Particular Concern." NMFS/NOAA Fisheries maintains a "no net loss" policy for eelgrass habitat in California (NOAA Fisheries 2014). Although limited data are available for eelgrass in the Marine Study Area, the NOAA Fisheries (2025) EFH mapper indicates that an eelgrass habitat of particular concern is present in the Eel River estuary (Pacific Marine & Estuarine Fish Habitat Partnership 2024). Eelgrass was also mapped north of the Marine Study Area in Humboldt and Arcata bays (Humboldt Bay Harbor Recreation & Conservation District 2024).

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Benthic Macroinvertebrates

The benthic marine community includes many invertebrate species that provide ecosystem services integral to the ocean's systems. Many of these organisms are decomposers, sifting through seafloor detritus and breaking it into particles that eventually form the seafloor sediment. These macroinvertebrates are typically sessile (anchored) or very slow-moving, resulting in an inability to avoid disturbances that other, more mobile, taxa can flee. Although individual macroinvertebrates may be unable to flee disturbance, on a community level these assemblages are resilient and can quickly recolonize following disturbance.

Marine Molluscs

Marine mollusc communities within the Marine Study Area occur in subtidal and intertidal zones and include squids and octopuses; whelks and other sea snails; chitons and limpets; sea rabbits and other nudibranchs; and bivalves such as clams, oysters, scallops, mussels, and cockles. Molluscs play crucial roles in the coastal and marine ecosystem by improving water quality via filter feeding; shaping marine plant community structure through grazing; and serving as primary predators, prey, and decomposers. Bivalves and chitons burrow into sediments and influence sediment stability, nutrient exchange, and oxygenation and provide habitat for other organisms. Bivalves are often colonial, and even when their shells are empty, they provide substrates, shelter, nursery habitats, and feeding grounds for various marine organisms. Filter-feeding bivalves are often used as indicators of environmental pollution because they can accumulate heavy metals, pesticides, and other contaminants in their tissues and provide insight into the health of the marine environment (Marine Conservation Society 2024).

Marine Crustaceans

Dungeness Crab

Dungeness crabs (*Metacarcinus magister*) are arthropods with hard shells that are found in coastal areas and that occupy sandy seafloor and eelgrass habitat of the Pacific north of Point Conception, California (a headland in southern Santa Barbara County north of the Channel Islands) to Alaska. The Dungeness crab fishery is one of the most important commercial fisheries on the West Coast. The main body of the crab's shell is between 6 and 7 in. across at the broadest point, with four jointed legs and two claws, and the species has a life cycle of up to 6 years. Dungeness crabs play an important role in the food web by cycling nutrients and through decomposition (CDFW 2025).

Krill

All species of euphausiids (krill) are crustaceans. They are approximately 8 to 70 mm (0.31 to 2.8 in.) in length and can be up to 14 cm (5.5 in.) long with a hard exoskeleton, 3 main segments, and appendages like shrimp. The most common krill species are addressed under the FMP for highly migratory species, and they, along with other dominant krill species (Table 2.2.3.17-3) such as *Euphausia pacifica* and *Thysanoessa spinifera*, are likely to be targeted by fishing (PFMC 2024). They feed on diatoms and stay aggregated in swarms with fish, whales, and other species that prey on them.

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Ocean Pink Shrimp

Ocean pink shrimp (*Pandalus jordani*) are free-swimming crustaceans with a hard outer shell, long bodies, and antennae. They are fast-growing, from 0.5 in. at year 1 to 1.1 in. at year 3. While their life cycle may be as long as 5 years, they rarely survive longer than 4 years. There is an important commercial fishery for ocean pink shrimp primarily employing trawling gear, and they inhabit oceanic waters from British Columbia to Point Arguello (CDFW 2023).

Anadromous and Marine Fish

Numerous anadromous and marine fish species occur in the Marine Study Area (Table 2.2.3.17-2). Fish species spending the majority of their life cycle in freshwater are covered in more detail in Section 2.2.3.3, Fish and Aquatic Resources. Some Pacific Coast marine and anadromous fish species are managed according to the four Pacific Coast FMPs: groundfish, coastal pelagic species, highly migratory species, and Pacific salmon. Each management plan describes EFH for each group, and each group is further subdivided into stocks (Tables 2.2.3.17-3 through 2.2.3.17-5).

Table 2.2.3.17-2. Anadromous and marine fish species in the Marine Study Area.

Common Name	Scientific Name
Anadromous Fish Species	
Juvenile Chinook salmon, FT	*Oncorhynchus tshawytscha*
Juvenile coho salmon, FT	*Oncorhynchus kisutch*
Juvenile steelhead trout, FT	*Oncorhynchus mykiss*
Juvenile cutthroat trout	*Oncorhynchus clarkii*
Green sturgeon (Southern DPS is marine, and the Northern DPS is riverine)	*Acipenser medirostris*
White sturgeon (California ESA candidate species as threatened)	*Acipenser transmontanus*
Pacific lamprey	*Entosphenus tridentatus*
American shad	*Alosa sapidissima*
Longfin smelt	*Spirinchus thaleichthys*
Estuarine or Marine Fish Species	
Eulachon, FT	*Thaleichthys pacificus*
Surf smelt	*Hypomesus pretiosus*
Pacific herring	*Clupea pallasii*
Pacific sardine	*Sardinops sagax*
Northern anchovy	*Engraulis mordax*
Top smelt	*Atherinops affinis*
Staghorn sculpin	*Leptocottus armatus*
Bay pipefish	*Syngnathus californiensis*
Walleye surfperch	*Hyperprosopon argenteum*

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Common Name	Scientific Name
English sole	*Parophrys vetulus*
Starry flounder	*Platichthys stellatus*
Sand sole	*Psettichthys melanostictus*
Cabezon	*Scorpaenichthys marmoratus*
Saddleback gunnel	*Pholis ornata*
Stickleback	*Gasterosteus aculeatus*
Tidepool sculpin	*Oligocottus maculosus*
Bay goby	*Lepidogobius lepidus*
Tidewater goby, CE	*Eucyclogobius newberryi*
Ring-tail snailfish	*Liparis rutteri*
Buffalo sculpin	*Enophrys bison*
Jack mackerel	*Trachurus symmetricus*

Source: CDFW 2010

Notes: DPS = distinct population segment
ESA = Endangered Species Act

Federal Status
FT = federally designated as a threatened species

State Status
CE = California State-designated endangered species

Coastal Pelagic Species

Coastal pelagic species that may occur in offshore waters along the Northern California coast include six actively managed species or species groups: northern anchovy (*Engraulis mordax*), Pacific sardine (*Sardinops sagax*), Pacific mackerel (*Scomber japonicus*), jack mackerel (*Trachurus symmetricus*), California market squid (*Loligo opalescens*), and krill (Table 2.2.3.17-3) (PFMC 2017). Coastal pelagic species are generally found anywhere from the surface to 3,281 ft. (1,000 m) deep in the water column. The EFH for these species is in marine and estuarine waters along the coast of Northern California and offshore to the exclusive economic zone (EEZ) boundary line (Map 2.2.3.17-2). Harvest of all species of krill is prohibited in the West Coast EEZ to ensure fisheries will not develop that could put krill stocks and the other living marine organisms that depend on krill at risk (PFMC 2024).

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Table 2.2.3.17-3. Taxa managed under the Coastal Pelagic Species Fishery Management Plan.

Common Name	Scientific Name
Pacific sardine	*Sardinops sagax*
Pacific (chub) mackerel	*Scomber japonicus*
Northern anchovy – central and northern subpopulations	*Engraulis mordax*
Market squid	*Doryteuthis opalescens*
Jack mackerel	*Trachurus symmetricus*
Krill or euphausiids	*Euphausia pacifica* *Thysanoessa spinifera* *Nyctiphanes simplex* *Nematoscelis difficilis* *Thysanoessa gregaria* *Euphausia recurva* *Euphausia gibboides* *Euphausia eximia*
Pacific herring	*Clupea pallasii pallasii*
Jacksmelt	*Atherinopsis californiensis*

Source: PFMC 2019a

Pacific Groundfish

Pacific groundfish include many resident species along the West Coast. The Northern California coast provides groundfish habitat from the nearshore mean high water elevation, or the upstream extent of saltwater intrusion, to deepwater areas seaward to the boundary of the EEZ. In 1998, the PFMC designated more than 400 EFH areas for 82 groundfish species (Table 2.2.3.17-4) (PFMC 2005). The PFMC further defined important habitat by species and life stage. Map 2.2.3.17-2 shows the Pacific groundfish EFH within the Marine Study Area.

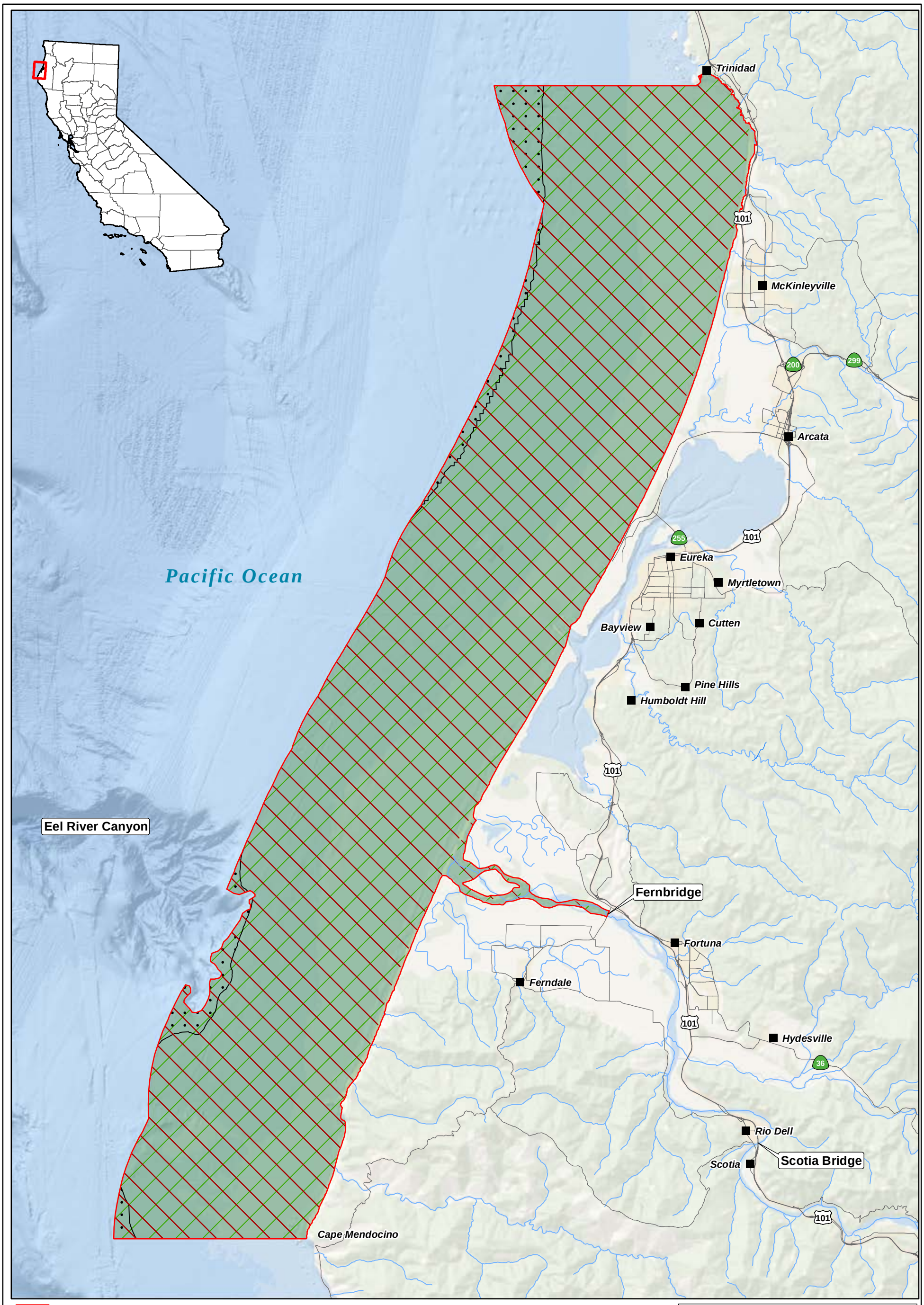
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Table 2.2.3.17-4. Groundfish stock within the Pacific Groundfish Fishery Management Plan, as amended.

Common Name	Scientific Name
Elasmobranchs	
Pacific spiny dogfish	*Squalus suckleyi*
Roundfish	
Lingcod north	*Ophiodon elongatus*
Lingcod south	*Ophiodon elongatus*
Sablefish	*Anoplopoma fimbria*
Rockfish	
Black rockfish – Washington	*Sebastes melanops*
Black rockfish – California	*Sebastes melanops*
Canary rockfish	*Sebastes pinniger*
Copper rockfish north	*Sebastes caurinus*
Copper rockfish south	*Sebastes caurinus*
Quillback rockfish – Washington	*Sebastes maliger*
Quillback rockfish – Oregon	*Sebastes maliger*
Quillback rockfish – California	*Sebastes maliger*
Squarespot rockfish	*Sebastes hopkinsi*
Vermilion rockfish	*Sebastes miniatus*
Vermilion/Sunset rockfish	*Sebastes miniatus*/*Sebastes crocotulus*
Shortspine thornyhead	*Sebastolobus alascanus*
Flatfish	
Dover sole	*Microstomus pacificus*
Petrale sole	*Eopsetta jordani*
Rex sole	*Glyptocephalus zachirus*

Source: PFMC 2023a

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Marine Study Area

Essential Fish Habitat (NOAA Fisheries)

- Coastal Pelagic Species (CPS)
- Pacific Coast Salmon (PCS)
- Highly Migratory Species (HMS)
- Pacific Groundfish (PG)

Note:
1) Extent of essential fish habitat shown on map is confined to the Marine Study

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Map 2.2.3.17-2

Essential fish habitat within Marine Study Area.

0 1 2 4 Miles

Projection: UTM, Zone 10 North
Datum: NAD 83

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Highly Migratory Species

Highly migratory species are pelagic fish species such as tunas, marlins, and sharks that occur worldwide. They can be found in the EEZ out to 230 mi. (370 km) from shore and in the high seas (PFMC 2018). Highly migratory species with EFH (Table 2.2.3.17-5) off the Northern California coast may include common thresher shark (*Alopias vulpinus*), bigeye thresher shark (*Alopias superciliosus*), albacore tuna (*Thunnus alalunga*), northern bluefin tuna (*Thunnus orientalis*), and broadbill swordfish (*Xiphias gladius*) (PFMC 2018). Map 2.2.3.17-2 shows the EFH for highly migratory species within the Marine Study Area.

Table 2.2.3.17-5. Taxa managed in the Highly Migratory Species Fishery Management Plan.

Common Name	Scientific Name
Tunas	
North Pacific albacore	*Thunnus alalunga*
Yellowfin tuna	*Thunnus albacares*
Bigeye tuna	*Thunnus obesus*
Skipjack tuna	*Katsuwonus pelamis*
Pacific bluefin tuna	*Thunnus orientalis*
Sharks	
Common thresher shark	*Alopias vulpinus*
Shortfin mako or bonito shark	*Isurus oxyrinchus*
Blue shark	*Prionace glauca*
Billfish/Swordfish	
Striped marlin	*Tetrapturus audax*
Swordfish	*Xiphias gladius*
Other	
Dorado or dolphinfish	*Coryphaena hippurus*

Source: PFMC 2023b

Pacific Coast Salmon

EFH for Chinook and coho salmon (Table 2.2.3.17-6) includes rivers and coastal streams from Central California to Alaska and oceanic waters along the U.S. and Canadian coasts seaward to the north-central Pacific Ocean and the high seas (PFMC 2024a). The marine environment covers an extensive area and has not been well-sampled. Therefore, EFH for salmon in the ocean cannot be precisely defined. Salmon EFH occurs within aquatic habitats of the Marine Study Area, and coho and Chinook salmon are likely to occur in many streams and tributaries. Adult and juvenile coho and Chinook salmon forage in nearshore and offshore areas (PFMC 2024a). Map 2.2.3.17-2 shows the extent of Pacific Coast salmon EFH in the Marine Study Area. Additional information about coho and Chinook salmon in the Eel River is provided in Section 2.2.3.3, Fish and Aquatic Resources.

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Table 2.2.3.17-6. Species managed under the Pacific Coast Salmon Fishery Management Plan.

Common Name	Scientific Name	Status
Chinook, California Coastal ESU	*Oncorhynchus tshawytscha*	FT
Coho salmon, Southern Oregon/Northern California Coast ESU	*Oncorhynchus kisutch*	FT

Source: PFMC 2024a; NOAA Fisheries 2005; 64 FR 50394; 70 FR 37159; 79 FR 20802; 70 FR 37159; 70 FR 52488; and 70 FR 37160

Note: ESU = evolutionarily significant unit

Federal Status
FT = federally designated as a threatened species

Sea Turtles

NOAA Fisheries (2021c) identified three species of ESA-listed sea turtles that may be present in the Marine Study Area, including green sea turtle (*Chelonia mydas*), leatherback sea turtle (*Dermochelys coriacea*), and olive ridley sea turtle (*Lepidochelys olivacea*) (Table 2.2.3.17-7).

Table 2.2.3.17-7. Special-status sea turtles known to occur or potentially occurring in the Marine Study Area.

Common Name (Scientific Name)	Status
Green sea turtle – East Pacific DPS (*Chelonia mydas*)	FT
Leatherback sea turtle (*Dermochelys coriacea*)	FE
Olive ridley sea turtle (*Lepidochelys olivacea*)	FT

Sources: NOAA Fisheries 2016, 2021c; USFWS 2021

Note: Federal Status
FE = federally designated as an endangered species
FT = federally designated as a threatened species

Sea turtles are rarely observed off the Northern California coast. Researchers conducted aerial line transects of leatherback sea turtles in waters less than 302 ft. deep off the coast of Central and Northern California between 1990 and 2003. The average estimated annual abundance was 178 turtles, with the highest densities off Central California (Benson et al. 2007). None of the detected individuals was reported north of Cape Mendocino. USFWS (2021) lists the green sea turtle as potentially occurring on beaches in the Marine Study Area, but this species does not nest on the West Coast. Green sea turtles have been sighted in marine waters as far north as southern Alaska, but they most commonly occur from San Diego south (NOAA Fisheries 2021c; Seminoff et al. 2015). Olive ridley sea turtles in the north Pacific typically occur from Southern California south to Chile, though they have been recorded as far north as Alaska (NOAA Fisheries 2021c; NOAA Fisheries and USFWS 2014).

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Marine Mammals

Cetaceans

Twenty-four species of cetaceans may occur within the Marine Study Area (NOAA Fisheries 2023). Cetaceans are subdivided into Odontocetes (toothed whales) and Mysticetes (baleen whales). All cetaceans have highly sophisticated acoustic abilities with which they send and receive sonic signals for communication and navigation. The species most likely to frequent offshore waters within the Marine Study Area include Dall's porpoise (*Phocoenoides dalli*), Risso's dolphin (*Grampus griseus*), and Pacific white-sided dolphin (*Lagenorhynchus obliquidens*) (Table 2.2.3.17-8). Species likely to occur in the offshore or nearshore zone include gray whale (*Eschrichtius robustus*), blue whale (*Balaenoptera musculus*), humpback whale—both the Mexico and Central America DPSs (*Megaptera novaeangliae*), Southern resident killer whales, and the transient ecotype of the killer whale. The most common species that occurs year-round in nearshore areas is the harbor porpoise (*Phocoena phocoena*) (H.T. Harvey & Associates 2020).

NMFS/NOAA Fisheries has established Biologically Important Areas within the Marine Study Area. Biologically Important Areas do not afford cetaceans additional legal protections. Biologically Important Areas for blue whales, gray whales, and humpback whales occur off the Northern and Central California coast, extending from shore to approximately 20 mi. offshore (NOAA Fisheries 2021d). The gray whale migration corridor extends across the entire coast of California and is within the Marine Study Area. Peak migration periods for this species are January through July and October through December (NOAA Fisheries 2021d). Blue whale feeding Biologically Important Areas are present between Point Arena and Fort Bragg (peak activity from August through November) and in the Greater Farallones (peak activity from July through November). Humpback whale feeding Biologically Important Areas (peak activity from July through November) overlap blue whale feeding Biologically Important Areas.

Critical habitat was designated by NMFS/NOAA Fisheries in 2021 for the Southern Resident killer whale DPS from Puget Sound, Washington, to Point Sur, California, including the coasts of Humboldt, Mendocino, Sonoma, Marin, and San Francisco counties between depths of 20 and 656 ft. (NOAA Fisheries 2021b). Critical habitat for both DPSs of humpback whale, Mexico and Central America DPSs, was designated in 2021 (NOAA) and spans the length of Washington, Oregon, and California as it encompasses areas where their prey occur within the California Current Ecosystem.

Pinnipeds

Pinnipeds include a wide range of species that occur in all four marine zones. Some species, such as California sea lions (*Zalophus californianus*) and harbor seals (*Phoca vitulina richardii*), frequently haul out on the shoreline, while others, such as northern elephant seals (*Mirounga angustirostris*), spend all of their non-breeding lives in deep water off the continental shelf (Table 2.2.3.17-8) (NOAA Fisheries 2021c). Pinniped species likely to occur regularly in the Marine Study Area include California sea lion, harbor seal, and Steller sea lion. The Steller sea lion has ESA-designated critical habitat near Sugarloaf Island in Humboldt County.

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Mustelids

The southern sea otter (*Enhydra lutris nereis*) primarily occurs from Monterey south to Point Conception but is occasionally observed as far north as San Francisco (Marine Mammal Commission 2021). Southern sea otters, also known as California sea otters, live in nearshore waters along the Central California coastline. Additionally, marine-adapted river otters (*Lontra canadensis*) are unique to Humboldt County (Table 2.2.3.17-8).

Table 2.2.3.17-8. Marine mammals known to occur or potentially occurring in the Marine Study Area.

Common Name (Scientific Name)	Status
Mustelids	
Southern sea otter (*Enhydra lutris nereis*)	FT, FP, MMPA
Pinnipeds	
California sea lion (*Zalophus californianus*)	MMPA
Guadalupe fur seal (*Arctocephalus townsendi*)	FT, CT, FP, MMPA
Northern elephant seal (*Mirounga angustirostris*)	MMPA
Northern fur seal (*Callorhinus ursinus*)	MMPA
Pacific harbor seal (*Phoca vitulina*)	MMPA
Steller sea lion (*Eumetopias jubatus*)[1]	MMPA
Cetaceans	
Baird's beaked whale (*Berardius bairdii*)	MMPA
Blue whale (*Balaenoptera musculus*)	FE, MMPA
Cuvier's beaked whale (*Ziphius cavirostris*)	MMPA
Dall's porpoise (*Phocoenoides dalli*)	MMPA
Dwarf sperm whale (*Kogia sima*)	MMPA
False killer whale (*Pseudorca crassidens*)	MMPA
Fin whale (*Balaenoptera physalus*)	FE, MMPA
Gray whale, eastern north Pacific (*Eschrichtius robustus*)	MMPA
Harbor porpoise (*Phocoena phocoena*)	MMPA
Hubb's beaked whale (*Mesoplodon carlhubbsi*)	MMPA
Humpback whaleMexico and Central American DPSs (*Megaptera novaeangliae*)[1]	FE, MMPA
Minke whale (*Balaenoptera acutorostrata*)	MMPA
North Pacific right whale (*Eubalaena japonica*)	FE, MMPA
Northern right whale dolphin (*Lissodelphis borealis*)	MMPA
Pacific white-sided dolphin (*Lagenorhynchus obliquidens*)	MMPA

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Common Name (Scientific Name)	Status
Pygmy sperm whale (*Kogia breviceps*)	MMPA
Risso's dolphin (*Grampus griseus*)	MMPA
Sei whale (*Balaenoptera borealis*)	FE, MMPA
Short-beaked common dolphin (*Delphinus delphis*)	MMPA
Short-finned pilot whale (*Globicephala macrorhynchus*)	MMPA
Southern Resident Killer Whale (*Orcinus orca*)	FE, MMPA, CH
Sperm Whale (*Physeter macrocephalus*)	FE, MMPA
Stejneger's beaked whale (*Mesoplodon stejnegeri*)	MMPA
Striped dolphin (*Stenella coeruleoalba*)	MMPA
Transient ecotype of killer whales (*Orcinus orca*)	MMPA

Sources: Marine Mammal Commission 2021; NOAA Fisheries 2016, 2021a, 2021c; USFWS 2021; Whale and Dolphin Conservation 2024

Note: Federal Status
CH = Critical habitat in or near Marine Study Area
CT = Species designated as threatened by State of California
FE = Species federally designated as endangered
FP = CDFW Fully Protected Species
FT = Species federally designated as threatened
MMPA = Marine Mammal Protection Act species

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2.2.4 Application for Surrender of License – Environmental Effects

This section provides an analysis of the potential effects of decommissioning the Potter Valley Hydroelectric Project (Project) on environmental and cultural resources. This section follows FERC's guidelines *Preparing Environmental Documents: Guidelines for Applicants, Contractors, and Staff* (FERC 2008).

The analyses presented in this section are based on the information presented in Section 2.2.3, Affected Environment, which documents the environmental and cultural resource conditions as they exist now with the Project in place and operated and maintained in accordance with the current FERC license and which would continue under the No-Action Alternative.

Following an overview of the analytical approach (Section 2.2.4.1), potential environmental effects that could occur under the Proposed Action relative to the No-Action Alternative are discussed in detail in Sections 2.2.4.2 through 2.2.4.18, organized as follows:

- 2.2.4.2, Water Use and Hydrology;
- 2.2.4.3, Water Quality;
- 2.2.4.4, Fish and Aquatic Resources;
- 2.2.4.5, Botanical Resources;
- 2.2.4.6, Wildlife Resources;
- 2.2.4.7, Geology and Soils;
- 2.2.4.8, Geomorphology;
- 2.2.4.9, Land Use;
- 2.2.4.10, Recreation Resources;
- 2.2.4.11, Aesthetic Resources;
- 2.2.4.12, Cultural Resources;
- 2.2.4.13, Tribal Resources;
- 2.2.4.14, Socioeconomic Resources;
- 42.2.4.15, Air Quality;
- 2.2.4.16, Noise;
- 2.2.4.17, Traffic; and
- 2.2.4.18, Marine Resources.

Cumulative impacts are addressed in Section 2.2.5.

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2.2.4.1 Analytical Approach

This section describes the approach used to identify and analyze the potential effects of decommissioning the Project on environmental and cultural resources.

This environmental analysis is based on information included in PG&E's Preliminary Application Document for the Project (PG&E 2017), data collected as part of initiation of 21 approved study plans developed as part of the relicensing process (FERC 2018), and information included in PG&E's Initial Draft Surrender Application and Conceptual Decommissioning Plan (PG&E 2023). Additional information available for the Project area is also incorporated, as appropriate.

This section describes the approach used to identify and analyze the potential effects of decommissioning the Project (Proposed Action) relative to the existing baseline condition. Modeled existing baseline hydrology (2004 through 2023) was used to represent the No-Action Alternative in the effects analyses and reflects (1) the current reservoir storage seismic restriction (reduces Lake Pillsbury reservoir's storage capacity by approximately 20,000 ac-ft) and (2) current operations that have included variance to the Reasonable and Prudent Alternative flows (NMFS 2002), particularly in the East Branch Russian River. The modeled existing baseline flows are the same as PG&E's proposed amendment flows for the East Branch Russian River (see Section 2.2.3.1.8, Regulatory Flow Requirements) and average PVID irrigation season deliveries in recent years.

Unimpaired stream flow in the Eel River at Scott Dam was calculated using a mass balance approach whereby inflow equals the change in Lake Pillsbury reservoir storage plus releases plus the volume of storage lost to evaporation (see Appendix 2.2.3.1-A). Accretions along the Eel River were calculated by subtracting the upstream stream gage from the downstream stream gage in a given reach. Unimpaired flows in the Eel River from Cape Horn Dam to the Eel River near Scotia CA stream gage (United States Geological Survey gage no. 11477000) were determined by adding the calculated accretions to the unimpaired flow at the location upstream. Unimpaired flow through the Potter Valley Powerhouse was assumed to be zero. Unimpaired flows in the East Branch Russian River were developed using a mass balance approach based on available gage data.

Existing sediment modeling and analyses were utilized to assess the potential volume of erodible sediment in Lake Pillsbury reservoir and Van Arsdale Reservoir and how it would be transported and deposited downstream following dam removal. These models, described in more detail in Section 2.2.3.7, Geomorphology, included the following:

- Conceptual Sediment Erosion Model (Stillwater Sciences 2021a) to estimate the volume and general locations of impounded sediment within Lake Pillsbury reservoir that could be present due to erosion and transported downstream;
- Suspended Sediment Transport Model (Stillwater Sciences 2021a), a two-phase conceptual model for fine sediment erosion following dam removal to assess the general magnitude of suspended sediment concentration and duration of high suspended sediment concentration impact downstream of the dams;

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- Gravel Transport Dynamics (Stillwater Sciences 2021b) were based on sediment pulse evolution theory and observations from previous dam removals; and
- Sand Transport Model (Stillwater Sciences 2021b; Dam Removal Express Assessment Model 1) to assess erosion and downstream transport and deposition of sand.

The effects analysis is organized into two phases within each resource area—(1) Construction and Deconstruction Effects and (2) Post-facility Removal Effects. Components of the Proposed Action that are analyzed under each phase are summarized below.

- **Phase 1: Construction and Deconstruction Effects** are temporary effects that may occur during the following:
  - Scott Dam and associated ancillary/recreation facility removal
    - Initial low-flow season activities (June–October)
    - Removal of the adit plug during the first high-flow season (may not be the same year as the initial low-flow season activities) (November–May)
    - Removal of the dam during the second low-flow season and after sediment flushing (June–October)
  - Cape Horn Dam and ancillary facility removal
    - Low-flow season activities (March–October)
    - Physical removal of the cofferdam following decommissioning of Cape Horn Dam and after construction of the NERF by ERPA, as described under Section 3.0, Non-Project Use of Project Lands

  These effects would result from implementation of the following activities within the Scott Dam and Cape Horn Dam construction areas (Map 2-8 and Map 2-10 in Section 2.1.2 Applicant's Proposal): site access improvements, construction of temporary access roads and staging/laydown areas, installation of cofferdams and drawdown or dewatering of the dam construction areas, ground disturbance, and use of heavy equipment. Construction effects would also occur from the transport of materials and workers to and from the work areas (e.g., helicopter and truck trips).
- **Phase 2: Post-facility Removal Effects** are the resulting physical conditions following removal of Lake Pillsbury reservoir (i.e., adit plug removal), Scott Dam, Cape Horn Dam, and ancillary/recreation facilities and implementation of restoration activities. Post-facility removal has been further defined to include two phases—Phase 2a and Phase 2b, as described below.
  - **Phase 2a: Initial Conditions and Preliminary Restoration** includes analysis of the initial temporary physical conditions that will occur immediately following dam and ancillary/recreation facility removal, including the following:
    - Loss of the facility or feature (e.g., loss of reservoir, ancillary facility, or recreation facility)

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- Initial release of stored water and sediment following removal of the adit plug at Scott Dam and complete removal of Scott Dam and Cape Horn Dam (including cofferdam removal)
- Pulse hydrology in the Eel River downstream of Scott Dam and Cape Horn Dam until the reservoir is drained
- Sediment load/deposition and turbidity in the Eel River downstream of Scott Dam and Cape Horn Dam
- Continued degraded water quality and sediment deposition after the initial sediment release until the system stabilizes and water quality and sediment transport return to natural conditions
- Ground disturbance, use of heavy equipment, and transport of materials to and from the Scott Dam and Cape Horn Dam restoration areas to allow for restoration of the former dam sites and ancillary/recreation facility sites

– **Phase 2b: Resulting Conditions and Restoration** includes analysis of the resulting conditions following dam and ancillary/recreation facility removal, including the following:

- Unimpaired hydrology in the Eel River downstream of Scott Dam and Cape Horn Dam
- Restored sediment transport and water quality in the Eel River downstream of Scott Dam and Cape Horn Dam
- Natural hydrology in the East Branch Russian River
- Restored former reservoir beds and ancillary/recreation facility sites following facility removal

Under the Proposed Action, PG&E would initiate removal of Scott Dam and Cape Horn Dam during the same low-flow season. During the first high-flow season after the initial removal, the adit plug at Scott Dam and the cofferdams at Cape Horn Dam would be removed simultaneously or in close sequence to flush sediment from the reservoirs, as described in Section 2.1.2, Applicant's Proposal. Final dam removal activities at the Scott Dam site would occur during the second low-flow season (the first low-flow season after sediment flushing). The majority of removal activities at Cape Horn Dam would occur during the first initial low-flow season.

The effects determinations for each environmental and cultural resource considers construction BMPs, environmental measures, and plans under the Proposed Action (Table 2.2.4.1-1). The following effects determinations were used in the analysis:

- **No Effect** – Implementation of the Proposed Action would protect and maintain a resource.
- **Negligible Effect** – Implementation of the Proposed Action would have a negligible effect on a resource, or the implementation of environmental measures will reduce the effect to a negligible level.

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- **Adverse Effect** – Implementation of the Proposed Action would have a significant effect on a resource that may be reduced, but not to a negligible level, through implementation of new environmental measures.
- **Beneficial Effect (Enhancement)** – Implementation of the Proposed Action would benefit the resource.

A list and description of environmental measures is provided in Section 2.1.2.2, Proposed Environmental Measures.

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Table 2.2.4.1-1. Management plans to address and reduce potential effects to environmental and cultural resources during decommissioning (construction and deconstruction) and restoration of the Potter Valley Hydroelectric Project, by resource area.

Proposed Plan or Measure	Potentially Affected Resource																
	Water Use and Hydrology	Water Quality	Fish and Aquatic Resources	Botanical Resources	Wildlife Resources	Geology and Soils	Geomorphology	Land Use	Recreation Resources	Aesthetic Resources	Cultural Resources	Tribal Resources	Socioeconomic Resources	Air Quality	Noise	Traffic	Marine Resources
Construction Management Plan (including Restoration[1]) that includes the following measures and plans:																	
General Construction Measures and BMPs				P1, P2	P1, P2	P1, P2		P1, P2	P1	P1, P2	P1, P2	P1, P2		P1, P2	P1, P2	P1, P2	
Water Quality and Erosion Control BMPS and Measures																	
Construction-related BMPs to reduce erosion and protect water quality		P1, P2	P1, P2		P1, P2	P1, P2	P1, P2	P1, P2	P1, P2			P1, P2	P1, P2				P1
Obtaining and implementing resource agency and construction permits		P1, P2	P1, P2		P1, P2	P1, P2	P1, P2	P1, P2	P1, P2			P1, P2	P1, P2				P1
Stormwater Pollution Prevention Plan		P1, P2	P1, P2		P1, P2	P1, P2	P1, P2	P1, P2	P1, P2			P1, P2	P1, P2				P1
General Wildlife Protection and Botanical Construction Measures, and includes:																	
General Wildlife Construction Measures					P1, P2							P1, P2					
Osprey Construction Measure					P1, P2												
American Peregrine Falcon Construction Measure					P1, P2												
Other Raptors Construction Measures					P1, P2							P1, P2					
Other Special-status Birds and Game Birds Construction Measures					P1, P2							P1, P2					
Special-status Bats Construction Measures					P1							P1					
Special-status Mesocarnivore Construction Measures					P1, P2							P1, P2					
Monarch Butterfly Construction Measure					P1												
Special-status Plant Construction Measures				P1, P2							P1, P2	P1, P2					
Invasive Weed Construction Measures		P2		P1, P2	P1, P2						P1, P2	P1, P2					
Riparian and Wetland Protection Measures				P1, P2	P1						P1, P2	P1, P2					
Construction Erosion Prevention Plan		P1, P2	P1, P2		P1, P2	P1, P2	P1, P2	P1, P2	P1, P2		P1, P2	P1, P2	P1, P2				P1, P2
Hazardous Materials Measures, and includes:																	
Spill Prevention, Control, and Countermeasures Plan		P1, P2	P1, P2		P1, P2	P1, P2		P1, P2	P1, P2				P1, P2				P1
Hazardous Materials Handling Measures		P1, P2	P1, P2		P1, P2	P1, P2		P1, P2	P1, P2		P1, P2	P1, P2	P1, P2				P1
Construction Fire Plan								P1, P2									

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Proposed Plan or Measure	Potentially Affected Resource																
	Water Use and Hydrology	Water Quality	Fish and Aquatic Resources	Botanical Resources	Wildlife Resources	Geology and Soils	Geomorphology	Land Use	Recreation Resources	Aesthetic Resources	Cultural Resources	Tribal Resources	Socioeconomic Resources	Air Quality	Noise	Traffic	Marine Resources
Land Use Measures, and includes:																	
Limit locations of staging and access to developed routes and previously disturbed areas to the extent possible								P1			P1	P1					
Post-construction Road Restoration Plan								P1			P1	P1	P1, P2				
Sediment Disposal Plan		P1															
Construction Recreation Plan								P1	P1		P1	P1					
Construction Site Water Diversion, Dewatering, and Drawdown Plan	P1	P1	P1				P1		P1		P1	P1	P1				P1
East Branch Russian River Diversion Plan	P1	P1	P1				P1		P1		P1	P1	P1				
Public Safety Plan (including emergency response)						P1, P2			P1, P2								
Water Quality and Water Temperature Monitoring Plan		P1, P2	P1, P2		P1, P2		P1, P2		P1, P2			P1, P2	P1				P1
Aquatic Resources Management Plan, that includes the following plans:																	
Construction Non-native Invasive Aquatic Species Management Plan			P1						P1			P1					
Aquatic Species Management and Monitoring Plan			P1, P2						P1, P2			P1, P2	P1				P1, P2
Estuary Protection Plan		P2	P2				P2		P2			P2					P1, P2
Sediment/Channel Monitoring and Response Plan, that includes the following plans:																	
Tributary-Mainstem Connectivity Plan			P2				P1, P2				P1, P2	P1, P2					
Mainstem Fish Passage Plan			P2				P2				P2	P2					
Infrastructure Monitoring (bridges and diversion)							P1, P2	P2			P1, P2	P1, P2	P2			P2	
Floodplain Sediment Deposition Plan			P2				P2	P2			P2	P2					
Flood Monitoring Plan							P2	P2			P2	P2	P2			P2	
Terrestrial Wildlife Management Plan, that includes the following plans:																	
Tule Elk Management Plan				P2	P2							P2					
Wildlife Stranding Measure					P2							P2					
Bald Eagle Conservation Plan					P1, P2							P1, P2					
Northern Spotted Owl Management Plan					P1, P2							P1, P2					
Scott Dam Slope Stability Monitoring Plan						P1					P1						

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Proposed Plan or Measure	Potentially Affected Resource																
	Water Use and Hydrology	Water Quality	Fish and Aquatic Resources	Botanical Resources	Wildlife Resources	Geology and Soils	Geomorphology	Land Use	Recreation Resources	Aesthetic Resources	Cultural Resources	Tribal Resources	Socioeconomic Resources	Air Quality	Noise	Traffic	Marine Resources
Cultural and Tribal Resources Measures[2], that includes the following:																	
Memorandum of Agreement (Known Historic Properties)											P1, P2	P1, P2					
Historic Properties Management Plan											P1, P2	P1, P2					
Restoration Plan		P2	P2	P1, P2	P2	P1, P2	P1, P2	P1, P2	P1, P2		P1, P2	P1, P2	P2				P2

[1] Restoration refers to all active restoration actions that require the use of heavy equipment or helicopters as part of the implementation of the Restoration Plan or Sediment/Channel Monitoring Response Plan.
[2] FERC will develop and execute a programmatic agreement (PA) pursuant to 36 CFR 800.14(b)(1)(ii), which stipulates a process for phased identification and evaluation of resources for eligibility for inclusion in the National Register of Historic Places (NRHP) and, if needed, FERC will develop and execute a memorandum of agreement (MOA) for known resources eligible for inclusion in NRHP to establish the terms and conditions agreed upon to resolve adverse effects (see Resolution of Adverse Effects in Sections 2.2.4.12.5, Cultural Resources, and 2.2.4.13.5, Tribal Resources).

Notes: P1 = Phase 1
P2 = Phase 2

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2.2.4.1.1 References

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2.2.4.2 Water Use and Hydrology

This section describes the potential effects to water use and hydrology that could occur because of the Proposed Action described in PG&E's Application for Surrender of License and Decommissioning Plan for the Potter Valley Hydroelectric Project (Project) (see Section 2.1.2, Applicant's Proposal). Section 2.1.2 includes a description of decommissioning Project facility modifications, including restoration activities, to be implemented under the Proposed Action.

Potential effects are separated into construction effects (Phase 1) and post-facility removal effects (Phase 2). As described in Section 2.2.4.1, Analytical Approach, post-facility removal effects are split into two subphases: Phase 2a – Initial Conditions and Preliminary Restoration and Phase 2b – Resulting Conditions and Restoration.

Effects were determined by analyzing the changes in water use and hydrology that may result from activities to be implemented under the Proposed Action (Section 2.1.2, Applicant's Proposal) compared to the No-Action Alternative (existing condition) (Section 2.1.1, No-Action Alternative). Final effects determinations consider construction measures and post-facility measures included to avoid or mitigate impacts associated with the Proposed Action (refer to Section 2.1.2.2, Proposed Environmental Measures). Unavoidable adverse effects are discussed at the end of this section.

The Analysis Area includes Lake Pillsbury reservoir, Van Arsdale Reservoir, the Eel River from Lake Pillsbury reservoir downstream to the estuary, and the East Branch Russian River from the Potter Valley Powerhouse Tailrace downstream to Lake Mendocino. Because PG&E does not control Lake Mendocino operations (storage, releases), the Analysis Area does not include Lake Mendocino or the Russian River downstream of Lake Mendocino.

2.2.4.2.1 Phase 1: Short-term Construction Effects

The following potential effects to water use and hydrology resulting from Project facility modifications were evaluated:

- Alteration of hydrology in the Eel River as a result of Lake Pillsbury reservoir drawdown and construction activities at Scott Dam;
- Alteration of hydrology in the Eel River as a result of Van Arsdale Reservoir drawdown and installation of dewatering and bypass systems at Cape Horn Dam; and
- Alteration of hydrology in the East Branch Russian River during construction.

Potential alteration of groundwater / potable water supply and water for wildfires are addressed in Section 2.2.4.7, Geology and Soils, and Section 2.2.4.9, Land Use, respectively.

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Scott Dam Area

Scott Dam construction activities would affect storage in Lake Pillsbury reservoir and flows in the Eel River downstream. An adit tunnel and channel would be constructed at the base of the dam/spillway with a capacity of approximately 7,000 cfs. The upper portion of the dam would be removed (dam lowering and spillway notching). Sediment would be dredged from the upstream side of the dam at the location of the adit tunnel to facilitate sediment flushing when the adit plug is removed. Subsequent to the flushing, the remaining dam and facilities would be removed.

PG&E will develop a Construction Site Water Diversion, Dewatering, and Drawdown Plan for resource agency review and approval prior to construction. The plan would include reservoir drawdown flow scheduling (magnitude and timing), construction minimum flows in the Eel River below the dam, measures to ensure minimum instream flows are met, coordination with East Branch Russian River diversions, and avoidance of drawdown flows (magnitude and timing) that could adversely affect resources such as early cueing of Chinook salmon (*Oncorhynchus tshawytscha*) upstream migration. Water drawdown of the reservoir would occur using the 400-cfs capacity of the low-level outlet needle value. The Construction Site Water Diversion, Dewatering, and Drawdown Plan would be approved by resource agencies, including NMFS. NMFS consultation would include modification of the 2002 Biological Opinion and RPA flows or some other mechanism to authorize potential non-compliance with the current RPA flows. With implementation of the Construction Site Water Diversion, Dewatering, and Drawdown Plan, drawdown flows would have a negligible effect on suitable conditions for aquatic resources in the Eel River below Scott Dam.

The construction activities at Scott Dam will temporarily affect flows in the Eel River downstream of the dam and have the potential to affect flows in the East Branch Russian River above Lake Mendocino. Drawdown of the reservoir using the low-level outlet needle valve will result in a release from Scott Dam of up to 400 cfs into the Eel River for up to 5 months (i.e., June – October). Drawdown will be completed in October at approximately 10,000 ac-ft of storage in Lake Pillsbury reservoir. The timing of the drawdown will be coordinated with water demands in the East Branch Russian River to the extent possible, which would result in a diversion of up to 130 cfs in the East Branch Russian River and potential release of 270 to 400 cfs to the Eel River below Cape Horn Dam. The potential increase in flow above existing conditions depends on the water year type and associated minimum instream flow requirements. Flow rates during the drawdown and under existing conditions are shown in Table 2.2.4.2-1.

Table 2.2.4.2-1. Flow rates during initial drawdown.

Season	Flow under Existing Condition	Flow during Drawdown Period
Eel River below Scott Dam		
June	55 to 320 cfs	Up to 400* cfs
July through September	55 to 87 cfs	Up to 400* cfs
October	47 to 240 cfs	Up to 400* cfs

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Season	Flow under Existing Condition	Flow during Drawdown Period
Eel River below Cape Horn Dam		
June	5 to 200 cfs	Up to 270 to 400* cfs
July through September	3 to 50 cfs	Up to 270 to 400* cfs
October	25 to 140 cfs	Up to 270 to 400* cfs
Release to East Branch Russian River		
June	10 to 80 cfs	0 to 130 cfs
July through September	10 cfs	0 to 130 cfs
October	10 to 40 cfs	0 to 130 cfs

* Subject to the Construction Site Water Diversion, Dewatering, and Drawdown Plan

Following the drawdown and dam lowering/spillway notching, natural flows would pass over the dam into the Eel River (there would be no storage). During times of low natural flow, this would result in less flow below Scott Dam than under existing conditions and during times of high natural flow, this would result in more flow below Scott Dam than under existing conditions due to the lack of the ability of Scott Dam to impound water. The current RPA minimum instream flows below Scott Dam would only be met if natural flows meet or exceed the RPA minimum instream flows.

With implementation of the Construction Site Water Diversion, Dewatering, and Drawdown Plan; the drawdown of Lake Pillsbury reservoir; maintenance of construction minimum flows in the Eel River below the dam; and passage of natural flows over the dam after the spillway notch is completed, the Proposed Action would have a negligible effect on hydrology in the Eel River.

Cape Horn Dam Area

Cape Horn Dam construction activities would affect Van Arsdale Reservoir and could affect flows in the Eel River downstream of the dam. PG&E will develop a Construction Site Water Diversion, Dewatering, and Drawdown Plan for the construction work at Cape Horn Dam for resource agency review and approval prior to construction. A bypass channel would be excavated through the earthen portion (right side) of Cape Horn Dam to pass Eel River flows downstream during construction. A temporary cofferdam at the top of the bypass channel would be constructed during excavation of the channel to prevent flow from entering until the channel is completed. It would be removed when the bypass channel is completed. Two channel-spanning cofferdams would be installed across the Eel River: one upstream of the Van Arsdale Diversion and the other downstream of Cape Horn Dam and the fish exclusion barrier. After the cofferdams are installed, the construction area would be dewatered and Cape Horn Dam and the fish hotel/exclusion barrier would be removed. PG&E would also develop an East Branch Russian River Diversion Plan that could include temporary pumping to the diversion tunnel, if needed, to provide diversions to the East Branch Russian River during construction. The plan would include coordination with ERPA related to NERF construction (see Section 3.0, Application for Non-Project Use of Project Lands) to minimize potential interference of ERPA's construction plans with diversions to the East Branch

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Russian River. At the end of construction, the cofferdams would be removed and flow would be restored through the Eel River construction area.

The current RPA minimum instream flows would continue to be released into the Eel River below Cape Horn Dam during the drawdown of Lake Pillsbury reservoir. Following the drawdown, however, the RPA minimum instream flows could only be released into the Eel River below Cape Horn Dam when natural flow is sufficient. When natural flow is too low, less than the minimum flow would be released. During construction, if the upstream cofferdam is installed in the Eel River above the Van Arsdale Diversion, the diversion would not be operable and water diversions into the East Branch Russian River would cease. This would affect Potter Valley water supply and RPA minimum flows in the East Branch Russian River. The East Branch Russian River Diversion Plan would include measures that could include temporary pumping, if needed, to continue providing water to the East Branch Russian River during construction.

With implementation of the Construction Site Water Diversion, Dewatering, and Drawdown Plan that includes construction minimum instream flows and measures to ensure minimum instream flows are met, sufficient flow will pass downstream into the Eel River. The Construction Site Water Diversion, Dewatering, and Drawdown Plan would be approved by resource agencies, including NMFS. NMFS consultation would include modification of the 2002 Biological Opinion and RPA flows or some other mechanism to authorize potential non-compliance with the current RPA flows. The East Branch Russian River Diversion Plan may include temporary pumping of Eel River water into the diversion tunnel and into the East Branch Russian River, if needed, that could provide some water supply during PG&E's construction. With implementation of these mitigation measures, the Proposed Action effects on water use and hydrology would be negligible.

2.2.4.2.2 Phase 2: Post-facility Removal Effects

The following initial condition and preliminary restoration (Phase 2a) and resulting conditions and restoration (Phase 2b) potential effects to water use and hydrology were evaluated:

- Dam removal pulse hydrology in the Eel River (e.g., 7,000-cfs increase) due to Scott Dam removal
- Unimpaired flows in the Eel River
- Potential effects on RPA flows
- Potential effects on downstream Eel River water users
- Potential effects of altered hydrology on the East Branch Russian River
  - Water supply
  - East Branch Russian River flow
- Loss of generation

Potential effects to groundwater / potable water supply and water for wildfires are addressed in Section 2.2.4.7, Geology and Soils, and Section 2.2.4.9, Land Use, respectively.

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A discussion of effects that could occur is provided below by river reach: Eel River from Scott Dam to the Van Arsdale Diversion, Eel River downstream of the Van Arsdale Diversion, and the East Branch Russian River.

Removal of the Project dams (Scott Dam and Cape Horn Dam) is the primary component of the Proposed Action evaluated. Removal of Project recreation facilities (i.e., campgrounds and day-use areas) and associated access roads located in the Scott Dam Area would not have an effect on hydrology or water use.

Phase 2a: Initial Condition and Preliminary Restoration

Scott Dam to Van Arsdale Diversion

Eel River high-flow hydrology could potentially be affected (increased) downstream of Scott Dam due to implementation of the Proposed Action. As part of rapid dam removal, the adit tunnel plug at the base of Scott Dam would be blasted open (approximately 7,000-cfs capacity) to initiate sediment flushing during the first high-flow season following dam lowering and spillway notching. Rapid removal would follow pre-established protocols related to river flow forecasting. Explosives would be detonated during or preceding an anticipated flood event of sufficient magnitude to evacuate fine sediment deposits from the reservoir (approximately 7,000 cfs; likely between December and March). Following draining of the reservoir, unimpaired flows up to 7,000 cfs would pass through the dam unaffected. Higher flows may be affected by temporary storage and release until the dam is completely removed in the second low-flow season.

When the adit plug is removed, there will be a release of approximately 7,000 cfs or more from Scott Dam for multiple days depending on inflow conditions. Assuming less than 14,000 ac-ft of storage behind the dam when the adit is blasted open, the storage would drain in one day or less; however, the inflow to the dam from the storm would likely be 7,000 cfs or more and last for multiple days. As a result, the release from blasting of the adit would add an additional day of 7,000 cfs to a multiple-day storm event. The No-Action Alternative 1-year, 2-year, 5-year, and 10-year high-flow events at Scott Dam are 304 cfs, 7,420 cfs, 16,500 cfs, and 24,700 cfs, respectively (refer to Section 2.2.3.1, Water Use and Hydrology, Table 2.2.3.1-8). The peak annual inflow at Scott Dam reaches 7,000 cfs in approximately 70 percent of years and reaches 5,000 cfs in approximately 90 percent of years. The release of 7,000 cfs due to adit plug removal would be well within the No-Action high-flow hydrology, and therefore, the Proposed Action would have a negligible effect on high-flow hydrology in the Eel River downstream of Scott Dam.

Removal of the dam would restore flows in the Eel River to unimpaired natural conditions. High flows are similar under existing conditions (No-Action) and the Proposed Action (refer to Section 2.2.3.1, Water Use and Hydrology, Figure 2.2.3.1-18), but low flows would vary substantially. Proposed Action unimpaired low flows would be approximately an order of magnitude lower than the No-Action Alternative (e.g., 10 cfs versus 100 cfs). Stored water would not be present to maintain the current RPA minimum instream flows in the Eel River below Scott Dam. The RPA minimum instream flows would no longer be applicable. Because there are no water users in the Eel River between Scott Dam and the Van Arsdale Diversion, the Proposed Action would have no effect on water users in the river reach.

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Van Arsdale Diversion, Cape Horn Dam, and Downstream

Eel River high-flow hydrology could potentially be affected (increased) downstream of Cape Horn Dam due to implementation of the Proposed Action. When the adit plug at Scott Dam is removed, there will be a release of approximately 7,000 cfs from Scott Dam for multiple days depending on inflow conditions (i.e., storm event when the adit plug is removed). Blasting of the adit will add approximately one 7,000-cfs day to the storm event. The No-Action Alternative 1-year, 2-year, 5-year, and 10-year high-flow events in the Eel River at Cape Horn Dam are 307 cfs, 8,962 cfs, 19,149 cfs, and 27,478 cfs, respectively (refer to Section 2.2.3.1, Water Use and Hydrology, Table 2.2.3.1-10). Farther downstream, the high-flow events are much larger. For example, the 5-year flow events at Seward and Scotia are 122,027 cfs and 205,066 cfs, respectively (refer to Section 2.2.3.1, Water Use and Hydrology, Tables 2.2.3.1-12 and 2.2.3.1-14). The release of 7,000 cfs from Scott Dam due to adit plug removal would be well within the range of No-Action Alternative high-flow events in the river, and therefore, the Proposed Action would have a negligible effect on high-flow hydrology in the Eel River downstream of Cape Horn Dam.

Removal of the dams would restore flows in the Eel River and East Branch Russian River to unimpaired natural conditions. No diversions would occur at the Van Arsdale Diversion / Cape Horn Dam. Removal of Cape Horn Dam would, however, allow other water users (e.g., ERPA) to utilize the area to construct a facility (e.g., the NERF) to divert water to the PVID and the East Branch Russian River prior to sediment being released from Scott Dam. Below Cape Horn Dam, flows in the Eel River would generally be similar (slightly higher in the winter/spring) under the Proposed Action and existing (No-Action) conditions (refer to Section 2.2.3.1, Figure 2.2.3.1-19). The modified flows could affect RPA flows, downstream water users, East Branch Russian River water supply and river flow, and hydropower generation. These potential effects are the same under Phase 2a and Phase 2b. Refer to Phase 2b for a discussion of these potential effects.

Phase 2b: Resulting Conditions and Restoration

Scott Dam to Van Arsdale Diversion

Following removal of Scott Dam, natural (unimpaired) hydrology would pass through the Eel River downstream to Cape Horn Dam. Proposed Action versus No-Action Alternative (existing condition) Eel River flows below Scott Dam are discussed in Section 2.2.3.1, Water Use and Hydrology, and shown on Figure 2.2.3.1-18. Figure 2.2.3.1-18 is reshown here as Figure 2.2.4.2-1. Proposed Action winter/spring flows would be higher and the summer/fall flows would be lower than in the No-Action Alternative. The Proposed Action low flows would be approximately an order of magnitude lower than the No-Action Alternative low flows (e.g., 9 cfs versus 90 cfs). Overall, the Proposed Action will have a beneficial effect on Eel River hydrology by restoring unimpaired flows.

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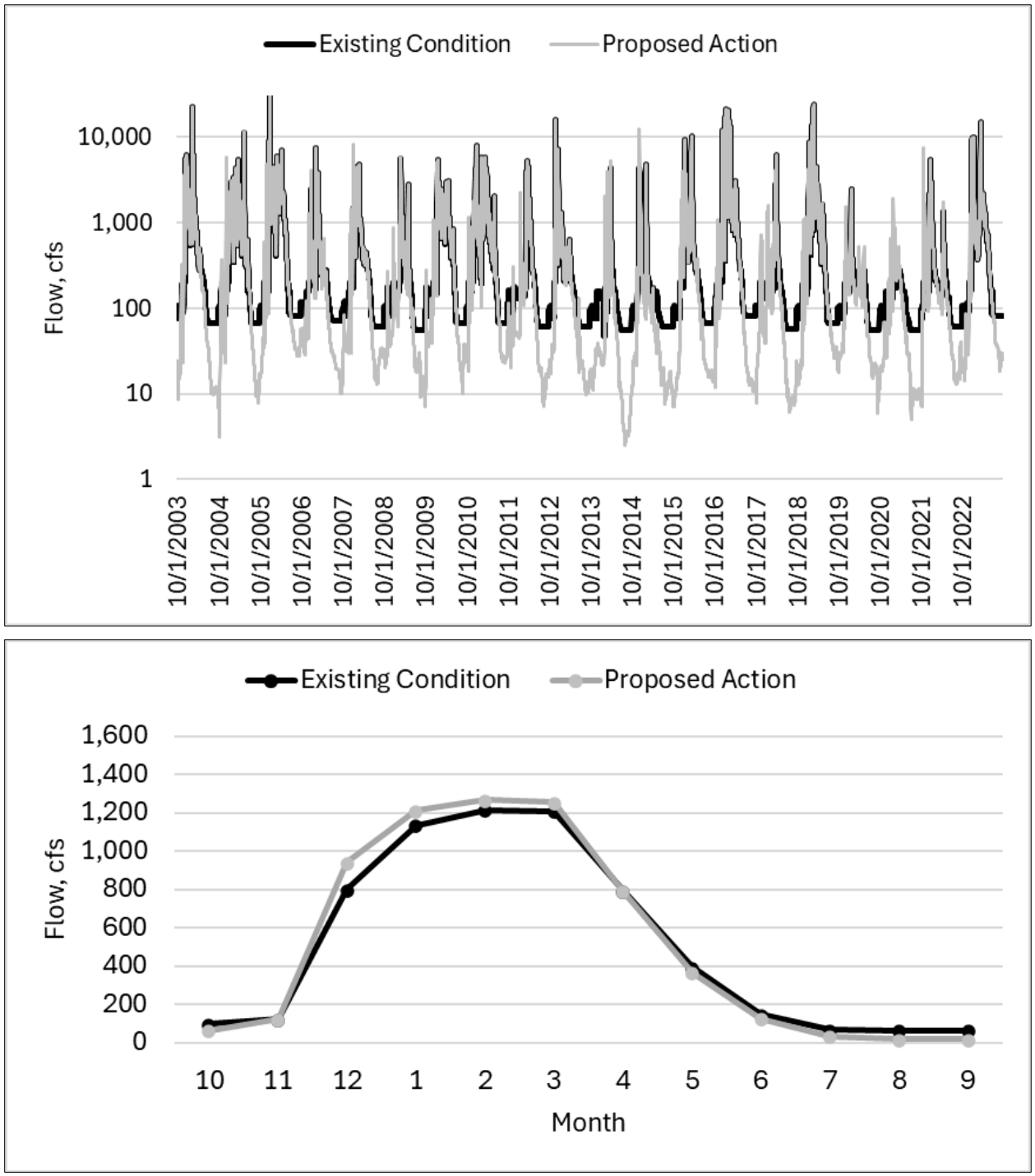


Figure 2.2.4.2-1. Modeled existing (No-Action Alternative) and Proposed Action flows in the Eel River below Scott Dam for the 2004–2023 modeling period of record. Average daily flow (top; log scale) and monthly average flow (bottom; arithmetic scale).

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With Scott Dam removed, stored water would not be available to maintain the current RPA minimum instream flows in the Eel River below Scott Dam. The RPA minimum instream flows would no longer be applicable. The intent of the RPA minimum instream flows was to approximately mimic unimpaired flows (e.g., 70 percent of unimpaired flows) in the wet season. With removal of Scott Dam, the Proposed Action would have a beneficial effect on minimum flows, albeit the flows would be significantly lower during the summer/fall than the No-Action Alternative flows.

Because there are no water users in the Eel River between Scott Dam and the Van Arsdale Diversion, the Proposed Action would have no effect on water users in the river reach.

Van Arsdale Diversion, Cape Horn Dam, and Downstream

Following removal of Scott Dam and Cape Horn Dam, natural (unimpaired) hydrology would pass through the Eel River downstream below Cape Horn Dam. Flow in the Eel River below Cape Horn Dam under the Proposed Action compared to flow in the No-Action Alternative (existing condition) are discussed in Section 2.2.3.1 (Water Use and Hydrology) and shown on Figure 2.2.3.1-19. Figure 2.2.3.1-19 is reshown here as Figure 2.2.4.2-2. Proposed Action winter/spring flows would be higher and the summer/fall flows would be the same as the No-Action Alternative flows. With Scott Dam removed, stored water will not be available to maintain the current RPA minimum instream flows in the Eel River below Cape Horn Dam. The RPA minimum instream flows would no longer be applicable. The intent of the RPA minimum instream flows was to approximately mimic unimpaired flows (e.g., 70 percent of unimpaired flows) in the wet season. With removal of Scott Dam, the Proposed Action would have a beneficial effect on minimum flows by restoring unimpaired flows.

There are water rights holders along the Eel River from Van Arsdale Reservoir downstream to the ocean (approximately 63 active; state, PG&E, individuals, corporations) that could potentially be affected by changes in Eel River hydrology. Overall, however, limited amounts of irrigable land exist along the river. Because there is minimal change in Eel River hydrology (Figure 2.2.4.2-2), the Proposed Action would have a negligible effect on water users in the river reach.

Altered hydrology in the Eel River would substantially affect flows in the East Branch Russian River. Under the Proposed Action, there would be no diversions from the Eel River to the East Branch Russian River and East Branch Russian River flows would return to natural (unimpaired) conditions. Modeled PVID water supply under the No-Action Alternative is shown on Figure 2.2.4.2-3. This water supply would not be available under the Proposed Action. Potter Valley is located at the head of the East Branch Russian River, and there is very little natural water supply in the valley. There would be an unavoidable adverse effect on the PVID water supply. Releases to the East Branch Russian River channel would also be lost. Under the Proposed Action, there would be an unavoidable adverse effect on existing condition hydrology but a return to unimpaired flow conditions in the East Branch Russian River compared to the No-Action Alternative.

During a routine inspection in July 2021, PG&E discovered a transformer at the Potter Valley Powerhouse that did not meet current operating standards. The powerhouse has been offline since that time; PG&E has no plans to replace the transformer and return the Potter Valley Powerhouse

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to service. Currently, PG&E is diverting water from the Eel River to meet minimum instream flow requirements in the East Branch Russian River and to meet water delivery contracts to the PVID at the tailrace of the Potter Valley. In the 5 years prior to the transformer being out of service, the average annual generation was 16,195 megawatt-hours (refer to Section 2.2.3.1, Water Use and Hydrology, Table 2.2.3.1-18). The Proposed Action would result in no loss of generation, as there is no generation in the existing condition No-Action Alternative.

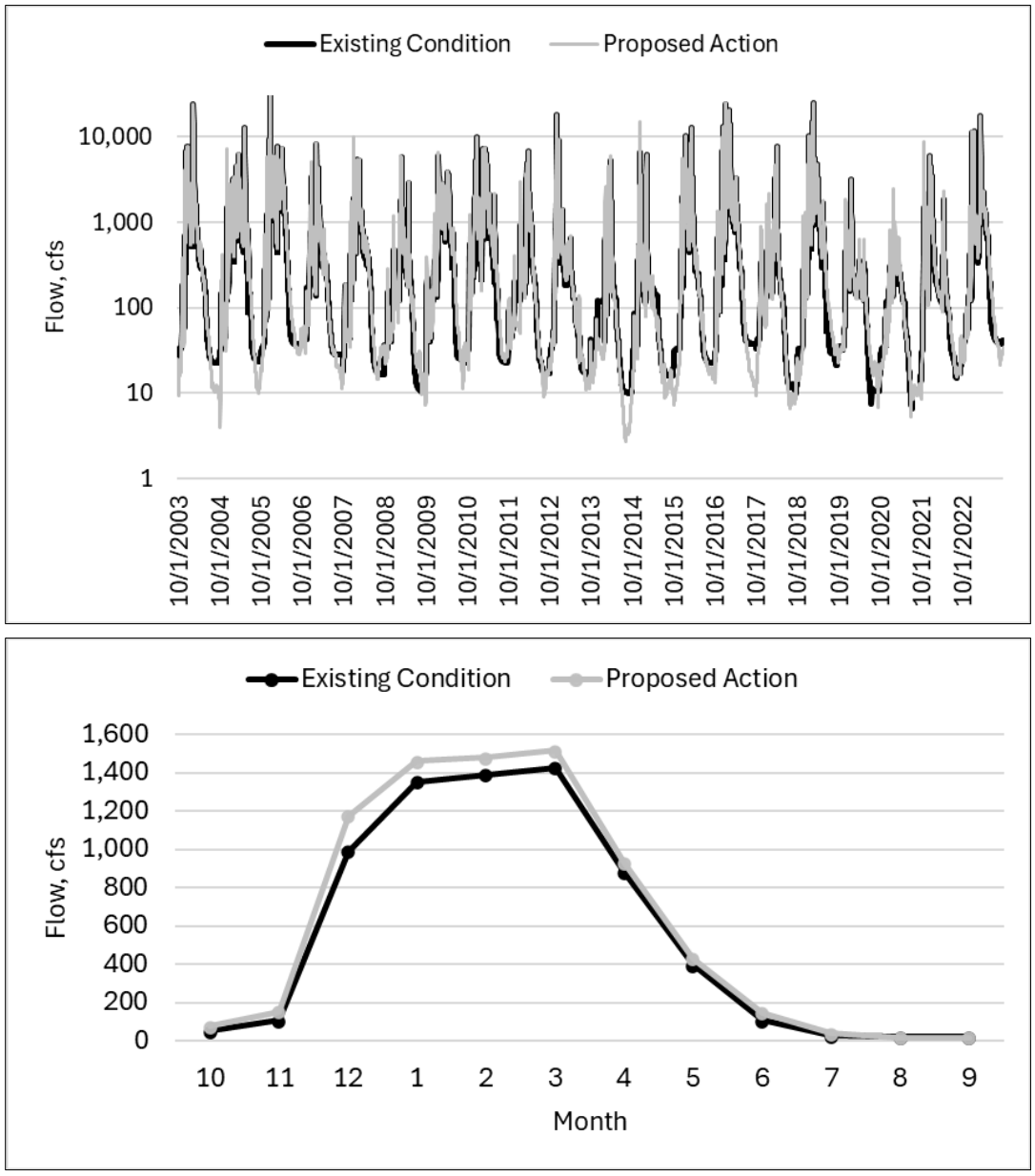


Figure 2.2.4.2-2. Modeled existing (No-Action Alternative) and Proposed Action flows in the Eel River below Cape Horn Dam for the 2004–2023 modeling period of record. Average daily flow (top; log scale) and monthly average flow (bottom; arithmetic scale).

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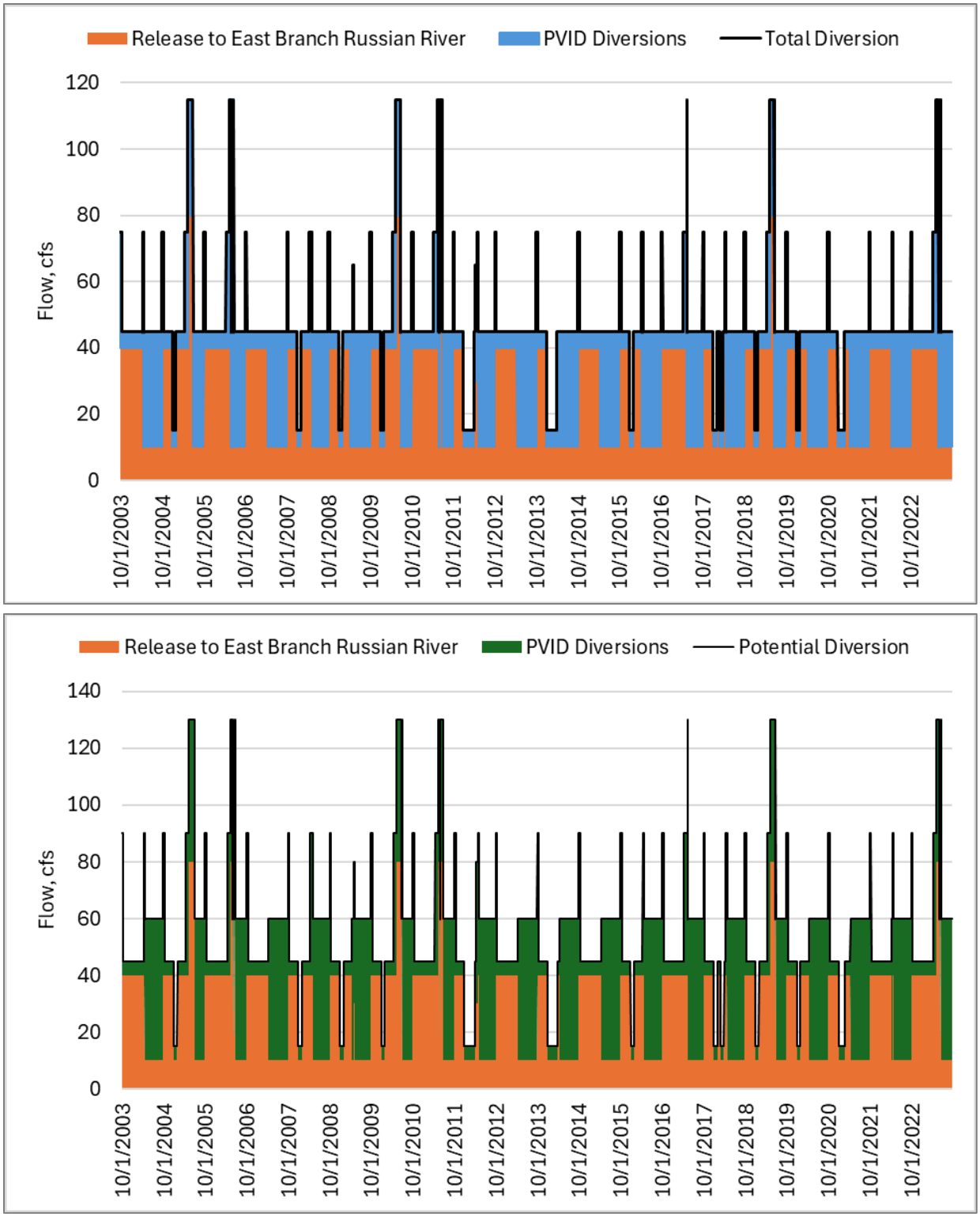


Figure 2.2.4.2-3. Modeled existing (No-Action Alternative) flow releases into the East Branch Russian River with PVID average diversions (top) and modeled existing flow release with PVID maximum diversions (bottom).

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2.2.4.2.3 Construction and Environmental Measures

To avoid or reduce effects to water use and hydrology during construction, PG&E will obtain, prepare, and/or implement the following measures. A complete list of construction measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Construction Site Water Diversion, Dewatering, and Drawdown Plan
- East Branch Russian River Diversion Plan

2.2.4.2.4 Unavoidable Adverse Effects

The following unavoidable adverse effects to water use and hydrology related to Project facility modifications implemented under the Proposed Action would occur:

- Unavoidable adverse effect on the PVID water supply because diversions to the East Branch Russian River would no longer occur under the Proposed Action; and
- Unavoidable adverse effect on water users along the East Branch Russian River compared to existing conditions because diversions to the East Branch Russian River would no longer occur under the Proposed Action. Flows would return to natural conditions.

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2.2.4.3 Water Quality

This section describes the potential effects to water quality that could occur because of the Proposed Action described in PG&E's Application for Surrender of License and Decommissioning Plan for the Potter Valley Hydroelectric Project (Project), which is described in Section 2.1.2, Applicant's Proposal. Section 2.1.2 includes a description of decommissioning Project facility modifications, including restoration activities, to be implemented under the Proposed Action.

Potential effects are separated into construction effects (Phase 1) and post-facility removal effects (Phase 2). Post-facility removal effects are split into two subphases: Phase 2a – Initial Conditions and Preliminary Restoration and Phase 2b – Resulting Conditions and Restoration. Refer to Section 2.2.4, Environmental Effects, for a description of each phase.

Effects were determined by analyzing the changes in water quality that may result from activities to be implemented under the Proposed Action (Section 2.1.2, Applicant's Proposal) compared to the No-Action Alternative (existing condition) (Section 2.1.1, No-Action Alternative). Final effects determinations consider construction measures and post-facility measures (Section 2.1.2.2, Proposed Environmental Measures) included to avoid or mitigate impacts associated with the Proposed Action. Unavoidable adverse effects are discussed at the end of this section.

2.2.4.3.1 Phase 1: Short-term Construction Effects

The area of analysis for water quality includes Lake Pillsbury reservoir; Van Arsdale Reservoir; the Eel River from Lake Pillsbury reservoir downstream to the estuary; the East Branch Russian River from the Potter Valley Powerhouse tailrace downstream to Lake Mendocino; and the marine intertidal, tidal, and oceanic habitats between the mouth of the Eel River estuary and the open ocean (see Map 2.2.3.2-1).

The following potential effects to water quality associated with Project facility modifications were evaluated:

- Potential change in Eel River water quality during construction activities (e.g., turbidity, water temperature, pH); and
- Potential change in East Branch Russian River water quality during construction activities (e.g., turbidity, water temperature, pH).

The Project facility modifications that would occur under the Proposed Action are as follows:

- Decommissioning and removal of Scott and Cape Horn dams and associated facilities and features;
- Removal of certain Project recreational facilities (e.g., campgrounds, day-use facilities, kiosk, and boat ramps) and restoration of associated USFS and PG&E lands;
- Diversion flows during decommissioning of the dams; and
- Drawdown of Lake Pillsbury reservoir prior to the removal of Scott Dam.

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Analysis of the construction water quality effects is based on the Decommissioning Plan (Section 2.1.2.1.1, Decommissioning Plan), and the analysis relies on the affected environment information presented in Section 2.2.3.2, Water Quality.

Water Quality Categories

The water quality categories that construction activities have the potential to temporarily impact include increases in turbidity and suspended sediment due to sediment disturbance, introduction of pollutants as a result of accidental spill(s), contamination associated with stormwater runoff from construction staging and stockpile areas, and effects to water temperature and DO due to modified releases from the reservoirs. These impacts are discussed below and further organized by construction site later in the section.

- **Increase in Turbidity and Suspended Solids**: Construction activities may cause a temporary increase in turbidity and suspended solids in the Eel River or East Branch Russian River due to ground disturbance from excavation and earthmoving, clearing and grading, dam deconstruction, installation of access roads / river crossings, bank stabilization around the dams, and stormwater runoff. Erosion and destabilization of soils could also result from use of heavy equipment, personnel, and light vehicle traffic, increasing the susceptibility of movement of soils into the Eel River or diversion into the East Branch Russian River. Dewatering of the reservoirs and dredging could potentially cause releases of sediment.
- **Increase in Pollutant Spill Risk**: Construction activities include the use of a variety of chemicals such as fuels, lubricants, paints, solvents, and construction materials. Improper handling, storage, or accidental spills of these chemicals could result in pollutants entering soil or surface water if not managed correctly. Activities associated with Project facility modifications could increase the potential for accidental spills and pollutants to be introduced into the Eel River or East Branch Russian River.
- **Contamination from Stormwater Runoff**: Construction activities, including dam removal and establishment of staging and stockpile areas, could temporarily alter natural drainage patterns. Without proper stormwater management practices such as silt fencing, straw/hay bales, or vegetative buffers, runoff from rainfall events could transport pollutants from the construction site into the Eel River or East Branch Russian River.
- **Contamination from Human Waste**: Construction activities include installation of sanitary facilities (e.g., portable toilets) to support workers. Bacteria, nutrients, and other contaminants from human waste and sanitation systems can enter surface water or groundwater if the system is not properly designed and operated or if sanitation facilities are not provided.
- **Modified Water Temperature**: Construction activities include drawdown of Lake Pillsbury reservoir. The Lake Pillsbury reservoir cold-water pool provides cold summer flow releases into the Eel River downstream of Scott Dam. The cold-water flows maintain cold-water species between Scott Dam and Cape Horn Dam and affect water temperature in the East Branch Russian River.

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- **DO Depletion:** Construction activities may cause a temporary increase in turbidity and suspended solids in the Eel River or East Branch Russian River. High turbidity, particularly when the sediment is anoxic and contains chemical oxygen demand (COD) (oxygen required to oxidize inorganic chemicals) and biological oxygen demand (BOD) (oxygen consumed by living organisms, e.g., bacteria), can result in significant impacts to DO.

Scott Dam Area – Dam Removal

Scott Dam construction activities would occur within an area located upstream and downstream of the dam. The work area would include staging and stockpile areas, portable sanitary facilities, and designated refueling areas. Water drawdown of the reservoir would occur using 400 cfs capacity of the low-level outlet needle valve. A temporary access road and barge launch would be installed below the dam. An adit tunnel and channel would be constructed in the base of the dam/spillway. The upper portion of the dam would be removed (dam lowering and notching), and clean material may be placed in the plunge pool area. Sediment would be dredged from the upstream side of the dam at the location of the adit tunnel to facilitate sediment flushing when the adit plug is removed. The adit plug would be blasted open during high flows and allow flushing of sediment from Lake Pillsbury reservoir. Subsequent to the flushing, the remaining dam and facilities would be removed and the bulk of the dam material would be stored and capped on PG&E lands.

Increase in Turbidity and Suspended Sediment

Construction activities at Scott Dam, including access roads and staging and storage areas, have the potential to temporarily affect water quality in the Eel River downstream of the dam. Draining the reservoir may result in scour of the Lake Pillsbury reservoir inlet channel sediments and generate suspended sediment / turbidity in the reservoir water and the outflow to the Eel River. Dredging of sediment in front of the adit (upstream side of the dam) could also generate turbidity that could be released into the river. Disposal of contaminated or dirty / crushed concrete debris into the plunge pool area could create downstream water quality issues. Some level of increase in turbidity and suspended sediment release into the Eel River may be unavoidable, particularly with drawdown of the reservoir and lowering of the dam. Flows over the dam or through the low-level outlet may be elevated in turbidity and suspended sediment compared to reference conditions upstream of the reservoir.

PG&E would include water quality and erosion control measures that would be implemented at the construction activity locations and access roads in the vicinity of Scott Dam. Construction measures include a Construction Site Water Diversion, Dewatering, and Drawdown Plan; a Water Quality and Water Temperature Monitoring Plan; BMPs; Sediment Disposal Plan, and a Construction Erosion Prevention Plan. PG&E would construct, maintain, and decommission access routes consistent with the SWRCB's General CWA Section 401 Water Quality Certification and Waste Discharge Requirements for Utility Wildfire and Similar Operations and Maintenance Activities and Handbook for Forest, Ranch, and Rural Roads. In addition, PG&E would obtain applicable resource agency and construction permits. With implementation of these measures, the potential for increase in turbidity and suspended sediment and related water quality effects during construction would be reduced in Lake Pillsbury reservoir and the Eel River below Scott Dam;

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however, it is anticipated there may be unavoidable adverse effects to turbidity and suspended sediment in Lake Pillsbury reservoir and the Eel River downstream of Cape Horn Dam.

Also, significant adverse effects to water quality from high turbidity and suspended sediment concentrations are expected when the adit plug at Scott Dam is removed (reservoir sediment flushing), which is discussed in Phase 2a: Initial Conditions and Preliminary Restoration.

Increase in Pollutant Spill Risk

Construction activities at Scott Dam have the potential to temporarily affect water quality in the Eel River downstream of the dam due to pollutant spill risk. Activities associated with construction could increase the potential for accidental spills and pollutants to be introduced into Lake Pillsbury reservoir and the Eel River.

PG&E would implement hazardous materials handling measures to avoid or minimize the risk of soil contamination from accidental spills. These measures would include the following: implementing construction-related BMPs to control spills; having emergency cleanup equipment readily available onsite; and implementing a Spill Prevention, Control, and Countermeasures (SPCC) Plan with protocols for preventing spills and managing incidents should they occur. In addition, PG&E would obtain applicable resource agency and construction permits. With adherence to the SPCC Plan, construction-related BMPs, and construction permits, potential effects from pollutant spill contamination from construction are reduced to a negligible level in the Eel River below Scott Dam.

Contamination from Stormwater Runoff

Construction activities at Scott Dam have the potential to temporarily affect water quality in the Eel River downstream of the dam due to contamination from stormwater runoff (e.g., construction and staging areas, access roads). Without proper stormwater management practices such as silt fencing, straw/hay bales, or vegetative buffers, runoff from rainfall events could also transport pollutants or sediment (turbidity / suspended sediment) from the construction site into the Eel River.

PG&E would include water quality and erosion control measures that would be implemented at the construction activity locations. Construction measures include a Stormwater Pollution Prevention Plan (SWPPP), Sediment Disposal Plan, and a Construction Erosion Prevention Plan. PG&E would construct, maintain, and decommission access routes consistent with the conditions in the SWRCB's National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit). In addition, PG&E would obtain applicable resource agency and construction permits. With these measures, the potential for contamination from stormwater runoff and related water quality effects are considered negligible in the Eel River below Scott Dam. With implementation of these measures, the effect of construction on water quality in the Eel River below Scott Dam due to contamination from stormwater runoff would be negligible.

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Contamination from Human Waste

Construction activities at Scott Dam have the potential to temporarily affect water quality in the Eel River downstream of the dam due to contamination from human waste. Bacteria, nutrients, and other contaminants from human waste and sanitation systems can enter surface water or groundwater if the system is not properly designed and operated or if sanitation facilities are not provided.

PG&E would include measures for containment of human waste that would be implemented at all construction activity locations. Construction measures include provision of portable toilets with secondary containment. In addition, PG&E would obtain applicable resource agency and construction permits. With implementation of these measures, the effect of construction on water quality in the Eel River below Scott Dam due to contamination from human waste would be negligible.

Modified Water Temperature

Construction activities at Scott Dam have the potential to affect water temperature in the Eel River downstream of the dam. Early drawdown of Lake Pillsbury reservoir has the potential to increase water temperatures in the late summer/fall period due to the earlier release of the cold-water pool. Drawdown of Lake Pillsbury reservoir is scheduled to begin in May (prior to the beginning of construction activities), reaching 10,000 acre-feet (ac-ft) of storage by the end of October. This drawdown is similar to storage conditions in 2015, when storage reached a minimum of 12,600 ac-ft around the beginning of December. It is possible that early drawdown could exacerbate cold-water pool loss and summer/fall water temperature.

Water temperature conditions below Lake Pillsbury reservoir during construction are likely to be similar to those observed in the fall and winter of 2015/2016. Maximum daily average water temperature in the Eel River below Scott Dam was 22.4 degrees Celsius (°C) in 2015. The annual maximum daily average water temperature at that location was similar in 2013, 2016, 2017, and 2020, all of which were above 22°C. Based on this historical information, it can be concluded that temperatures would at a minimum be above average due to the early and more extreme than usual drawdown. They would still fall within the bounds of numerous recent historical years if drawdown is managed properly. The Construction Site Water Diversion, Dewatering, and Drawdown Plan would include a measure to manage drawdown and, if necessary, identify construction measures to release surface water in combination with the cold-water pool to reduce potential temperature effects. Therefore, with implementation of the Construction Site Water Diversion, Dewatering, and Drawdown Plan, the effect of construction activities on water temperature in the Eel River below Scott Dam would be negligible.

Dissolved Oxygen Depletion

Construction activities at Scott Dam have the potential to affect DO levels in the Eel River downstream of the dam. Draining the reservoir may result in scour of the Lake Pillsbury reservoir inlet channel sediments and generate suspended sediment / turbidity in the reservoir water and the outflow to the Eel River. Dredging of sediment in front of the adit (upstream side of the dam)

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could also generate turbidity that could be released into the river. High turbidity and disturbing sediments high in BOD and COD can lead to depletion of DO in the water column.

PG&E would include water quality and erosion control measures that would be implemented at the construction activity locations in the vicinity of Scott Dam. Construction measures include a Construction Site Water Diversion, Dewatering, and Drawdown Plan; a Water Quality and Water Temperature Monitoring Plan; BMPs, and a Construction Erosion Prevention Plan. In addition, PG&E would obtain applicable resource agency and construction permits. With implementation of these measures, the potential for depletion of DO due to increases in turbidity and suspended sediment would be negligible in Lake Pillsbury reservoir and the Eel River below Scott Dam.

Significant adverse effects to DO are expected when the adit plug at Scott Dam is removed, which is discussed in Phase 2a: Initial Conditions and Preliminary Restoration.

Scott Dam Area – Recreation Facility Removal

Some of the Project recreation facilities (i.e., campgrounds and day-use areas) and ancillary facilities would be removed and the sites would be restored. Pogie Point, Sunset Point, Oak Flat, and Navy Camp campgrounds are not proposed to be removed. A site-specific engineering design would be developed for recreation facilities. The design would include plans to remove any restroom facilities.

Increase in Turbidity and Suspended Sediment

Construction activity related to the removal of Project recreation facilities has the potential to affect water quality in Lake Pillsbury reservoir and the Eel River due to the location of the construction area near Lake Pillsbury reservoir and the potential for disturbing soils and reservoir sediments (boat ramp removals).

PG&E would include water quality and erosion control measures that would be implemented at the recreation facility removal locations. Construction measures include BMPs, a Water Quality and Water Temperature Monitoring Plan, and a Construction Erosion Prevention Plan. In addition, PG&E would obtain applicable resource agency and construction permits. With these measures, the potential for increase in turbidity and suspended sediment and related water quality effects are negligible in Lake Pillsbury reservoir and the Eel River.

Increase in Pollutant Spill Risk

Construction activity related to the removal of Project recreation facilities has the potential to affect water quality in Lake Pillsbury reservoir and the Eel River due to an increased risk of pollutant spill. Activities associated with deconstruction could increase the potential for accidental spills and pollutants to be introduced into Lake Pillsbury reservoir and the Eel River due to the use of equipment, fuel, and other hazardous materials.

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PG&E would implement hazardous materials handling measures to avoid or minimize the risk of soil contamination from accidental spills. These measures would include the following: implementing construction-related BMPs to control spills; having emergency cleanup equipment readily available onsite; and implementing an SPCC Plan with protocols for preventing spills and managing incidents should they occur. In addition, PG&E would obtain applicable resource agency and construction permits. With adherence to the SPCC Plan, construction-related BMPs, and construction permits, potential effects from pollutant spill contamination from construction are reduced to a negligible level in Lake Pillsbury reservoir and the Eel River.

Contamination from Stormwater Runoff

Construction activity related to the removal of Project recreation facilities has the potential to affect water quality in Lake Pillsbury reservoir and the Eel River due to contamination from stormwater runoff. Removal of sites would disturb soils and make them susceptible to erosion. Similarly, stockpiled materials may be susceptible to erosion during storm events.

PG&E would include water quality and erosion control measures that would be implemented at the construction activity locations. Construction measures include an SWPPP and a Construction Erosion Prevention Plan. In addition, PG&E would obtain applicable resource agency and construction permits. With implementation of these measures, the impact of construction on water quality in Lake Pillsbury reservoir and the Eel River due to contamination from stormwater runoff would be negligible.

Contamination from Human Waste

Construction activity related to the removal of Project recreation facilities has the potential to affect water quality in Lake Pillsbury reservoir and the Eel River due contamination from human waste. Bacteria, nutrients, and other contaminants from human waste and sanitation systems can enter surface water or groundwater if the system is not properly designed and operated, if sanitation facilities are removed, or if sanitation facilities are not provided for workers.

PG&E would include measures for containment of human waste that would be implemented at all construction activity locations. Construction measures include provision of portable toilets with secondary containment. In addition, PG&E would obtain applicable resource agency and construction permits. With implementation of these measures, the impact of construction on water quality in Lake Pillsbury reservoir and the Eel River due to contamination from human waste would be negligible.

Modified Water Temperature

No in-water work is proposed as part of the removal of Project recreation facilities, and therefore, this phase of the Project would have no effect on water temperature.

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Dissolved Oxygen Depletion

Construction activity related to the removal of Project recreation facilities has limited potential to affect DO in Lake Pillsbury reservoir and the Eel River due to the location of the construction area near Lake Pillsbury reservoir and the potential for disturbing soils and reservoir sediments (boat ramp removals) that could impact DO levels.

PG&E would include water quality and erosion control measures that would be implemented at the recreation facility removal locations. Construction measures include BMPs, a Water Quality and Water Temperature Monitoring Plan, and a Construction Erosion Prevention Plan. In addition, PG&E would obtain applicable resource agency and construction permits. With these measures, the potential for DO depletion due to increases in turbidity and suspended sediment are negligible in Lake Pillsbury reservoir and the Eel River.

Cape Horn Dam Area

Cape Horn Dam construction activities would occur within an area located upstream and downstream of the dam. The work area would include staging and stockpile areas, portable sanitary facilities, and designated refueling areas. A temporary access road would be constructed, and a flow bypass channel would be constructed with an upstream cofferdam that would be removed when the channel is completed. Two channel-spanning cofferdams would be installed, one upstream and the other downstream of the dam. The work area between the cofferdams would be drained with pumps, and sediment would be removed and placed on PG&E lands for disposal. The concrete dam, the earthen portion of the dam, and the fish hotel / exclusion barrier would be removed. Concrete and dirt materials would be stored on PG&E land above the 100-year floodplain. At the end of construction, the cofferdams would be removed and sediment (as much as 640,000 to 1,700,000 cubic yards [cy]) from upstream of the upstream cofferdam would flow downstream into the Eel River. For a discussion of the effects of cofferdam removal, see the Phase 2a discussion below.

Trout Creek Campground , near Van Arsdale Reservoir, is not proposed for removal and, therefore, no construction would occur in this area.

Increase in Turbidity and Suspended Sediment

Construction activities in the vicinity of Cape Horn Dam have the potential to temporarily affect water quality in the Eel River downstream of the dam. Construction of the diversion channel, installation of access roads and two cofferdams, dewatering of the work area between the two cofferdams, and removal and disposal of sediment from the dewatered work area could all result in increased suspended sediment concentrations downstream in the Eel River.

PG&E would include water quality and erosion control measures that would be implemented at the construction activity locations in the vicinity of Cape Horn Dam. Construction measures include a Construction Site Water Diversion, Dewatering, and Drawdown Plan; a Water Quality and Water Temperature Monitoring Plan; BMPs; Sediment Disposal Plan; and a Construction Erosion Prevention Plan. PG&E would construct, maintain, and decommission access routes

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consistent with the SWRCB's General CWA Section 401 Water Quality Certification and Waste Discharge Requirements for Utility Wildfire and Similar Operations and Maintenance Activities and Handbook for Forest, Ranch, and Rural Roads. In addition, PG&E would obtain applicable resource agency and construction permits. With these measures, the potential for increase in turbidity and suspended sediment and related water quality effects are negligible in the Eel River below Cape Horn Dam.

Increase in Pollutant Spill Risk

Construction activities in the vicinity of Cape Horn Dam have the potential to temporarily affect water quality in the Eel River downstream of the dam due to pollutant spill risk. Activities associated with construction could increase the potential for accidental spills and pollutants to be introduced into Lake Pillsbury reservoir and the Eel River.

PG&E would implement hazardous materials handling measures to avoid or minimize the risk of soil contamination from accidental spills. These measures would include the following: implementing construction-related BMPs to control spills; having emergency cleanup equipment readily available onsite; and implementing an SPCC Plan with protocols for preventing spills and managing incidents should they occur. In addition, PG&E would obtain applicable resource agency and construction permits. With adherence to the SPCC Plan, construction-related BMPs, and construction permits, potential effects from pollutant spill contamination from construction are reduced to a negligible level in the Eel River below Cape Horn Dam.

Contamination from Stormwater Runoff

Construction activities in the vicinity of Cape Horn Dam, including access roads and staging and storage areas, have the potential to temporarily affect water quality in the Eel River downstream of the dam due to contamination and erosion (turbidity and suspended sediment) from stormwater runoff. Without proper stormwater management practices such as silt fencing, straw/hay bales, or vegetative buffers, runoff from rainfall events could also transport pollutants from the construction site into the Eel River.

PG&E would include water quality and erosion control measures that would be implemented at the construction activity locations. Construction measures include an SWPPP, Sediment Disposal Plan, and a Construction Erosion Prevention Plan. PG&E would construct, maintain, and decommission access routes consistent with the conditions in the SWRCB's Construction General Permit. In addition, PG&E would obtain applicable resource agency and construction permits. With implementation of these measures, the effect of construction on water quality in the Eel River below Cape Horn Dam due to contamination from stormwater runoff would be negligible.

Contamination from Human Waste

Construction activities in the vicinity of Cape Horn Dam have the potential to temporarily affect water quality in the Eel River downstream of the dam due to contamination from human waste. Bacteria, nutrients, and other contaminants from human waste and sanitation systems can enter

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surface water or groundwater if the system is not properly designed and operated or if sanitation facilities are not provided.

PG&E would include measures for containment of human waste that would be implemented at all construction activity locations. Construction measures include provision of portable toilets with secondary containment. In addition, PG&E would obtain applicable resource agency and construction permits. With implementation of these measures, the effect of construction on water quality in the Eel River below Cape Horn Dam due to contamination from human waste would be negligible.

Modified Water Temperature

Construction activities in the vicinity of Cape Horn Dam have the potential to temporarily affect water temperature in the Eel River downstream of the dam. Water would no longer be stored behind the dam, and flows would be routed around the construction area and returned to the river below the lower cofferdam. However, due to the very small storage capacity of Van Arsdale Reservoir (700 ac-ft), the difference in water temperature observed in the Eel River below Cape Horn Dam under existing conditions (with the dam in place) and during the construction phase (with flows routed around the construction area) is expected to be negligible. Therefore, the effect of construction in the vicinity of Cape Horn Dam on water temperatures in the Eel River below Cape Horn Dam would be negligible.

Dissolved Oxygen Depletion

Construction activities in the vicinity of Cape Horn Dam have the potential to temporarily affect DO in the Eel River downstream of the dam. Construction of the diversion channel, installation of two cofferdams, dewatering of the work area between the two cofferdams, and removal and disposal of sediment from the dewatered work area could all result in increased suspended sediment concentrations downstream in the Eel River that could affect DO levels in the river.

PG&E would include water quality and erosion control measures that would be implemented at the construction activity locations in the vicinity of Cape Horn Dam. Construction measures include a Construction Site Water Diversion, Dewatering, and Drawdown Plan; a Water Quality and Water Temperature Monitoring Plan; BMPs; and a Construction Erosion Prevention Plan. In addition, PG&E would obtain applicable resource agency and construction permits. With these measures, the potential for DO depletion due to increases in turbidity and suspended sediment are negligible in the Eel River below Cape Horn Dam.

East Branch Russian River

During deconstruction of Scott Dam and Cape Horn Dam, storage water and/or diversion capacity at the Van Arsdale diversion may not be available to maintain the current RPA minimum flows in the Eel River or East Branch Russian River (NMFS 2002). Following the completion of the Lake Pillsbury reservoir drawdown in October, no storage would be available to maintain the RPA minimum flows in the event of low inflow to Lake Pillsbury reservoir. Resulting low flows in the East Branch Russian River could increase water temperatures. Also, if water quality in the Eel

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River is affected by Scott Dam or potentially Cape Horn Dam construction in a way that affects the water quality diverted to the East Branch Russian River, water quality in the East Branch Russian River could be affected.

PG&E would develop an East Branch Russian River Diversion Plan that could include temporary pumping to the diversion tunnel, if needed, to provide diversions to the East Branch Russian River during construction. PG&E would also include water quality and erosion control measures that would be implemented at the Scott Dam and Cape Horn Dam construction locations. Construction measures include BMPs, a Construction Erosion Prevention Plan, an SWPPP, and an SPCC Plan, and PG&E would obtain applicable resource agency and construction permits. With the implementation of these mitigation measures, the impact on water temperature and water quality in the East Branch Russian River would be negligible.

2.2.4.3.2 Phase 2: Post-facility Removal Effects

Phase 2a: Initial Conditions and Preliminary Restoration

The potential effects to water quality during and following deconstruction of Scott Dam and Cape Horn Dam include the following:

- Fine sediment transport in the Eel River during and following removal of Scott Dam and of Cape Horn Dam (turbidity, suspended sediment);
- Potential release of toxic sediment (e.g., heavy metals or other contaminants);
- Change in water quality in the Eel River during and after dam removal (e.g., DO, nutrients, chlorophyll-a, algal toxins, pH, alkalinity, temperature);
- Contamination from application of herbicides for treatment of invasive weeds in restored riverbeds; and
- Beneficial uses.

Under the Proposed Action, PG&E would initiate removal of Scott Dam and Cape Horn Dam during the same low-flow season. During the first high-flow season, the adit plug at Cape Horn Dam and the cofferdams at Cape Horn Dam would be removed simultaneously or in close sequence to flush sediment from the reservoirs. Final dam removal activities at the Scott Dam site would occur during the second low-flow season after the sediment flushing. The majority of removal activities at Cape Horn Dam would occur during the first low-flow season.

Mainstem Eel River – Scott Dam and Cape Horn Dam Removal

Lake Pillsbury reservoir contains approximately 21 million cy of sediment (primarily silt and clay), and an estimated 12 million cy could potentially be mobilized downstream of Scott Dam following rapid dam removal. The adit tunnel plug at the base of the dam would be blasted open (approximately 7,000-cfs capacity) to initiate sediment flushing during the first high-flow season following dam lowering and notching. Rapid removal would follow pre-established protocols related to river flow forecasting. Explosives would be detonated during or preceding an anticipated

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flood event of sufficient magnitude to evacuate fine sediment deposits from the reservoir (likely between December and March).

Van Arsdale Reservoir is relatively small (originally 1,140 ac-ft) but contains approximately 1.7 million cy of sediment (primarily coarser sediment) that could potentially be mobilized downstream of Cape Horn Dam following the removal of cofferdams following dam removal. The cofferdams constructed upstream and downstream of Cape Horn Dam would likely be removed at the same time as the adit blast would occur in Scott Dam. Sediment from both reservoirs would be released downstream almost simultaneously.

Increase in Turbidity and Suspended Sediment

Removal of Scott Dam following the blasting of the adit at the base of the dam would result in a large flush of sediment in the Eel River below Scott Dam. Following draining of the reservoir, erosion of the bare, relatively fine sediment could produce fine sediment transport into the Eel River, increasing suspended sediment and turbidity.

Stillwater Sciences (2021a) developed a two-phase conceptual model (TPCM) for fine sediment erosion of the bottom-set sediment deposit (sediment in the reservoir versus coarser sediment at the reservoir inlets) following rapid base-level control lowering due to draining of Lake Pillsbury reservoir following dam removal. The results of the TPCM are presented for three different discharge scenarios in Table 2.2.4.3-1. The duration of erosion of 12 million cy of Phase 1 erosion[1] fine sediment is calculated to take from 0.8 day at a discharge of 5,000 cfs to 7.7 days if the discharge is only 1,000 cfs. The calculated sediment concentration at a discharge of 5,000 cfs (900,000 milligrams per liter [mg/L]) is nearly twice as high as at 1,000 cfs (457,800 mg/L). Concentrations are expected to decrease downstream; for example, Stillwater Sciences (2021b) assumed about 30 percent diluted at the Middle Fork Eel River. Discharge of the Middle Fork Eel River was between 0.9 and 12.2 times greater than the Eel River discharge at Cape Horn Dam. Table 2.2.4.3-2 shows monthly average flow dilution factors along the length of the Eel River. Dilution at Scotia would be about 92 percent (600,000 mg/L at Scott Dam would be 48,000 mg/L at Scotia).

The assumptions used in the TPCM were conservative (all the sediment was assumed to be fine grain sediment, whereas it is composed of both fine and coarse sediment), and therefore, it is possible that actual suspended sediment concentrations might be less than modeled.

Table 2.2.4.3-1. Modeled magnitude of suspended sediment concentration and duration for fine sediment erosion during dam removal.

Water Discharge (cfs)	1,000	2,000	5,000
Maximum suspended sediment concentration (mg/L)	457,800	612,500	900,000
Duration of Phase 1 erosion (days)	7.7	2.9	0.8

Source: Table 1 in Stillwater Sciences (2021a)

[1] See description of Stillwater Sciences (2021a) Phase 1 erosion and Phase 2 erosion in Section 3.4.1.8.

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Table 2.2.4.3-2. Hydrology-based suspended sediment concentration dilution factors for the Eel River (1925–2023 hydrology; see Section 2.2.3.1).

Month	Eel River Mean Monthly Flow and Dilution Factor (concentration original X dilution factor = new concentration)											
	Scott Dam (RM 168.5)		Cape Horn Dam (RM156.7)		Below MF Eel River Confluence (RM 119.3)		Fort Seward (RM ca. 64)		Scotia (RM20.8)		Eel River Estuary (RM7.0)	
	Mean Monthly (cfs)	Dilution Factor	Mean Monthly (cfs)	Dilution Factor	Mean Monthly (cfs)	Dilution Factor	Mean Monthly (cfs)	Dilution Factor	Mean Monthly (cfs)	Dilution Factor	Mean Monthly (cfs)	Dilution Factor
October	58	--	63	0.92	264	0.22	486	0.12	724	0.08	838	0.07
November	275	--	326	0.84	1,609	0.17	2,839	0.1	4,732	0.06	5,436	0.05
December	976	--	1,132	0.86	5,228	0.19	9,595	0.1	14,664	0.07	16,366	0.06
January	1,435	--	1,728	0.83	7,518	0.19	12,910	0.11	19,870	0.07	22,089	0.06
February	1,537	--	1,867	0.82	7,561	0.2	12,193	0.13	19,812	0.08	21,935	0.07
March	1,220	--	1,427	0.85	5,876	0.21	10,282	0.12	15,181	0.08	16,860	0.07
April	795	--	933	0.85	4,124	0.19	5,982	0.13	9,456	0.08	10,528	0.08
May	369	--	432	0.85	2,196	0.17	2,753	0.13	4,147	0.09	4,637	0.08
June	132	--	152	0.87	667	0.2	875	0.15	1,436	0.09	1,604	0.08
July	38	--	43	0.88	141	0.27	207	0.18	382	0.1	423	0.09
August	17	--	19	0.89	47	0.36	78	0.22	157	0.11	174	0.1
September	19	--	20	0.95	43	0.44	81	0.23	146	0.13	163	0.12

The duration of the high concentrations would be extended by the time it takes to drain the reservoir and would depend upon the particular streamflow at the time. It is estimated that there would be approximately 10,000 ac-ft of storage remaining behind the dam, and the outlet capacity of the tunnel used for drawdown is 7,000 cfs. The plug of the tunnel is intended to be detonated during or preceding an anticipated flood event. The 2-year flood in the Eel River at this location has a peak discharge of over 11,000 cfs, and therefore, it is possible that it would take some time to drain the reservoir and there could be a delayed flush of fine sediment after the initial tunnel opening.

A TPCM for fine sediment erosion was not developed to analyze the effect of removing Cape Horn Dam or adjacent cofferdams. Other dam removal projects, such as the removal of J.C. Boyle Dam on the Klamath River in Oregon (a similarly sized dam with a sediment load of 1.3–2.9 million cy of fine sediment) can provide some insight into possible effects to suspended sediment concentrations below Cape Horn Dam. Spikes in suspended sediment in the Klamath River were observed following two stoplog blasts during the drawdown of J.C. Boyle Reservoir with a maximum concentration of 4,280 mg/L measured at the nearest USGS station located 6.5 miles [mi.] downstream (USGS 11510700). Moderately high suspended sediment concentrations (over 500 mg/L) lasted about a month following the initial drawdown of J.C. Boyle Reservoir, and suspended sediment concentrations continued to spike above 500 mg/L for about three months. It is, therefore, likely that the removal of cofferdams at Cape Horn Dam would result in elevated suspended sediment concentrations in the Eel River for several days and up to several weeks. However, the suspended sediment concentrations are likely to be lower than those observed below J.C. Boyle due to the difference in the composition of sediments from the two reservoirs. A size distribution analysis of the sediments from Van Arsdale Reservoir showed that silt and clay (less than 0.0626 millimeters [mm]) made up less than 1 percent of the total sediment sample (Geosyntec 2020). A similar analysis of sediments from J.C. Boyle Reservoir indicated that over 90 percent was composed of silt and clay

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of less than 0.0626 mm (USGS 2022). This indicates that significantly less fine sediment would be released from the removal of Cape Horn Dam than was mobilized by the removal of J.C. Boyle Dam.

PG&E would schedule the adit blast at Scott Dam and the removal of the Cape Horn cofferdams during a period of high flows, which would minimize the duration of elevated suspended sediment to the extent possible. A very large flush of sediments would travel down the Eel River from Scott Dam and cause high turbidity along the entire Eel River to the ocean. A much smaller contribution to suspended sediments would be made by the Cape Horn Dam deconstruction approximately 11.7 mi. downstream of Scott Dam. As the highly turbid water travels down the Eel River to the mouth of the Eel River estuary, suspended sediments would be diluted from tributary inflows and some suspended sediment would settle out along the way in the riverbed. These sediments would be remobilized with subsequent high-flow events, possibly over the course of several years, until they make their way out of the system.

Removing Scott Dam and Cape Horn Dam would have a short-term unavoidable adverse effect on suspended sediments and turbidity in the Eel River for a period of several days up to several months, for which no mitigation is possible. This effect is likely to extend along the entire length of the Eel River, including the estuary and nearshore. This action would also have a smaller long-term effect of increased turbidity during high-flow events as the remainder of the sediments are remobilized and carried out to the ocean for 1 to 3 years. PG&E would implement the Water Quality and Water Temperature Monitoring Plan. This plan would include monitoring of water quality, including turbidity, and define appropriate response actions. In addition, PG&E would implement the Estuary Protection Plan that would include measures to monitor turbidity in the estuary. The North Coast Regional Water Quality Control Board's Basin Plan Amendment for the Policy in Support of Restoration in the North Coast Region (Order Resolution No. R1-2015-0004) allows restoration projects within the Basin Plan boundary to temporarily exceed water quality objectives if it is shown that the project will result in long-term protection of beneficial uses and water quality impacts. For example, dam removal activities may result in temporary stream channel alterations from erosion and siltation and result in increased turbidity and suspended sediment load, which will likely exceed Basin Plan water quality objectives. With respect to exceedances of water quality objectives, short-term impacts may be acceptable in cases wherein long-term benefits to beneficial uses outweigh short-term impacts, based on detailed, site-specific information and findings. Section 2.2.4.3.2, Phase 2b, shows that the Proposed Action is a restoration project that results in long-term benefits to water quality, and Section 2.2.4.4.3, Phase 2b, shows that the Proposed Action restoration results in long-term benefits to fish and aquatic resources.

Release of Toxic Sediment

Removal of Scott Dam and Cape Horn Dam and the associated releases of trapped sediment from behind the dams have the potential to release inorganic and organic contaminants into the Eel River. In 2020, Geosyntec (2020) characterized sediments in Lake Pillsbury reservoir and Van Arsdale Reservoir to support the California State Coastal Conservancy's evaluation of current sediment quality conditions. The objective was to chemically analyze the soft reservoir sediments that have accumulated behind Scott and Cape Horn dams and that could potentially mobilize during dam removal. Analytical results were compared to published freshwater sediment screening levels and background concentrations. Overall, results indicated that the Lake Pillsbury

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reservoir and Van Arsdale Reservoir sediments were generally not contaminated and represent background conditions for remote reservoirs. Specific analytical findings were as follows:

- Many constituents were not detected, including polychlorinated biphenyls, organophosphate pesticides, herbicides, diesel-range organic total petroleum hydrocarbons (TPH), asbestos, many semi-volatile organic compounds (SVOCs), some metals (i.e., antimony, beryllium, cadmium, molybdenum, selenium, silver, thallium), and most organochlorine pesticides.
- The chemicals/metals detected included some metals, methylmercury, some SVOCs, motor-oil-range TPH, methoxychlor, and two dioxin congeners (Van Arsdale Reservoir only). Except for nickel, all other detected chemicals were below freshwater sediment screening levels. Nickel concentrations were elevated about two- to three-fold above the screening levels but are likely indicative of background concentrations in this area, as they fall within the range of concentrations measured in other reservoirs and California soils.

The results of the 2020 Geosyntec sediment study indicate that sediments held behind Scott Dam and Cape Horn Dam do not contain contaminants of concern, and therefore, there would be a negligible effect on downstream water quality in the Eel River from potential release of toxic sediments due to the removal of either dam.

Change in Other Water Quality Parameters

Removal of Scott Dam and Cape Horn Dam and the associated releases of trapped sediment from behind the dams have the potential to affect water quality parameters such as DO, nutrients, chlorophyll-a, algal toxins, pH, and alkalinity in the Eel River.

Dissolved Oxygen

High suspended sediment concentrations are likely to result in significant impacts to DO downstream while Lake Pillsbury reservoir is draining. The sediment is anoxic and contains chemical oxygen demand (COD) (oxygen required to oxidize inorganic chemicals) and BOD (oxygen consumed by living organisms, e.g., bacteria). When sediment is scoured and released from the reservoir, intense consumption of oxygen in the water due to COD and BOD would result in a period of low DO that could extend many miles downstream from Scott Dam. On the Klamath River in January of 2024 when sediment was released from Iron Gate and Copco No. 1 dams (USGS RM 190.2 and 198.3, respectively), DO was 0.0 mg/L from Copco No. 1 Dam downstream to Walker Bridge (42 mi.; USGS RM 156.3) for 1 to 2 days. DO was depressed from a typical 11 mg/L down to 5 mg/L as far as 70 mi. downstream the Klamath River at Seiad Valley (USGS RM 128.5). Based on these observations, it is reasonable to suggest that low DO conditions would exist below Scott Dam and result in a period of 1 to 2 days (or potentially longer depending on sediment loads) of 0.0 mg/L DO as far downstream as the Middle Fork Eel River (49.2 mi.). The exact extent and duration of this DO sag would depend on the COD and BOD loads released from the sediments, the water temperature, the rate of reaeration in the Eel River, and the flows.

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The removal of the cofferdams upstream and downstream of Cape Horn Dam and the associated release of trapped sediments would likely result in a brief decrease in DO in the Eel River below Cape Horn Dam. The exact magnitude, extent, and duration of the effects are unknown but can be informed by the removal of J.C. Boyle Dam on the Klamath River in Oregon. The USGS gage located 6 mi. downstream of J.C. Boyle observed two brief DO dips (corresponding to stoplog blasts used to release water from behind the dam) of 6.1 mg/L for 1 hour and 9 mg/L for 1.5 hours, with a baseline DO of 10.5 to 12 mg/L. Although the overall sediment load released from behind Cape Horn Dam would be similar, it would likely be that the effect to DO would be less due to the difference in sediment composition between the two reservoirs. A size distribution analysis of the sediments from Van Arsdale Reservoir showed that silt and clay (less than 0.0626 mm) made up less than 1 percent of the total sediment sample (Geosyntec 2020). A similar analysis of sediments from J.C. Boyle Reservoir indicated that over 90 percent was composed of silt and clay of less than 0.0626 mm (USGS 2022). It is, therefore, likely that the impact to DO from the release of sediments behind the cofferdams would be moderate and may not pose a lethal effect on fish or other aquatic organisms downstream.

PG&E would schedule the adit blast at Scott Dam and removal of the Cape Horn cofferdams during a time of high flows and low water temperatures, which would minimize the potential effects to DO to the extent possible. Regardless, removing Scott Dam would have an unavoidable adverse effect on DO in the Eel River for a period of several days and as far as 40 to 50+ mi. downstream, for which no mitigation is possible. The effect on DO of removing the Cape Horn cofferdams would be moderate, and as it would happen in the same season as the removal of Scott Dam, it would likely be masked by the larger effect from upstream once the flows reach the Cape Horn Dam Area a few hours following the adit blast. PG&E would implement the Water Quality and Water Temperature Monitoring Plan. This plan would identify monitoring of water quality, including DO. In addition, PG&E would implement the Estuary Protection Plan that would include measures to monitor water quality in the estuary. The North Coast Regional Water Quality Control Board's Basin Plan Amendment for the Policy in Support of Restoration in the North Coast Region (Order Resolution No. R1-2015-0004) allows restoration projects within the Basin Plan boundary to temporarily exceed water quality objectives if it is shown that the project will result in long-term protection of beneficial uses and water quality impacts. For example, dam removal activities may result in temporary reduction of DO, which will likely exceed Basin Plan water quality objectives. With respect to exceedances of water quality objectives, short-term impacts may be acceptable in cases wherein long-term benefits to beneficial uses outweigh short-term impacts, based on detailed, site-specific information and findings. Section 2.2.4.3.2, Phase 2b, shows that the Proposed Action is a restoration project that results in long-term benefits to water quality, and Section 2.2.4.4.4, Phase 2b, shows that the Proposed Action restoration results in long-term benefits to fish and aquatic resources.

Nutrients, Algae Production, and Algal Toxins

Sediment releases have the potential to release nutrients into the Eel River that could fuel the excessive growth of algae and aquatic plants. Toxic algal blooms due to excessive growth of certain cyanobacteria have been observed in the Eel River Watershed in several recent years (see Section 2.2.3.2, Water Quality). The sediment study carried out in 2020 (Geosyntec 2020) measured average concentrations of total Kjeldahl nitrogen and total phosphorous in Lake

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Pillsbury reservoir sediments of 2,415 milligrams per kilogram (mg/kg) and 376 mg/kg, respectively. These concentrations represent relatively high levels of nutrients (Marx et al. 1999) that are typical of a eutrophic system. The same study (Geosyntec 2020) measured average concentrations of total Kjeldahl nitrogen and total phosphorous in Van Arsdale Reservoir sediments of 369 mg/kg and 143 mg/kg, respectively. These concentrations represent moderately high levels of nutrients in sediments (Marx et al. 1999) but are significantly lower than concentrations found in Lake Pillsbury reservoir.

PG&E would schedule the removal of Scott Dam during a time of high flows and low water temperature, which would minimize the potential short-term effects of increased nutrient loads in the Eel River to the extent possible. Algal blooms caused by high nutrient loads generally require warm, slow-moving water and, therefore, would be unlikely to occur during high winter flow periods. Much of the sediment and nutrients present in the sediments would be flushed out to the ocean before immediate effects would be expected (following summer). However, it is possible that some sediment settling would occur along the length of the Eel River, and these nutrient-rich sediments have the potential for causing increased algal production in the first and subsequent summers when algae growth conditions are more favorable. It is expected, therefore, that removal of Scott Dam could potentially have a short-term (1 to 3 years) significant effect on water quality in the Eel River due to high nutrient levels, which could lead to algal blooms, some of which could produce toxins. PG&E would implement the Water Quality and Water Temperature Monitoring Plan. This plan would include monitoring effects to water quality from harmful algal blooms. In addition, PG&E would implement the Estuary Protection Plan that would include measures to monitor water quality in the estuary.

pH and Alkalinity

Potential fluctuation of other water quality parameters such as pH and alkalinity is possible as a result of the deconstruction of Scott and Cape Horn dams. Data from the removal of Copco No. 1 Dam as part of the Klamath River Dam removal project indicate that effects to pH were relatively moderate and of short duration. pH measured downstream of Copco No. 1 Dam dropped from 7.5 to a minimum of 6.4 after dam removal and took two weeks to fully recover (USGS 2024a). Data from the removal of J.C. Boyle Dam as part of the Klamath River Dam removal project also indicate that effects to pH were relatively minor and of short duration. pH was measured 6 mi. downstream of J.C. Boyle, and it dropped from 8 to a minimum of 7.1 and remained below 7.7 for about one day (USGS 2024b). Alkalinity would also be expected to drop due to the release of large amounts of sediment from the reservoir, which can temporarily bind with available alkaline particles in the water. These effects are not expected to be of long duration.

The removal of Scott Dam and Cape Horn Dam is expected to have a short-term (less than a month) significant effect on pH and reduction in alkalinity in the Eel River. PG&E would implement the Water Quality and Water Temperature Monitoring Plan. This plan would include monitoring of water quality.

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Water Temperature

Following removal of Scott and Cape Horn dams, the Eel River would return to unimpaired flow conditions, which would affect existing water temperature by increasing water temperature in the summer and decreasing water temperature in the winter. Water temperature in the Eel River at the E2 gage (downstream of the current location of Scott Dam) could increase (up to 8.5°C) from approximately May through the end of August compared to existing conditions (No-Action Alternative) (based on recent data from 2020–2023). Water temperatures at this location from September through January would be cooler (up to 5°C) when compared to existing conditions. The anticipated distance of the water temperature effects is from Scott Dam to below Cape Horn Dam some distance (a few miles). Farther downstream after diversion flows are removed from the Eel River at the Van Arsdale Diversion, water temperatures return to unimpaired conditions.

The Proposed Action decrease in water temperature in the winter below Cape Horn Dam may not be harmful compared to the No-Action Alternative, but the increase in spring and summer water temperature would have a short-term and long-term unavoidable adverse negative effect on existing cold-water conditions in the Eel River from below Scott Dam to below Cape Horn Dam (a few miles). PG&E would implement the Water Quality and Water Temperature Monitoring Plan. This plan may include monitoring of water temperature in the Eel River if necessary. In addition, PG&E would implement the Estuary Protection Plan that would include measures to monitor water temperature in the estuary. While the resulting condition and restoration of the Eel River to unimpaired conditions would have an unavoidable adverse effect on water temperature, the change to natural conditions, overall, is considered to be a beneficial effect on the Eel River.

The change in water temperature would also affect water temperature in the East Branch Russian River through reduction of flows into the East Branch Russian River (see East Branch Russian River section below).

Contamination from Herbicides

Herbicides may be used to treat invasive weeds under the Restoration Plan in the newly exposed reservoir beds in Lake Pillsbury reservoir and Van Arsdale Reservoir. The Restoration Plan would also include a water quality monitoring plan and BMPs to be implemented in the event that herbicides are used to treat invasive weeds. With the implementation of these measures, there would be no effect to water quality in the Eel River from herbicide contamination.

Beneficial Uses

The removal of Scott Dam has the potential to affect beneficial uses of Lake Pillsbury reservoir and the Eel River. The Basin Plan water quality standards are composed of designated existing (E) and potential (P) beneficial uses and water quality objectives. According to the Basin Plan, existing beneficial uses for the Project area include the following (NCRWQCB 2018):

- Municipal and domestic supply (MUN)
- Agricultural supply (AGR)
- Industrial service supply (IND)
- Groundwater recharge (GWR)
- Commercial and sport fishing (COMM)
- Warm freshwater habitat (WARM)
- Cold freshwater habitat (COLD)
- Wildlife habitat (WILD)

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- Freshwater replenishment (FRSH)
- Navigation (NAV)
- Power generation (POW)
- Contact recreation (REC-1)
- Non-contact recreation (REC-2)
- Rare, threatened, or endangered species (RARE)
- Migration of aquatic organisms (MIG)
- Cold spawning habitat (SPWN)
- Aquaculture (AQUA)

Beneficial uses that have the potential to be affected by the removal of Scott Dam and Cape Horn Dam include agricultural supply (ARG); groundwater recharge (GWR); power generation (POW); contact recreation (REC-1); non-contact recreation (REC-2); commercial and sport fishing (COMM); warm freshwater habitat (WARM); cold freshwater habitat (COLD); wildlife habitat (WILD); rare, threatened, or endangered species (RARE); migration of aquatic organisms (MIG); cold spawning habitat (SPWN); and aquaculture (AQUA).

Following the blasting of the adit at Scott Dam and removal of the Cape Horn cofferdams, most of the beneficial uses listed above would be or could be affected. Water quality discussed in this section above addresses conditions potentially related to contact recreation (REC-1) and fish and wildlife habitat (COMM, WARM, COLD, WILD, RARE, MIG, SPWN, and AQUA). These water quality parameters are used in Section 2.2.4.10, Recreation Resources; Section 2.2.4.4, Fish and Aquatic Resources; and Section 2.2.4.6, Wildlife Resources, to address their respective beneficial uses. Other issues related to changes in water supply (POW, GWR) are addressed in Section 2.2.4.2, Water Use and Hydrology, and Section 2.2.4.7, Geology and Soils, respectively.

East Branch Russian River

After the adit blast at Scott Dam and removal of the Cape Horn Dam cofferdams, the Eel River would experience high turbidity and low DO conditions for several days up to several weeks; however, under the Proposed Action, there would not be facilities to divert water to the East Branch Russian River (see Section 2.2.5, Cumulative Effects, for a discussion of the effects of the NERF); therefore, water quality in the East Branch Russian River would not be affected, except a reduction of flows into the East Branch Russian River would affect water temperature. Reduced flows during the summer in the East Branch Russian River would increase water temperature in the East Branch Russian River compared to the No-Action Alternative. This change in water temperature would be similar to unimpaired conditions. There would be a short-term and long-term unavoidable adverse effect on water temperature during the spring and summer months compared to the No-Action Alternative.

Phase 2b: Resulting Conditions and Restoration

Resulting physical conditions and restoration (Phase 2b) potential effects to water quality resulting from physical changes that may occur following removal of the dams and recreation facilities/ancillary facilities compared to the No-Action Alternative (existing condition) were evaluated:

- Increase in turbidity and suspended sediments during high-flow events;
- Modified water temperature/return to unimpaired water temperature conditions; and
- Beneficial uses.

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Mainstem Eel River

Following draining of Lake Pillsbury reservoir and Van Arsdale Reservoir, restoration of the former reservoir beds would be in process. The restoration goals are listed in Section 2.0, Table 2-11. Final removal of the dam and recreational facilities would have already occurred, and hydrology in the Eel River would be restored to unimpaired conditions.

Increase in Turbidity and Suspended Sediments

Increased turbidity in the Eel River downstream of Scott and Cape Horn dams is expected during high-flow events for up to several years following their removal. Accumulated sediments that are not immediately mobilized during reservoir drawdown would continue to erode over time, releasing higher concentrations of suspended sediments into the Eel River than would be present under existing conditions. However, in the long term, suspended sediment concentrations would eventually return to unimpaired levels following several years of high-flow events.

The resulting conditions and restoration of Project lands as a result of the Proposed Action would have a beneficial effect on turbidity and suspended sediments in the Eel River. Turbidity and suspended sediment conditions would return to natural conditions.

Modified Water Temperature

Following removal of Scott and Cape Horn dams, the Eel River would return to unimpaired flow conditions, which would affect existing water temperature by increasing water temperature in the summer and decreasing water temperature in the winter. Water temperature in the Eel River at the E2 gage (downstream of the current location of Scott Dam) could increase (up to 8.5°C) from approximately May through the end of August compared to existing conditions under the No-Action Alternative (based on recent data from 2020–2023). Water temperatures at this location from September through January would be cooler (up to 5°C) when compared to existing conditions. The anticipated distance of the water temperature effects is from Scott Dam to below Cape Horn Dam some distance (few miles). Farther downstream after diversion flows are removed from the Eel River at the Van Arsdale Diversion, water temperatures return to unimpaired conditions.

The Proposed Action decrease in water temperature in the winter below Cape Horn Dam may not be harmful compared to the No-Action Alternative, but the increase in spring and summer water temperature would have a long-term unavoidable adverse effect on existing cold-water conditions in the Eel River from below Scott Dam to below Cape Horn Dam a few miles. While the resulting conditions and restoration of Eel River to unimpaired conditions would have an unavoidable adverse effect on water temperature, the change to natural conditions, overall, is considered to be a beneficial effect on the Eel River.

The change in water temperature would also affect water temperature in the East Branch Russian River through reduction of flows into the East Branch Russian River (see East Branch Russian River section below).

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Beneficial Uses

The removal of Scott Dam has the potential to affect beneficial uses of Lake Pillsbury reservoir and the Eel River.

The Basin Plan water quality standards are composed of designated E and P beneficial uses and water quality objectives. According to the Basin Plan, existing beneficial uses for the Project area include the following (NCRWQCB 2018):

- Municipal and domestic supply (MUN)
- Agricultural supply (AGR)
- Industrial service supply (IND)
- Groundwater recharge (GWR)
- Freshwater replenishment (FRSH)
- Navigation (NAV)
- Power generation (POW)
- Contact recreation (REC-1)
- Non-contact recreation (REC-2)
- Commercial and sport fishing (COMM)
- Warm freshwater habitat (WARM)
- Cold freshwater habitat (COLD)
- Wildlife habitat (WILD)
- Rare, threatened, or endangered species (RARE)
- Migration of aquatic organisms (MIG)
- Cold spawning habitat (SPWN)
- Aquaculture (AQUA)
- Saline/Freshwater Wetlands (FLD, WET, WQE)

Water quality discussed in this section addresses conditions potentially related to contact recreation (REC-1) and fish and wildlife habitat (COMM, WARM, COLD, WILD, RARE, MIG, SPWN, and AQUA). These water quality parameters are used in Section 2.2.4.10, Recreation Resources; Section 2.2.4.4, Fish and Aquatic Resources; and Section 2.2.4.6, Wildlife Resources, to address their respective beneficial uses. Issues related to changes in water supply (POW, GWR) are addressed in Section 2.2.4.2, Water Use and Hydrology, and Section 2.2.4.7, Geology and Soils, respectively. Issues related to saline and freshwater wetlands (FLD, WET, WQE) are addressed in Section 2.2.4.5, Botanical Resources.

East Branch Russian River

After removal of Scott Dam and Cape Horn Dam under the Proposed Action, there would not be storage or facilities to divert water to the East Branch Russian River (see Section 2.2.5, Cumulative Effects, for a discussion of the effects of the NERF); therefore, water quality in the East Branch Russian River would not be affected, except a reduction of flows into the East Branch Russian River would affect water temperature. Reduced flows during the summer in the East Branch Russian River would increase water temperature compared to the No-Action Alternative. This change in water temperature would be a return to unimpaired conditions. There would be a long-term unavoidable adverse effect on water temperature during the spring and summer months compared to the No-Action Alternative.

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2.2.4.3.3 Construction and Environmental Measures

To avoid or reduce effects to water temperature and quality during construction, PG&E would obtain, prepare, and/or implement the following measures. A complete list of construction measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Construction Site Water Diversion, Dewatering, and Drawdown Plan
- Water Quality and Water Temperature Monitoring Plan
- Construction BMPs
- East Branch Russian River Diversion Plan
- Estuary Protection Plan
- Stormwater Pollution Prevention Plan (SWPPP)
- Sediment Disposal Plan
- Construction Erosion Prevention Plan
- Hazardous Materials Handling Measures:
  - SPCC Plan
  - Construction-related BMPs
  - Required compliance with applicable local, state, and federal standards associated with handling and disposal of hazardous materials.

Construction also would include obtaining and implementing resource agency and construction permits; following water quality BMPs (e.g., USFS 2012); complying with the SWRCB's Construction General Permit; and complying with local, state, and federal laws (e.g., Basin Plan water quality requirements):

- USACE Section 404 CWA Permit
- SWRCB Section 401 CWA Water Quality Certification
- SWRCB Construction General Permit/SWPPP

To reduce potential effects to water quality and temperature post-facility removal (Phase 2), PG&E would implement the following environmental measures. A complete list of environmental measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Water Quality and Water Temperature Monitoring Plan
- Estuary Protection Plan
- Restoration Plan

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2.2.4.3.4 Unavoidable Adverse Effects

Phase 1: Short-term Construction

There would be a short-term unavoidable adverse effect to suspended sediment and turbidity in Lake Pillsbury reservoir and the Eel River downstream of Scott Dam as a result of reservoir dewatering, dam lowering, and dredging during Scott Dam deconstruction under the Proposed Action.

Phase 2a: Initial Conditions and Preliminary Restoration

Unavoidable adverse effects to water quality and water temperature include the following:

- Short-term unavoidable adverse effect on suspended sediment and turbidity in the Eel River from removal of the dams for a period of several days up to several months, for which no mitigation is possible:
  - This effect is likely to extend along the entire length of the Eel River, including the estuary and nearshore ocean environment.
  - This action would also have a smaller long-term effect of increased turbidity during high-flow events as the remainder of the sediments are remobilized and carried out to the ocean potentially for 1 to 3 years.
- Short-term unavoidable adverse effect on DO in the Eel River from Scott Dam removal for a period of several days and as far as 40 to 50+ mi. downstream from Scott Dam, for which no mitigation is possible:
  - The impact on DO of removing the Cape Horn cofferdams would be moderate, and as it would happen in the same season with the removal of Scott Dam, it would likely be masked by the larger impact from upstream once the flows reach the Cape Horn Dam Area a few hours following the adit blast.
- Short-term (1 to 3 years) unavoidable adverse effect on water quality in the Eel River from the removal of Scott Dam due to high nutrient levels, which could be accompanied by higher chlorophyll-a and algal toxins due to algal blooms.

The North Coast Regional Water Quality Control Board's Basin Plan Amendment for the Policy in Support of Restoration in the North Coast Region (Order Resolution No. R1-2015-0004) allows restoration projects within the Basin Plan boundary to temporarily exceed water quality objectives if it is shown that the project will result in long-term protection of beneficial uses and water quality impacts. For example, dam removal activities may result in temporary stream channel alterations from erosion and siltation and result in increased turbidity, suspended sediment load, and reduction of DO, which will likely exceed Basin Plan water quality objectives. With respect to exceedances of water quality objectives, short-term impacts may be acceptable in cases wherein long-term benefits to beneficial uses outweigh short-term impacts, based on detailed, site-specific information and findings.

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Phase 2b: Resulting Conditions and Restoration

Unavoidable adverse effects to water quality and water temperature include the following:

- Increased spring and summer water temperature would have a long-term unavoidable adverse negative effect on existing cold-water conditions in the Eel River from below Scott Dam to below Cape Horn Dam a few miles compared to the No-Action Alternative:
  - While the resulting condition and restoration of Eel River to unimpaired conditions would have an unavoidable adverse effect on water temperature, the change to natural conditions, overall, is considered to be a positive effect on the Eel River.
- Increased spring and summer water temperatures in the East Branch Russian River because diversions to the East Branch Russian River would no longer occur would have a long-term unavoidable adverse negative effect on existing water temperature conditions compared to the No-Action Alternative:
  - This resulting change to water temperature would be similar to unimpaired conditions.

2.2.4.3.5 References

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2.2.4.4 Fish and Aquatic Resources

This section describes the potential effects to fish and aquatic resources that could occur because of the Proposed Action described in PG&E's Application for Surrender of License and Decommissioning Plan for the Potter Valley Hydroelectric Project (Project) (see Section 2.1.2, Applicant's Proposal). Section 2.1.2 includes a description of decommissioning Project facility modifications, including restoration activities, to be implemented under the Proposed Action.

Potential effects are separated into construction effects (Phase 1) and post-facility removal effects (Phase 2). As described in Section 2.2.4.1, Analytical Approach, Phase 2 effects are further delineated into initial conditions and preliminary restoration (Phase 2a) and resulting conditions and restoration (Phase 2b).

Effects were determined by analyzing the changes in fish and aquatic resources that may result from activities to be implemented under the Proposed Action (Section 2.1.2, Applicant's Proposal) compared to the No-Action Alternative (existing condition) (Section 2.1.1, No-Action Alternative). Final effects determinations consider construction measures and post-facility removal measures included to avoid or mitigate the effects of the Proposed Action (Section 2.1.2.2, Proposed Environmental Measures). Unavoidable adverse effects are discussed at the end of this section.

2.2.4.4.1 Species and Habitat

The Proposed Action may directly or indirectly affect individual fish and aquatic organisms or their habitats. It is anticipated that the direct and indirect adverse effects of the Proposed Action would generally be short term and that the dam removals and river restoration would benefit fish and aquatic resources in the Eel River in the long term, including special-status aquatic species and their habitats.

The direct effects include the loss of or disturbance to special-status and other aquatic species known to occur in the Project area and their habitats, including:

- California Coastal Chinook salmon (*Oncorhynchus tshawytscha*), winter and summer-run Northern California DPS steelhead (*O. mykiss*), and Southern Oregon/Northern California Coastal coho salmon (*O. kisutch*), which are federally designated as threatened;
- Tidewater goby (*Eucyclogobius newberryi*), which is federally designated as endangered;
- Northwestern pond turtle (*Actinemys marmorata*), which is a candidate species for ESA listing and an SSC in California; and
- Other SSC, including FYLF (*Rana boylii*), Pacific lamprey (*Entosphenus tridentatus*), western river and brook lamprey (*Occidentis ayresii*), western pearlshell mussel (*Margaritifera falcata*), green sturgeon (*Acipenser medirostris*), white sturgeon (*Acipenser transmontanus*), and coastal cutthroat trout (*Oncorhynchus clarkii clarkii*).

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BMI and other native freshwater fish species, such as Sacramento sucker (*Catostomus occidentalis*), sculpin (*Cottus* spp.), and stickleback species (*Gasterosteus* spp.) could also be affected by the Proposed Action.

Indirect effects include modification of habitat that fish and aquatic species rely upon for migration, holding, spawning/reproduction, incubation, rearing, and recruitment. Indirect effects include modification of critical habitat for federally listed Northern California DPS steelhead, Southern Oregon/Northern California Coastal coho salmon, California Coastal Chinook salmon, tidewater goby, EFH (see Section 2.2.3.3, Fish and Aquatic Resources, Table 2.2.3.3-22), and habitat for other aquatic species (e.g., FYLF, northwestern pond turtle, lamprey, freshwater mussels).

2.2.4.4.2 Phase 1: Short-term Construction Effects

The following potential effects to fish and aquatic resources as a result of Project facility modifications were evaluated:

Scott Dam, Cape Horn Dam, and Eel River:

- Modified fish attraction flows in the Eel River;
- Changes in water quality that may affect aquatic resources;
- Direct loss or disturbance of fish and aquatic species;
- Modification of aquatic habitats resulting from construction; and
- Release of non-native aquatic species from Lake Pillsbury reservoir or Van Arsdale Reservoir.

East Branch Russian River:

- Changes in water quality that may affect aquatic resources; and
- Direct loss of aquatic species and habitat.

PG&E is proposing to develop a suite of construction plans and management measures to help mitigate the effects of the Proposed Action on fish and aquatic resources. These measures are included in the analysis sections below and summarized in Section 2.1.2.2, Proposed Environmental Measures. Analysis of the construction effects is based on the Decommissioning Plan (Section 2.1.2.1.1) and discussed by spatial area (Scott Dam, Cape Horn Dam, East Branch Russian River) below.

Scott Dam Area

At Scott Dam, construction activities could affect fish and aquatic resources. Construction activities include the initiation of the reservoir drawdown after the runoff season when inflows would be generally below 400 cfs, which is the approximate capacity of the existing low-level outlet needle valve. The reservoir storage at the start of the drawdown period (June) would be approximately 50,000 ac-ft at an elevation of 1,900 ft. Completion of the drawdown to

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approximately 10,000 ac-ft of storage at an elevation of 1,861.7 ft. would occur by October. To the extent possible, timing of the drawdown and flow releases would be coordinated with water demands in the East Branch Russian River. PG&E is proposing drawdown rates in Lake Pillsbury reservoir between approximately 1 and 2 ft. per day. Phase 1 also includes construction of temporary roads, a temporary barge launch and landing area, road improvements, construction of an approximately 15-ft.-diameter adit tunnel at the base of Scott Dam, removal of sediment immediately upstream of the newly constructed adit tunnel, and construction of an artificial channel and buttress to facilitate downstream sediment transport. Some large, clean material from the dam removal (e.g., no rebar protruding, greater than approximately 2 ft. in diameter) may be placed in the large plunge pool area below the dam. The material would be placed below the final river grade. Material will be large enough and placed deep enough so that it will not be eroded or mobilized. The feasibility and size of material will be determined during engineering design.

During the initial low-flow season (June–October), the upper portion of Scott Dam would be removed. During the lowering of the dam, a large notch (10 to 15 ft. deep and 150 to 200 ft. wide; overall discharge capacity between 15,000 and 40,000 cfs depending on head) would be constructed in the spillway. This new, lower spillway would ensure that storage in Lake Pillsbury reservoir does not exceed the target storage of 10,000 ac-ft.

A temporary adit tunnel constructed in Scott Dam would be blasted opened during the first high-flow season (November to May) following the removal of the upper portion of the dam, which would result in significant sediment flushing. The sediment flushing from the removal of the adit plug is evaluated as part of Phase 2a: Post-facility Removal Effects and is separate from Phase 1: Short-term Construction Effects.

During the second low-flow season (following sediment flushing), dam removal would be completed. Dam removal would include cutting a section through the base of the dam to accommodate the 100-year flood flow. This final phase of construction would be completed while the Eel River is allowed to flow unimpaired past the remnants of Scott Dam. Construction activities during the second low-flow season would be primarily land-based (i.e., final dam removal activities), including removal of approximately 115,00 cy of material, most of which would be stored offsite. Additional mobilization of impounded sediment from behind Scott and Cape Horn dams may occur during the second low- and high-flow seasons, especially during precipitation or as unstable, exposed shorelines slump into the river channel.

Modified Fish Attraction Flows in the Eel River

During the initial low-flow season (June–October) drawdown of Lake Pillsbury reservoir, the ≤400-cfs release from Scott Dam could be higher than baseline conditions. Average monthly baseline flows from Scott Dam under existing conditions range from 170 to 200 cfs (see Section 2.2.3.1, Water Use and Hydrology, Table 2.2.3.1-7). These flows, if they occur too late in the year (e.g., late October), could affect migratory patterns for ESA-listed Chinook salmon, coho salmon, and steelhead and may attract migrating salmonids past important spawning tributaries such as Tomki Creek and Outlet Creek prior to fall rainstorm events that water these streams. Fall-run Chinook salmon typically arrive in the upper Eel River in late October through late December. The run is typically

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over by the end of January. Winter-run steelhead start arriving at the fish ladder at Cape Horn Dam in mid-December, and the run typically peaks between January and March and ends by late May (see Section 2.2.3.3, Fish and Aquatic Resources, Figures 2.2.3.3-11 and 2.2.3.3-12). Some summer-run steelhead occur annually, but they are generally found in the lower watershed (i.e., Van Duzen River, Middle Fork Eel River). Coho salmon typically enter the Eel River in September, with peak migration occurring in November and December. The current distribution of coho salmon is primarily in the cooler coastal tributaries, particularly the South Fork Eel River, Van Duzen River, and lower Eel River. A small population persists in Outlet Creek, and a few individuals may potentially be found in other tributaries to the upper Eel River; however, observations from the Project area are sparse.

If the drawdown of Lake Pillsbury reservoir occurred too late in the year (e.g., late October) and induced an early migration of Chinook salmon into mainstem habitats prior to tributary habitats (Tomki Creek, Outlet Creek) having flows, this could move a large portion of adults into the Eel River reach above Cape Horn Dam to spawn in the same year that Scott Dam would be flushed of sediment. This could result in significant loss of that cohort of adults, spawning, and/or recruitment. Under existing conditions (No-Action Alternative), flow releases from Scott Dam, which are elevated compared to the unimpaired flow regime, can also attract migrating salmon into the upper Eel River past Tomki and Outlet creeks before fall rainstorms sufficiently wet those tributaries. However, under existing conditions, mainstem spawning may be successful compared to the Proposed Action, which would result in mortality of many mainstem spawners depending on the timing of the sediment release (see Phase 2: Post-facility Removal Effects). Without a measure to manage drawdown releases, construction activities could have a significant, unavoidable adverse effect on salmon in the Eel River.

To minimize the potential adverse effects of changes in river flow on anadromous fish run timing (and other aquatic organisms) during construction, PG&E would implement a Construction Site Water Diversion, Dewatering, and Drawdown Plan that would be approved by resource agencies. The Construction Site Water Diversion, Dewatering, and Drawdown Plan would be intended to identify the appropriate dewatering flow timing and incorporate measures to (1) minimize unwanted attraction flow that would affect migratory fish entering the Eel River and (2) encourage migration of salmon into tributary streams (Tomki Creek, Outlet Creek) where adults and spawning would be protected from flushing of sediment from Lake Pillsbury reservoir. The plan may include diversion of flows at Cape Horn Dam to the East Branch Russian River (see East Branch Russian River Diversion Plan below). With implementation of the plan, Proposed Action construction activities would have a negligible effect on successful migration and spawning of salmon in the Eel River below Scott Dam.

Changes in Water Quality and Effects to Aquatic Species

Water temperature is a critical parameter for salmonids. Optimal water temperature for Chinook salmon varies by life stage, ranging from 5.6°C to 19°C (Richter and Kolmes 2005). The lethal limit for juvenile steelhead has been reported as 24°C (Richter and Kolmes 2005) although juvenile steelhead in the Eel River system are thought to withstand water temperature up to 26.5°C (Kubicek 1977). Optimal water temperature for coho salmon ranges from 2.5°C to 20°C depending on life stage (Richter and Kolmes 2005). The lethal limit for juvenile coho has been reported as 22.0°C to

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23°C (Richter and Kolmes 2005). Elevated water temperatures above these limits can adversely affect salmonid growth, interactions with predatory fish (i.e., Sacramento pikeminnow [*Ptychocheilus grandis*]), migration, spawning, reproductive success, and recruitment (FERC 2022; Richter and Kolmes 2005). For example, Reese and Harvey (2002) demonstrated in a lab setting that the growth of juvenile steelhead decreases and stream positioning (i.e., proximity to food resources) diminishes in warmer water (20–23°C) containing juvenile Sacramento pikeminnow.

Initial low-flow season construction activities at Scott Dam (June–October) would likely result in warm water temperatures downstream of Scott Dam that would at a minimum be similar to current dry-year conditions because stored water (including the cold-water pool) would be released from Lake Pillsbury reservoir approximately similar to how it is currently released in dry years. Based on 2023 summer water temperature monitoring profile data in Lake Pillsbury reservoir, hypolimnetic water released from the dam during the drawdown would likely range from approximately 10°C to 22°C or higher during the 5-month-long period (June–October). The Construction Site Water Diversion, Dewatering, and Drawdown Plan would include a measure to manage drawdown and water temperature and, if necessary, identify construction measures to release surface water in combination with the cold-water pool to reduce potential temperature effects. Therefore, with implementation of the Construction Site Water Diversion, Dewatering, and Drawdown Plan, water temperature would be less than optimal but is expected to remain below the lethal limit for Chinook salmon and steelhead in the reach below Scott Dam to below Cape Horn Dam. Like the No-Action Alternative, the Eel River is expected to warm during the construction season as it flows downstream through the watershed due to solar radiation and inflows from unimpaired tributaries, reaching a maximum of approximately 27°C near the Middle Fork Eel River confluence area. As such, the effects of the Proposed Action would be similar to existing conditions, with some mortality of rearing juvenile salmonids possible in the lower reaches.

Adequate DO levels are critical for the survival of salmonids and other fish species. Salmonid species (e.g., Chinook, steelhead) typically have stricter DO requirements than other fish species, generally above 7.0 mg/L or higher for spawning and egg incubation life stages. Reduced DO concentrations can affect the growth and development of different life stages, including eggs, alevins, and fry, as well as the swimming, feeding, and reproductive ability of juvenile and adult fish. Small changes in pH can alter the chemical state of many pollutants and change their solubility, transport, and bioavailability. This can increase exposure to and toxicity of metals and nutrients to aquatic plants and animals. Salmonids typically require pH in the range of 6.0 to 8.5. Lower or higher levels could cause mortality. During the initial low-flow season, DO and pH levels would likely mimic existing conditions while up to 400 cfs is released from the low-level outlet during the drawdown. Based on data collected in 2018 in the Eel River downstream of Scott Dam, DO would likely stay above 8 mg/L from June through October and pH would likely stay around 7 or 8. These levels of DO and pH would continue to provide suitable water quality for fish and other aquatic organisms inhabiting the Eel River between Scott Dam and Cape Horn Dam.

Short-term changes to suspended sediment could occur during initial Phase 1 dam removal activities and the drawdown of Lake Pillsbury reservoir. The restricted 1- to 2 ft.-per-day drawdown would be expected to reduce the potential for sediment erosion in Lake Pillsbury reservoir inlets and suspended sediment releases to the Eel River; however, some increased

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suspended sediment and turbidity could occur. Similarly, increased turbidity could occur during dredging of sediment in front of the adit and during final removal of the dam remnants. The most common effects of suspended sediment on anadromous salmonids include (1) avoidance of turbid waters in migrating adults resulting in delay or straying, (2) avoidance or alarm reactions by juveniles, (3) displacement of juveniles, (4) reduced feeding and growth, (5) physiological stress and respiratory impairment, (6) damage to gills, (7) reduced tolerance to disease and toxicants, (8) reduced survival, and (9) direct mortality (Newcombe and Jensen 1996, as cited in Stillwater Sciences 2021). Stillwater Sciences (2021) also noted,

> "[Y]earling and older salmonids can survive high concentrations of suspended sediment for considerable periods, and acute lethal effects generally occur only if concentrations exceed 20,000 mg/L."

Relatively short-term exposure to minor increases in suspended sediment (e.g., <500 mg/L), as would be expected during Phase 1 construction, is unlikely to result in substantial direct mortality to juvenile or adult anadromous salmonids in the Eel River. Analysis of the effects of large increases in suspended sediment during flushing of Lake Pillsbury reservoir, which includes the release of approximately 12 million cy of fine-grained sediment, is provided in the Phase 2a analysis below.

During construction, activities associated with Project facility modifications could increase the potential for accidental spills of pollutants and contamination from stormwater runoff to be introduced into the Eel River that could affect fish and aquatic species. These effects are discussed in Section 2.2.4.3, Water Quality.

To minimize the potential adverse effects related to changes to water quality on aquatic species during construction, PG&E would implement several mitigation plans, including a Construction Site Water Diversion, Dewatering, and Drawdown Plan; a Construction Water Quality and Water Temperature Monitoring Plan; water quality BMPs; a SWPPP; Hazardous Materials Handling Measures; an SPCC Plan; and a Construction Erosion Prevention Plan, and would comply with federal and state construction permits (see Section 2.2.4.3, Water Quality). With implementation of these plans, the construction activities undertaken during this phase of the Proposed Action would have a negligible effect on water quality and thus a negligible effect on fish and aquatic resources in the Eel River downstream of Scott Dam.

Direct Loss or Disturbance of Fish and Aquatic Species

Aquatic habitat in Lake Pillsbury reservoir would transition from lacustrine to riverine during construction activities. The proposed drawdown of Lake Pillsbury reservoir of 1 to 2 ft. per day during the first low-flow season (June to October) would be expected to be protective of fish and aquatic organisms inhabiting Lake Pillsbury reservoir and the Eel River downstream of Scott Dam. These flows are within the existing range of flows released from Scott Dam during June–October. Lake Pillsbury reservoir shoreline habitats would gradually become exposed as the reservoir level drops, exposing mud flats, rocky bars, and unvegetated riparian areas. Juvenile and adult forms of mobile and semi-mobile aquatic organisms (e.g., fish, FYLF, northwestern pond turtle) would

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be able to relocate to wetted habitat, although some stranding of individual organisms may occur during the drawdown.

At the Scott Dam construction area, a range of activities could affect Chinook salmon and steelhead designated as threatened under the ESA and other special-status aquatic species (e.g., FYLF, northwestern pond turtle, lamprey spp., and western pearlshell mussels) known to occur or potentially occurring in the area. Disruption of flows passing the dam into the Eel River during construction could occur (e.g., low-level outlet clogging). If flow disruptions at the dam occurred, they could strand fish and result in mortality of threatened Chinook salmon or steelhead. Placement of large, clean debris from Scott Dam into the tailwater pool could injure fish and aquatic species. Steelhead cold-water summer rearing habitat between Scott Dam and Van Arsdale Reservoir may be affected (see discussion of water quality above). Work in the channel, particularly during the second low-flow season when the dam is being removed from the channel and floodplain, could result in channel dewatering and potential stranding of aquatic species (fish, FYLF, northwestern pond turtle, and mussels). Terrestrially mobile aquatic amphibians or aquatic reptiles (FYLF, northwestern pond turtle) could be present in the construction footprint and susceptible to mortality from foot, vehicle, or equipment traffic. Implementation of fish rescue and relocation efforts prior to dewatering and dam removal would reduce the effects of the Proposed Action on Chinook salmon and steelhead designated as threatened under the ESA; however, some injury or mortality of individual Chinook salmon or steelhead could occur during those rescue efforts.

To protect fish and aquatic species from direct mortality and disturbance, the following measures would be implemented. PG&E would implement a Construction Site Water Diversion, Dewatering, and Drawdown Plan that would ensure redundant options would be available to release flows past Scott Dam. The plan would include construction minimum flows in the Eel River (these may be the same or different than the current RPA minimum instream flows) and established drawdown rates. PG&E would implement an Aquatic Species Management and Monitoring Plan that would include pre-construction surveys, periodic surveys during construction, environmental training and inadvertent discovery procedures for workers, and removal/relocation of aquatic species by qualified biologists. PG&E would also implement BMPs for work within and near aquatic habitats and the construction water quality measures identified in Section 2.2.4.3, Water Quality. With implementation of these measures, the effects of the Proposed Action on fish and aquatic species would be reduced; however, construction activities would be expected to have an unavoidable adverse effect on fish and aquatic species, including impacts associated with relocation of ESA-listed salmonids prior to dewatering and potential harm/death from stranding downstream of Scott Dam.

Modification of Habitat Resulting from Construction

The Eel River from Scott Dam downstream, including the construction area, is critical habitat and EFH for Northern California Coastal DPS steelhead, California Coastal Chinook salmon, and Southern Oregon/Northern California coho salmon. The area is the upstream terminus of anadromous habitat in the Eel River and is potential spawning and rearing habitat. Under existing conditions, the large pool area below the dam and Lake Pillsbury reservoir upstream of Scott Dam

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is a source of pikeminnow predation on juvenile salmonids. The construction area is also potentially habitat for other special-status species (FYLF, northwestern pond turtle, lamprey spp., and western pearlshell mussels) and native species such as BMI and native freshwater fish species (e.g., Sacramento sucker).

Deconstruction of Scott Dam would include removal/repositioning of riverine sediment, permanent fill of the plunge pool below the dam to the normal channel bed, and restoration of the river channel and floodplain at the dam. The modification of critical habitat and EFH within the construction footprint would require PG&E to informally consult with NMFS. NMFS's issuance of a biological opinion would allow modifications to critical habitat/EFH and would include reasonable and prudent measures to minimize the effects of the Proposed Action on habitat for unavoidable adverse effects, if necessary. PG&E would obtain CWA Section 401/404 permits and comply with all conditions of the permits. A USACE 404 permit would be obtained to place fill material into waters of the United States. PG&E would develop and implement a Restoration Plan that would include measures to restore the channel, including fish passage, in the footprint of Scott Dam. With implementation of the above measures, the Proposed Action would have a beneficial effect on critical habitat, EFH, and habitat for other Eel River fish and aquatic species.

Construction would also modify Lake Pillsbury reservoir during Phase 1 activities. Lake Pillsbury reservoir shoreline habitats would gradually become exposed as the reservoir level dropped during drawdown, exposing mud flats, rocky bars, and unvegetated riparian areas. The remaining reservoir pool would temporarily result in crowded, low reservoir pool conditions for fish. The habitat would be less than ideal; however, when Lake Pillsbury reservoir is flushed of sediment, the reservoir pool would be completely dewatered except for the flowing stream segments. Restoration of Lake Pillsbury reservoir habitat to riverine habitat is addressed under Phase 2a below.

Release of Non-native Aquatic Species from Lake Pillsbury Reservoir

At least 12 fish species are present in Lake Pillsbury reservoir: rainbow trout (*O. mykiss*), Sacramento sucker, California roach (*Lavinia symmetricus*), Sacramento pikeminnow, golden shiner (*Notemigonus crysoleucas*), largemouth bass (*Micropterus salmoides*), green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*), catfish (*Ictalurus* spp.), brown bullhead (*Ameiurus nebulosus*), threadfin shad (*Dorosoma petenense*), and western brook lamprey (Section 2.2.3.3, Fish and Aquatic Resources). Of these 12 species, only 3 are native (rainbow trout, Sacramento sucker, and western brook lamprey); the remainder are introduced. Generally, these species have been found downstream in the Eel River. Some are not river species and are adapted primarily to lakes (e.g., largemouth bass), and only a few, Sacramento pikeminnow and California roach, have been observed in relatively high densities downstream. Sacramento pikeminnow and largemouth bass are the species of primary concern in Lake Pillsbury reservoir for native fish restoration (Potter Valley Fish Passage Working Group 2019). Although all non-native species may adversely affect native fish, Sacramento pikeminnow have a major effect on salmonids and other native fish in the Eel River through predation and competition for food and space (Nakamoto and Harvey 2003). Sacramento pikeminnow currently is one of the most abundant species within the Eel River fish community, and Lake Pillsbury reservoir has a large population of Sacramento pikeminnow.

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Asian clams (*Corbicula fluminea*) currently occur upstream and downstream of Scott Dam. The potential for the spread of this species within the watershed is high (PG&E 2019). The biological traits of Asian clams contribute to their success as invaders. These traits include high growth rates, short life spans, high fecundity rates, self-fertilization or self-cloning (parthenogenesis), and unique dispersal mechanisms (Crespo et al. 2015). Asian clams can live out of water for prolonged periods of time and be spread through many natural and human-related processes. The most prominent effects of Asian clams in North American rivers are that at high densities they can alter benthic substrates and outcompete native benthic taxa (USFWS 2011).

Construction activities have the potential to increase the spread of invasive aquatic species present in Lake Pillsbury reservoir (e.g., pikeminnow) after the drawdown due to crowding of aquatic species in the reduced-size reservoir and the potential for the lowered dam/spillway to increase spills. During the winter season following the drawdown of Lake Pillsbury reservoir, the elevation of the Scott Dam spillway would be lowered and there would be a significant likelihood of spills occurring when inflows exceed the capacity of the low-level outlet. These spills would potentially transport non-native aquatic species over the dam and downstream into the Eel River. Under existing conditions, spills are not typical during the winter when the reservoir volume is low. Subsequent to these spills, when Lake Pillsbury reservoir would be flushed of sediment (adit blasted open) (see Phase 2a), the non-native aquatic species would be released regardless. PG&E would implement the Construction Non-native Invasive Aquatic Species Management Plan, which would evaluate potential options to minimize the spread of non-native species. Elements of the plan may be implemented prior to construction activities to minimize the spread of non-native invasive aquatic species. It is not, however, anticipated that the plan would include an option to reduce the effect of release of non-native aquatic species to less than adverse. Release of non-native aquatic species due to Proposed Action construction would have an unavoidable adverse effect on aquatic species in the Eel River. In addition, golden mussels (*Limnoperna fortunei*), an invasive bivalve, were documented in the Sacramento – San Joaquin Delta in October of 2024. Preventing the spread of golden mussels in California is a top priority for state and federal resource agencies. Although not currently distributed in the Eel River watershed, PG&E's Construction Non-native Invasive Aquatic Species Management Plan would address the potential spread of golden mussels by incorporating standard preventative measures during construction activities.

Proposed Action construction may adversely affect the overall distribution of non-native aquatic species in the watershed; however, the anticipated benefits of converting the Eel River to a free-flowing system along with the removal of migration barriers for native fish, including special-status salmonid species and the opening of habitat upstream of Lake Pillsbury reservoir to these species are expected to outweigh the adverse effects of the dispersal of non-native fish species.

Cape Horn Dam Area

Cape Horn Dam construction activities include constructing temporary access roads; installing channel-spanning cofferdams upstream and downstream of the dam to isolate the work area; constructing a bypass channel to temporarily reroute the Eel River; draining water from the work area; removing accumulated sediment from areas immediately upstream of the dam; removing the concrete gravity portion of the dam using land-based heavy equipment such as hydraulic high-traction excavators, hoe rams, and/or drilling and blasting; lowering the existing wingwall and

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earthen portion of the dam; and removing the existing fish exclusion barrier, fish hotel, and fish ladder. ERPA would construct the NERF near the existing diversion intake to prepare for future water diversions to the East Branch Russian River (see Section 3.0, Non-Project Use of Project Lands). Phase 1 construction would be completed when PG&E removes the cofferdams and releases water and upstream sediment through the newly opened channel. The new channel would be passable to upstream migrating fish.

Modified Fish Attraction Flows and Fish Passage at Cape Horn Dam

Flows released from the low-level outlet at Scott Dam (i.e., 400 cfs) during the Lake Pillsbury reservoir drawdown could alter fish attraction flows that cue anadromous fish migrations. The drawdown flows would be bypassed around Cape Horn Dam through the temporary bypass channel. The flows could be higher than existing average monthly flows under the No-Action Alternative (i.e., 100 to 200 cfs), which could result in false attraction of migrating salmonids past spawning tributaries such as Tomki and Outlet creeks. These effects are described above (see Scott Dam Area effects) and would be addressed by implementing the Construction Site Water Diversion, Dewatering, and Drawdown Plan to protect Chinook salmon, steelhead, and coho salmon from untimely migratory behavior. Cape Horn Dam construction would not affect the attraction flows.

Cape Horn Dam construction could, however, adversely affect management of fish and fish passage due to loss of fish capture/management infrastructure. During removal of Scott Dam, release of sediment downstream would cause mortality of adult fish, redds, fry, and juveniles in the mainstem Eel River (see Phase 2a effects below). Any fish that would have migrated into the reach upstream (l1.8 mi.) or downstream (34.7+ mi.) of Cape Horn Dam would likely be lost. Currently, when migratory anadromous species arrive at Cape Horn Dam, the fish ladder and VAFS facilities provide a mechanism to manage migration into the reach above Cape Horn Dam and a mechanism to capture fish. If the bypass channel constructed around Cape Horn Dam provides unconstrained upstream passage or if the existing fish ladder and VAFS are not accessible to fish, then managing migration into the reach above Cape Horn Dam or managing fish capture, relocation, or potential broodstock rescue at VAFS would not be possible. In the winter/spring following deconstruction of Cape Horn Dam, an entire cohort of Chinook salmon, steelhead, and Pacific lamprey adults, redds, and juveniles could be lost.

Steelhead adults arrive at the fish ladder at Cape Horn Dam December through May, Chinook salmon typically arrive October through December, and Pacific lamprey typically arrive April through July. During the fall/winter of 2024, 893 Chinook salmon (639 adults, 170 jacks) were observed at VAFS (November to December). The first steelhead were observed in early December 2024. In the recent past, the annual total number of Chinook salmon and steelhead has typically been fewer than 600. During Proposed Action construction, the annual fish migration would either pass unconstrained into the reach above Cape Horn Dam (through the flow bypass channel or main channel if the cofferdams have been removed) or be blocked below the dam (if the cofferdams are still in place and the bypass channel does not provide passage) and there would be no mechanism to manage the fish. The Aquatic Species Management and Monitoring Plan would be implemented prior to release of sediment from Scott Dam and would include measures to implement fish salvage, capture, relocation, or potential broodstock rescue. The ability to implement the plan could be compromised based on the existing

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plan for Cape Horn Dam deconstruction. As a result, Cape Horn Dam construction would have an unavoidable adverse effect on threatened Chinook salmon and steelhead. Similarly, Pacific lamprey arriving in the spring/summer, at the beginning of Cape Horn Dam construction, would also be adversely affected.

PG&E would engage with resource agencies to develop measures in the Aquatic Species Management and Monitoring Plan to address the issue described above. This may include construction of a temporary fish station in the bypass channel to manage migration and capture of fish, or it could include modification of the construction plan. For example, the downstream cofferdam and/or sequencing of removal of the fish ladder/ VAFS could be modified. The current fish exclusion weir could possibly function as the downstream cofferdam for the majority of the deconstruction and then be removed as a last step of construction. This would require routing bypass flows through the existing fish ladder (pipeline on river left instead of a bypass channel on river right). The mechanism to address the fish passage/migration management issue is currently unresolved but is likely tractable. With implementation of the Aquatic Species Management and Monitoring Plan and/or a modified Cape Horn construction plan, fish passage at Cape Horn Dam could have a negligible effect on management of ESA-listed Chinook salmon and steelhead and other migratory species such as Pacific lamprey.

Changes in Water Quality and Effects to Aquatic Species

Short-term changes to DO, temperature, pH, and suspended sediment could occur in the Eel River near Cape Horn Dam during construction activities. Potential pollutant spill risk and contamination from stormwater could also occur as a result of construction. These issues are addressed in Section 2.2.4.3, Water Quality. The water quality effects would be negligible with implementation of construction measures, including a Construction Site Water Diversion, Dewatering, and Drawdown Plan; a Construction Water Quality and Water Temperature Monitoring Plan; construction BMPs; a SWPPP; a Construction Erosion Prevention Plan; hazardous materials handling measures; an SPCC Plan; and required compliance with state and federal construction permits. With implementation of these plans, Proposed Action construction activities would have a negligible effect on fish and aquatic species in the Eel River below Cape Horn Dam.

Direct Loss or Disturbance of Fish and Aquatic Species

ESA threatened Chinook salmon and steelhead and other special-status aquatic species (e.g., FYLF, northwestern pond turtle, lamprey spp., and western pearlshell mussels) are known to occur in Van Arsdale Reservoir and the Eel River in the vicinity of Cape Horn Dam (Section 2.2.3.3, Fish and Aquatic Resources). During the June–October initial low-flow construction season, a variety of life stages (adult holding/rearing, juvenile rearing, spawning/reproduction, and migratory) could be present in the construction area, except that spawning of threatened and endangered Chinook salmon and steelhead would occur during the late fall/winter/spring period, outside the construction season.

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Construction activities at Cape Horn Dam (constructing the river bypass, installing cofferdams, dewatering the work area, removing sediment) would result in modifications to the river that could cause mortality or disturbance to aquatic species within the construction footprint. Dewatering of the channel between the cofferdams would strand fish and other aquatic species. Vehicle traffic, construction equipment, and foot traffic could impact aquatic species that may be present in the construction footprint or enter the construction area. Potential disruption of flow past Cape Horn Dam could dewater a portion of the Eel River downstream of the construction area and result in species mortality. Implementation of fish rescue and relocation efforts prior to dewatering and dam removal would reduce the effects of the Proposed Action on Chinook salmon and steelhead designated as threatened under the ESA; however, some injury or mortality of individual Chinook salmon or steelhead could occur during those rescue efforts.

PG&E would implement measures to reduce potential direct effects (mortality, harassment) on fish and aquatic species. PG&E would develop and implement an Aquatic Species Management and Monitoring Plan that would include pre-construction surveys, capture, and relocation of individuals. For the dewatering process, the plan would include rescue/salvage and relocation of aquatic species (fish, FYLF, northwestern pond turtle, and mussels). Following dewatering, construction activities would occur in the dry; therefore, riverine fish species, western pearlshell mussels, and other aquatic macroinvertebrates would not be present in the construction footprint. Mobile aquatic amphibians or aquatic reptiles could re-enter the dewatered construction area (e.g., FYLF, northwestern pond turtle) and be affected (e.g., mortality). The Aquatic Species Management and Monitoring Plan would include periodic surveys during construction, environmental training and inadvertent discovery procedures for workers, as well as removal/relocation of aquatic species by qualified biologists. PG&E would also implement General Wildlife Measures that include measures that would avoid entrapment of amphibians and Riparian and Wetland Protection Measures that would require BMPs for work within and near aquatic habitats. PG&E would implement a Construction Site Water Diversion, Dewatering, and Drawdown Plan to ensure continued bypass of flows downstream of the construction site. Implementation of these measures during Proposed Action construction activities would reduce the direct effects on Chinook salmon, steelhead, and other special-status/native aquatic species to the extent possible; however, construction activities are expected to have an unavoidable adverse effect on fish and aquatic species, due to relocation of ESA-listed salmonids prior to dewatering as well as potential harm/death from stranding.

Modification of Habitat Resulting from Construction

The Eel River in the Cape Horn Dam construction area is critical habitat for Chinook salmon, coho salmon, and steelhead and EFH for the Pacific Coast Salmon Fishery Management Plan (PFMC 2022). Chinook salmon and steelhead are known to occur in or near the proposed construction area, using the area primarily as a migratory corridor and/or as rearing habitat. Under existing conditions, Van Arsdale Reservoir is a source of pikeminnow predation on juvenile salmonids. The construction area is also habitat for other special-status species (FYLF, northwestern pond turtle, lamprey spp., and western pearlshell mussels) and native species such as BMI and native freshwater fish species (e.g., Sacramento sucker).

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Removal of Cape Horn Dam and associated facilities (e.g., exclusion weir, fish hotel, fish ladder) would include modification of the river and river channel. Removal of Van Arsdale Reservoir would occur when the construction cofferdams are removed. Natural flows would flush sediments from the former reservoir (see Phase 2a). The entire construction area would be converted back to a river channel and floodplain. A NERF pump station would be constructed on the river left, upstream of the dam and is analyzed separately in Section 3.0, Non-Project Use of Project Lands.

The removal of Cape Horn Dam and Van Arsdale Reservoir would restore critical habitat and EFH physical and biological features (habitat for holding, spawning, rearing, migration). There would be a local loss of northwestern pond turtle habitat and habitat for other species in the reservoir due to construction; however, ample habitat exists in river pools upstream and downstream. PG&E would informally consult with NMFS to minimize and/or offset adverse modifications of designated critical habitat and EFH. NMFS's issuance of a biological opinion would allow modifications to critical habitat/EFH and would include reasonable and prudent measures to minimize the effects of the Proposed Action on the habitat. PG&E would obtain CWA Section 401/404 permits and comply with all conditions of the permits. A USACE 404 permit would be obtained to dredge within waters of the United States. PG&E would develop and implement a Restoration Plan that would include measures to restore the channel, including fish passage, in the footprint of Cape Horn Dam and Van Arsdale Reservoir. With implementation of the above measures, the Proposed Action would have a beneficial effect on critical habitat, EFH, and habitat for other Eel River fish and aquatic species.

Release of Non-native Aquatic Species from Van Arsdale Reservoir

Van Arsdale Reservoir is small (390 ac-ft) but is an existing "hot spot" for non-native fish predation (pikeminnow, bass) on Chinook and steelhead juveniles. Construction at Cape Horn Dam would include the dewatering of a portion of the reservoir. Non-native aquatic species such as Sacramento pikeminnow and largemouth bass that occur in the dewatered channel would not be salvaged and relocated. The removal of non-native aquatic species would be a benefit of the Proposed Action. To minimize the potential effects of the Proposed Action on the release of non-native aquatic species, PG&E would implement a Construction Non-native Invasive Aquatic Species Management Plan that would specify management activities for non-native aquatic species. With implementation of this plan, Proposed Action construction activities would have a beneficial effect on the release of non-native aquatic species. As described above, golden mussels were documented in the Sacramento – San Joaquin Delta in October of 2024. Although not currently distributed in the Eel River watershed, PG&E's Construction Non-native Invasive Aquatic Species Management Plan would address the potential spread of golden mussels by incorporating standard preventative measures during construction activities.

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East Branch Russian River

Changes in Water Quality and Effects to Aquatic Species

Special-status aquatic species (FYLF, northwestern pond turtle, and western pearlshell mussels), stocked rainbow trout, common native and non-native fish species, and BMI occur in the East Branch Russian River. During deconstruction of Scott Dam and Cape Horn Dam, Lake Pillsbury reservoir storage would be drawn down from approximately June (approximately 50,000 ac-ft of storage) to October (approximately 10,000 ac-ft of storage). To the extent possible, timing of drawdown (flow releases) would be coordinated with water demands in the East Branch Russian River. During drawdown, water temperature, turbidity, and suspended sediment in the Eel River may be elevated (see above), which would affect the quality of water diverted to the East Branch Russian River. Diversion capacity at the Van Arsdale Diversion due to construction activity may not be available to maintain the current RPA minimum flows in the Eel River or East Branch Russian River, which could affect water temperature. Changes in water temperature and water quality in the East Branch Russian River could affect special-status species, including mortality.

PG&E would develop an East Branch Russian River Diversion Plan, which could include temporary pumping to the diversion tunnel to provide diversions to the East Branch Russian River during construction (and potentially to minimize unwanted attraction flows for migratory salmonids). PG&E would also include measures in the Construction Site Water Diversion, Dewatering, and Drawdown Plan to manage water temperature in the Eel River and water quality and erosion control measures that would be implemented at the Scott Dam and Cape Horn Dam construction locations. Construction measures include BMPs, a Construction Erosion Prevention Plan, a SWPPP, and an SPCC Plan, and PG&E would obtain applicable resource agency and construction permits (see Section 2.2.4.3, Water Quality). With implementation of these mitigation measures, the effects on water temperature, water quality, and special-status species (FYLF, northwestern pond turtle, and western pearlshell mussels) in the East Branch Russian River would be negligible.

Direct Loss of Aquatic Species and Habitat

Special-status aquatic species (FYLF, northwestern pond turtle, and western pearlshell mussels), stocked rainbow trout, common native and non-native fish species, and BMI habitat is maintained by diversions from the Eel River. Altered hydrology in the Eel River could affect flows in the East Branch Russian River (see discussion of hydrology above), which could result in direct loss of species and/or habitat. As discussed above, the timing of drawdown (flow releases) from Lake Pillsbury reservoir would be coordinated with water demands in the East Branch Russian River so that the effects of the Proposed Action on fish and aquatic resources in the East Branch Russian River are minimized to the extent feasible. PG&E would develop an East Branch Russian River Diversion Plan, which could include temporary pumping to the diversion tunnel to provide diversions during construction. With implementation of the East Branch Russian River Diversion Plan, the Proposed Action would result in a negligible loss of special-status aquatic species (FYLF, northwestern pond turtle, and western pearlshell mussels) and other aquatic species present in the river.

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2.2.4.4.3 Phase 2: Post-facility Removal Effects

This section analyzes the effects of Phase 2 decommissioning activities on fish and aquatic resources. Phase 2 includes the removal of the temporary adit at Scott Dam, releases of water and sediment from Lake Pillsbury reservoir, the removal of the Cape Horn cofferdams, and post-removal restoration activities (i.e., restoration of the remnant reservoir beds in Lake Pillsbury reservoir and Van Arsdale Reservoir). The Phase 2 effects are categorized into Phase 2a: Initial Conditions and Preliminary Restoration and Phase 2b: Resulting Conditions and Restoration effects.

The following potential effects to fish and aquatic resources as a result of Phase 2 post-facility removal were evaluated:

Phase 2a: Initial Conditions and Preliminary Restoration:

- Changes in water quality and effects to aquatic species;
- Fish passage in the Eel River;
- Release of non-native aquatic species from Lake Pillsbury reservoir and Van Arsdale Reservoir;
- Modification of habitat for aquatic species in the Eel River downstream of Lake Pillsbury reservoir; and
- Effects on East Branch Russian River aquatic species and habitat.

Phase 2b: Resulting Conditions and Restoration:

- Fish passage, anadromous fish migrations, and access to historical habitat in the Eel River;
- Modification of habitat downstream of Lake Pillsbury reservoir; and
- Effects on East Branch Russian River aquatic species and habitat.

The area of analysis includes Lake Pillsbury reservoir, Van Arsdale Reservoir, the Eel River from upstream of Lake Pillsbury reservoir downstream to the estuary, and the East Branch Russian River from the Potter Valley Powerhouse Tailrace downstream to Lake Mendocino. The marine intertidal, tidal, and oceanic habitats between the mouth of the Eel River estuary and the open ocean are addressed in Section 2.2.4.18, Marine Resources.

Phase 2a: Initial Conditions and Preliminary Restoration

Phase 2a includes the release of accumulated sediment from behind Scott Dam and Cape Horn Dam during the initial high-flow season. It is anticipated that as much as 12 million cy of fine-grained sediment could be mobilized into the Eel River downstream of Scott Dam within approximately 1 week (Stillwater Sciences 2021). Most entrained sediment from Lake Pillsbury reservoir would be fine-grained (e.g., silts, clays) that would move through the Eel River without major deposition; however, sand from the reservoir would deposit along the river. Removal of the Cape Horn cofferdams would result in a relatively small release of accumulated sediments into the

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Eel River. Sediment trapped behind Cape Horn Dam is primarily coarse-grained, and therefore, most of it would likely settle out relatively quickly as it travels downstream. Additional mobilization of impounded sediment from behind Scott Dam and/or Cape Horn Dam would be expected following the second low-flow and second high-flow seasons, especially during precipitation or as unstable, exposed shorelines slump into the riverbed. The amount of sediment mobilized following dam removals has not been quantified but is expected to be minor compared to the amount mobilized during initial sediment flushing activities. As noted in Section 2.2.3.7, Geomorphology, the Eel River has the highest recorded average suspended sediment load per unit area of any river of its size or larger in the conterminous United States.

Changes to Water Quality and Effects to Aquatic Species

As described above in Phase 1: Short-term Construction Effects section, water temperature, DO, suspended sediment concentration, and pH are all critical water quality parameters for the survival of salmonids and other aquatic species. Elevated water temperature, low DO, high suspended sediment concentrations, and changes in pH can all adversely affect fish health and result in mortality or sub-lethal effects, depending on the severity and duration of the impaired water quality event.

Water Temperature

Following removal of the adit plug at Scott Dam, the Eel River would return to unimpaired flow conditions, which would increase water temperature in the summer and decrease water temperature in the winter in the Eel River downstream of Scott Dam. Water temperature in the Eel River at the E2 gage (downstream of Scott Dam) could increase (up to 8.5°C) from approximately May through the end of August compared to existing conditions (No-Action Alternative) based on recent data from 2020–2023. Water temperatures at this location from September through January would be cooler (up to 5°C) when compared to existing conditions. It is expected that water temperature would exceed temperatures suitable for over-summering salmonids in drier years. This would be an adverse effect on summer water temperature and over-summering steelhead juveniles for a distance of approximately 11 mi. below Scott Dam. However, because dam removal would provide passage into previously inaccessible, high-quality aquatic habitat upstream of Scott Dam (Eel River, Rice Fork, Salmon and Smokehouse creeks) (Section 2.2.3.3, Fish and Aquatic Resources, Table 2.2.3.3-2) and because the amount of potential habitat that would be made available upstream of Scott Dam (50+ mi.) exceeds the potential 11 mi. of habitat lost (Section 2.2.3.3, Fish and Aquatic Resources, Table 2.2.3.3-2), the overall effect of the Proposed Action would be beneficial.

Dissolved Oxygen

As described in Section 2.2.4.3, Water Quality, during the initial flushing of sediment, low DO conditions would exist below Scott Dam and potentially result in a period of 1 to 2 days (or potentially longer depending on sediment loads) of 0.0 mg/L DO as far downstream as the Middle Fork Eel River (49.2 mi.). DO would be expected to be severely depleted downstream of Scott Dam, potentially reaching 0.0 mg/L for 1 to 2 days as the plume of sediment released from behind the dam travels downstream (see Section 2.2.4.3, Water Quality). DO concentrations downstream of the dam would be reduced due to the mobilization and downstream transport of anoxic reservoir sediments with high

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BOD and COD. Low DO conditions would ameliorate with surface reaeration and as tributary water mixes with the anoxic water. Especially downstream of the Middle Fork Eel River, inflowing freshwater would increase the DO concentration. Low DO, down to 0.0 mg/L, would be expected to extend at least 50 mi. downstream of Scott Dam to at least the Middle Fork Eel River. High DO demand would also occur downstream of Cape Horn Dam upon removal of the Cape Horn cofferdams and release of stored sediment, but the effect would be considerably smaller than that expected after the removal of Scott Dam (see Section 2.2.4.3, Water Quality). On the Klamath River in January of 2024 when sediment was released, DO was 0.0 mg/L from Copco No. 1 Dam downstream to Walker Bridge (42 mi.; USGS RM 156.3) for 1 to 2 days. DO was depressed from 11 mg/L down to 5 mg/L as far as 70 mi. downstream at Seiad Valley (USGS RM 128.5).

Anoxic conditions resulting from the Proposed Action would be expected to have lethal effects on all fish and aquatic organisms and life stages (adult, juvenile, fry, redds) inhabiting the Eel River from Scott Dam to the Middle Fork Eel River and potentially farther downstream. These species include ESA-listed Chinook salmon, steelhead, and coho, special-status lamprey spp., western pearlshell mussels, FYLF, Sacramento sucker, green sturgeon, benthic invertebrates, and other native species. Species and life stages in tributary streams (steelhead, some Chinook salmon, coho salmon, FYLF) or species/individuals capable of surviving temporarily in semi-terrestrial habitat (FYLF, northwestern pond turtle) would not be affected. The lethal effects of the Proposed Action are unavoidable with rapid removal of Scott Dam (or other removal options). The distance and duration of the effects may be modified by the flow conditions during sediment release and the rate of sediment release. Regardless of the exact flow conditions present at the time of the adit blast, significant adverse effects to fish and aquatic resources are anticipated in the Eel River.

PG&E would implement measures to partially mitigate these effects. The Aquatic Species Management and Monitoring Plan would include measures to capture/salvage, relocate, and/or potential broodstock rescue of aquatic species. The details would be developed with resource agencies. The goal would be to create a process whereby reestablishment of Eel River species would occur as quickly as possible and genetic diversity would not be lost. Tributary streams and the Eel River/tributaries upstream of Lake Pillsbury reservoir would help recolonize species affected by removal of Scott Dam. The Proposed Action would have a significant, unavoidable adverse effect on the direct loss of fish and aquatic species (special-status and native) in the Eel River from Scott Dam down to the Middle Fork Eel River confluence or farther (depending on flow conditions during the sediment release) due to low DO concentrations.

Suspended Sediment/Turbidity

As described in Section 2.2.4.3, Water Quality, and Section 2.2.4.8, Geomorphology, Stillwater Sciences (2021) developed a two-phase conceptual model (TPCM) to evaluate the movement of fine sediments (clay and silt) resulting from the draining of Lake Pillsbury reservoir during dam removal. The clay and silt would be expected to have low potential for deposition and would be transported to the estuary in a relatively short amount of time. The movement of up to 12 million cy of fine sediment from Lake Pillsbury reservoir was calculated to take 0.8 day at a discharge of 5,000 cfs, 2.9 days at a discharge of 2,000 cfs, and 7.7 days at a discharge of 1,000 cfs. The calculated suspended sediment concentrations below Scott Dam at the same discharges (5,000 cfs, 2,000 cfs, and 1,000 cfs) were 900,000 mg/L, 612,500 mg/L, and 457,800 mg/L, respectively. These are extremely high

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concentrations but possible. At Condit Dam, removal of 2.1 million cy of fine sediment resulted in hyper-concentrated slurries of 850,000 mg/L for about 2 hours (Wilcox et al. 2014). During historical suspended sediment sampling in the Eel River at Scotia (RM 20.8), the suspended sediment concentration rarely exceeded 10,000 mg/L. Concentrations are expected to decrease in downstream reaches. For example, Stillwater Sciences (2021) assumed about 30 percent dilution at the Middle Fork Eel River. Section 2.2.4.3, Water Quality and Table 2.2.4.3-2 show average monthly dilution factors in a downstream direction. Figure 2.2.4.4-1 shows the approximate sediment concentration based on the dilution factors.[1] Dilution at Scotia could be about 92 percent (147 mi. downstream of Scott Dam). Nevertheless, modeled suspended sediment concentrations could still be extremely high, 40,000 mg/L or higher (Figure 2.2.4.4-1; also see Section 2.2.4.2, Water Use and Hydrology, and Section 2.2.4.3, Water Quality Tables 2.2.4.3-1 and 2.2.4.3-2).

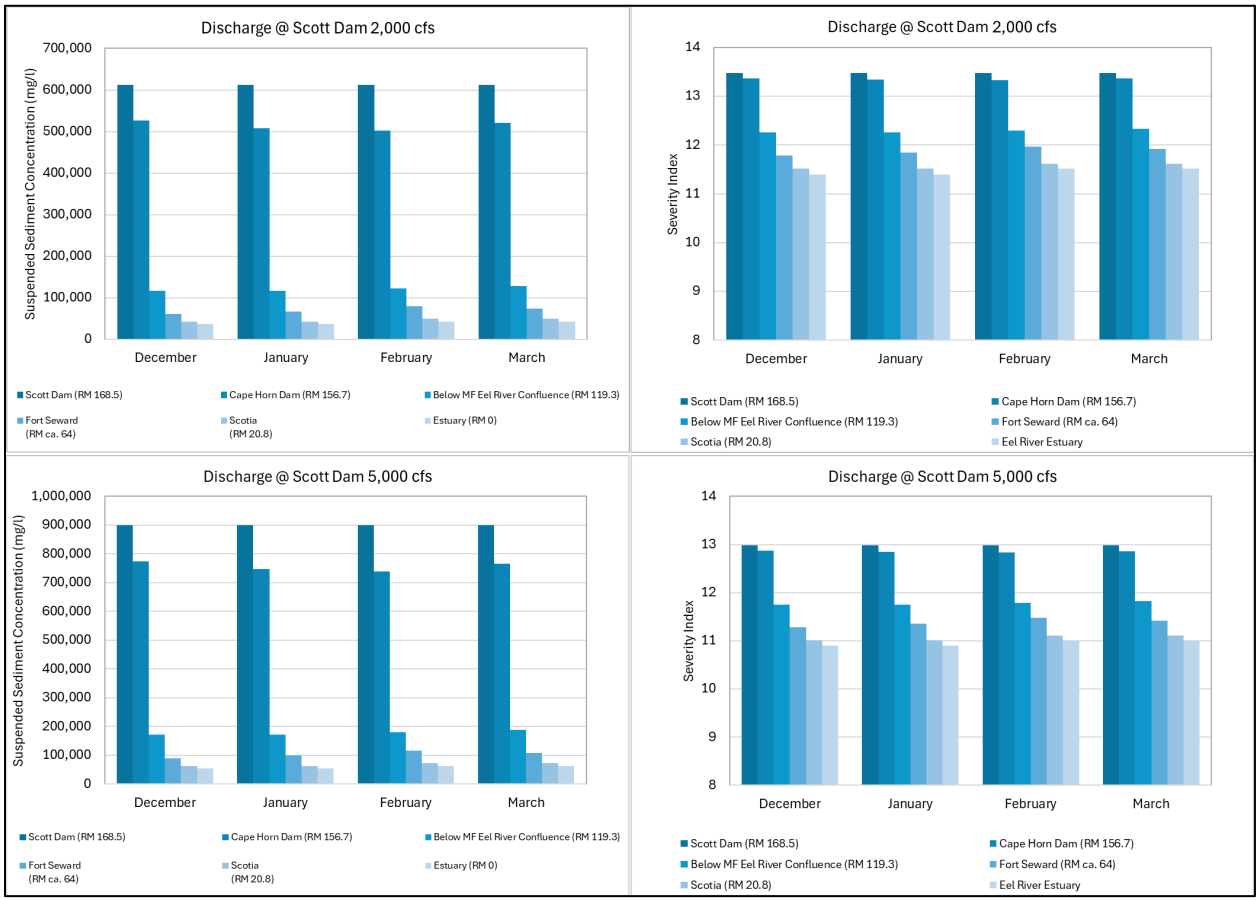


Figure 2.2.4.4.-1. Proposed Action effects of fine sediment releases from Scott Dam on suspended sediment along the Eel River (left) and the biological Severity Index (SEV) of Newcombe and Jensen (1996) (right) for release flows of 2,000 cfs and 5,000 cfs at Scott Dam.

1. The dilution factors are estimates based on average monthly flows. During storm events, the factors may vary from average annual flows and the dilution factors do not account for variation in natural suspended sediment in the system. They assume the same concentration upriver and downriver.

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Newcombe and Jensen (1996) developed a dose-response severity of ill effects (SEV) scale for salmonids and non-salmonids in relation to suspended sediment duration and concentration. The 2,000 cfs and 5,000 cfs initial Scott Dam suspended sediment concentrations and durations listed above were used with the dilution factors along the Eel River (Table 2.2.4.4-1) to calculate the SEV for salmonid adults, juveniles, eggs, and larvae and non-salmonid adults, eggs, and larvae in freshwater and estuarine water for the months of December, January, February, and March. Figure 2.2.4.4-1 shows the SEV for juvenile and adult salmonids in freshwater. The minimum and maximum SEV values and mortality for other salmonid life stages and for non-salmonid species/life stages are shown in Table 2.2.4.4-2 (Newcombe and Jensen 1996). The table shows the estimated maximum SEV and the estimated maximum mortality for salmonids and non-salmonid species at Scott Dam and the minimum SEV and minimum mortality that would occur at the estuary. The SEV for the Proposed Action would range from approximately 13.8 at Scott Dam to 9.3 at the estuary. An SEV index of 13.5, for example, has an estimated mortality of >76 to 96 percent, and an SEV of 9.3 has an estimated effect of reduced growth and density. The Proposed Action would result in high mortality of juvenile and adult Chinook salmon, coho salmon, and steelhead along the length of the Eel River and of salmonid species in the estuary (Table 2.2.4.4-2). Non-salmonid special-status fish species as well as other native species would also be severely affected.

Table 2.2.4.4-1. Hydrology-based suspended sediment concentration dilution factors for the Eel River (1925–2023 hydrology).

Month	Eel River Mean Monthly Flow and Dilution Factor (concentration original X dilution factor = new concentration)											
	Scott Dam (RM 168.5)		Cape Horn Dam (RM156.7)		Below MF Eel River Confluence (RM 119.3)		Fort Seward (RM ca. 64)		Scotia (RM20.8)		Eel River Estuary (RM7.0)	
	Mean Monthly (cfs)	Dilution Factor	Mean Monthly (cfs)	Dilution Factor	Mean Monthly (cfs)	Dilution Factor	Mean Monthly (cfs)	Dilution Factor	Mean Monthly (cfs)	Dilution Factor	Mean Monthly (cfs)	Dilution Factor
October	58	--	63	0.92	264	0.22	486	0.12	724	0.08	838	0.07
November	275	--	326	0.84	1,609	0.17	2,839	0.1	4,732	0.06	5,436	0.05
December	976	--	1,132	0.86	5,228	0.19	9,595	0.1	14,664	0.07	16,366	0.06
January	1,435	--	1,728	0.83	7,518	0.19	12,910	0.11	19,870	0.07	22,089	0.06
February	1,537	--	1,867	0.82	7,561	0.2	12,193	0.13	19,812	0.08	21,935	0.07
March	1,220	--	1,427	0.85	5,876	0.21	10,282	0.12	15,181	0.08	16,860	0.07
April	795	--	933	0.85	4,124	0.19	5,982	0.13	9,456	0.08	10,528	0.08
May	369	--	432	0.85	2,196	0.17	2,753	0.13	4,147	0.09	4,637	0.08
June	132	--	152	0.87	667	0.2	875	0.15	1,436	0.09	1,604	0.08
July	38	--	43	0.88	141	0.27	207	0.18	382	0.1	423	0.09
August	17	--	19	0.89	47	0.36	78	0.22	157	0.11	174	0.1
September	19	--	20	0.95	43	0.44	81	0.23	146	0.13	163	0.12

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Table 2.2.4.4-2. Proposed Action effects of fine sediment (suspended sediment mg/L) on salmonid and non-salmonid species and life stages.

Taxon	Salmonid	Salmonid	Salmonid	Salmonid & Non-salmonid	Non-salmonid	Non-salmonid
Life Stage	Juvenile & adult	Adult	Juvenile	Eggs & larvae	Adult	Adult
Life History	Freshwater	Freshwater	Freshwater	Freshwater & estuarine	Estuarine	Freshwater
Sediment Particle Size	Fine & coarse	Fine & coarse	Fine	Fine	Fine	Fine
Maximum Severity Index (SEV) (Scott Dam)	13.5	13.8	13.2	12.5	N/A	10.9
Maximum Mortality (Scott Dam)	>70–90%	>76–96%	>64–84%	>50–70%	N/A	>18–38%
Minimum Severity Index (SEV) (Estuary)	11.0	11.5	10.7	10.4	12.2	9.3
Minimum Mortality (Estuary)	>20–40%	>30–50%	>14–34%	>8–28%	>44–64%	Reduced growth/ density

Note: The maximum effect occurs below Cape Horn Dam, and the lowest effect is based on flow dilution along the Eel River at the estuary (160 mi. downstream). Data are based on Stillwater Sciences (2021), Newcombe and Jensen (1996), and mean monthly hydrology estimates.

The release and entrainment of accumulated sediment from behind Scott Dam would result in lethal effects on aquatic species inhabiting the mainstem Eel River downstream of Scott Dam and Cape Horn Dam during and immediately following the release of sediments from Lake Pillsbury reservoir and Van Arsdale Reservoir. The extreme high suspended sediment concentration would be of short duration (days) but could potentially have lasting effects on fish stocks and aquatic species. The effect is assumed to be unavoidable. Modeling designed to simulate spreading the release of sediment over 4 years (Stillwater Sciences 2021) resulted in similarly large effects spread over 4 years. PG&E would implement measures to partially mitigate the effects of dam removal. The Aquatic Species Management and Monitoring Plan would include measures to capture/salvage, relocate, and/or implement potential broodstock rescue of aquatic species. The details would be developed with resource agencies. The goal would be to create a process whereby reestablishment of Eel River species occurs as quickly as possible and genetic diversity is not lost. Tributary streams and the Eel River/tributaries upstream of Lake Pillsbury reservoir would help recolonize species. The Estuary Protection Plan would include water quality monitoring prior to, during, and after the dam removals and monitoring for potential sedimentation in the estuary that may occur, as well as define a process for developing additional measures, if needed. Elevated turbidity may occur during subsequent high-flow events as the remainder of the sediments are remobilized and carried out to the ocean for potentially 1 to 3 years (estimated). The Proposed Action would have a large, unavoidable adverse effect on fish and aquatic species (direct loss) due to high suspended sediment concentrations.

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pH

Potential fluctuation of pH in the Eel River would be possible as a result of Phase 2a post-facility release of sediment from Scott Dam and Cape Horn Dam. pH could exceed the range suitable for fish and aquatic resources. Data from the removal of Copco No. 1 Dam as part of the Klamath River Dam removal project indicate that effects to pH were relatively moderate and of short duration. pH measured downstream of Copco No. 1 Dam dropped from 7.5 to a minimum of 6.4 after dam removal and took 2 weeks to fully recover (USGS 2024a). Data from the removal of J.C. Boyle Dam as part of the Klamath River Dam removal project also indicate that effects to pH were relatively minor and of short duration. pH was measured 6 mi. downstream of J.C. Boyle, and pH dropped from 8 to a minimum of 7.1 and remained below 7.7 for about 1 day (USGS 2024b). Fluctuations in pH would be likely to occur during the release of sediment from Scott Dam and Cape Horn Dam and post-release are expected to be within the range of pH typically tolerated by salmonoids (6.0 to 8.5). It is anticipated that pH would typically remain in the range of 6.5 to 8.5 identified in the Basin Plan (NCRWQCB 2018). Therefore, the Proposed Action would have a negligible effect on pH and special-status salmonids and other special-status species, including native species.

Fish Passage in the Eel River

Under the Proposed Action, PG&E would initiate removal of Scott Dam and Cape Horn Dam during the same low-flow season. During the first high-flow season, the adit plug at Scott Dam and the cofferdams at Cape Horn Dam would be removed simultaneously or in close sequence to flush sediment from the reservoirs. It is uncertain whether upstream fish passage would be present through the Scott Dam adit tunnel immediately after (spring/summer) the reservoir is drained based on natural fluvial processes. Extensive channel erosion through the reservoir sediment from the Eel River, the Rice Fork, and Salmon and Smokehouse creeks (reservoir tributaries) would occur. PG&E would implement the Sediment/Channel Monitoring and Response Plan and Restoration Plan, and as soon as the adit is opened and storage is draining/drained, locations where natural fluvial processes were not eroding the sediment in a way that provided fish passage would be identified and measures to remove fish passage impediments or barriers with mechanized equipment, as needed, would be implemented. Final removal of Scott Dam would occur during the second low-flow season after sediment flushing. It is anticipated that full upstream fish passage would occur through the former Lake Pillsbury reservoir during that fall season. Upstream fish passage is anticipated to occur at Cape Horn Dam and through the former Van Arsdale Reservoir after the cofferdams are removed.

Release of sediment (sand in particular) from Lake Pillsbury reservoir and Van Arsdale Reservoir could affect upstream fish passage into Eel River tributaries if sediment blocks the tributary entrances. Also, several critical riffles exist in the Eel River downstream of Cape Horn Dam under existing conditions that affect anadromous fish migration. Passage at these critical riffles could be adversely affected by sediment deposition. The Sediment/Channel Monitoring and Response Plan would include monitoring of the tributary mouths and critical riffles and include a timely response plan to mobilize hand crews or equipment to open passage by removing/repositioning sediment, as necessary.

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Removal of the dams would restore pre-dam upstream passage and restore full downstream passage. Implementation of the Sediment/Channel Monitoring and Response Plan and the Restoration Plan would include monitoring of fish passage in the former reservoirs, dam removal sites, and tributary confluences downstream of Scott and Cape Horn dams and measures to restore passage if passage is not present. The Proposed Action, with implementation of the monitoring and restoration measures, would have a beneficial effect on upstream and downstream passage for Chinook salmon, steelhead, lamprey, and native fish, including providing connectivity for recolonization of habitat by aquatic organisms (e.g., fish, amphibians, benthic invertebrates, algae).

Release of Non-native Aquatic Species from Lake Pillsbury Reservoir and Van Arsdale Reservoir

As discussed in Phase 1: Short-term Construction Effects, populations of at least eight non-native species inhabit Lake Pillsbury reservoir and have potential to be released into the Eel River when the adit is removed from Scott Dam. These species have typically been found in the river upstream and downstream and/or are lake species not well adapted to riverine habitat. Predatory Sacramento pikeminnow and largemouth bass (typically a lake species) are the species of primary concern in Lake Pillsbury reservoir for native fish restoration (Potter Valley Fish Passage Working Group 2019), and release of a large population of pikeminnow downstream is the primary concern related to predation in the Eel River. The release of non-native aquatic species would coincide with the period of extreme suspended sediment concentrations and low DO that would likely result in significant mortality non-native fish released from the reservoir or in the Eel River downstream of Scott Dam (see Changes to Water Quality and Effects to Aquatic Species above). Some non-native fish, however, may survive by remaining upstream of the sediment plume or recolonize afterward. A much smaller population of predatory non-native fish at Van Arsdale Reservoir would also be released when the cofferdams are removed at Cape Horn Dam. PG&E would implement the Construction Non-native Invasive Aquatic Species Management Plan, which would evaluate options to minimize the spread of non-native species, including clams, as possible. Implementation of the plan may occur prior to dam removal. It is not anticipated, however, that the plan would fully mitigate or reduce the effects of releasing non-native species to less than adverse. Release of non-native species due to the Proposed Action removal of Scott Dam and Cape Horn Dam would still have an unavoidable adverse effect on aquatic species in the Eel River. As described above, golden mussels were documented in the Sacramento – San Joaquin Delta in October of 2024. Although not currently distributed in the Eel River watershed, PG&E's Construction Non-native Invasive Aquatic Species Management Plan would address the potential spread of golden mussels by incorporating standard preventative measures during construction activities.

Modification of Habitat for Aquatic Species in the Eel River Downstream of Lake Pillsbury Reservoir

The release of an estimated 12 million cy of sediment that has accumulated behind Scott Dam and up to 1.65 million cy behind Cape Horn Dam has the potential to adversely affect aquatic habitat in the Eel River (filling of pools, fine sediment in spawning gravels, etc.). Removal of the dams also has the potential to affect habitat in the vicinity of the dams (sediment in the former reservoirs). The Proposed Action would also modify fish passage (see Fish Passage in the Eel River above).

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Sediment Deposition in the Eel River

Clay and silt materials are expected to be transported through the river to the ocean. Some settling of silt and clay may occur in slow-water areas downstream (backwaters, channel margins, floodplains) and deposit within the interstitial spaces of coarser substrate, but this material would be relatively entrainable by spring/winter high-flow events and transported farther downstream to the ocean. Clay and silt deposits are not expected to adversely affect riverine habitat except temporarily.

Sand deposition, however, may affect habitat from Scott Dam to approximately the Middle Fork Eel River confluence. In the reach from Scott Dam to Cape Horn Dam, sand deposition could initially be several feet thick and concentrated in and near Van Arsdale Reservoir, primarily between Cape Horn Dam (RM 156.8) to about 3 mi. upstream to RM 160. Sand deposition would temporarily adversely affect channel morphology. It would likely lead to partial or complete filling of pools and burial of coarse channel substrate that would diminish aquatic habitat. Sand deposition would adversely affect pool holding/rearing habitat and spawning habitat for anadromous salmonids, Pacific lamprey, and FYLF and habitat for mussels and benthic invertebrates. The elevated sediment deposition would be temporary, as subsequent high-flow events through restored, unimpaired Eel River hydrology following the dam removals would remobilize most of the deposited sand and flush accumulated sediment from pools and coarse channel substrate. This could take a number of years and would depend on the natural hydrology. A large, wet water year could transport sand quickly versus multiple low-flow water years, which would take longer. Gravel deposition from the dam removals is anticipated to occur within or in proximity to the reservoirs and is expected to be beneficial to aquatic habitat. The Proposed Action would have a short-term unavoidable adverse effect on habitat due to sand and sediment deposition in the Eel River for special-status fish and aquatic species and native species.

Construction Explosives

Detonation of explosives placed at the adit could affect fish and aquatic resources and associated habitat (e.g., high decibel levels, contact with debris, modification of the river bed); however, the explosives would be placed at the upper end of the adit tunnel at a water depth of approximately 60 ft. and several feet of sediment would need to be excavated prior to setting the explosives (McMillen 2021). Therefore, it is unlikely that fish or other aquatic organisms (e.g., freshwater mussels, northwestern pond turtles, FYLF) that inhabit the specific area of the Eel River near the dam would be affected by the explosives more than the primary effect of the release of water and sediment from rapid removal of the dam.

Habitat in the Former Reservoirs and Dam Sites

Riverine habitat within the former reservoirs and dam sites would initially consist of accumulated fine sediment and incising river channels. Without management, the channels could become deeply incised without proper floodplains, riparian habitat, natural pool/riffle sequencing, and spawning habitat. PG&E would implement the Sediment/Channel Monitoring and Response Plan and the Restoration Plan, which would include measures to restore the channels, floodplains, and riparian vegetation in the former reservoirs and dam sites. The Lake Pillsbury reservoir area reportedly was historically a high-quality spawning area for anadromous fish. With the restoration measures, the Proposed Action would have a beneficial effect on habitat for fish and aquatic habitat.

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Reestablishment of Upstream Historical Habitat

Following the opening of Scott Dam and removal of the cofferdams at Cape Horn Dam, fish passage would be reestablished (see Fish Passage in the Eel River sub-section above). Habitat in the tributaries upstream of Scott Dam, including the Eel River, the Rice Fork, and Salmon and Smokehouse creeks and their associated tributaries, would be available to Chinook salmon, steelhead, and Pacific lamprey. Section 2.2.3.3, Fish and Aquatic Resources, identifies the amount of habitat available upstream of the dam. Under existing conditions, the fish ladder at Cape Horn Dam periodically becomes filled with sediment during high flows and becomes non-functional. With removal of the dam, unconstrained fish passage would be restored. The Proposed Action will have a beneficial effect on Chinook salmon, steelhead, and Pacific lamprey by reestablishing access to 50+ mi. of spawning and rearing habitat (Section 2.2.3.3, Table 2.2.3.3-2). As noted in Section 2.2.3.3, Fish and Aquatic Resources, Kannry et al. (2020) demonstrated that the resident rainbow trout upstream of Scott Dam includes summer-run and winter-run genotypes for anadromy and that the resident trout population would likely be a suitable source for recolonization of the upper basin by anadromous individuals.

Effects on East Branch Russian River Aquatic Species and Habitat

As described in Section 2.2.4.2, Water Use and Hydrology, following loss of storage at Scott Dam, water would not be diverted to the East Branch Russian River. As such, flows in the East Branch Russian River would be unimpaired (see Section 2.2.3.1, Water Use and Hydrology, Table 2.2.3.1-16 and Figures 2.2.3.1-13 and 2.2.3.1-14). Mean summer August flow would change from 126 cfs under existing conditions to 1 cfs with the Proposed Action at Calpella, California. There would be an almost complete loss of flow and aquatic habitat, resulting in direct loss of aquatic species. Potential future diversion to the East Branch Russian River by the NERF pump station is addressed in Section 2.2.5, Cumulative Effects. The Proposed Action would have an unavoidable adverse effect on special-status aquatic species (FYLF, northwestern pond turtle, western pearlshell mussels), the stocked trout fishery, and BMI and aquatic habitat in the East Branch Russian River.

Phase 2b: Resulting Conditions and Restoration

Phase 2b of the Proposed Action includes post-dam removal restoration and the resulting restored condition in the watershed. The effects of Phase 2b are expected to be permanent and significantly beneficial to fish and aquatic resources in the Eel River in comparison to the No-Action Alternative, which would result in continued delays or barriers to migratory fish, impaired hydrological conditions, modified geomorphological and habitat formation processes, modified water quality (i.e., DO and pH), and modified water temperature regimes.

Fish Passage, Anadromous Fish Migrations, and Access to Historical Habitat

Under existing conditions, fall-run Chinook salmon, coho salmon, steelhead, and Pacific lamprey are able to access much of the Eel River and its tributaries (e.g., spawning, rearing, and migration); however, migratory fish are unable to access historical habitat upstream of Scott Dam. Anadromous fish may also be delayed or turned back at Cape Horn Dam due to the fish ladder, although recent improvements to the Fish Hotel have minimized instances of delay or turn back. The presence of these barriers and the effects of the artificial release of colder water from Lake

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Pillsbury reservoir in the spring altering juvenile outmigration timing have been identified as limiting factors to run sizes of anadromous fish in the Eel River. Following removal of both dams, the Eel River would be free-flowing, providing unimpeded upstream and downstream passage of anadromous fish. Removal of the dams would allow Chinook salmon, steelhead, and Pacific lamprey to reach historical riverine habitats located above Scott Dam. More than 50 mi. of spawning and rearing habitat (Section 2.2.3.3, Fish and Aquatic Resources, Table 2.2.3.3-2) are present above Scott Dam. The resulting condition would also provide improved access for anadromous fish and resident fish to tributaries upstream of the former Cape Horn Dam site because it is likely that more spawning fish will pass the former Cape Horn Dam site. Increased access to riverine habitat would be expected to increase the numbers of naturally produced salmon and steelhead in the Eel River as well as resident fish. As noted above, O. mykiss upstream of Scott Dam contain summer-run and winter-run genotypes for anadromy and these fish would have unimpeded access to outmigrate (Kannry et al. 2020). Therefore, the Proposed Action would benefit special-status species (Chinook salmon, steelhead, Pacific lamprey) populations by improving fish passage and access to habitat in the upper Eel River (upstream of Cape Horn and Scott dams).

Modification of Habitat Downstream of Lake Pillsbury Reservoir

The Proposed Action would result in unimpaired fish passage, unimpaired hydrology, natural water quality and water temperature conditions, restored sediment supply downstream of the Scott and Cape Horn Dam sites, access to habitats upstream of Scott Dam, and connectivity of habitats in the Eel River. The Proposed Action would result in a long-term significant beneficial effect to critical habitat, particularly for species that utilize the upper Eel River (Chinook salmon and steelhead), and EFH for Chinook salmon and coho salmon. The improved conditions would benefit habitat for a range of special-status species (lamprey spp., FYLF, western pearlshell mussels, green sturgeon) and perhaps other species listed in Section 2.2.3.3, Fish and Aquatic Resources, including native species (e.g., Sacramento sucker).[2] Reservoir habitat for non-native predatory species (e.g., pikeminnow) would be removed. Habitat benefits may extend farther downstream to species/populations in the lower Eel River and estuary.

[2] Stillwater Sciences et al. (2021) suggested the removal of Scott Dam "would enhance habitat for FYLF and northwestern pond turtle through habitat reconnection, reversing riparian encroachment, and reduction of non-native predators and competitors." The authors also noted that the restoration of a natural hydrograph would likely improve growth and reproductive success for FYLF and that removal of Cape Horn Dam and Van Arsdale Reservoir would reduce habitat for non-native aquatic predators, while also "improving, expanding and reconnecting habitat and populations of foothill yellow-legged frog. The conversion of lentic habitat (Lake Pillsbury reservoir and Van Arsdale Reservoir) back to a lotic condition may reduce the quantity of northwestern pond turtle habitat; however, northwestern pond turtle are well adapted to utilize pools in-river that are likely to remain once the channel returns to equilibrium."

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Effects on East Branch Russian River Aquatic Species and Habitat

The long-term effects of the Proposed Action on the East Branch Russian River are the same as those described above under Phase 2a. The Proposed Action would have an unavoidable adverse effect on special-status aquatic species (FYLF, northwestern pond turtle, western pearlshell mussels), the stocked trout fishery, and BMI and aquatic habitat in the East Branch Russian River due to loss of flow.

2.2.4.4.4 Environmental Measures

To avoid or reduce the effects of the Proposed Action on fish and aquatic resources during construction, PG&E would obtain, prepare, and/or implement the following measures. A complete list of construction measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Construction Site Water Diversion, Dewatering, and Drawdown Plan
- East Branch Russian River Diversion Plan
- Aquatic Species Management and Monitoring Plan
- Construction Non-native Invasive Aquatic Species Management Plan
- Construction Water Quality and Water Temperature Monitoring Plan
- Water quality and construction BMPs
- SWPPP
- Hazardous Materials Handling Measures
- SPCC Plan
- Construction Erosion Prevention Plan
- Compliance with federal and state construction permits

To avoid or reduce the effects of the Proposed Action on fish and aquatic resources during facility removal (Phase 2), PG&E would implement the following post-facility removal measures. A complete list of environmental measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Sediment/Channel Monitoring and Response Plan
- Restoration Plan
- Post-construction Water Quality and Water Temperature Monitoring Plan
- Aquatic Species Management and Monitoring Plan
- Estuary Protection Plan

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2.2.4.4.5 Unavoidable Adverse Effects

Phase 1: Short-term Construction

Unavoidable adverse effects to fish and aquatic resources include the following:

- Short-term unavoidable adverse effect from the release of non-native species, including Sacramento pikeminnow and largemouth bass from Lake Pillsbury reservoir into the Eel River during winter spill events following the lowering of Scott Dam;
- Short-term unavoidable adverse effect from Scott Dam and Cape Horn Dam construction due to relocation of ESA-listed salmonids prior to dewatering as well as potential harm/death from stranding;
- Short-term unavoidable adverse effects from removal of fish capture/management infrastructure at Cape Horn Dam by October, prior to an entire year class (cohort) of Chinook salmon, steelhead, and Pacific lamprey arriving at Cape Horn Dam, could result in loss of the entire cohort and jeopardize the ability to implement Aquatic Species Management and Monitoring Plan measures to provide fish salvage, capture, relocation, and/or potential broodstock rescue; and
- Long-term benefit to fish and aquatic species due to removal of dams improving access for anadromous fish and resident fish to 50+ mi. of spawning and rearing habitat above Scott Dam.

Phase 2a: Initial Conditions and Preliminary Restoration

Unavoidable adverse effects to fish and aquatic resources resulting from Phase 2a include the following:

- Short-term unavoidable significant adverse effect from the direct loss of all fish and aquatic species (special-status and native) in at least 50 mi. of the Eel River below Scott Dam due to low DO during the release of sediment from Lake Pillsbury reservoir and Van Arsdale Reservoir (special-status species include Chinook salmon, steelhead, Pacific lamprey, FYLF, northwestern pond turtle, western pearlshell mussels, lamprey spp., green sturgeon, coho salmon);
  - In the long term, removal of the dams would benefit fish and aquatic species by improving access for anadromous fish and resident fish to 50+ mi. of spawning and rearing habitat above Scott Dam and restoring natural hydrology and sediment processes in the Eel River;
- Short-term unavoidable adverse effect from the direct loss of a percentage of fish and aquatic species (special-status and native) along the 168.5 mi. of the Eel River below Scott Dam, including the estuary, due to high suspended sediment concentrations during the release of sediment from Lake Pillsbury reservoir and Van Arsdale Reservoir (special-status species include Chinook salmon, steelhead, Pacific lamprey, FYLF, northwestern

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pond turtle, western pearlshell mussels, lamprey spp., green sturgeon, coastal cutthroat trout, coho salmon, and species in the lower Eel River and estuary);

  - In the long term, removal of the dams would benefit fish and aquatic species by improving access for anadromous fish and resident fish to 50+ mi. of spawning and rearing habitat above Scott Dam and restoring natural hydrology and sediment processes in the Eel River;

- Short-term unavoidable adverse effect to fish and aquatic resources from the release of non-native species, including Sacramento pikeminnow and largemouth bass from Lake Pillsbury reservoir into the Eel River during winter spill events during the release of storage and sediment from Scott Dam;
- Short-term unavoidable adverse effect resulting from sediment deposition in channel pools and spawning habitats in the Eel River as a result of releasing accumulated sediment from Lake Pillsbury reservoir and Scott Dam; and
- Long-term unavoidable adverse effect in the East Branch Russian River resulting from the loss of special-status species (FYLF, northwestern pond turtle, western pearlshell mussels) because diversions to the East Branch Russian River would no longer occur under the Proposed Action.

Phase 2b: Resulting Conditions and Restoration

Unavoidable adverse effects to fish and aquatic resources include the following:

- Long-term unavoidable adverse effect in the East Branch Russian River resulting from the loss of special-status species (FYLF, northwestern pond turtle, western pearlshell mussels) because diversions to the East Branch Russian River would no longer occur under the Proposed Action.

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2.2.4.5 Botanical Resources

This section describes the potential effects to botanical resources that could occur because of the Proposed Action described in PG&E's Application for Surrender of License and Decommissioning Plan for the Potter Valley Hydroelectric Project (see Section 2.1.2, Applicant's Proposal). Section 2.1.2 includes a description of decommissioning of Project facilities and restoration goals to be met as part of the Proposed Action.

Potential effects are separated into construction effects (Phase 1) and post-facility removal effects (Phase 2). Post-facility removal effects are split into phases: Phase 2a – Initial Conditions and Preliminary Restoration and Phase 2b – Resulting Conditions and Restoration. Refer to Section 2.2.4.1, Analytical Approach, for a description of each phase.

The effects are determined by analyzing the changes in botanical resources that may result from activities to be implemented under the Proposed Action compared to the No-Action Alternative (existing condition) (Section 2.1.1). Analysis of the Proposed Action considers removal of Scott Dam and removal of Cape Horn Dam within the same construction season, as described in Section 2.1.2, Applicant's Proposal.

Final effects determinations consider measures (i.e., construction measures and post-facility removal measures) included to avoid or mitigate impacts associated with implementation of the Proposed Action (refer to Section 2.1.2.2, Proposed Environmental Measures). Unavoidable adverse effects are discussed at the end of this section.

2.2.4.5.1 Phase 1: Short-term Construction Effects

This section evaluates the potential effects of construction activities on botanical resources (including special-status plants and invasive weeds) and riparian and wetland habitats. Refer to Section 2.2.3.4, Botanical Resources, Table 2.2.3.4-2, for a list of special-status plant species known to occur in the Analysis Area. Refer to Section 2.2.3.4, Botanical Resources, Table 2.2.3.4-4, for a list of invasive weeds known to occur in the Analysis Area. Refer to Section 2.2.3.4.3, Riparian and Wetland Resources, for a discussion of riparian and wetland habitats known to occur in the Analysis Area. The baseline Analysis Area for short-term construction effects includes the Scott Dam Area and Cape Horn Dam Area, which each include two construction areas:

- The Scott Dam Area construction areas include (1) the Scott Dam and ancillary support facility (necessary for dam removal) construction area and (2) the ancillary facility (not necessary for dam removal) and recreation facility construction area.
- The Cape Horn Dam Area construction areas include (1) the Cape Horn Dam and ancillary support facility (necessary for dam removal) construction area and (2) the ancillary facility (not necessary for dam removal) construction area.

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The baseline Analysis Area is further defined under the Botanical Resources and Riparian and Wetland Resources sections below. The baseline Analysis Area for post-facility removal effects encompasses the larger Eel River and Russian River watersheds and is detailed in the post-facility removal section below.

The following potential effects to botanical resources resulting from construction-related activities were evaluated.

- Botanical Resources
  - Direct loss of special-status plant individuals or populations during construction; and
  - Indirect effects through loss or degradation of habitat, including the introduction or spread of invasive weeds, during construction.
- Riparian and Wetland Resources
  - Direct reduction in the amount of riparian habitat (e.g., through trimming or removal) during construction;
  - Indirect effects to riparian and wetland habitat on the shoreline of Lake Pillsbury reservoir from reservoir drawdown during construction; and
  - Indirect effects to riparian and wetland habitat downstream of the dam sites from increased erosion and hazardous material spills potentially resulting from construction activities.

A discussion of potential construction effects to botanical resources that could occur as a result of implementation of the Proposed Action, with incorporation of construction measures, is provided below by area. In addition, potential effects of removal of Cape Horn Dam prior to the removal of Scott Dam are also qualitatively analyzed to provide flexibility in decommissioning of the Project following completion of engineering design. Unavoidable adverse effects from construction are also discussed at the end of this section.

Botanical Resources

This section evaluates potential effects of construction activities on botanical resources, including plant species listed under the ESA. This includes potential direct and indirect effects to special-status plants (including effects from the introduction or spread of invasive weeds).

The Analysis Area for effects to botanical resources is defined to include the boundaries of the construction work, access, staging, and stockpile areas, as defined in Section 2.1.2, Applicant's Proposal. Refer to Section 2.2.3.4, Botanical Resources, Table 2.2.3.4-2, for a list of special-status plants known to occur or potentially occurring in the vicinity of the Project and their status and habitat requirements. Section 2.2.3.4, Botanical Resources, Table 2.2.3.4-4, provides a list of invasive weed populations identified in the vicinity of the Project. Refer to Volume III, Exhibit E: Privileged Information-Biological Resources, Maps 2.2.3.4-2a–i, and Section 2.2.3.4, Botanical Resources, Map 2.2.3.4-3, for the locations of known populations of special-status plants and invasive weeds, respectively, in relation to Project dams, ancillary facilities, recreation facilities, and Lake Pillsbury reservoir and Van Arsdale Reservoir.

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For the purposes of this analysis, a special-status plant is defined as a species listed, proposed, or under review as rare, threatened, or endangered by the federal or state government; those designated by USFS as sensitive or watchlist species with the MNF; and/or those on CDFW's Special Vascular Plants, Bryophytes, and Lichens List with a CRPR of 1 or 2.

For the purposes of this analysis, invasive weeds are those rated by the California Department of Food and Agriculture as A or B, on the California Code of Regulations 4500 Noxious Weed List, and by the MNF Priority Ranking. Invasive weeds listed by the MNF would only be addressed on MNF lands.

Provided below is an evaluation of potential direct and indirect effects to special-status plants, separated by geographic area.

Scott Dam Area

Four special-status plant species were documented in the Scott Dam Area during botanical studies completed in the FERC Project boundary in 2018 (PG&E 2019a). Populations were found in the following locations:

- Three-fingered morning glory (*Calystegia collina* ssp. *tridactylosa*) (CRPR 1B.2) – one population was identified along the southeast shore of Lake Pillsbury reservoir within the FERC Project boundary.
- Greene's narrow-leaved daisy (*Erigeron greenei*) (CRPR 1B.2) – one population was identified along the southeast shore of Lake Pillsbury reservoir within the FERC Project boundary.
- Glandular western flax (*Hesperolinon adenophyllum*) (CRPR 1B.2) – six populations were identified in the Scott Dam Area, including three populations along Scott Dam Road near the dam, two populations on the south shore of Lake Pillsbury reservoir in the FERC Project boundary, and one population near the Fuller Grove Day Use Area and Boat Launch.
- Grooved beard lichen (*Sulcaria badia*) (Forest Service Sensitive, CRPR 4.2) – one population was found near the Eel River Visitor Information Kiosk.

While not identified during surveys in 2018, suitable habitat is present for an additional 20 special-status plants that may potentially occur in uplands and 6 special-status plants that may potentially occur in riparian areas and/or wetlands.

Potential direct and indirect effects to special-status plants from construction activities are provided below.

Direct Effects

Construction activities required for the decommissioning of Scott Dam, Project recreation facilities, and Project ancillary facilities may potentially affect special-status plants, if present within the construction work areas. For example, use of heavy equipment or placement of stockpiled material could crush or bury special-status plant individuals.

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To address and reduce the potential for direct effects to special-status plant populations (either previously known or newly established), PG&E will implement the Special-status Plant Construction Measures. These measures require PG&E to implement a special-status plant survey within a 100-ft. buffer of all construction areas in the year prior to construction. If special-status plant populations are found, PG&E will flag populations prior to each year of ground-disturbing construction activities or will implement site-specific measures considering the life history of the special-status plant species in relation to the work being conducted. Examples of site-specific measures may include, but are not limited to, implementing work following the seed set and senescence of annual plants or during the dormant phase of perennial plants. In addition, PG&E would implement General Construction Measures that limit the location and extent of ground-disturbing work activities and require contractors and staff to attend trainings to comply with site-specific avoidance and protection measures. Refer to Section 2.1.2.2, Proposed Environmental Measures, Table 2-12, for additional details of these measures.

With implementation of construction measures, construction would have temporary and negligible direct effects on special-status plants in the Scott Dam Area.

Indirect Effects

Potential indirect effects to special-status plants include degradation of habitat from ground disturbance and the spread or introduction of invasive weed populations.

Construction activities will create ground disturbance and will require use of heavy equipment, which could potentially result in destabilization and erosion of soils within work areas. Effects to soil stability could potentially degrade habitat for native vegetation, including special-status plants. Indirect effects to special-status plants would be short term and temporary. In addition, as described further in Phase 2: Post-facility Removal Effects below, PG&E would implement the Restoration Plan following construction to restore disturbed areas following facility removal. Therefore, any indirect effects to special-status plants would be negligible.

Thirteen invasive weed species are known to occur in the Scott Dam Area. Transporting construction vehicles and heavy equipment to work, access, staging, and stockpile areas, as well as foot traffic associated with construction activities, could result in the spread of previously established invasive weed populations or introduce new invasive weed populations into the work areas. The potential for the introduction or spread of invasive weeds will be addressed and reduced through implementation of the Invasive Weed Construction Measures. These measures require PG&E to conduct invasive weed surveys in conjunction with special-status plant surveys (i.e., within a 100-ft. buffer of the construction areas and in the accessible areas of the historical inundation zone of Lake Pillsbury reservoir) the year before construction. During construction, PG&E will implement measures to limit the spread or introduction of invasive weeds, such as cleaning off-road equipment to be free of soil and plant parts prior to arrival at the construction sites; minimizing soil disturbance as much as possible; driving and parking on established roads to the extent possible; maintaining gravel and spoil piles in a weed-free state; using weed-free areas for staging and laydown; properly containing and transporting any invasive weed–infested materials to a landfill; using certified weed-free erosion control materials; restoring sites with a native seed mix; seeding topsoil stockpiles with a native seed mix if left for longer than a month; cleaning clothing, footwear, and gear before moving from an

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infested area to a non-infested area; and avoiding invasive weed–infested areas or prioritizing activities such that invasive weed–infested areas are worked last. PG&E will also implement the General Construction Measures that limit the location and extent of ground-disturbing work activities and require contractors and staff to attend trainings to comply with site-specific avoidance and protection measures. Refer to Section 2.1.2.2, Proposed Environmental Measures, Table 2-12, for additional details of these measures.

With implementation of construction measures, indirect effects to special-status plants from the spread or introduction of invasive weeds would be negligible.

Cape Horn Dam Area

Two special-status plant species were documented in the Cape Horn Dam Area during botanical studies completed in the FERC Project boundary in 2018 (PG&E 2019a). Populations were found in the following locations:

- Three-fingered morning glory (CRPR 1B.2) – one population was identified along Tunnel No. 1 between Cape Horn Dam and the Potter Valley Powerhouse.
- Glandular western flax (CRPR 1B.2) – five populations were identified in the Cape Horn Dam Area, including four populations along the Penstock, Pipeline, and Butterfly Valve House in the vicinity of Conduit No. 1 and one population along Penstock No. 2 between Conduit No. 2 and the Potter Valley Powerhouse.

While not identified during surveys in 2018, suitable habitat is present for 22 special-status plants that may potentially occur in uplands and 6 special-status plants that may potentially occur in riparian areas and/or wetlands.

Potential direct and indirect effects to special-status plants from construction activities are provided below.

Direct Effects

As described above under the Scott Dam Area section, use of ground-disturbing heavy equipment for construction activities and stockpiling soil could potentially crush or bury special-status plants. To address and reduce this potential effect, PG&E will implement the Special-status Plant Construction Measures, which require pre-construction surveys and flagging and avoidance of populations during construction or site-specific measures considering the life history of the special-status plant species. PG&E will also implement General Construction Measures that limit the location and extent of ground-disturbing work activities and require contractors and staff to attend trainings to comply with site-specific avoidance and protection measures.

With implementation of these measures, potential direct effects to special-status plants would be negligible.

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Indirect Effects

As described above, construction activities will create ground disturbance and will require use of heavy equipment, which could potentially result in destabilization and erosion of soils. Soil erosion could degrade habitat for native vegetation, including special-status plants. Indirect effects to special-status plants would be short-term and temporary. In addition, as described further in Phase 2: Post-facility Removal Effects below, PG&E would implement the Restoration Plan following construction to restore disturbed areas following facility removal. Therefore, any effects to special-status plants would be negligible.

Eight invasive weed species are known to occur in the Cape Horn Dam Area. As described above, use of ground-disturbing heavy equipment and human foot traffic have the potential to introduce or spread invasive weed populations. To reduce this potential effect, PG&E will implement the Invasive Weed Construction Measures, which require surveys for invasive weeds prior to construction and the implementation of the previously described measures to control the spread and introduction of invasive weeds. PG&E will also implement General Construction Measures that limit the location and extent of ground-disturbing work activities and require contractors and staff to attend trainings to comply with site-specific avoidance and protection measures.

With implementation of these measures, potential indirect effects to special-status plants from invasive weeds would be negligible.

Riparian and Wetland Resources

This section presents an evaluation of potential direct and indirect effects of construction activities on riparian and wetland resources.

The Analysis Area for effects to riparian and wetland resources is defined to include (1) the boundaries of the construction work, access, staging, and stockpile areas, as defined in Section 2.1.2, Applicant's Proposal, and (2) the shorelines of Lake Pillsbury reservoir and Van Arsdale Reservoir. Refer to Section 2.2.3.4.3 for a description of riparian and wetland resources in the Analysis Area. Refer to Figure 2.2.3.4-1 for a preliminary map of wetlands along the shoreline of Lake Pillsbury reservoir and Figure 2.2.3.4-2 for a preliminary map of wetlands along the shoreline of Van Arsdale Reservoir.

Provided below is an evaluation of potential direct and indirect effects to riparian and wetland resources, separated by geographic area.

Scott Dam Area

Riparian and wetland habitats are located both along the shoreline of Lake Pillsbury reservoir and immediately downstream of Scott Dam along the Eel River (refer to Section 2.2.3.4, Botanical Resources, for more information). Based on preliminary maps from Stillwater Sciences (PG&E 2019a), there are 32 wetlands adjacent to Lake Pillsbury reservoir, including both forested and emergent wetlands. Maps of CALVEG communities indicate that willow (shrub) riparian communities are also present downstream of Scott Dam. Discussion of potential direct and indirect effects to riparian and wetland habitat resulting from construction is provided below.

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Direct Effects

This section evaluates the potential for direct effects (e.g., removal and trimming) to riparian habitat as a result of construction activities in the Scott Dam Area. While most work, staging, and stockpile areas are located in upland habitats within the previously disturbed footprint of Project facilities, approximately 0.6 acre of riparian vegetation will be removed for extension of the existing road off Scott Dam Road that will provide access to the temporary barge launch and the downstream terminus of the existing plunge pool below the dam. This riparian vegetation is located along the bed and bank of the Eel River. An additional 0.04 acre of riparian would be removed for construction of the new access road south of Scott Dam (access road off of Elk Mountain Road). To address and reduce effects to riparian habitats, PG&E would implement Riparian and Wetland Protection Measures, which require that riparian vegetation removal be limited to the extent possible and that riparian vegetation outside of immediate construction work areas be flagged for avoidance. PG&E would also obtain CWA Section 404/401 permits/certification and implement all conditions of the permits, including any riparian protection measures. Refer to Section 2.1.2.2, Proposed Environmental Measures, Table 2-12, for additional details of this measure. With implementation of Riparian and Wetland Protection Measures, direct effects from riparian vegetation removal would be reduced. Nevertheless, removal of approximately 0.64 acre of riparian vegetation would be considered a temporary adverse effect. Following completion of construction, the temporary access road would be restored to its prior natural condition and vegetation would be allowed to regrow. Therefore, any effects to riparian habitat would be temporary and negligible. Refer to Phase 2: Post-facility Removal Effects for a detailed discussion of effects to riparian vegetation following facility removal.

PG&E would also implement General Construction Measures, as described above under the Botanical Resources section, which require all staff and contractors to limit the location and extent of ground-disturbing work activities and require contractors and staff to attend trainings to comply with site-specific avoidance and protection measures, including riparian and wetland protection measures.

With implementation of these construction measures, direct effects to riparian and wetland vegetation in the Scott Dam Area would be negligible.

Indirect Effects

Indirect effects to riparian and wetland habitats include degradation of habitat resulting from the spread of invasive weeds, degradation of riparian and wetland shoreline habitat during the Lake Pillsbury reservoir drawdown, and degradation of downstream habitat from erosion and sedimentation and hazardous materials that can affect water quality. Each of these potential effects is described below.

As described above, construction activities could potentially result in the spread of existing invasive weeds or introduce new invasive weeds into the construction areas, which could, in turn, result in the degradation of riparian and wetland habitats in the Scott Dam Area. PG&E will implement the Invasive Weed Construction Measures and General Construction Measures, as described above, to reduce impacts from invasive weeds. Refer to Section 2.1.2.2, Proposed Environmental Measures, Table 2-12, for additional details of these measures. With

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implementation of these measures, potential indirect effects to riparian and wetland habitats from invasive weeds would be negligible.

Lake Pillsbury reservoir will be drawn down in the initial low-flow season. Drawdown of the reservoir for construction would result in the reduction of the water table for riparian and wetland habitats found on the shoreline of Lake Pillsbury reservoir under existing conditions. As described in Section 2.1.2, Applicant's Proposal, the drawdown would occur slowly, with the drawdown rate being restricted to between 1 and 2 ft. per day, which would give riparian and wetland plants time to complete their life cycle before the next growing season. Furthermore, based on a study of tule elk (*Cervus canadensis nannodes*) foraging in the emergent wetland along the north shore of Lake Pillsbury reservoir (PG&E 2019b), plants in these wetlands may be adapted to seasonal drying and tolerate periodic changes in water levels under existing conditions. Therefore, in the short term, any indirect effects to riparian and wetland habitat on the shoreline from the drawdown during construction (i.e., a single year) are expected to be negligible.

Use of ground-disturbing heavy equipment during implementation of construction activities could result in temporary degradation of water quality within Lake Pillsbury reservoir and in the Eel River downstream of the dam through increased erosion and sedimentation or through the release of hazardous materials including fuels or other chemicals. Such effects to water quality could degrade riparian and wetland habitats. The potential for construction-related degradation of water quality would be addressed and reduced through implementation of the Construction Water Quality and Water Temperature Monitoring Plan, Construction Erosion Prevention Plan, Water Quality and Erosion Control Measures, Hazardous Materials Handling Measures, Stormwater Pollution Prevention Plan, and applicable USFS BMPs. In addition, PG&E will obtain coverage under CWA Section 404/401 permits and implement Riparian and Wetland Protection Measures, which require PG&E to implement BMPs for work within and near aquatic habitats. BMPs may include prohibiting refueling of equipment within 100 ft. of wetlands, streams, or waterways; using secondary containment; providing spill kits onsite; and using appropriate erosion control materials. Refer to Section 2.1.2.2, Proposed Environmental Measures, Table 2-12 for additional details of these measures. With implementation of these construction measures, potential effects to riparian and wetland habitats from degradation of water quality would be negligible. Effects following dam removal (including sedimentation in the Eel River Watershed) are addressed under Phase 2: Post-facility Removal Effects below.

Cape Horn Dam Area

Riparian and wetland habitats are located both along the shoreline of Van Arsdale Reservoir and immediately downstream of Cape Horn Dam along the Eel River (refer to Section 2.2.3.4.3, Riparian and Wetland Resources for more information). Based on preliminary maps from Stillwater Sciences (PG&E 2019a), there are eight wetlands adjacent to Van Arsdale Reservoir, including both forested and emergent wetlands. Mapping of CALVEG communities indicates that willow (shrub) riparian communities are also present downstream of Cape Horn Dam. A discussion of potential direct and indirect effects to riparian and wetland habitat resulting from construction is provided below.

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Direct Effects

This section evaluates the potential for direct effects (e.g., removal and trimming) to riparian habitat as a result of construction activities in the Cape Horn Dam Area. While most work, staging, and stockpile areas are located in upland habitats within the previously disturbed footprint of Project facilities, Cape Horn Dam removal will require the construction of a new temporary access road to provide access to work areas near Cape Horn Dam. This temporary access road would require the removal of approximately 0.3 acre of riparian vegetation. Additional riparian vegetation (0.18 acre) adjacent to the construction area near the Fish Screen Facility may also be removed. This riparian vegetation is located along the banks of Van Arsdale Reservoir and the Eel River downstream. As described above, to reduce effects to riparian habitats, PG&E would implement Riparian and Wetland Protection Measures, which require that riparian vegetation removal be limited to the extent possible and that riparian vegetation outside of immediate construction work areas be flagged for avoidance. PG&E will obtain CWA Section 404/401 permits/certification and implement all conditions of the permits, including any riparian protection measures. Nevertheless, removal of approximately 0.48 acre of riparian vegetation would be considered a temporary adverse effect. Following completion of construction, the temporary access road and the area near the Fish Screen Facility would be restored to its prior natural condition and vegetation would be allowed to regrow. Therefore, any effects to riparian habitat would be temporary and negligible. Refer to Phase 2: Post-facility Removal Effects for effects to riparian vegetation following facility removal.

PG&E would also implement General Construction Measures, as described above, which require all staff and contractors to limit the location and extent of ground-disturbing work activities and require contractors and staff to attend trainings to comply with site-specific avoidance and protection measures, including riparian and wetland protection measures.

With implementation of these construction measures, direct effects to riparian and wetland vegetation in the Cape Horn Dam Area would be negligible.

Indirect Effects

Indirect effects to riparian and wetland habitats include degradation of habitat resulting from the spread of invasive weeds, dewatering within Van Arsdale Reservoir during construction, and erosion and sedimentation and hazardous materials that can affect water quality. Each of these potential effects is described below.

As described above, construction activities could potentially result in the spread of existing invasive weeds or introduce new invasive weeds into the construction areas, which could, in turn, result in the degradation of riparian and wetland habitats in the Cape Horn Dam Area. To address and reduce these potential effects, PG&E will implement the Invasive Weed Construction Measures and General Construction Measures as described above under the Scott Dam Area section. Refer to Section 2.1.2.2, Proposed Environmental Measures, Table 2-12, for additional details of these measures.

With implementation of these measures, potential indirect effects to riparian and wetland habitats from invasive weeds would be negligible.

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Construction of the temporary cofferdams upstream and downstream of Cape Horn Dam to dewater the work area would result in a significant reduction in the size of Van Arsdale Reservoir, which could lower the water table and reduce available water to adjacent wetland and riparian habitats during construction in the summer growing season. Riparian species, such as cottonwood, alder, and willow often exhibit drought-stress responses, which can include reduced shoot and root growth, branch sacrifice, or crown die-backs when the depth to the water table is increased. Therefore, lowering the water table during construction along the dewatered portion of Van Arsdale Reservoir could result in minor effects to riparian and wetland habitat. However, these effects would be limited to the construction period, and flows within the construction area would be restored after removal of the cofferdams after one construction season. Therefore, any effects to riparian and wetland habitat from dewatering the construction work area would be negligible. Refer to Phase 2: Post-facility Removal Effects for a discussion of indirect effects to riparian and wetland revegetation following Cape Horn Dam removal.

As described above, use of ground-disturbing heavy equipment during implementation of construction activities could result in temporary degradation of water quality in the Eel River downstream of the dam through increased erosion and sedimentation or through the release of hazardous materials including fuels or other chemicals. Such effects to water quality could degrade riparian and wetland habitats. The potential for construction-related degradation of water quality would be addressed and reduced through implementation of Construction Water Quality and Water Temperature Monitoring Plan, Construction Erosion Prevention Plan, Water Quality and Erosion Control Measures, Hazardous Materials Handling Measures, Stormwater Pollution Prevention Plan, applicable BMPs, and Riparian and Wetland Protection Measures, as described above under the Scott Dam Area section. Refer to Section 2.1.2.2, Proposed Environmental Measures, Table 2-12, for additional details of these measures.

With implementation of these measures, potential indirect effects to riparian and wetland habitats from degradation of water quality would be negligible. Effects following dam removal (including sedimentation in the Eel River) are addressed under Phase 2: Post-facility Removal Effects.

2.2.4.5.2 Phase 2: Post-facility Removal Effects

This section presents an evaluation of the potential effects of physical changes that may occur following dam and ancillary/recreation facility removal on botanical resources, including special-status plants, riparian, and wetland resources.

The baseline Analysis Area for the post-facility removal section includes four primary areas:

- The Scott Dam Area – Restoration Area, which consists of the following:
  - The former Scott Dam construction areas;
  - The former Project ancillary/recreation facility construction areas; and
  - The former reservoir bed of Lake Pillsbury reservoir.

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- The Cape Horn Dam Area – Restoration Area, which consists of the following:
  - The former Cape Horn Dam construction areas;
  - The former Project ancillary/recreation facility construction areas; and
  - The former reservoir bed of Van Arsdale Reservoir.
- The Eel River from the former Scott Dam to the Eel River estuary (i.e., Eel River Watershed); and
- The East Branch Russian River from the Potter Valley Powerhouse to Lake Mendocino (i.e., Russian River Watershed).

The baseline Analysis Area for botanical resources and riparian and wetland habitats is further defined below in each section.

As described above, post-facility removal effects are split into phases: Phase 2a – Initial Conditions and Preliminary Restoration and Phase 2b – Resulting Conditions and Restoration. Refer to Section 2.2.4.1, Analytical Approach for a description of each phase.

Phase 2a includes analysis of the initial temporary physical conditions that will occur immediately following dam and ancillary/recreation facility removal, including the following:

- Loss of the facility or feature (e.g., loss of reservoir, ancillary facility, or recreation facility);
- Initial release of stored water and sediment following removal of the adit plug at Scott Dam and complete removal of Scott Dam and Cape Horn Dam:
  - Pulse hydrology in the Eel River downstream of Scott Dam and Cape Horn Dam until the reservoir is drained; and
  - Sediment load/deposition and turbidity in the Eel River downstream of Scott Dam and Cape Horn Dam.
- Continued degraded water quality and sediment deposition after the initial sediment release until the system stabilizes and water quality and sediment transport return to natural conditions; and
- Ground disturbance, use of heavy equipment, and transport of materials to and from the Scott Dam and Cape Horn Dam Area restoration areas to allow for restoration of the former dam sites and ancillary/recreation facility sites.

Phase 2b includes analysis of the resulting conditions following dam and ancillary/recreation facility removal, including the following:

- Unimpaired hydrology in the Eel River downstream of Scott Dam and Cape Horn Dam;
- Restored sediment transport and water quality in the Eel River downstream of Scott Dam and Cape Horn Dam;

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- Natural hydrology in the East Branch Russian River; and
- Restored former reservoir beds and ancillary/recreation sites following facility removal.

The following potential post-facility removal effects to botanical resources resulting from physical changes that occur following dam and recreation facility/ancillary facility removal were evaluated:

- Potential effects to botanical resources (including special-status plants and invasive weeds):
  - Phase 2a
    - Direct loss of special-status plant individuals or populations during restoration;
    - Indirect effects through loss or degradation of habitat, including the introduction or spread of invasive weeds, during restoration; and
    - Indirect effects to special-status plant individuals in riparian and wetland habitats along the Eel River downstream from the initial sediment pulse.
  - Phase 2b
    - Beneficial effects to special-status plants from restoration of the former reservoir beds and recreation facility/ancillary facility sites;
    - Beneficial effects to plants in the Eel River Watershed from return to natural hydrology and sediment transport processes; and
    - Change in habitat potentially supporting special-status plants in the East Branch Russian River following reestablishment of natural flow conditions.
- Potential effects to riparian and wetland resources:
  - Phase 2a
    - Direct reduction in the amount of riparian habitat or effects to riparian plant species during restoration activities;
    - Potential degradation of riparian and wetland habitats during restoration of former reservoir beds and recreation facility/ancillary facility sites, including degradation resulting from the introduction or establishment of invasive weeds;
    - Potential loss of riparian and wetland habitat from the shoreline of Lake Pillsbury reservoir and Van Arsdale Reservoir; and
    - Potential loss/burial/degradation of riparian habitat in the Eel River (downstream of Scott Dam and Cape Horn Dam) from sediment released following dam removal.
  - Phase 2b
    - Beneficial effects to wetland and riparian habitat resulting from restoration of the former reservoir beds;
    - Beneficial effects to riparian and wetland habitat in the Eel River downstream of the former dams from reestablishment of the natural hydrograph and sediment transport; and

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- Change in riparian and wetland habitat in the East Branch Russian River following reestablishment of natural flow conditions.

A discussion of potential post-facility removal effects to botanical resources that could occur from facility removal, with incorporation of measures, is provided below by area.

Botanical Resources

This section presents an evaluation of potential effects of post-facility removal on botanical resources. This includes potential direct and indirect effects to special-status plants (including effects from the introduction or spread of invasive weeds).

The Analysis Area for effects to botanical resources is defined to include the following:

1) The boundaries of the Scott Dam and Cape Horn Dam Area restoration areas, including the former reservoir beds

2) Riparian and wetland habitats along the bed and bank of

   a) the Eel River to the Eel River estuary

   b) the East Branch Russian River

Refer to Section 2.2.3.4, Botanical Resources, Table 2.2.3.4-2, for a list of special-status plants known to occur or potentially occurring in the vicinity of the Project and their status and habitat requirements. Section 2.2.3.4, Botanical Resources, Table 2.2.3.4-3, provides a list of special-status plants that are known to occur or may potentially occur in riparian and wetland habitats along the Eel River from Scott Dam to the Eel River estuary and/or the East Branch Russian River from the Potter Valley Powerhouse to Lake Mendocino.

Provided below is an evaluation of potential direct and indirect effects to special-status plants by geographic area.

Scott Dam Area

As described above, there are four special-status plant species—three-fingered morning glory, Greene's narrow-leaved daisy, glandular western flax, and grooved beard lichen—that are known to occur in the Scott Dam Area (PG&E 2019a). While not identified during surveys in 2018, suitable habitat is present for an additional 20 special-status plants that may potentially occur in uplands and 6 special-status plants that may potentially occur in riparian areas and/or wetlands.

Potential direct and indirect effects to special-status plants following facility removal are provided below and are separated by Phase 2a and Phase 2b.

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Phase 2a

Potential direct effects from Phase 2a include direct loss of special-status plant individuals during restoration activities. Potential indirect effects include loss or degradation of habitat from the introduction of invasive weeds during restoration and potential effects to special-status plants in riparian and wetland habitats along the shoreline of Lake Pillsbury reservoir following loss of the reservoir. Each potential effect is further described in the sections below.

Direct Effects – Special-status Plant Individuals

Special-status plant populations are known to occur around existing Project ancillary and recreation facilities that would be restored, as described above for construction effects. In addition, while the majority of the former Lake Pillsbury reservoir bed would be unvegetated, the margins of Lake Pillsbury reservoir support habitat for special-status plants.

Restoration activities that require the use of heavy equipment or placement of stockpiles could crush or bury special-status plant individuals, if present in restoration work areas. To address and reduce the potential for direct effects to special-status plant populations (either previously known or newly established), PG&E will implement Special-status Plant Restoration Measures. If special-status plant populations are found during pre-construction surveys, as described above for construction effects, PG&E will flag populations prior to each year of ground-disturbing restoration activities or will implement site-specific measures considering the life history of the special-status plant species. Examples may include working in areas that are known to have special-status species only following the seed set and senescence of annual plants or working in the dormant phase of perennial plants. In addition, PG&E would implement General Restoration Measures that limit the location and extent of ground-disturbing work activities and require contractors and staff to attend trainings to comply with site-specific avoidance and protection measures. Refer to Section 2.1.2.2, Proposed Environmental Measures, Table 2-12, for additional details of these measures.

With implementation of post-facility removal measures, Phase 2a activities would have temporary and negligible direct effects on special-status plants in the Scott Dam Area.

Indirect Effects – Invasive Weeds

Thirteen invasive weed species are known to occur in the Scott Dam Area. Invasive weeds could be introduced or spread within the restoration area through two primary mechanisms.

First, use of ground-disturbing heavy equipment or movement of restoration personnel during active restoration activities may potentially introduce new invasive weed populations or spread existing populations, if equipment or personnel are unintentionally carrying weed seeds or plant materials. The potential for the active introduction or spread of invasive weeds will be addressed and reduced through implementation of the Invasive Weed Restoration Measures, which are the same as Invasive Weed Construction Measures described above under Phase 1: Construction Effects. This measure requires a survey for invasive weeds within the historical inundation zone of Lake Pillsbury reservoir in the year prior to construction. PG&E will also implement the General Restoration Measures that limit the location and extent of ground-disturbing work

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activities and require contractors and staff to attend trainings to comply with site-specific avoidance and protection measures. Refer to Section 2.1.2.2, Proposed Environmental Measures, Table 2-12, for additional details of these measures.

Second, because existing populations of invasive weeds found around the shoreline of Lake Pillsbury reservoir provide a seed source, exposed sediments within the former reservoir bed may be passively colonized by invasive weed populations, even if these areas do not receive active restoration treatments. The physical (e.g., particle-size distribution) and chemical (e.g., macronutrient and micronutrient status) character of newly exposed sediments in the former reservoir bed of Lake Pillsbury reservoir may potentially create conditions that favor growth of invasive plants (Shafroth et al. 2002). For example, soils containing high micronutrients or metal levels may favor invasive plants that are more tolerant of these ions. To reduce this potential effect, PG&E will implement the Restoration Plan, which will include measures to address invasive weeds.

With implementation of the Invasive Weed Restoration Measures, General Restoration Measures, and Restoration Plan, indirect effects to special-status plants from the spread or introduction of invasive weeds in the Scott Dam Area would be negligible.

Indirect Effects – Loss of Reservoir

The tributary-influenced zones of Lake Pillsbury reservoir support forested wetland habitats, and the northern shoreline of Lake Pillsbury reservoir, which is periodically inundated, supports both emergent wetland and upland vegetation. Several additional small wetlands were also mapped along the reservoir shoreline by Stillwater Sciences during technical studies (PG&E 2019a). These areas represent suitable habitat for six special-status plant species that grow in riparian and wetland habitats. Wetland habitats in the tributary-influenced zones would likely be preserved following removal of Scott Dam. Vegetation growing along the periodically inundated northern shoreline of the reservoir tolerates periodic changes in water levels under existing conditions and therefore is expected to persist in the near term following removal of Scott Dam but may experience some loss due to the reduction in surface water. Ground disturbance and use of heavy equipment associated with implementation of the Restoration Plan could potentially result in the temporary loss of portions of these habitats, particularly if stabilization of soils is required in these habitats along the Eel River channel or tributary channels within the reservoir bed. In the short term, there may be a temporary reduction in the availability of riparian and wetland habitats for special-status plants. Over time, additional riparian and wetland habitat is expected to establish along the tributary streams through both natural revegetation and active introduction through the Restoration Plan (refer to discussion under Phase 2b below).

Considering that no riparian and wetland special-status plants were observed during surveys in 2018 (PG&E 2019a) and that any effects to shoreline riparian and wetland habitats would be short term, any effects to special-status plants in riparian and wetland habitats following the dewatering of Lake Pillsbury reservoir would be negligible.

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Phase 2b

Potential effects from Phase 2b include beneficial indirect effects to special-status plants from restoration of the former reservoir bed of Lake Pillsbury reservoir and recreation facility/ancillary facility sites. PG&E will implement the Restoration Plan (including any required monitoring and adaptive management) to facilitate restoration of the former reservoir bed of Lake Pillsbury reservoir. Over time, it is expected that the former lacustrine habitat will become a more diverse mosaic of wetland, riparian, and upland habitats along the restored channel of the Eel River and tributary streams. Overall, the diversity and health of riparian and wetland ecosystems is expected to improve, benefiting special-status plants in riparian and wetland habitats. Restoration of the former Project ancillary and recreation facility sites would also allow for native vegetation to develop within previously disturbed and/or developed lands, benefiting upland special-status plants. Therefore, restoration would increase the total area of native habitats available for special-status plants to recolonize in the long term. In addition, the cessation of operations and maintenance activities and reduced recreation pressure following removal of Project facilities would reduce risk of spread of invasive weeds associated with human activities.

Therefore, with implementation of the Restoration Plan, removal of Project facilities would have a beneficial effect on habitat for special-status plants in the Scott Dam Area. Refer to Section 2.1.2, Applicant's Proposal, for more details on the goals of the Restoration Plan.

Cape Horn Dam Area

As described above, there are two special-status plant species—three-fingered morning glory and glandular western flax—that are known to occur in the Cape Horn Dam Area (PG&E 2019a). While not identified during surveys in 2018, suitable habitat is present for 22 special-status plants that may potentially occur in uplands and 6 special-status plants that may potentially occur in riparian areas and/or wetlands.

Potential direct and indirect effects to special-status plants following facility removal are provided below and are separated by Phase 2a and Phase 2b.

Phase 2a

Potential direct effects from Phase 2a include direct loss of special-status plant individuals during restoration activities. Potential indirect effects include loss or degradation of habitat from introduction of invasive weeds during restoration and potential effects to special-status plants in riparian and wetland habitats along the shoreline of Van Arsdale following removal of Cape Horn Dam. Each potential effect is further described in the sections below.

Direct Effects – Special-status Plant Individuals

Following construction activities, the former Cape Horn Dam construction area would be heavily disturbed and would not support habitat for special-status plants. There are no special-status plants known to occur or likely to occur within the former reservoir bed of Van Arsdale Reservoir or along the existing shoreline (PG&E 2019a). Therefore, special-status plants would not be affected by restoration activities within the former inundation zone.

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Special-status plant populations are known to occur along existing Project ancillary facilities in the Cape Horn Dam Area. Restoration activities that require the use of heavy equipment or placement of stockpiles could crush or bury special-status plant individuals, if they occur in restoration work areas. To address and reduce the potential for direct effects to special-status plant populations (either previously known or newly established), PG&E will implement the Special-status Plant Restoration Measures and General Restoration Measures, as described above. Refer to Section 2.1.2.2, Proposed Environmental Measures, Table 2-12, for additional details of these measures.

With implementation of these post-facility removal measures, Phase 2a activities would have temporary and negligible direct effects on special-status plants in the Cape Horn Dam Area.

Indirect Effects – Invasive Weeds

Eight invasive weed species are known to occur in the Cape Horn Dam Area. As described above, active restoration activities have the potential to introduce new invasive weed populations or spread existing populations. The potential for the introduction or spread of invasive weeds from active restoration will be addressed and reduced through implementation of the Invasive Weed Restoration Measures and General Restoration Measures. Refer to Section 2.1.2.2, Proposed Environmental Measures, Table 2-12, for additional details of these measures.

Because invasive weeds have been documented around the shoreline of Van Arsdale Reservoir, exposure of soils within the former reservoir bed has the potential for passive recolonization by invasive weeds. Spread of weeds could, in turn, degrade habitat for special-status plants. To address and reduce this potential effect, PG&E will implement the Restoration Plan, which will address invasive weeds.

With implementation of the Invasive Weed Restoration Measures, General Restoration Measures, and Restoration Plan, indirect effects to special-status plants from the spread or introduction of invasive weeds in the Cape Horn Dam Area would be negligible.

Indirect Effects – Loss of Reservoir

Van Arsdale Reservoir is confined within a narrow river valley. Under Phase 2a, following drawdown of Lake Pillsbury reservoir and Van Arsdale Reservoir and removal of the dams, water levels would be similar to the historical (pre-dam) condition. The first high-flow event would mobilize coarse sediments from Van Arsdale Reservoir downstream at the same time that millions of cubic yards of fine and coarse sediment from the former Lake Pillsbury reservoir would be mobilized. Aggradation of sediment is likely within portions of the former reservoir bed, and new bars may form that promote increased bank erosion and lateral channels. The sediment release is expected to result in temporary burial of riparian and wetland vegetation, which could affect availability of habitat for special-status plants that grow in riparian and wetland vegetation.

Under existing conditions, Van Arsdale Reservoir supports forested wetlands as well as several small emergent wetlands, which may provide habitat for special-status plants. While dam removal could result in minor reductions in the extent of forested and emergent wetlands because of lower water levels or from burial in sediment, new riparian vegetation (including special-status riparian plants) may also become established in response to the sediment deposition. Therefore, effects to

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special-status plants resulting from temporary and minor changes in riparian and wetland habitat in the Cape Horn Dam Area would be negligible.

Phase 2b

Following mobilization of sediments, PG&E will restore the former reservoir bed consistent with the Restoration Plan. Refer to Section 2.1.2, Applicant's Proposal for more details on the goals of the Restoration Plan. The focus of the restoration would be stabilization of the new river channel including native plantings, as necessary. Over time, the reach of the Eel River within the former Van Arsdale Reservoir is expected to return to a morphologic condition similar to pre-dam conditions. The river would become a more dynamic channel, formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, deeper pools, and less-dense riparian vegetation. The length of time required for a return to this condition may be a few to several years and would be largely dependent on the magnitude, frequency, and duration of subsequent flood events. The restored Eel River in this area would continue to provide aquatic and riparian habitat for special-status plants. Restoration of the former Project ancillary and recreation facility sites would facilitate the transition of previously disturbed and/or developed habitats to native upland habitats. Therefore, restoration would increase the total area and quality of native habitats available for special-status plants to recolonize in the long term. In addition, the cessation of operations and maintenance activities following removal of the ancillary facilities would reduce risk of spread of invasive weeds associated with human activities.

Therefore, with implementation of the Restoration Plan, removal of Project facilities would have a beneficial effect on habitat for special-status plants in the Cape Horn Dam Area.

Eel River Watershed

Phase 2a and Phase 2b would not affect upland special-status plants in the Eel River Watershed; therefore, only special-status plants that may occur in riparian and wetland habitats are discussed in this section. Outside of the Cape Horn Dam and Scott Dam areas, the Eel River Watershed has not been systematically surveyed for special-status plants. While there are no records for special-status plants in riparian and wetland habitats along the Eel River downstream of Scott Dam to the confluence of the Eel River estuary, five special-status plants have the potential to occur along this reach. Seven special-status plants are known to occur in the estuarine habitats of the Eel River estuary. These species include the federally listed western lily (*Lilium occidentale*, Federal Endangered, California Endangered, CRPR 1B.1) and Lyngbye's sedge (*Carex lyngbyei*, CRPR 2B.2), Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*, CRPR 1B.1), Point Reyes salty bird's-beak (*Chloropyron maritimum* ssp. *palustre*, CRPR 1B.2), minute pocket moss (*Fissidens pauperculus*, CRPR 1B.2), Howell's montia (*Montia howellii*, CRPR 2B.2), and dwarf alkali grass (*Puccinellia pumila*, CRPR 2B.1). Two other special-status plants may also potentially occur in the Eel River estuary.

Because restoration activities would not take place within the Eel River Watershed outside of the Scott Dam and Cape Horn Dam areas described above, potential effects to special-status plants are limited to sediment release effects during Phase 2a and the return of unimpaired hydrology in the Eel River under Phase 2b. Each potential effect is described further below.

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Phase 2a

As described above, Phase 2a includes the initial temporary physical conditions in the Eel River Watershed immediately following facility removal. This includes the approximately 12-mi. section of the Eel River from Scott Dam to Van Arsdale Reservoir, the approximately 38-mi. section of the Eel River below Cape Horn Dam to the Middle Fork Eel River, and the approximately 119-mi. section from the Middle Fork Eel River to the estuary. Potential effects to riparian and wetland habitats in the Eel River Watershed under Phase 2a are described below.

Special-status plants occurring in riparian and wetland habitats could be affected by the sediment pulse and suspended sediment in the Eel River following dam removal. The duration of erosion of upstream sediment during the initial high-flow event following dam removal is calculated to take from 1 to 8 days depending on the rate of discharge. Based on sediment transport modeling completed for the Proposed Action (refer to Section 2.2.4.8, Geomorphology), it is expected that the majority of coarse sediment will be deposited prior to the confluence with the Middle Fork Eel River. In addition, some of the suspended fine sediment may deposit and alter channel or floodplain morphology in this reach, at least temporarily until subsequent high-flow events can resuspend it and transport it farther downstream. Flow from major tributaries downstream will diminish the effect of the elevated sediment load, and it is likely that alterations to the existing channel morphology will become difficult to distinguish downstream of the confluence with the Middle Fork Eel River (located about 38 mi. downstream of Van Arsdale Reservoir).

The effects of sediment release on riparian special-status plants potentially present along the Eel River would vary based on site-specific factors including volume of discharge, distance from the point of release, and the geomorphology of the site affected. Deposition of sediment closest to the former dam sites could result in temporary burial of vegetation, particularly low-lying shrubs and herbaceous vegetation in close proximity to the river channel. Effects would occur primarily in the reach from Scott Dam downstream to Van Arsdale Reservoir and from Cape Horn Dam to the confluence with the Middle Fork Eel River. Temporary burial of special-status plants may occur if sediments are deposited in suitable habitat. While some loss of individuals is possible, new surfaces for riparian and wetland special-status plants to colonize may be created with formation of new sediment deposits or channel bars. Therefore, effects to special-status plants in this reach may be negligible, neutral, or beneficial.

Sediment deposition is expected to decrease with distance downstream from the dams and is expected to have minimal effect downstream of the Middle Fork Eel River to the Eel River estuary. Only suspended fine sediments are expected to reach the Eel River estuary. While suspended sediments have been shown to affect light availability for submerged aquatic plants such as eelgrass (*Zostera marina*) (Fonseca and Fisher 1986), none of the special-status species known or potentially occurring in the Eel River estuary are submerged plant species and would likely be unaffected by suspended sediment. Therefore, facility removal would not result in detectable changes in associated riparian or estuarine habitats for special-status plants in this reach.

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Phase 2b

Phase 2b is the resulting conditions in the Eel River following restoration. From Scott Dam downstream to the Middle Fork Eel River, the Proposed Action is expected to result in a more dynamic channel, formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, deeper pools, and less-dense riparian vegetation. It is likely that the currently over-coarsened sediment gradation in the reach will become less coarse with the renewed sediment supply. Long-term aggradation may occur that raises the bed elevation profile, though much of the sediment initially deposited will likely be remobilized in subsequent floods and transported farther downstream. Temporary filling of pools may occur, and more pronounced sediment bars may form that will promote development of a more sinuous channel. Areas with existing overly dense riparian vegetation would be expected to be scoured more frequently or buried with sediment deposits, resulting in less-dense vegetation. In other areas, the formation of new sediment bars may provide surfaces for establishment of young riparian vegetation (Shafroth et al. 2002). In the long term, the riparian community, diversity, age class structure, and composition are expected to increase under the unimpaired hydrology, resulting in more complex and diverse riparian communities. These changes in the Eel River would have a neutral to beneficial effect on habitat for special-status plants.

The Proposed Action would have minimal effects to river morphology downstream of the Middle Fork Eel River, is not likely to result in detectable long-term changes in associated riparian and estuarine habitats, and would therefore have no effect on special-status plants in this reach.

East Branch Russian River

One special-status plant species, Bolander's catchfly (*Silene bolanderi*) (CRPR 1B.2), is known to occur along the East Branch Russian River south of the Potter Valley Powerhouse. Additionally, Howell's montia may potentially occur in suitable habitat.

Under existing conditions, PG&E diverts water from the Potter Valley Powerhouse into the approximately 11-mi. East Branch Russian River, which runs from the powerhouse through an alluvial valley (i.e., Potter Valley) and through more mountainous terrain to Lake Mendocino, formed where the East Branch meets the mainstem Russian River. Diversions into the East Branch Russian River, based on monthly average, typically ranged between about 150 cfs and 225 cfs, with maximum flows of about 300 cfs for the period of record (see Section 2.2.3.1, Water Use and Hydrology). Based on a review of the USFWS NWI, riparian habitats (i.e., forested wetlands) are present, primarily along the valley portion of the river. One special-status plant species, Bolander's catchfly, is known to occur along the East Branch Russian River south of the Potter Valley Powerhouse, and Howell's montia may potentially occur in suitable habitat.

Following removal of Cape Horn Dam under Phase 2a, PG&E would no longer divert water to the Potter Valley Powerhouse. Reestablishment of natural flows in the East Branch Russian River would result in an intermittent flow regime in the river, and the majority of the river from the powerhouse to the ordinary high water mark of Lake Mendocino (approximately 11 mi.) would be seasonally dry. This would result in an alteration in the location and extent of riparian and wetland habitats. Upland habitats that are more tolerant of drier seasonal conditions would likely become

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more prevalent in the valley. While the degree of changes resulting from the Proposed Action is unknown, changes in the location and extent of these habitats may potentially reduce the amount and/or suitability of riparian habitats for special-status plants. However, considering that both Bolander's catchfly and Howell's montia can also grow in upland habitats in addition to wetland and riparian habitats, effects to these species from changes in riparian habitats in the East Branch Russian River would be negligible.

Riparian and Wetland Resources

This section presents an evaluation of potential effects of post-facility removal on riparian and wetland resources. This includes potential direct and indirect effects to riparian and wetland resources.

The Analysis Area for effects to riparian and wetland resources is defined to include the following:

1) The boundaries of the Scott Dam and Cape Horn Dam restoration areas
2) Riparian and wetland habitats along the bed and bank of
    a) the Eel River to the Eel River estuary
    b) the East Branch Russian River

Refer to Section 2.2.3.4.3, Riparian and Wetland Resources for more information on riparian and wetland resources known to occur in the Analysis Area.

Provided below is an evaluation of potential direct and indirect effects to wetland and riparian habitats, separated by geographic area.

Scott Dam Area

The tributary-influenced zones of Lake Pillsbury reservoir support forested wetland habitats, and the northern shoreline of Lake Pillsbury reservoir, which is periodically inundated, supports both emergent wetland and upland vegetation. Several additional small wetlands were also mapped along the reservoir shoreline by Stillwater Sciences during technical studies (PG&E 2019a).

Potential direct and indirect effects to riparian and wetland habitats following facility removal are provided below and are separated by Phase 2a and Phase 2b.

Phase 2a

Potential direct effects from Phase 2a include disturbance of riparian/wetland habitats during implementation of restoration activities. Potential indirect effects include (1) loss or degradation of habitat from introduction of invasive weeds during restoration, (2) loss of water available to riparian and wetland habitats along the shoreline of Lake Pillsbury reservoir, and (3) indirect effects of tule elk browsing on young riparian vegetation reestablishing within the former inundation zone. Each potential effect is further described in the sections below.

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Direct Effects

Most restoration activities will take place within the dewatered reservoir bed of Lake Pillsbury reservoir (i.e., bare substrates), but some access may be needed along the shoreline. Restoration access routes outside of existing construction areas may require additional removal/trimming of riparian or wetland vegetation. Ground disturbance and use of heavy equipment associated with implementation of the Restoration Plan could potentially result in the temporary loss of portions of these habitats, particularly if stabilization of soil is required along the Eel River channel or tributary channels within the reservoir bed. To address and reduce this potential effect, PG&E will implement the Riparian and Wetland Protection Measures, which require any riparian or wetland vegetation that is outside of immediate restoration areas to be flagged for avoidance prior to implementation of the restoration activities.

Additionally, implementation of the Restoration Plan may potentially require the trimming or cutting of live riparian vegetation and/or wetland plugs from existing riparian/wetland habitats in order to revegetate the former inundation zone of Lake Pillsbury reservoir. These cuttings and plugs would then be transplanted along the Eel River and tributary streams within the former reservoir bed. Plantings would stabilize exposed sediments and would enhance the process of restoration within the former reservoir bed. Collection of willow cuttings would result in a short-term effect to riparian vegetation in source populations; however, riparian vegetation often rapidly resprouts following trimming (Braatne et al. 1996), so this direct effect from collection would be negligible. Similarly, any collection of wetland plugs for herbaceous vegetation could result in short-term impacts to the source of collection (Hoag 2000).

Considering the availability of these habitats in the Analysis Area, that collections would be short-term and small-scale, and that implementation of the Restoration Plan would reestablish riparian and wetland habitats in the former reservoir bed, any effects to wetland habitats from ground disturbance or collections would be considered negligible.

Indirect Effects – Invasive Weeds

As described above for botanical resources, 13 invasive weed species are known to occur in the Scott Dam Area. Active restoration activities have the potential to introduce new invasive weed populations or spread existing populations. As described for botanical resources above, the potential for the introduction or spread of invasive weeds from active restoration will be addressed and reduced through implementation of the Invasive Weed Restoration Measures and General Restoration Measures. Refer to Section 2.1.2.2, Proposed Environmental Measures, Table 2-12, for additional details of these measures.

Because invasive weeds have been documented around the entire shoreline of Lake Pillsbury reservoir, exposure of soils within the former reservoir bed has the potential to result in passive recolonization by invasive weeds. Within the Elwha River system in Washington, for example, non-native species were often the first colonizers of exposed substrates in the former Lake Aldwell and Lake Mills reservoir beds before weed treatments were implemented (Shafroth et al. 2024). Spread of weeds could, in turn, degrade riparian and wetland habitats. To address and reduce this potential effect, PG&E will implement the Restoration Plan, which will address invasive weeds.

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With implementation of the Invasive Weed Restoration Measures, General Restoration Measures, and Restoration Plan, effects to riparian and wetland habitats in the Scott Dam Area from invasive weeds would be considered negligible.

Indirect Effects – Riparian and Wetland Habitats along the Shoreline of Lake Pillsbury Reservoir

Following the removal of Scott Dam, Lake Pillsbury reservoir would no longer impound water, removing a source of water for riparian and wetland habitats along the shoreline under existing conditions. It is likely the riparian and wetland habitats along the tributary-influenced zones would remain unaffected because tributaries would continue to be a water source for the vegetation. However, for any riparian and wetland habitats that are dependent on the reservoir for water, loss of this water source could result in contraction and/or degradation of these habitats.

To address and reduce effects to riparian and wetland habitats that are dependent on reservoir water sources, PG&E would implement the Riparian and Wetland Protection Measures. PG&E will obtain CWA Section 404/401 permits for the Proposed Action and implement all conditions of the permits, including any riparian protection measures. PG&E would also implement the Restoration Plan to facilitate growth of native riparian and wetland habitats along the Eel River and tributary streams within the former reservoir bed, which would mitigate any short-term losses of reservoir-dependent riparian and wetland habitats. The Restoration Plan will define actions to encourage rapid revegetation of riparian and wetland habitats within the former reservoir bed of Lake Pillsbury reservoir and monitoring measures. With implementation of the Restoration Plan, effects to riparian and wetland habitats would be reduced. Refer to Section 2.1.2, Applicant's Proposal for more details on the goals of the Restoration Plan. Over time, it is expected that the Restoration Plan would result in a greater amount and increased diversity of riparian and wetland vegetation within the former inundation zone along the restored Eel River. Refer to Phase 2b below for a further discussion of the long-term trajectory of riparian and wetland vegetation in the restoration area.

Indirect Effects – Tule Elk Browsing

As described in Section 2.2.4.6, Wildlife Resources, a herd of tule elk is known to occur on the north shore of Lake Pillsbury reservoir and has been observed feeding on riparian and wetland vegetation in the tributary-influenced zones and in the emergent wetland habitat on the north shore of Lake Pillsbury reservoir. Loss of the reservoir may influence tule elk behavior if forage is significantly affected by the drawdown. Tule elk and other game mammals may be drawn to forage in active restoration areas containing young riparian vegetation and may affect the success of restoration actions, particularly in active planting areas. Several studies have shown that elk and other large herbivores can hinder restoration objectives by preferentially browsing in restored areas, which slows the recovery of riparian vegetation (Averett et al. 2017; Craig 2015; Opperman and Merenlender 2000). To address and reduce this potential effect, PG&E will develop and implement the Tule Elk Management Plan, which would specify monitoring and reporting requirements to document tule elk habitat use during the restoration period and would also specify humane elk exclusion methods to limit elk browsing from hindering restoration success. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12 for additional details of these measures. With implementation of the Tule Elk Management Plan, potential effects to riparian and wetland restoration efforts from tule elk browsing would be negligible.

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Phase 2b

Potential effects from Phase 2b include beneficial indirect effects to riparian and wetland habitats from restoration of the former reservoir bed of Lake Pillsbury reservoir. Through the implementation of the Restoration Plan (including any required monitoring and adaptive management), restoration of the former reservoir bed of Lake Pillsbury reservoir would convert a large area of formerly lacustrine habitats to a mosaic of upland, wetland, and riparian habitats found along the restored channel of the Eel River and tributary streams. Therefore, restoration would likely increase the total area of riparian and wetland vegetation in the long term compared to the existing condition. Also, riparian connectivity would be enhanced between existing riparian and wetland habitats upstream and downstream of Lake Pillsbury reservoir.

Therefore, with implementation of the Restoration Plan, facility removal would have a beneficial effect on riparian and wetland habitats in the Scott Dam Area.

Cape Horn Dam Area

The shoreline of Van Arsdale Reservoir contains eight adjacent forested and emergent wetlands (refer to Section 2.2.3.4, Botanical Resources, Figure 2.2.3.4-2).

Potential direct and indirect effects to riparian and wetland habitats following facility removal are provided below and are separated by Phase 2a and Phase 2b.

Phase 2a

Potential direct effects from Phase 2a include disturbance of riparian/wetland habitats during implementation of restoration activities. Potential indirect effects include (1) loss or degradation of habitat from introduction of invasive weeds during restoration and (2) potential changes to riparian and wetland habitats along the shoreline of Van Arsdale Reservoir from sediment release upstream from Cape Horn Dam. Each potential effect is further described in the sections below.

Direct Effects

Most restoration activities will take place within the dewatered reservoir bed of Van Arsdale Reservoir (i.e., on bare substrates). Restoration activities would be conducted in newly exposed areas along the historical river channel that do not support vegetation under existing conditions. Access to restoration areas would utilize construction access roads, as described for construction effects above, and would not require removal of riparian and wetland vegetation.

PG&E will implement the Restoration Plan to facilitate the restoration of riparian and wetland habitat within the former reservoir bed. Because the existing reservoir is set within a relatively narrow valley, the restoration area would be relatively small and limited to newly exposed banks of the Eel River. While, as described previously, the Restoration Plan will include collecting and planting native vegetation (e.g., willow plugs), due to the small size of the restoration area, passive revegetation from nearby riparian and wetland vegetation along the banks may reduce the need for any collections. Therefore, it is anticipated that a smaller amount of material at Van Arsdale Reservoir would need to be collected to implement revegetation under the Restoration Plan as

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compared to Lake Pillsbury reservoir restoration areas. Collection of willow cuttings would result in a short-term effect to riparian vegetation in source populations; however, riparian vegetation often rapidly resprouts following trimming (Braatne et al. 1996), so direct effects from collection would be negligible. Similarly, any collection of wetland plugs for herbaceous vegetation could result in minor short-term impacts to the source of collection (Hoag 2000).

Considering the small amount of material and the overall availability of riparian habitats in the Analysis Area, any collections to support the Restoration Plan would result in negligible effects to riparian and wetland habitats in the Cape Horn Dam Area.

Indirect Effects – Invasive Weeds

As described above for botanical resources, eight invasive weed species are known to occur in the Cape Horn Dam Area. Active restoration activities have the potential to introduce new invasive weed populations or spread existing populations. The potential for the introduction or spread of invasive weeds from active restoration will be addressed and reduced through implementation of the Invasive Weed Restoration Measures and General Restoration Measures, as described above. Refer to Section 2.1.2.2, Proposed Environmental Measures, Table 2-12, for the full language of these measures.

Because invasive weeds have been documented around the shoreline of Van Arsdale Reservoir, exposure of soils within the former reservoir bed have the potential for passive recolonization by invasive weeds. Spread of weeds could, in turn, degrade habitat for special-status plants. To address and reduce this potential effect, PG&E will implement the Restoration Plan, which will include invasive weed monitoring and treatment requirements.

With implementation of the Invasive Weed Restoration Measures, General Restoration Measures, and Restoration Plan, effects to riparian and wetland habitats in the Cape Horn Dam Area from invasive weeds would be considered negligible.

Indirect Effects – Riparian and Wetland Habitats along the Shoreline of Van Arsdale Reservoir

Under Phase 2a, following drawdown of Lake Pillsbury reservoir and Van Arsdale Reservoir and removal of the dams, water levels in Van Arsdale Reservoir would be similar to the historical condition (i.e., confined within the historical Eel River channel). Portions of the narrow reservoir bed would be exposed, and the surface and depth to groundwater for shoreline riparian vegetation may increase. The first high-flow event would mobilize coarser sediments from Van Arsdale Reservoir downstream at the same time that millions of cubic yards of fine and coarse sediment from the former Lake Pillsbury reservoir would be mobilized. Aggradation of sediment is likely within portions of the reservoir bed, and new bars may form that promote increased bank erosion and lateral channels. The nature of the changes will vary depending on the width and slope of any given portion of the reservoir bed. Relatively wide and low-gradient portions of the narrow reservoir bed would be expected to have more sediment deposition than narrower and steeper reaches. While these changes could result in reductions in the current extent of forested and emergent wetlands because of reduced water levels or from burial in sediment, new riparian vegetation may also become established over time on the new depositional surfaces (Shafroth et

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al. 2002, 2024). A 2024 review of several studies on the Elwha River system noted that new surfaces within the former reservoirs were rapidly colonized, particularly in areas of fine sediment, within 3 to 5 years after dam removal (Shafroth et al. 2024). Additionally, sediments trapped behind Scott Dam upstream may also contain seed sources that could facilitate rapid colonization within Van Arsdale Reservoir, as was observed downstream of the Glines Canyon Dam in the Elwha River system (Shafroth et al. 2024).

Following mobilization of sediments, PG&E will restore the former reservoir bed consistent with the Restoration Plan. The focus of the restoration would be stabilization of the new river channel including native plantings, as necessary. Refer to Section 2.1.2, Applicant's Proposal for more details on the goals of the Restoration Plan.

With implementation of the Restoration Plan, effects to riparian and wetland habitats in the Cape Horn Dam Area would be negligible. Refer to Phase 2b below for a further discussion of the long-term trajectory of riparian and wetland vegetation in the restoration area.

Phase 2b

Phase 2b is the resulting conditions following restoration of the Cape Horn Dam Area, including the construction restoration area and the bed of Van Arsdale Reservoir. Under Phase 2b, restoration of the dam and ancillary facility sites would result in a long-term benefit to riparian and wetland habitats.

Following mobilization of sediments, PG&E will restore the former reservoir bed consistent with the Restoration Plan. The focus of the restoration would be stabilization of the new river channel including native plantings, as necessary. Over time, the reach of the Eel River within Van Arsdale Reservoir is expected to return to a morphologic condition similar to pre-dam conditions. Similar to the patterns observed following dam removal in the Elwha River system (Shafroth et al. 2024), the river is expected to become a more dynamic channel, formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, deeper pools, and less-dense riparian vegetation. In other areas, the formation of new sediment bars may provide surfaces for the establishment of young riparian vegetation (Shafroth et al. 2002, 2024). The length of time required for a return to this condition may be a few to several years and would be largely dependent on the magnitude, frequency, and duration of subsequent flood events. While the density of mature riparian vegetation decreased, increased diversity of riparian species and age class structure was observed within 3 to 5 years following dam removal on the Elwha River system (Shafroth et al. 2024). In the long term, the riparian community, diversity, age class structure, and composition are expected to increase under the unimpaired hydrology, resulting in more complex and diverse riparian communities.

Therefore, with implementation of the Restoration Plan, facility removal would have a beneficial effect on riparian and wetland habitats in the Cape Horn Dam Area.

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Eel River Watershed

The predominant riparian and wetland vegetation along the Eel River downstream of Scott Dam includes black cottonwood, Fremont cottonwood, red alder, riparian mixed hardwood, riparian mixed shrub, wet meadows, white alder, willow, willow (shrub), and willow–alder alliances. Further downstream, riparian and wetland vegetation within the Eel River estuary includes willow, willow (shrub), and pickleweed–cordgrass alliances (refer to Section 2.2.3.4, Botanical Resources, Maps 2.2.3.4-1a–i, for the location of these habitats). Woody plant encroachment has been documented on the Eel River downstream of Scott Dam, particularly in the reach between Scott Dam and Soda Creek (Stillwater Sciences et al. 2020).

Outside of the Scott Dam and Cape Horn Dam areas, there would be no direct restoration activities in the Eel River Watershed. Potential indirect effects to riparian and wetland habitats following facility removal are provided below and are separated by Phase 2a and Phase 2b.

Phase 2a

As described above, Phase 2a includes the initial temporary physical conditions in the Eel River Watershed immediately following facility removal. This includes the approximately 12-mi. section of the Eel River from Scott Dam to Van Arsdale Reservoir, the approximately 38-mi. section of the Eel River below Cape Horn Dam to the Middle Fork Eel River, and the approximately 119-mi. section from the Middle Fork Eel River to the estuary. Potential effects to riparian and wetland habitats in the Eel River Watershed under Phase 2a are described below.

The sediment release in Phase 2a may indirectly affect riparian and wetland habitats. The duration of erosion of upstream sediment during the initial high-flow event following dam removal is calculated to take from 1 to 8 days depending on the rate of discharge. Based on sediment transport modeling completed for the Proposed Action (refer to Section 2.2.4.8, Geomorphology), it is expected that the majority of coarse sediment will be deposited upstream of the confluence with the Middle Fork Eel River. In addition, some of the suspended fine sediment may deposit and alter channel or floodplain morphology in this reach, at least temporarily until subsequent high-flow events can resuspend it and transport it farther downstream. Flow from major tributaries downstream will diminish the effect of the elevated sediment load, and it is likely that alterations to the existing channel morphology will become difficult to distinguish downstream of the confluence with the Middle Fork Eel River (located approximately 38 mi. downstream of Van Arsdale Reservoir).

The effects of sediment release on riparian vegetation present along the Eel River would vary based on site-specific factors including volume of discharge, distance from the point of release, and the geomorphology of the site affected. Deposition of sediment closest to the former dam sites could result in temporary burial of vegetation, particularly low-lying shrubs and herbaceous vegetation in close proximity to the river channel. In the Elwha River system, sediment burial did not have measurable effects on the amount of mature riparian vegetation downstream of the removed dams within a 3- to 5-year monitoring period (Shafroth et al. 2024). Effects to riparian vegetation would occur primarily in the reach from Scott Dam downstream to the confluence with the Middle Fork Eel River.

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While these changes could result in reduction in the extent of forested and emergent wetlands from burial in sediment, riparian vegetation is generally adapted to periodic disturbances. Riparian areas generally resprout rapidly following sediment deposition (Braatne et al. 1996; Shafroth et al. 2002), and creation of new channel bars and deposits provides surfaces for riparian species to colonize (Rood et al. 2003), particularly early successional species that are not able to compete with mature late-successional riparian species that tend to encroach on regulated channels (Shafroth et al. 2024). Effects from the sediment pulse are anticipated to be greatest in the first year after dam removal, and natural sediment transport dynamics and riparian recruitment processes would be restored over time (refer to the Phase 2b discussion below). Therefore, any indirect effects to riparian habitats from sedimentation would be temporary and negligible.

Wetland habitats may also experience temporary burial from sediment deposition (U.S. Bureau of Reclamation 2010). However, because transient sediment deposits would be erodible during subsequent flow events, any effects to existing wetland vegetation would be short term and negligible. Deposition of sediments in new locations may also provide surfaces for the colonization of new wetland vegetation, as was documented in studies of the Elwha River system (Shafroth et al. 2024).

Sediment deposition is expected to decrease with distance and is expected to have a minimal effect downstream of the Middle Fork Eel River to the Eel River estuary and therefore would not result in detectable changes in associated riparian habitats in this reach.

Though sediment deposition is not expected within the Eel River estuary, fine suspended sediment is anticipated to reach the Eel River estuary and would be temporarily suspended in the water column (refer to Section 2.2.4.8, Geomorphology for more information). Because significant deposition is not anticipated, emergent wetland and riparian habitats in the Eel River are unlikely to be significantly affected by fine suspended sediment. However, the Eel River estuary is known to contain submerged aquatic eelgrass habitats (Merkel & Associates, Inc. 2023). Eelgrass can be affected by suspended sediment because fine suspended sediments restrict sunlight penetration, which can reduce photosynthesis and result in reduced growth and survival of eelgrass (Fonseca and Fisher 1986; U.S. Environmental Protection Agency 2003). While the extent of effects is unknown, this effect is expected to be short-term, but it is possible that increased suspended sediment concentrations may adversely affect eelgrass communities in the Eel River estuary.

Phase 2b

From Scott Dam downstream to the Middle Fork Eel River, the Proposed Action is expected to result in a more dynamic channel, formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, and deeper pools. Areas with existing overly dense riparian vegetation may be scoured more frequently or buried in sediment deposits, resulting in less-dense vegetation. In the Elwha River system, large patches of stable, mature riparian vegetation in the reach between two dams were scoured, and new channel bars formed that allowed the establishment of early successional species (Shafroth et al. 2024). In other areas, the formation of new sediment bars may provide surfaces for establishment of young riparian vegetation (Shafroth et al. 2002, 2024). In addition, unimpaired hydrology would be anticipated to limit re-encroachment along and within the channel following removal of the dams (Stillwater et al. 2020). While the extent of riparian vegetation may be less in

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some locations along the Eel River over time because vegetation encroachment would be expected to be reduced after dam removal, in the long term, the riparian community species diversity, age class structure, composition, and structural complexity are expected to increase under the unimpaired hydrology, resulting in more complex and diverse riparian communities. For example, within 3 to 5 years following monitoring on the Elwha River system, native species diversity on the Elwha River reach between the two former dams increased by 31 percent after dam removal (Shafroth et al. 2024). Restoring the connectivity of the Elwha River also enhanced seed dispersal of hydrochorous plants (i.e., plants that disperse by water) (Shafroth et al. 2024). Therefore, while dam removal may result in local changes in the distribution of riparian vegetation, in the long term, facility removal is expected to benefit the diversity, age class structure, and connectivity of riparian and wetland habitats in the Eel River Watershed as a whole.

The Proposed Action would have minimal effects to river morphology downstream of the Middle Fork Eel River and is not likely to result in detectable long-term changes in associated riparian and estuarine habitats.

East Branch Russian River

The USFWS NWI identified forested wetlands along the East Branch Russian River (refer to Section 2.2.3.4.4, Riparian and Wetland Resources for more information), and a review of recent Google Earth Pro imagery (2024) suggests that riparian habitats are present along a series of interconnected canals.

Under existing conditions, PG&E diverts water from the Potter Valley Powerhouse into the approximately 11-mi. stretch of the East Branch Russian River, which flows from the powerhouse through an alluvial valley (i.e., Potter Valley) and up through more mountainous terrain to Lake Mendocino, formed where the East Branch meets the mainstem Russian River. Diversions into the East Branch Russian River, based on monthly average, typically ranged between about 150 cfs and 225 cfs, with maximum flows of about 300 cfs for the period of record (see Section 2.2.3.1, Water Use and Hydrology).

Following removal of Cape Horn Dam under Phase 2a, PG&E would no longer divert water to the Potter Valley Powerhouse. Reestablishment of natural flows in the East Branch Russian River would result in an intermittent flow regime in the river, and the majority of the river from the powerhouse to the ordinary high water mark of Lake Mendocino (approximately 11 mi.) would be seasonally dry. This would result in an alteration in the location and extent of riparian habitats along the East Branch Russian River. Riparian habitat may be reduced in some areas, but valley oaks and other trees that can tolerate seasonal flows would be expected to persist. Hydrophytic vegetation that requires year-round inundation would be expected to decline.

Therefore, while the extent of alteration is unknown, it is anticipated that a change from a perennial to an intermittent system could result in loss of riparian and wetland habitat. Because many species in California are adapted to intermittent flow regimes, certain riparian species may be able to persist. Nevertheless, the Proposed Action may potentially have a significant adverse effect on riparian vegetation in the East Branch Russian River.

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2.2.4.5.3 Environmental Measures

To avoid or reduce effects to botanical resources during construction (Phase 1), PG&E will obtain, prepare, and/or implement the following measures. A complete list of construction measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- General Construction Measures;
- Special-status Plant Construction Measures;
- Invasive Weed Construction Measures;
- Riparian and Wetland Protection Measures; and
- Restoration Plan.

To reduce potential effects to botanical resources post-facility removal (Phase 2), PG&E will implement the following environmental measures. A complete list of environmental measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- General Restoration Measures;
- Restoration Plan;
- Special-status Plant Restoration Measures;
- Invasive Weed Restoration Measures;
- Riparian and Wetland Protection Measures; and
- Tule Elk Management Plan.

2.2.4.5.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects to special-status plants from implementation of the Proposed Action.

Unavoidable adverse effects to riparian and wetland resources include the following:

- Potential temporary effects to eelgrass communities in the Eel River estuary from suspended fine sediment load from removal of the dams; and
- Potential alteration of riparian and wetland habitat along the East Branch Russian River because diversions to the East Branch Russian River would no longer occur under the Proposed Action.

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2.2.4.6 Wildlife Resources

This section describes the potential effects to wildlife resources that could occur because of the Proposed Action described in PG&E's Application for Surrender of License and Decommissioning Plan for the Potter Valley Hydroelectric Project (Project), which is described in Section 2.1.2, Applicant's Proposal. Section 2.1.2, Applicant's Proposal, includes a description of decommissioning Project facilities and restoration goals to be met as part of the Proposed Action.

Potential effects are separated into construction effects (Phase 1) and post-facility removal effects (Phase 2). Post-facility removal effects are split into two subphases: Phase 2a – Initial Conditions and Preliminary Restoration and Phase 2b – Resulting Conditions and Restoration. Refer to Section 2.2.4.1, Analytical Approach, for a description of each phase.

The effects are determined by analyzing the changes in wildlife resources that may result from activities to be implemented under the Proposed Action compared to the No-Action Alternative (existing condition) (Section 2.1.1, No Action Alternative). Analysis of the Proposed Action considers removal of Scott Dam and removal of Cape Horn Dam within the same construction season, as described in Section 2.1.2, Applicant's Proposal.

Final effects determinations consider measures (i.e., construction measures and post-facility removal measures) included to avoid or mitigate impacts associated with the implementation of the Proposed Action (refer to Section 2.1.2.2, Proposed Environmental Measures). Unavoidable adverse effects are discussed at the end of this section.

This section evaluates the potential effects of construction and post-facility removal activities on wildlife resources, including species listed under the ESA as well as other special-status wildlife and game species. For this analysis, species have been grouped to include taxonomically similar species, including special-status invertebrates (such as monarch butterfly [*Danaus plexippus*] and western bumble bee [*Bombus occidentalis*]), bald eagle (*Haliaeetus leucocephalus*), northern spotted owl (*Strix occidentalis caurina*), other raptors, other special-status birds and game birds, special-status bats, special-status mesocarnivores, and tule elk (*Cervus elaphus nannodes*) and other game mammals. Refer to Section 2.2.3.5, Wildlife Resources, Table 2.2.3.5-3, for a list of special-status wildlife species known to occur or potentially occurring in the Analysis Area (defined below) and their status and habitat requirements. Table 2.2.3.5-6 provides a list of resident and migratory game species potentially occurring in the Analysis Area.

The baseline Analysis Area for short-term construction effects (Phase 1) includes the Scott Dam Area and Cape Horn Dam Area, which each include two construction areas:

- The Scott Dam Area construction areas include (1) the Scott Dam and ancillary support facility (necessary for dam removal) construction area and (2) the ancillary facility (not necessary for dam removal) and recreation facility construction area; and
- The Cape Horn Dam Area construction areas include (1) the Cape Horn Dam and ancillary support facility (necessary for dam removal) construction area and (2) the ancillary facility (not necessary for dam removal) construction area.

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As described above, post-facility removal effects are split into two subphases: Phase 2a – Initial Conditions and Preliminary Restoration and Phase 2b – Resulting Conditions and Restoration. Refer to Section 2.2.4.1, Analytical Approach, for a description of each phase.

Phase 2a includes analysis of the initial temporary physical conditions that will occur immediately following dam and ancillary/recreation facility removal, including the following:

- Loss of the facility or feature (e.g., loss of lake/reservoir, ancillary facility, or recreation facility);
- Initial release of stored water and sediment following removal of the adit plug at Scott Dam and complete removal of Scott Dam and Cape Horn Dam:
  - Pulse hydrology in the Eel River downstream of Scott Dam and Cape Horn Dam until the reservoir is drained
  - Sediment load/deposition and turbidity in the Eel River downstream of Scott Dam and Cape Horn Dam;
- Continued degraded water quality and sediment deposition after the initial sediment release until the system stabilizes and water quality and sediment transport return to natural conditions; and
- Ground disturbance, use of heavy equipment, transport of materials to and from the Scott Dam Area and Cape Horn Dam Area - Restoration Areas to allow for restoration of the former dam sites and ancillary/recreation facility sites.

Phase 2b includes analysis of the resulting conditions following dam ancillary/recreation facility removal including:

- Unimpaired hydrology in the Eel River downstream of Scott Dam and Cape Horn Dam;
- Restored sediment transport and water quality in the Eel River downstream of Scott Dam and Cape Horn Dam;
- Unimpaired hydrology in the East Branch Russian River; and
- Restored former reservoir beds and ancillary/recreation facility sites following facility removal.

The baseline Analysis Area for post-facility removal effects (Phases 2a and 2b) encompasses the larger Eel River and Russian River watersheds and is detailed below.

- The baseline Analysis Area for the post-facility removal section includes four primary areas:
  - Scott Dam Area – Restoration Area, which consists of:
    - The former Scott Dam construction areas;
    - The former Project ancillary/recreation facility construction areas; and
    - The former reservoir bed of Lake Pillsbury reservoir;

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  - The Cape Horn Dam Area – Restoration Area, which consists of:
    - The former Cape Horn Dam construction areas;
    - The former Project ancillary facility construction areas; and
    - The former reservoir bed of Van Arsdale Reservoir;
  - The Eel River from the former Scott Dam to the Eel River estuary (i.e., Eel River Watershed); and
  - The East Branch Russian River from the Potter Valley Powerhouse to Lake Mendocino (i.e., Russian River Watershed).

The baseline Analysis Area as defined above varies depending on the biology of wildlife species and is therefore further defined under each section below, where applicable.

The following potential effects to wildlife resources resulting from short-term construction-related activities (Phase 1) and post-facility removal (Phase 2a and 2b) were evaluated:

- Potential effects to special-status invertebrate species:
  - Phase 1
    - Direct effects to breeding or foraging individuals during construction; and
    - Indirect effects through the reduction or degradation of habitat resulting from removal of floral resources or the introduction of invasive weeds during construction.
  - Phase 2a
    - Direct effects to foraging individuals during restoration activities;
    - Indirect effects through the conversion of lacustrine habitat to riverine habitat within the former reservoir beds;
    - Indirect effects from sediment deposition in downstream riparian/wetland habitat; and
    - Indirect effects through the potential spread or introduction of invasive weeds during restoration activities.
  - Phase 2b
    - Long-term benefit to habitat (increase in floral resources) from restoration of the former reservoir beds and return of unimpaired hydrology in the Eel River Watershed; and
    - Change in potential habitat in the East Branch Russian River following reestablishment of natural flow conditions.

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- Potential effects to bald eagle (FD, Eagle Act, FSS, SE, and CFP):
  - Phase 1
    - Direct effects to active nests or disturbance of foraging individuals during dam and Project recreation facility/ancillary facility removal and potential helicopter use; and
    - Indirect effects through degradation of water quality within aquatic habitats.
  - Phase 2a
    - Direct disturbance of active nests or foraging individuals during restoration activities;
    - Change in bald eagle foraging and nesting habitat in the former reservoir beds;
    - Potential nest territory abandonment and loss of foraging habitat from loss of Lake Pillsbury reservoir following removal of Scott Dam; and
    - Indirect effects through degradation of water quality within aquatic habitats for fish prey resources following dam removal and during restoration activities.
  - Phase 2b
    - Long-term beneficial effect to foraging habitat through restoration of riverine habitats in former reservoir beds and enhancement of native anadromous fish within the Eel River Watershed; and
    - Change in potential foraging habitat in the East Branch Russian River following reestablishment of natural flow conditions.
- Potential effects to northern spotted owl (FT, FSS, ST, and California SSC):
  - Phase 1
    - Direct effects to active nests or disturbance of foraging individuals during dam and Project recreation facility/ancillary facility removal and potential helicopter use.
    - Indirect effects from minor removal of suitable nesting and foraging habitat within construction areas.
  - Phase 2a
    - Direct disturbance of active nests or foraging individuals during restoration activities.
  - Phase 2b
    - Long-term benefit through restoration of upland habitats following dam and recreation facility/ancillary removal.

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- Potential effects to other raptors:
  - Phase 1
    - Direct effects to active nests or disturbance of foraging individuals during dam and Project recreation facility/ancillary facility removal and potential helicopter use; and
    - Indirect effects through degradation of water quality within aquatic habitats for aquatic foraging raptors.
    - Indirect effects from minor removal of suitable nesting habitat within construction areas.
  - Phase 2a
    - Direct disturbance of active nests or foraging individuals during restoration activities;
    - Change in osprey foraging and nesting habitat in the former reservoir beds and Eel River;
    - Reduction of osprey foraging habitat from the loss of Lake Pillsbury reservoir following removal of Scott Dam; and
    - Indirect effects through degradation of water quality within aquatic habitats for fish prey resources following dam removal and during restoration activities.
  - Phase 2b
    - Long-term benefit to several raptor species through restoration of aquatic and upland habitats following dam and recreation facility/ancillary facility removal;
    - Long-term beneficial effect to osprey foraging habitat through restoration of riverine habitats in former reservoir beds and enhancement of native anadromous fish within the Eel River Watershed;
    - Long-term beneficial effect to raptors foraging in riparian and wetland habitats throughout the Eel River Watershed; and
    - Change in potential habitat in the East Branch Russian River following reestablishment of natural flow conditions.
- Potential effects to other special-status birds, common birds, and game birds:
  - Phase 1
    - Direct effects to active nests during trimming or removal of vegetation, dam removal, and Project recreation facility/ancillary facility removal; and
    - Indirect effects through the loss or degradation of habitat.

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  - Phase 2a
    - Direct disturbance of active nests during restoration activities;
    - Indirect effects from loss of Lake Pillsbury reservoir and potential loss of riparian/wetland habitats along the shoreline; and
    - Indirect effects from sediment released following dam removal, including potential burial/degradation of riparian habitat, effects to macroinvertebrate prey resources, and changes in estuarine habitats.
  - Phase 2b
    - Long-term benefit through restoration of upland, riparian/wetland, and aquatic habitats following dam and recreation facility/ancillary facility removal;
    - Long-term benefit to special-status birds nesting and foraging in riparian and wetland habitats in the Eel River Watershed from return of natural hydrology and sediment transport dynamics; and
    - Change in riparian habitat in the East Branch Russian River following reestablishment of natural flow conditions.

- Potential effects to special-status bat species:
  - Phase 1
    - Direct effects from potential removal of bat roosts in Project facilities to be removed; and
    - Indirect effects through degradation of aquatic foraging habitat during dam and Project recreation facility/ancillary facility removal.
    - Indirect effects through minor removal of tree-roosting habitat in construction areas.
  - Phase 2a
    - Indirect effects through loss of aquatic foraging habitat (reservoirs) and effects from sediment released following dam removal.
  - Phase 2b
    - Long-term benefit to roosting and foraging habitat through restoration of upland and aquatic habitats following dam and recreation/ancillary facility removal;
    - Long-term benefit to aquatic foraging habitat in the Eel River Watershed from return of natural hydrology and sediment transport dynamics; and
    - Change in potential habitat in the East Branch Russian River following reestablishment of natural flow conditions.

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- Potential effects to special-status mesocarnivores:
  - Phase 1
    - Direct disturbance of individuals during construction activities;
    - Potential collisions with construction vehicles;
    - Indirect effects from minor removal of suitable denning and foraging habitat in construction areas.
  - Phase 2a
    - Direct disturbance of individuals during restoration activities.
    - Potential collisions with vehicles necessary for restoration activities; and
    - Indirect effects through burial of riparian habitat from sediment released following dam removal.
  - Phase 2b
    - Long-term benefit to potential habitat through restoration of aquatic and upland habitats following dam and recreation facility/ancillary facility removal; and
    - Change in riparian habitat in the East Branch Russian River following reestablishment of natural flow conditions.
- Potential effects to tule elk or other game mammals:
  - Phase 1
    - Direct disturbance of individuals during construction activities; and
    - Potential collisions with construction vehicles.
  - Phase 2a
    - Direct disturbance of individuals during restoration activities;
    - Potential stranding of individuals in the reservoir beds following dam removal; and
    - Potential attraction to active restoration sites.
  - Phase 2b
    - Long-term benefit to foraging habitat through restoration of aquatic and upland habitats following dam and recreation facility/ancillary facility removal; and
    - Change in habitat in the East Branch Russian River following reestablishment of unimpaired flow conditions.

A discussion of potential construction and post-facility removal effects to wildlife resources that could occur as a result of implementation of the Proposed Action, with incorporation of construction and restoration measures, is provided below by area. Unavoidable adverse effects are also discussed at the end of this section.

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2.2.4.6.1 Special-status Invertebrates

Monarch butterflies (Federal Candidate) and western bumble bees (FSS, State Candidate Endangered) have the potential to occur in the Analysis Area. Provided below is a description of potential effects to these species and their habitat from Phase 1 (Construction) and Phase 2 (Post-facility Removal) activities.

***Phase 1* (*Construction*)**

Phase 1 is defined to include construction activities required for the removal of dams, ancillary facilities, and recreation facilities. The Phase 1 Analysis Area for special-status invertebrates includes the Scott Dam and Cape Horn Dam construction areas (see Map 2-8 and Map 2-10 in Section 2.1.2, Applicant's Proposal) as well as potential riparian habitat within the bed and bank of the Eel River immediately downstream of the dams.

Provided below is a discussion of potential direct effects to special-status invertebrate individuals from construction activities, as well as indirect effects to habitat.

Direct Effects

Monarch butterflies rely on milkweed (*Asclepias* spp.) as larval host plants, and adults can forage on a wide variety of floral resources in upland and riparian communities. Western bumble bees nest in rodent burrows in the ground and forage on a wide variety of floral resources, typically in open areas. Floral resources located in the proposed construction areas at Scott Dam and Cape Horn Dam (including the dams, ancillary facilities, and recreation facilities) may provide foraging habitat for both species.

Although construction areas (work areas, staging areas, and access routes) are primarily located within the footprint of existing facilities that support little vegetation compared to the surrounding landscape, some portions extend into suitable habitat including densely vegetated portions of the construction area south of Scott Dam, east and west of Cape Horn Dam, and southeast of the Fish Screen Facility. Construction activities will require removal of vegetation. Vegetation that supports breeding and/or floral foraging resources may potentially be present and be affected during the following activities:

- Scott Dam Area:
  - Site access improvements and establishment of work, staging, and stockpile areas required for construction in the Scott Dam Area;
  - Temporary improvements to and extension of an existing 0.35-mi. access road off Scott Dam Road that will provide access to the barge launch at the downstream terminus of the existing plunge pool below the dam;
  - Establishment of the new access road south of Scott Dam (off of Elk Mountain Road); and
  - Establishment of construction work, staging, and stockpile areas required for removal of Project recreation facilities and associated access roads.

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- Cape Horn Dam Area:
  - Site access improvements and establishment of work, staging, and stockpile areas required for construction in the Cape Horn Dam Area; and
  - Construction of a new approximate 200-ft. temporary access road on river-right (looking downstream) from the existing wingwall to an area across the river from the diversion intake.

A search of Calflora (2024) indicates records of milkweed species in the Analysis Area, including two records within 100 ft. of Oak Flat Campground and Pogie Point Campground. Milkweed is also known to occur near Navy Camp Campground (CDFW 2025). There is potential for milkweed to be present in areas of proposed site access improvements and the new temporary access roads, as well as construction work, staging, and stockpile areas. Similarly, rodent burrows containing suitable nesting sites for western bumble bee may be present in these areas. Considering that most of the construction work areas would be placed within the existing developed footprint of Project ancillary facilities and Project recreation facilities, the area potentially affected is small compared to the availability of breeding habitat on the landscape scale. Vegetation removal and ground disturbance could result in minor, localized direct effects to monarch butterfly and western bumble bee breeding, including disturbance (i.e., flushing or displacement), removal of monarch butterfly larvae, and crushing or burial of burrows containing western bumble bee nests.

To address and reduce potential effects to monarch butterfly and western bumble bee breeding, PG&E will implement General Construction Measures, which restrict ground disturbance to designated areas and require all contractors and staff to be given instructions on how to comply with site-specific avoidance and protection measures, and General Wildlife Measures, which require any observations of special-status species that were previously undiscovered to be reported to PG&E as soon as practicable. To further address and reduce potential effects to monarch butterfly, PG&E will implement Monarch Butterfly Measures, which require that (1) milkweed habitat be mapped in conjunction with special-status plant surveys and (2) PG&E flag and avoid milkweed during construction, to the extent possible. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of construction measures to be implemented to address and reduce effects to special-status invertebrates.

Foraging habitat for monarch butterfly and western bumble bee is more general than breeding habitat and consists of flowering plants of a wide variety of species. Therefore, trimming or removal of vegetation to support removal of Scott Dam, Cape Horn Dam, and Project ancillary/recreation facilities could potentially result in disturbance (i.e., flushing or displacement) of butterflies and bees if they are foraging in the vicinity. Flushing or displacement of foraging individuals would be short term and temporary and would cease upon completion of the activity.

With the implementation of construction measures, proposed construction activities in the Scott Dam Area and Cape Horn Dam Area would have negligible and temporary direct effects on special-status invertebrates.

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Indirect Effects

As described previously, while the Scott Dam and Cape Horn Dam construction areas are primarily located within existing disturbed footprints and do not support abundant floral resources for special-status invertebrates, some portions extend into densely vegetated areas located east and west of Cape Horn Dam, and southeast of the Fish Screen Facility. Construction activities in these areas may result in removal of approximately 3.35 acres of habitat in the Scott Dam Area and 4.18 acres in the Cape Horn Dam Area. Some trimming and/or removal of vegetation may be required. Removal of vegetation would result in a minor and temporary decrease in potential habitat available for foraging butterflies and a temporary decrease in potential breeding habitat for monarch butterfly if milkweed were removed. Removal of vegetation would also result in a minor and temporary decrease in potential habitat available for foraging western bumble bees. To address and reduce effects of vegetation removal/trimming, PG&E will implement the General Construction Measures, which require all contractors and staff to be given instructions on how to comply with site-specific avoidance and protection measures, and General Wildlife Measures, which require any observations of special-status species that were previously undiscovered to be reported to PG&E as soon as practicable. In addition, implementation of the Riparian and Wetland Protection Measure, which requires flagging and avoidance of riparian habitat outside of construction work areas, would also protect floral resources. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of construction measures to be implemented to address and reduce indirect effects to special-status invertebrates.

Importation and use of construction vehicles and equipment and foot traffic associated with construction activities could degrade native plant habitat for special-status invertebrates through the introduction or spread of invasive weeds. To address and reduce the potential for the introduction or spread of invasive weeds, PG&E will implement the Invasive Weed Construction Measure, which requires pre-construction invasive weed surveys; cleaning equipment prior to transport to construction work areas; minimizing soil disturbance to the extent possible; utilizing existing roads; maintaining gravel and spoil piles free of invasive weeds and using weed-free areas for staging and laydown; using certified weed-free erosion control materials; seeding stockpiles with native seed mixes; cleaning clothing, footwear, and gear before moving from an infested area to a non-infested area; and avoiding working in invasive weed-infested areas or prioritizing activities so that infested areas are worked last. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of construction measures. Implementation of the Invasive Weed Construction Measure will address and reduce the potential for the introduction or spread of invasive weeds that could degrade habitat for special-status invertebrates.

With the implementation of construction measures, proposed construction activities in the Scott Dam Area and Cape Horn Dam Area would have negligible indirect effects on habitat for special-status invertebrates.

***Phase 2* (*Post-facility Removal*)**

Phase 2a includes the initial temporary physical conditions in the Scott Dam Area, Cape Horn Dam Area (including the former reservoir beds), and Eel River Watershed immediately following completion of Phase 1. Phase 2b is defined to include the long-term resulting conditions following

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completion of Phase 2a. The Phase 2 Analysis Area for special-status invertebrates includes (1) the Scott Dam Area and Cape Horn Dam Area - Restoration Areas (including the former reservoir beds of Lake Pillsbury reservoir and Van Arsdale Reservoir), (2) potential riparian and wetland foraging habitats along the bed and bank of the Eel River from Scott Dam to the Eel River estuary, and (3) riparian, wetland, and cropland habitats along the East Branch Russian River.

Provided below is a discussion of direct and indirect effects to special-status invertebrates resulting from Phase 2a and Phase 2b activities.

Phase 2a

Direct Effects

The following describes potential indirect effects to special-status invertebrates during Phase 2a in the Scott Dam Area, Cape Horn Area, and Eel River Watershed.

Scott Dam Area: Following facility removal activities, the former Scott Dam and Project ancillary facility/recreation facility sites would consist of disturbed areas that would not represent breeding and foraging habitats for special-status invertebrates. Therefore, any use of heavy equipment or ground disturbance associated with restoration of these areas would not directly affect special-status invertebrates.

Following removal of Scott Dam, the bed of Lake Pillsbury reservoir will be exposed. While the majority of the reservoir bed would be unvegetated, the margins of Lake Pillsbury reservoir support flowering plants that may provide foraging habitat for special-status invertebrates. Use of heavy equipment and ground disturbance associated with the restoration of the reservoir bed, if required, could result in minor disturbance effects to special-status invertebrates (e.g., flushing). Such effects would be localized, short term, and temporary and would not significantly affect special-status invertebrates. Therefore, direct effects to special-status invertebrates from construction associated with the restoration of the Lake Pillsbury reservoir bed would be negligible.

Cape Horn Dam Area: Following construction activities, the former Cape Horn Dam and ancillary facility areas would be heavily disturbed and would not support habitat for special-status invertebrates. Similarly, construction activities in support of the restoration of the reservoir bed would be conducted in newly exposed areas along the historical river channel, which do not support flowering vegetation. Therefore, construction activities associated with restoration are not expected to directly affect special-status invertebrates.

Eel River Watershed: Outside of the Scott Dam and Cape Horn Dam restoration areas described above, no direct restoration activities would occur within the Eel River Watershed. Therefore, there are no direct effects to special-status invertebrates in the Eel River Watershed.

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Indirect Effects

The following describes potential indirect effects to special-status invertebrates during Phase 2a in the Scott Dam Area, Cape Horn Area, and Eel River Watershed.

Scott Dam Area: The tributary-influenced zones of Lake Pillsbury reservoir support forested wetland habitats, and the northern shoreline of Lake Pillsbury reservoir, which is periodically inundated, supports both wetland and upland vegetation. In 2018, PG&E conducted a botanical study to document plant species diversity across three transects spaced across the north shore of Lake Pillsbury reservoir from the waterline to the top of the OHWM (PG&E 2019a). Thirty-eight unique plant species were observed across transects, including flowering plants that represent suitable floral foraging habitat for special-status invertebrates (e.g., sky lupine [*Lupinus nanus*] and clover [*Trifolium* spp.]). Several additional small wetlands were also mapped along the reservoir shoreline by Stillwater Sciences during technical studies (PG&E 2019b). These habitats support flowering vegetation that represents potential foraging habitat for special-status invertebrates.

Wetland habitats in the tributary-influenced zones of Lake Pillsbury reservoir would likely be preserved following removal of Scott Dam. Vegetation growing along the periodically inundated northern shoreline of the reservoir tolerates periodic changes in water levels under existing conditions and therefore is expected to persist in the near term following removal of Scott Dam; however, it may experience some loss due to the reduction in surface water. Ground disturbance and use of heavy equipment within the Lake Pillsbury reservoir bed required for implementation of the Restoration Plan could potentially result in the temporary loss of portions of these habitats as well, particularly if stabilization of soils is required in these habitats along the Eel River channel or tributary channels within the reservoir bed. Considering that these impacts would be relatively minor and small scale and that surrounding areas support a wide diversity of flowering plants, indirect effects to special-status invertebrates in the Scott Dam Area would be negligible.

Cape Horn Dam Area: Van Arsdale Reservoir, a narrow reservoir, supports forested wetlands as well as several small emergent wetlands that, in turn, support flowering plants that may potentially provide habitat for special-status invertebrates. Under Phase 2a, following removal of the dams, water levels in Van Arsdale Reservoir would be similar to the historical condition (i.e., confined within the historical Eel River channel). Portions of the narrow reservoir bed would be exposed, and the surface and depth to groundwater for shoreline riparian vegetation may increase. The first high-flow event would mobilize coarser sediments from Van Arsdale Reservoir downstream at the same time that millions of cubic yards of fine and coarse sediment from the former Lake Pillsbury reservoir would be mobilized. Aggradation of sediment is likely within portions of the reservoir bed, and new bars may form that promote increased bank erosion and lateral channels. The nature of the changes will vary depending on the width and slope of any given portion of the reservoir bed. Relatively wide and low-gradient portions of the narrow reservoir bed will experience more sediment deposition than narrower and steeper reaches. While these changes could result in reductions in the extent of forested and emergent wetlands because of reduced water levels or from burial in sediment, new riparian vegetation may also become established over time on the new depositional surfaces (Shafroth et al. 2002, 2024). A 2024 review of several studies on the Elwha River in Washington noted that new surfaces within the former reservoirs were rapidly colonized, particularly in areas of fine sediment, within 3 to 5 years after

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dam removal (Shafroth et al. 2024). Additionally, sediments trapped behind Scott Dam upstream may also contain seed sources that could facilitate rapid colonization within Van Arsdale Reservoir, as was observed downstream of the Glines Canyon Dam on the Elwha River system (Shafroth et al. 2024).

Following mobilization of sediments, PG&E will restore the former Van Arsdale Reservoir bed consistent with the Restoration Plan. The focus of the restoration would be stabilization of the new river channel including native plantings, as necessary. While the location and extent of riparian vegetation present along the former Van Arsdale Reservoir will change over time following dam removal, sediment mobilization, and restoration, flowering plants will persist in the area and will continue to provide habitat for special-status invertebrates.

Scott Dam and Cape Horn Dam Areas: Restoration activities and exposure of soils within the beds of the former Lake Pillsbury reservoir and Van Arsdale Reservoir have the potential to introduce and/or spread invasive weeds that can, in turn, degrade foraging habitat for special-status invertebrates. Because invasive weeds have been documented around the entire shoreline of Lake Pillsbury reservoir, exposure of soils within the former reservoir bed has the potential to result in passive recolonization by invasive weeds. The physical (e.g., particle-size distribution) and chemical (e.g., macronutrient and micronutrient status) character of sediments may potentially create conditions that favor growth of invasive plants (Shafroth et al. 2002). For example, soils containing high micronutrients or metal levels may favor invasive plants that are more tolerant of these ions. Within the Elwha River system, for example, non-native species were often the first colonizers of exposed substrates in the former Lake Aldwell and Lake Mills reservoir beds before weed treatments were implemented (Shafroth et al. 2024).

In the year prior to construction, PG&E will identify and map the locations of invasive weeds within the historical inundation zone of Lake Pillsbury reservoir in conjunction with implementation of special-status plant surveys conducted under the Special-Status Plant Restoration Measures (refer to Section 2.1.2, Applicant's Proposal, Table 2-12). These invasive weed surveys will inform the Restoration Plan as it relates to addressing and reducing potential spread or introduction of invasive weeds. During restoration activities at both the Scott Dam Area and the Cape Horn Dam Area, PG&E will implement Invasive Weed Restoration Measures, which require staff and contractors to implement BMPs such as cleaning equipment prior to arriving onsite, minimizing soil disturbance as much as possible, using established roads to the extent possible, using certified weed-free erosion control materials, and avoiding working in invasive weed-infested areas. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these measures. PG&E will also implement the Restoration Plan, which addresses invasive weed species within the restoration areas. With the implementation of the Invasive Weed Restoration Measures and the Restoration Plan, effects to special-status invertebrate foraging habitat from potential introduction or spread of invasive weeds would be negligible.

Eel River Watershed: As described in Section 2.2.4.5, Botanical Resources, the effects of sediment release on riparian vegetation along the Eel River that represents potential habitat for special-status invertebrates would vary based on site-specific factors including volume of discharge, distance from the point of release, and the geomorphology of the site affected. Deposition of sediment closest to

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the former dam sites could result in temporary burial of some vegetation, particularly low-lying shrubs and herbaceous vegetation closest to the river channel. In the Elwha River system, sediment burial did not have measurable effects on the amount of mature riparian vegetation downstream of the removed dams within a 3- to 5-year monitoring period (Shafroth et al. 2024). Effects to riparian habitats would occur primarily in the reach from Scott Dam downstream to the confluence with the Middle Fork Eel River. Sediment deposition is expected to decrease with distance and is expected to have a minimal effect downstream of the Middle Fork Eel River and therefore would not result in detectable changes in associated riparian or estuarine habitats in this reach. Considering that special-status invertebrates are habitat generalists and are potentially present wherever flowering resources are available and that effects on riparian vegetation would be localized, temporary, and restricted to limited portions of the Eel River Watershed (i.e., from Scott Dam to the Middle Fork Eel River) and would not significantly affect availability of flowering resources, indirect effects of Phase 2a activities on special-status invertebrates would be negligible.

Phase 2b

Provided below is a discussion of resulting conditions during Phase 2b (i.e., following restoration) at the Scott Dam Area and Cape Horn Dam Area, in the Eel River Watershed, and in the Russian River Watershed.

Scott Dam Area and Cape Horn Dam Area: Under Phase 2b, restoration of the dam and associate ancillary/recreation facility sites in the Scott Dam Area and at the Cape Horn Dam Area would result in a long-term benefit to special-status invertebrates.

The former reservoir bed of Lake Pillsbury reservoir is expected to recolonize with upland and riparian vegetation and return to a riverine system. To enhance this succession process, PG&E will implement the Restoration Plan, which would reestablish the connectivity of the Eel River and tributary streams within the former reservoir bed and would enhance natural vegetation recruitment processes within the former reservoir bed. In the long term, the conversion of lacustrine habitat within Lake Pillsbury reservoir to a mosaic of wetland, riparian, and upland habitats found along a restored riverine channel would increase both the availability and diversity of breeding and foraging habitat for special-status invertebrates.

The focus of the restoration at Van Arsdale Reservoir would be stabilization of the new river channel including native plantings, as necessary. Over time, the reach of the Eel River formerly within Van Arsdale Reservoir is expected to return to a morphologic condition similar to pre-dam conditions. Similar to the patterns observed following dam removal in the Elwha River system (Shafroth et al. 2024), the river would become a more dynamic channel, formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, deeper pools, and less-dense riparian vegetation. In other areas, the formation of new sediment bars may provide surfaces for the establishment of young riparian vegetation (Shafroth et al. 2002, 2024). The length of time required for a return to this condition may be a few to several years and would be largely dependent on the magnitude, frequency, and duration of subsequent flood events. While the density of mature riparian vegetation decreased, increased diversity of riparian species and age class structure was observed within 3 to 5 years following dam removal on the Elwha River system (Shafroth et al. 2024). Therefore, riparian vegetation would persist throughout these changes and would continue

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to provide habitat for special-status invertebrates. In addition, the conversion of former Project ancillary facility sites to native upland habitats would also increase the availability of breeding and foraging habitats. Therefore, implementation of the Proposed Action, including the Restoration Plan, would result in an overall benefit to special-status invertebrates in the vicinity of the former Van Arsdale Reservoir in the long term.

Eel River Watershed: From Scott Dam downstream to the Middle Fork Eel River, the Proposed Action is expected to result in a more dynamic channel, formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, and deeper pools. Areas with existing overly dense riparian vegetation will be scoured more frequently or buried with sediment deposits, resulting in less-dense vegetation. In the Elwha River system, large patches of stable, mature riparian vegetation in the reach between the two former dams were scoured, and new channel bars formed that allowed the establishment of early successional species (Shafroth et al. 2024). In other areas, the formation of new sediment bars may provide surfaces for establishment of young riparian vegetation (Shafroth et al. 2002, 2024). In the long term, the riparian community, diversity, age class structure, and composition are expected to increase under the unimpaired hydrology, resulting in more complex and diverse riparian communities. For example, within 3 to 5 years following monitoring on the Elwha River system, native plant species diversity on the reach between the two former dams increased by 31 percent after dam removal (Shafroth et al. 2024).

The Proposed Action would have minimal effects to river morphology downstream of the Middle Fork Eel River and is not likely to result in detectable long-term changes in associated riparian and estuarine habitats.

As stated previously, special-status invertebrates are habitat generalists and are potentially present wherever flowering resources are available. Restoration of unimpaired river flow conditions and associated variable effects on riparian habitat would have a minor, neutral, or beneficial effect on special-status invertebrates.

Russian River Watershed: Under existing conditions, PG&E diverts water from the Potter Valley Powerhouse into the approximate 11-mi. East Branch Russian River, which runs from the powerhouse through an alluvial valley (i.e., Potter Valley) and down through more mountainous terrain to Lake Mendocino, formed where the East Branch meets the mainstem Russian River. Diversions into the East Branch Russian River, based on monthly average, typically ranged between about 150 cfs to 225 cfs, with maximum flows of about 300 cfs for the period of record (refer to Section 2.2.3.1, Water Use and Hydrology), although in recent years they have been much lower (see Section 2.2.3.1, Water Use and Hydrology, Figure 2.2.3.1-15). Since 1908, diversions from the Eel River have been used to irrigate a wide variety of irrigated croplands in Potter Valley including, but not limited to, irrigated pasture, hayfields, pears, vineyards, and other row crops (PVID 2024). Riparian and wetland habitats are also present, primarily along the valley portion of the river. Flowering plants present within agricultural, riparian, and wetland habitats in Potter Valley provide suitable habitat for both the monarch butterfly and western bumble bee.

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Following removal of Cape Horn Dam under Phase 2a, PG&E would no longer divert water to the Potter Valley Powerhouse. Re-establishment of unimpaired flows in the East Branch Russian River from the powerhouse to the OHWM of Lake Mendocino (approximately 11 mi.) would result in very low flows seasonally (e.g., 1 cfs; see Table 2.2.3.1-15). This would result in an alteration in the location and extent of riparian and wetland habitats, and the reduction or loss of irrigation water is likely to result in the loss of irrigated croplands. Upland habitats and dryland crops that are more tolerant of drier seasonal conditions would become more prevalent in the valley. Changes in the location and extent of these habitats over time would not result in a significant change in the availability of flowering plants, which can occur in all habitat types. Therefore, implementation of Phase 2a and Phase 2b would result in negligible effects to special-status invertebrates along the East Branch Russian River.

2.2.4.6.2 Bald Eagle

Bald eagles are known to occur in the Analysis Area. Provided below is a description of potential effects to this species and their habitat from Phase 1 (Construction) and Phase 2 (Post-facility Removal) activities.

***Phase 1* (*Construction*)**

Phase 1 is defined to include construction activities required for the removal of dams, ancillary facilities, and recreation facilities. Bald eagles in California typically nest in large conifers located within 1 mi. of large bodies of water that provide aquatic foraging habitat (Jackman and Jenkins 2004). Therefore, the Analysis Area for bald eagles includes a 1-mi. buffer around the Scott Dam and Cape Horn Dam construction areas (Section 2.1.2, Applicant's Proposal, Map 2-8 and Map 2-10), Lake Pillsbury reservoir, and Van Arsdale Reservoir. The Analysis Area also includes the bed and bank of the Eel River 500 ft. downstream of the dam construction sites.

Provided below is a discussion of potential direct and indirect effects during Phase 1 to bald eagle and its habitat.

Direct Effects

There are six active bald eagle territories at Lake Pillsbury reservoir in the vicinity of the Scott Dam construction areas (refer to Volume III, confidential Map 2.2.3.5-2b) (PG&E 2022, 2021, 2019c). There is one active bald eagle territory at Van Arsdale Reservoir just east of Cape Horn Dam (refer to Volume III, confidential Map 2.2.3.5-2b) (personal communication, A. Anderson, Aquatic Biologist, PG&E, with Robyn Smith, Janelle Nolan & Associates Environmental Consulting, 2025).

Construction activities at Scott Dam will take place over three seasons: the initial low-flow period (June–October), the first high-flow season after the initial low-flow period (November–May), and the first low-flow season after sediment flushing activities (June–October). Construction activities in the Cape Horn Dam Area will take place from March to November. Construction activities at both locations will partially overlap with the bald eagle nesting period, which occurs between January 1 and August 1 (Jackman and Jenkins 2004). Bald eagles display varying sensitivities to noise depending on the type of activity. While some construction activities (heavy equipment use

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and human presence) have minor disturbance effects in a localized area, louder activities such as helicopter use or blasting can affect eagles within a wider radius. Construction noise has the potential to cause nest disturbance and/or failure and could result in the abandonment of eggs, nestlings, and/or fledglings.

Blasting may be required during the early breeding season (January/February) to remove the adit plug and flush sediments at Scott Dam (no blasting is proposed at Cape Horn Dam). Available information on the response of breeding bald eagles to sonic booms indicates that loud noises increased displays of alert behavior (Grubb and King 1991). In many cases, foraging eagles were more easily disturbed than nesting bald eagles, but in some cases, eagles have abandoned their nest following loud noises (Grubb and King 1991). These behaviors varied depending on the distance of the sonic boom from the nest location, with eagles farther away from the sonic boom location showing less disturbance behavior.

The Proposed Action may also require helicopter use during the construction period. Compared to the existing condition in which helicopter use is infrequent, this represents increased potential for disturbance of nesting bald eagles. A literature review completed by Anderson (2007) compares data from various studies on the response of raptors (including eagles, peregrine falcon [*Falco peregrinus anatum*], osprey [*Pandion haliaetus*], and red-tailed hawk [*Buteo jamaicensis*]) to the disturbance and noise of helicopters. In the studies reviewed, helicopters elicited a disturbance response (e.g., flushing from nest) more frequently than fixed-wing aircraft; however, adults were typically flushed from nests only when helicopters approached closely or hovered for long periods of time. A sudden or surprise approach may also elicit a stronger response from adult raptors at nests than a gradual approach (White and Sherrod 1973). Increased helicopter activity has the potential to result in nest abandonment.

The *National Bald Eagle Management Guidelines* (USFWS 2007) recommend implementation of the following activity-specific non-disturbance buffers between January 1 and August 1 to avoid impacts to nesting eagles:

- 0.5-mi. no-disturbance buffer for blasting activities;
- 1,000-ft. no-disturbance buffer (horizontal/vertical) for helicopters and fixed-wing aircraft; and
- 660-ft. no-disturbance buffer for use of heavy equipment and general construction activities.

Based on a preliminary evaluation, one existing territory is located within the 0.5-mi. no-disturbance buffer (blasting) from Scott Dam and may therefore potentially be affected by this activity. A historical nest location at Cape Horn Dam was within the 660-ft. no-disturbance buffer at Cape Horn Dam, but more recent nest surveys show a new nest is being used well outside this buffer. Refer to Section 2.2.3.5, Wildlife Resources, for more information on active and historical bald eagle nest locations. PG&E annually monitors active bald eagle nesting activity within the Project area, which provides high-quality data on nest locations and nest fidelity over the years. There is potential for

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active nest locations to change over time or new nest territories to be established by the time construction activities are implemented in the Scott Dam Area and Cape Horn Dam Area.

To address and reduce disturbance of nesting bald eagles during construction, PG&E will implement a Bald Eagle Conservation Plan (see Section 2.1.2, Applicant's Proposal, Table 2-12 for additional details of the plan). The Bald Eagle Conservation Plan requires the following:

- Tree removal must be restricted to outside the nesting season (i.e., September 1–December 31). With the implementation of this measure, trees would not be removed during a time of year when eagles are actively scouting trees for potential nest sites (Jackman and Jenkins 2004).
- Pre-construction surveys will be conducted prior to each construction season (i.e., Scott Dam removal, Cape Horn Dam removal, and ancillary/recreation facility removal) in the Scott Dam Area and Cape Horn Dam Area. Surveys would be conducted consistent with methods established in PG&E's existing License Article 54 (PG&E 2004).
- Following completion of surveys, PG&E would conduct a GIS analysis of the location of active nests relative to the timing and location of construction activities (including blasting, helicopter flight paths, and heavy equipment use) and determine whether nests fall within the USFWS-recommended no-disturbance buffers (USFWS 2007). Based on this analysis, the following avoidance and protection measures would apply:
  - If bald eagle nests are found within the no-disturbance buffer of the construction area for Project ancillary facilities (i.e., not necessary for dam removal) and recreation facilities, PG&E would modify the timing of construction activities and/or helicopter flight paths to maintain the no-disturbance buffer to the extent possible. If activities cannot be modified to provide the no-disturbance buffer, construction activities would not proceed within this buffer until a qualified biologist determines that the nest is no longer active or PG&E informally consults with USFWS to obtain authorization to proceed.
  - If bald eagle nests are found within the no-disturbance buffer of the Scott Dam and ancillary facility (i.e., necessary for dam removal) construction area, PG&E would modify the timing of construction activities and/or helicopter flight paths to the extent possible. However, dam removal must occur during the summer/fall prior to high flows to allow the adit plug removal at Scott Dam, for sediment flushing to occur during high flows, and to address and reduce potential effects to aquatic resources in the Eel River downstream of Scott Dam. Blasting associated with adit plug removal would be implemented during an appropriate high-flow event (anticipated between December and February). Because these time periods may potentially overlap with the bald eagle nesting season (January 1–August 31), nest disturbance may be unavoidable. Through development of the Bald Eagle Conservation Plan and informal consultation with USFWS under the Eagle Act, PG&E would further develop and implement measures to avoid, address, and reduce potential disturbance as part of the Proposed Action to protect bald eagles.

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With the implementation of the Bald Eagle Conservation Plan, as well as General Construction Measures and General Wildlife Measures that provide environmental training and inadvertent discovery procedures, adverse direct effects to bald eagle would be reduced. However, the potential for nest disturbance, failure, and/or abandonment in the vicinity of Scott Dam and Cape Horn Dam remains and would be considered a significant unavoidable adverse effect. PG&E will informally consult with USFWS.

Indirect Effects

Potential indirect effects to bald eagles as a result of changes to nesting or foraging habitat are described below.

Nesting Habitat: Nesting habitat is defined to include tall trees within 1 mi. of Project reservoirs and rivers. The proposed construction activities would result in minimal effects to nesting habitat for bald eagle for several reasons. The construction areas (i.e., work areas, access routes, staging areas, and stockpile areas) are primarily located within the existing disturbed footprint of Project ancillary facilities that do not provide nesting habitat for bald eagle, but some portions extend into densely vegetated areas located east and west of Cape Horn Dam, and southeast of the Fish Screen Facility. Construction activities in these areas may result in removal of approximately 3.35 acres of vegetation in the Scott Dam Area and 4.18 acres in the Cape Horn Dam Area. PG&E may also need to improve existing access roads in preparation for construction. Some tree removal may be required along these roads to ensure passage of large construction vehicles and equipment (e.g., barges). Minimal removal of individual trees may also be required to allow for removal of ancillary and recreation facilities. As described in the General Construction Measures, removal of mature, large trees (35 inches dbh or greater) that have high wildlife value and that represent potential nesting structures for raptors such as bald eagles would be avoided to the extent possible. Removal of smaller trees would not significantly alter nesting habitat for bald eagle. Therefore, effects to nesting habitat would be negligible.

Foraging Habitat: Bald eagle foraging habitat in the reservoir may also be affected by the drawdown of Lake Pillsbury reservoir during construction. Lake Pillsbury reservoir would be drawn down to approximately 10,000 ac-ft by October of the initial low-flow season. Drawdown of the reservoir would reduce the total surface area of aquatic habitat available for foraging bald eagles. However, research suggests that reservoir drawdowns can benefit eagle foraging by exposing spawning and foraging fish to predation (Jackman et al. 2007), especially in the short term before fish populations have a chance to decline. Therefore, effects to foraging habitat in the vicinity of Scott Dam would be negligible.

As part of construction, PG&E would remove or partially remove the fish ladder on the face of Cape Horn Dam. The existing fish ladder at Cape Horn Dam attracts foraging bald eagles—bald eagles were observed foraging at this facility during studies conducted in 2018 (PG&E 2019a). Construction of temporary cofferdams upstream and downstream to dewater the work area would result in a signification reduction in the size of Van Arsdale Reservoir, which is another foraging location for bald eagle at the Van Arsdale bald eagle territory. Furthermore, fish rescue would be conducted during dewatering (refer to Section 2.2.4.4, Fish and Aquatic Resources), and stranded fish that represent potential prey would be removed, unlike at Lake Pillsbury reservoir. Van

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Arsdale Reservoir is a narrow reservoir, and the presence of construction equipment and personnel would likely deter eagles from foraging in the reservoir. Therefore, construction would result in a significant adverse effect to bald eagle foraging in the Cape Horn Dam Area.

Use of ground-disturbing construction equipment at both the Scott Dam Area and the Cape Horn Dam Area could result in degradation of water quality in downstream aquatic habitats from sedimentation or runoff of hazardous materials. Degradation of water quality could, in turn, affect fish that represent prey species for foraging bald eagles. The potential for temporary downstream effects to aquatic foraging habitats will be addressed and reduced through implementation of the Construction Water Quality and Water Temperature Monitoring Plan, Construction Erosion Prevention Plan, Water Quality and Erosion Control Measures, Hazardous Materials Handling Measures, Stormwater Pollution Prevention Plan, and applicable USFS BMPs. In addition, PG&E will implement the Riparian and Wetland Protection Measure, which includes (1) obtaining coverage under CWA Section 404/401 permits and complying with all conditions of the permits and (2) implementing BMPs for work within and near aquatic habitats. Such BMPs may include prohibiting refueling of equipment within 100 ft. of wetlands, streams, or waterways; using secondary containment; providing spill kits onsite; and using appropriate erosion control materials. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these measures.

With the implementation of the Bald Eagle Conservation Plan and other construction measures, potential effects to bald eagle aquatic foraging habitats during construction at Scott Dam would be negligible. However, construction activities at Cape Horn Dam would still likely result in adverse indirect effects to bald eagles by significantly altering preferred foraging habitat for the Van Arsdale bald eagle territory.

***Phase 2* (*Post-facility Removal*)**

Phase 2a includes the initial temporary physical conditions in the Scott Dam Area, Cape Horn Dam Area (including the former reservoir beds), and Eel River Watershed immediately following completion of Phase 1. Phase 2b is defined to include the long-term resulting conditions following completion of Phase 2a. The Analysis Area for bald eagle for Phase 2 construction includes (1) a 1-mi. buffer around the Scott Dam Area and Cape Horn Dam Area - Restoration Areas, (2) the Eel River from Scott Dam to the Eel River estuary, and (3) the East Branch Russian River from the Potter Valley Powerhouse to Lake Mendocino.

Provided below is a discussion of direct and indirect effects to bald eagles resulting from Phase 2 (Post-facility Removal) activities.

Phase 2a

Phase 2a includes the initial temporary physical conditions in the Scott Dam Area, Cape Horn Dam Area (including the former reservoir beds of both reservoirs), and Eel River Watershed. Direct and indirect effects to these areas from implementation of Phase 2a activities are described below.

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Direct Effects

Scott Dam Area and Cape Horn Dam Area: There are currently six active bald eagle territories at Lake Pillsbury reservoir in the vicinity of the Scott Dam construction and restoration areas (refer to Volume III, confidential Map 2.2.3.5-2b) and one active bald eagle territory at Van Arsdale Reservoir in the vicinity of the Cape Horn Dam construction and restoration areas (refer to Volume III, confidential Map 2.2.3.5-2b).

The noise from ground-disturbing heavy equipment, helicopter use, and increased human presence during restoration activities could result in disturbance effects to bald eagles nesting or foraging in the Analysis Area. Refer to the Phase 1 effects discussion for a detailed description of how these activities may adversely affect bald eagle nesting and foraging. Noise disturbance could result in the abandonment of eggs and/or chicks and result in nest failure.

The *National Bald Eagle Management Guidelines* (USFWS 2007) recommend implementation of the following activity-specific non-disturbance buffers between January 1 and August 1 to avoid impacts to nesting eagles:

- 1,000-ft. no-disturbance buffer (horizontal/vertical) for helicopters and fixed-wing aircraft; and
- 660-ft. no-disturbance buffer for use of heavy equipment and general construction activities.

Use of helicopters and ground-disturbing heavy equipment during restoration activities may adversely affect eagle nests if restoration activities occur within the buffers described above during the breeding season.

To address and reduce disturbance of nesting bald eagles during construction, PG&E will implement a Bald Eagle Conservation Plan, which requires the following:

- Pre-restoration nest surveys will be conducted prior to use of heavy equipment or helicopters associated with the Restoration Plan or Sediment/Channel Monitoring and Response Plan in the Scott Dam Area – Restoration Area and Cape Horn Dam Area – Restoration Area. Surveys would be conducted consistent with methods established in PG&E's existing License Article 54 (PG&E 2004).
- Following completion of surveys, PG&E would conduct a GIS analysis of the location of active nests relative to the timing and location of restoration activities (including helicopter flight paths and heavy equipment use) and determine whether nests fall within the USFWS-recommended no-disturbance buffers (USFWS 2007). Based on this analysis, the following avoidance and protection measures would apply:
  - If bald eagle nests are found within the no-disturbance buffer of the Scott Dam Area – Restoration Area or Cape Horn Dam Area – Restoration Area, PG&E would modify the timing of restoration activities and/or helicopter flight paths to maintain the no-disturbance buffer. Restoration activities would not proceed within this buffer until a qualified biologist determines that the nest is no longer active.

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- If it is determined that restoration activities cannot be modified (timing/location) to provide the no-disturbance buffer, PG&E will informally consult with USFWS to develop site-specific measures that consider the type of restoration activity and the specific location of the nest (topography, slope, etc.).

With implementation of the Bald Eagle Conservation Plan, as well as the General Restoration Measures and General Wildlife Restoration Measures that provide environmental training and inadvertent discovery procedures, direct effects to nesting bald eagles would be negligible.

Eel River Watershed: There are no direct effects to bald eagle in the Eel River Watershed outside of the Scott Dam and Cape Horn Dam restoration areas described above.

Indirect Effects

Scott Dam Area: Immediately following dam removal, there would no longer be impounded water behind Scott Dam and the former Lake Pillsbury reservoir would be restored to a riverine habitat. This would result in the loss of available lacustrine foraging habitat, which could affect the number of bald eagle nesting territories this area is able to support. Research suggests that reservoir drawdowns can benefit eagle foraging in the short term by exposing spawning and foraging fish to predation (Jackman et al. 2007). In addition, fish carrion availability is expected to increase in the short term following drawdown and removal of the dam. However, a reduction in overall foraging area may result in adverse effects to the reproductive success of the existing bald eagle nesting territories after the first year, after stranded fish have been consumed.

In California, though bald eagles are often seen foraging on both rivers and reservoirs, nests are most abundant on reservoirs (Jackman and Jenkins 2004). Therefore, loss of Lake Pillsbury reservoir may result in a reduction in nesting territories and available reservoir foraging habitat for bald eagles. Loss of Lake Pillsbury reservoir would also result in the loss of foraging habitat within the Analysis Area.

As described under Phase 2b, PG&E would implement the Restoration Plan to reduce effects to bald eagle foraging habitat over time. Although lacustrine habitat will be lost, over time, the Eel River and tributary streams within the former reservoir bed of Lake Pillsbury reservoir are expected to improve native anadromous fish resources and fish habitat conditions within the Eel River Watershed. However, the loss of the reservoir may still result in the abandonment of nesting territories in the Scott Dam Area, resulting in a significant adverse effect.

Cape Horn Dam Area: Under Phase 2a, following drawdown of Lake Pillsbury reservoir and removal of Scott and Cape Horn dams, sediments will be deposited in and near the former Van Arsdale Reservoir primarily between Cape Horn Dam (RM 156.8) to approximately 3 miles upstream (RM 160). Loss of Van Arsdale Reservoir and sediment deposition will result in adverse effects to fish habitat and, therefore, loss of foraging habitat for bald eagle. With adverse effects to foraging habitat, the loss of Van Arsdale Reservoir may result in a reduction in nesting territories.

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Following the first high-flow event would mobilize coarse sediments from Van Arsdale Reservoir downstream at the same time that millions of cubic yards of fine and coarse sediment from the former Lake Pillsbury reservoir would be mobilized. The release of accumulated sediment would result in temporary adverse effects to fish prey species inhabiting the river channel within the former reservoir during and immediately following the release of sediments from Lake Pillsbury reservoir. High suspended sediment loads will kill and adversely affect the physiology and behavior of fish species that represent prey for bald eagles, including (1) displacement of juveniles, (2) reduced feeding and growth, (3) physiological stress and respiratory impairment, (4) damage to gills, (5) reduced tolerance to disease and toxicants, (6) reduced survival, and (7) direct mortality (FERC 2022). As the transported sand and fine sediments settle on the streambed, they may also reduce the survival of incubating eggs and developing alevins in salmonid redds by impeding inter-gravel flow as well as the emergence of fry (FERC 2022).

To address and reduce the potential adverse effects of short-term increases in suspended sediment on fish species (bald eagle fish prey), PG&E proposes to implement a Construction Site Water Diversion, Dewatering, and Drawdown Plan and an Aquatic Species Management and Monitoring Plan. The Construction Site Water Diversion, Dewatering, and Drawdown Plan describes the timing and sequencing of drawdown and dam removal, which are designed to flush fine sediments from the historical river channel in the reservoir as rapidly as possible so that the duration of adverse effects on downstream biota would be as limited as possible. PG&E's Construction Site Water Diversion, Dewatering, and Drawdown Plan would time the drawdown and mobilization of sediments to coincide with seasonal high flows. PG&E's Aquatic Species Management and Monitoring Plan includes surveys and a rescue and relocation plan to reduce the effects of the Proposed Action on individual fish.

While the presence of fish carrion would increase food availability for bald eagles in the short term, this would be followed by a temporary overall decrease in availability of both carrion and live fish over Phase 2a.

Bald eagles would temporarily benefit from fish carrion in the near term following the initial sediment release. In addition, they are opportunistic feeders (Jackman et al. 2007) and may be able to utilize other local sources of food (e.g., terrestrial species) once carrion numbers are reduced. However, Phase 2a would result in a short-term reduction in their preferred prey (fish), which could potentially result in adverse effects to the reproductive success of the existing bald eagle nesting territory.

Eel River Watershed: Bald eagles may be indirectly affected by the effects of initial sediment release on fish populations in the Eel River downstream of the dams. Effects on fish populations are expected to vary with the distance from dam removal sites (refer to Section 2.2.4.4, Fish and Aquatic Resources).

Below Lake Pillsbury reservoir, the river flows approximately 12 mi. westward to Van Arsdale Reservoir, with an average slope of approximately 29 fpm (0.5 percent). The morphology of the reach is typical of reaches downstream of large dams that substantially regulate flow and sediment. The channel downstream of Scott Dam ranges from 100 to 180 ft. wide, with the widest portion

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where the river enters Van Arsdale Reservoir (based on observations from 2016 and 2017 aerial photographs, as cited in Stillwater Sciences 2021a). As the Eel River approaches Van Arsdale Reservoir, sediment transport potential decreases (Stillwater Sciences 2021a).

Following removal of the adit plug and Scott Dam (initial high-flow season), approximately 12 million cy of accumulated sediment from behind the dam would be mobilized into the Eel River downstream of Scott Dam within approximately 1 week (Stillwater Sciences 2021b). Additional mobilization of impounded sediment from behind the dam is expected during the second high-flow season, especially during precipitation or as unstable, exposed shorelines slump into the riverbed. The amount of sediment mobilized during the second high-flow season has not been quantified but is expected to be minor compared to the amount mobilized during sediment flushing activities. Sediment released would eventually settle in downstream reaches, creating aquatic habitats and providing substrates for riparian habitat.

Below Cape Horn Dam, the river flows 38 mi. westward to the Middle Fork Eel River, with an average slope of approximately 16 fpm (0.3 percent) (Brown and Ritter 1971). The morphology of the reach is typical of reaches downstream of large dams that substantially regulate flow and sediment.

Based on the most recent bathymetric and topographic surveys conducted in 2002 and 2006, the current capacity of Van Arsdale Reservoir is less than 390 ac-ft (PG&E 2006). The capacity data indicate that 1.7 million cy of sediment has been trapped behind the dam (McMillen Jacobs Associates 2021). Approximately 40,000 to 50,000 cy of sediment immediately upstream of the dam would be excavated to provide access for heavy equipment to begin demolition of Cape Horn Dam.

Following removal of the concrete gravity portion of Cape Horn Dam and lowering of the existing wingwall and earthen portion of the dam, the remaining 1.65 million cy of accumulated sediment from behind the dam would be mobilized into the Eel River downstream of Cape Horn Dam during the high-flow season.

Fifteen total fish species (including native and non-native species), are present or may occur in the Eel River downstream of Scott Dam. Refer to Section 2.2.4.4, Fish and Aquatic Resources, for a complete list of species known to occur or potentially occurring.

The release of accumulated sediment would result in temporary adverse effects to fish prey species inhabiting the Eel River downstream of Scott Dam during and immediately following the release of sediments from Lake Pillsbury reservoir. High suspended sediment loads will kill and adversely affect the physiology and behavior of fish species that represent prey for bald eagles, including (1) displacement of juveniles, (2) reduced feeding and growth, (3) physiological stress and respiratory impairment, (4) damage to gills, (5) reduced tolerance to disease and toxicants, (6) reduced survival, and (7) direct mortality (FERC 2022). As the transported sand and fine sediments settle on the streambed, they may also reduce the survival of incubating eggs and developing alevins in salmonid redds by impeding inter-gravel flow as well as the emergence of fry (FERC 2022).

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The initial die-off of fish would temporarily increase the availability of carrion, which is also a prey source for bald eagles. However, there will be reduced fish prey available for bald eagles within the Eel River until fish populations recover from the sediment release. Bald eagle foraging is relatively adaptable; in the Pacific Northwest, bald eagles make seasonal migrations to take advantage of the seasonal salmon die-off (Walters et al. 2021), and bald eagles are able to switch prey resources (e.g., carrion, mammals, waterfowl) when fish are unavailable as a food source (Buehler 2000).

To address and reduce the potential adverse effects of short-term increases in suspended sediment on fish species (bald eagle fish prey), PG&E proposes to implement a Construction Site Water Diversion, Dewatering, and Drawdown Plan and a Post-dam Removal Aquatic Species Management and Monitoring Plan. The Construction Site Water Diversion, Dewatering, and Drawdown Plan describes the timing and sequencing of drawdown and dam removal, which are designed to flush fine sediments from the historical river channel in the reservoir as rapidly as possible so that the duration of adverse effects on downstream biota is as limited as possible. PG&E's Construction Site Water Diversion, Dewatering, and Drawdown Plan would time the drawdown and mobilization of sediments to coincide with seasonal high flows. PG&E's Aquatic Species Management and Monitoring Plan includes surveys and a rescue and relocation plan to reduce the effects of the Proposed Action on individual fish.

Even with the implementation of measures to address and reduce potential effects to fish species (bald eagle fish prey), there will still be a short-term reduction in fish prey available to bald eagles following release of sediments from Scott Dam and Cape Horn Dam, and impacts to foraging bald eagles would be considered a significant adverse effect in the Eel River between Scott Dam and the Middle Fork Eel River.

The Eel River from the Middle Fork Eel River to the Eel River estuary flows approximately 119 mi. The Middle Fork Eel River drains 753 mi.^{2}, which is a larger drainage area than that of the upper Eel River upstream of the Middle Fork (688 mi.^{2}). It is a major contributor of flow and sediment to the mainstem Eel River. The exceptionally high sediment yield from the watershed (Lisle 1990) is apparent in the extensive sediment bars that are nearly continuous along the river channel. About 11 mi. upstream of the estuary, the Eel River transitions into a branching channel pattern and the average channel slope of the reach decreases to 0.05 percent.

Twenty total fish species (native and non-native) are present or may occur in the Eel River downstream of the Middle Fork Eel River. Refer to Section 2.2.4.4, Fish and Aquatic Resources for a complete list of species known to occur or potentially occurring.

The duration of erosion of 12 million cy of fine sediment is calculated to take from 1 day at a discharge of 5,000 cfs to 8 days if the discharge is only 1,000 cfs. The majority of the sediment eroded from Lake Pillsbury reservoir will be transported past the dam without settling. There will be minimal potential for deposition, and the reservoir deposit will be transported directly to the Eel River estuary (Stillwater Sciences 2021b). PG&E's Construction Site Water Diversion, Dewatering, and Drawdown Plan would time the drawdown and mobilization of sediments to

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coincide with seasonal high flows so that fine sediment would remain suspended as it passes through the lower Eel River and Eel River estuary to the Pacific Ocean.

The potential for fish kill in the Eel River is highest below Scott Dam and Cape Horn Dam where there are the highest concentrations of suspended fine sediments. From the confluence of the Eel River with the Middle Fork Eel River downstream to the confluence with the North Fork Eel River, flows from the Middle Fork Eel River will reduce the potential effects of fine sediment on fish species. Although effects would be reduced, suspended sediment loads are still anticipated to kill and adversely affect the physiology and behavior of fish species that represent prey for bald eagles. Therefore, the effects to foraging bald eagles in this segment would be considered short term and significant.

Downstream of the North Fork Eel River, potential effects to fish from fine sediment would be further reduced from the increase in flows from the North Fork Eel River. Although suspended sediments and high turbidity would still be present, they are not anticipated to result in a fish kill but may continue to affect the behavior of fish species. The overall availability of prey for bald eagles would not be affected. Potential effects to foraging bald eagles downstream of the North Fork Eel River to the Eel River estuary would therefore be considered negligible.

Phase 2b

Provided below is a discussion of resulting conditions following restoration at the Scott Dam Area and Cape Horn Dam Area, in the Eel River Watershed, and in the Russian River Watershed.

Scott Dam Area and Cape Horn Dam Area: PG&E will implement the Restoration Plan, which includes the reestablishment of the Eel River within the former reservoir beds, enhancement of fish habitat, and improvement of fish passage, allowing the future recolonization of native anadromous fish within the former reservoir bed. Implementation of the Restoration Plan would reduce effects to bald eagle foraging habitat by promoting the long-term recovery of fish populations and enhancing fish habitat along the reestablished Eel River.

As described for Phase 2a, the Eel River will be reestablished within the former reservoir bed of Lake Pillsbury reservoir and anadromous fish passage will be restored and monitored consistent with the Restoration Plan. In the long term, the conversion of lacustrine habitat within Lake Pillsbury reservoir to a mosaic of wetland, riparian, and upland habitats found along a restored riverine channel would increase the diversity, health, and distribution of the native fish community, which is expected to benefit bald eagle foraging habitat in the long term. However, even with improved anadromous fish habitat within the Eel River and the former Lake Pillsbury reservoir bed, the loss of Lake Pillsbury reservoir would result in a loss of total foraging habitat within the Analysis Area.

The restoration of the Eel River within the bed of the former Van Arsdale Reservoir is expected to result in a morphologic condition similar to pre-dam conditions. The river would become a more dynamic channel, formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, deeper pools, and less-dense riparian vegetation. The length of time required for a return to this condition may be a few to several years and would be largely dependent on the magnitude, frequency, and duration of subsequent flood events. PG&E will implement the Restoration Plan,

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which includes monitoring of restoration activities. In the long term, the conversion of lacustrine habitat within Van Arsdale Reservoir to a restored riverine channel that allows anadromous fish passage would benefit bald eagle foraging habitat and provide continued resources for foraging.

In addition, bald eagles at both locations are expected to benefit from the reduced human presence on the landscape once Project ancillary facilities and recreation facilities are removed. Reduced human disturbance pressure may benefit bald eagle nesting in the future. Therefore, over the long term, bald eagles would benefit from restoration of the former reservoir beds and ancillary/recreation facility sites following facility removal.

Eel River Watershed: Phase 2b is the resulting conditions in the Eel River following restoration. In the long term, the return of unimpaired hydrology, natural transport of sediment, removal of the anadromous fish passage barrier (Scott Dam), and unimpeded passage upstream of Cape Horn Dam would benefit bald eagles and their foraging habitat throughout the Eel River Watershed.

Under existing conditions, anadromous fish use portions of the Eel River and its tributaries for some or all of their life stages (e.g., spawning, rearing, and migration). Fish passage would be improved in the Eel River above both dams, as described below.

Scott Dam currently impedes fish passage into historical habitat upstream of Scott Dam. The presence of these barriers contributes to suppressed anadromous fish run size. Following the removal of Scott Dam, unimpaired flows would return to the Eel River downstream of Scott Dam and fish passage would be reestablished. Removal of Scott Dam will allow Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*O. mykiss*) to reach historical riverine habitats located above Scott Dam. NMFS (2002) estimated that 2,000 to 4,000 fall Chinook salmon and winter steelhead could have spawned above Scott Dam historically. Anadromous fish can respond relatively quickly to dam removal projects; a study of salmonid response to the dam removal project on the Elwha River documented fish recolonizing reaches upstream of the dams over the course of only a few years (Duda et al. 2021). On the Klamath River, a single fall-run Chinook salmon was documented in a tributary upstream of J.C. Boyle Dam approximately two months after the dam was removed (Oregon Department of Fish and Wildlife 2024), illustrating the potential of how quickly salmon could return upstream of the removed dams.

Cape Horn Dam currently provides fish passage via the fish ladder, but following removal of Cape Horn Dam, there will be unimpeded fish passage into historical habitat upstream of Scott Dam. There is a breeding pair of bald eagles that are known to forage near Cape Horn Dam. Following dam removal, unimpeded fish passage to upstream riverine habitat is expected to increase the numbers of naturally occurring salmon and steelhead in the Eel River above Cape Horn Dam (refer to Section 2.2.4.4, Fish and Aquatic Resources).

The restored condition would result in more natural sediment transport and hydrologic processes in the Eel River but is not expected to substantially change habitat conditions or fish populations downstream of the confluence with the Middle Fork Eel River.

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The restored condition would result in more natural sediment transport and hydrologic processes in the Eel River, which would enhance fish habitat complexity, increase the quantity and quality of spawning areas, and enhance forage and feeding opportunities for fish species by creating more habitat for stream-dwelling macroinvertebrates (e.g., caddisflies, mayflies, stoneflies). A more natural sediment and hydrological regime would also benefit fish habitat by increasing channel complexity, promoting pool formation, increasing side-channel rearing habitat, and facilitating a lower incidence of pathogens that cause disease.

The removal of the fish passage barrier (Scott Dam), improvement of fish passage at Cape Horn Dam, and reestablishment of unimpaired hydrology and natural sediment transport would result in an overall benefit to the fish community and habitat in the Eel River Watershed. Improved fish habitat and abundance would therefore benefit foraging bald eagles over the long term.

Russian River Watershed: The approximately 11-mi. stretch of the East Branch Russian River from the Potter Valley Powerhouse to Lake Mendocino is currently stocked with rainbow trout (*O. mykiss*), which may be prey for bald eagles foraging in the area. There are no known bald eagle nesting territories along this stretch of the East Branch Russian River.

Following removal of Cape Horn Dam under Phase 2a, PG&E would no longer divert water to the Potter Valley Powerhouse. As described in Section 2.2.4.6.1 above, the East Branch Russian River will have very low flows seasonally from the powerhouse to the OHWM of Lake Mendocino (approximately 11 mi.) under natural flow conditions (e.g., 1 cfs; see Section 2.2.3.1, Water Use and Hydrology, Table 2.2.3.1-15). Stocking would no longer occur, and the trout population would significantly diminish, reducing the suitability of this creek as foraging habitat for bald eagle. Considering that the East Branch Russian River to Lake Mendocino is a relatively small river channel, that no nesting territories are located in this area, and that alternate prey resources such as carrion or landbirds (Jackman and Jenkins 2004) would continue to be available, effects to bald eagles in the East Branch Russian River would be negligible.

2.2.4.6.3 Northern Spotted Owl

The Project is within the range of the northern spotted owl. Provided below is a description of potential effects to this species and its habitat from Phase 1 (Construction) and Phase 2 (Post-facility Removal) activities.

Phase 1 (*Construction*)

Phase 1 is defined to include construction activities required for the removal of dams, ancillary facilities, and recreation facilities. The Phase 1 Analysis Area for northern spotted owl is defined as a 1-mi. buffer from the boundaries of the Scott Dam and Cape Horn Dam construction areas (Section 2.1.2, Applicant's Proposal, Map 2-8 and Map 2-10). This Analysis Area encompasses the largest buffer imposed by USFWS for the minimization of disturbance effects to northern spotted owl.

Provided below is a discussion of potential direct and indirect effects to northern spotted owl and its habitat.

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Direct Effects

Scott Dam Area: The Scott Dam construction areas are within 1 mi. of USFWS-designated critical habitat for the northern spotted owl (USFWS 2012), and historical records indicate multiple historical occurrences of northern spotted owl in this region (CNDDB 2024; USFS 2024). There are two known northern spotted owl pairs that have been observed within 2 mi. of Scott Dam since the fires in 2018 (USFS 2024), and there are multiple USFS-designated activity centers within 1 mi. of Scott Dam (USFS 2024). Two of these activity centers overlap with the construction area located south of Scott Dam. There are also critical habitat and USFS-designated activity centers within 1 mi. of the Eel River Information Kiosk (a recreation facility that will be removed as part of the Proposed Action). There are no USFS-designated activity centers within 1 mi. of the recreation facility construction areas surrounding Lake Pillsbury reservoir. Northern spotted owls may potentially forage and nest within the Analysis Area.

As described above, construction activities at Scott Dam will take place over three main periods: the initial low-flow period (June–October), the first high-flow season (November–May), and the first low-flow season after sediment flushing activities (June–October). These periods partially overlap with the USFWS-designated limited operating period for northern spotted owl (USFWS 2020), which is from February 1 to July 31 in California. In addition, the *Revised Recovery Plan for the Northern Spotted Owl* (USFWS 2011) indicates that the breeding season for interior northern spotted owl extends from February 1 to August 31.

Suitable habitat for northern spotted owl was mapped as part of studies completed in 2018 (PG&E 2019a). There is suitable habitat within the Scott Dam and Cape Horn Dam construction area footprints near the Project dams and reservoirs (PG&E 2019a). This includes densely vegetated portions of the construction areas that are present south of Scott Dam. Construction activities in these areas may result in removal of approximately 3.35 acres of suitable habitat in a known activity center. PG&E will also improve existing access roads and construct new access roads in preparation for construction. Some tree removal may also be required along existing roads to ensure passage of large construction vehicles and equipment (e.g., barges) and for establishment of new access roads, and within the construction area to allow for equipment access and staging. Minimal removal of individual trees may also be required to allow for removal of ancillary and recreation facilities. Therefore, removal of large trees and activities within the construction area could result in disturbance of nesting northern spotted owl.

Northern spotted owl displays varying sensitivities to noise depending on the type of activity; while some construction activities (heavy equipment use and human presence) have minor disturbance effects in a localized area, noisier activities such as helicopter use or blasting can affect northern spotted owl across a much wider radius (USFWS 2020). Construction noise (including noise along the helicopter flight paths) has the potential to cause nest disturbance and/or failure and could result in the abandonment of eggs, nestlings, and/or fledglings.

The Proposed Action may require helicopter use during the construction period. Compared to the existing condition in which helicopter use is infrequent, this represents increased potential for disturbance along the helicopter route. In addition to the activity center near Scott Dam, other

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northern spotted owl activity centers along the helicopter route may also be affected by the helicopter noise.

During the daytime when construction activities take place, owls typically rest in roost locations or tend the nest. Adult owls roost in proximity to the nest (particularly the females), and egg and nestling survival depends on their behavior (Swarthout and Steidl 2003). Spotted owls typically roost in cool, moist microclimates, and flushing caused by loud noises could expose them to heat stress and increase their energy intake (Swarthout and Steidl 2003). Spotted owls are also more vulnerable to predation (particularly fledgling birds), and flushing may cause increased mortality (Forsman et al. 1984; Verner et al. 1992). Studies measuring stress hormone levels in spotted owls have found that use of machinery and heavy construction activity associated with timber harvest activities raise their physiological stress response (Tempel and Gutiérrez 2004; Wasser et al. 1997). Other studies have shown that northern spotted owls in proximity to noisy roads fledge fewer young than those near less trafficked roads (Hayward et al. 2011).

USFWS (2020) recommends implementing the following activity-specific no-disturbance buffers during the breeding season (February 1–August 31; USFWS 2011) to avoid impacts to northern spotted owl nests:

- 1-mi. no-disturbance buffer for blasting activities;
- 0.5-mi. no-disturbance buffer (horizontal/vertical) for helicopters; and
- 0.25-mi. no-disturbance buffer for hauling on open roads, use of heavy equipment, rock crushing, and use of fixed-wing aircraft.

Based on a preliminary evaluation, there two USFS-designated activity centers that overlap with the construction areas south of Scott Dam and there are three activity centers that are located within a 1-mi. buffer (blasting) from Scott Dam, and nests may therefore potentially be affected by construction activities. Active nest locations may change over time, and new activity centers may be designated by the time construction activities are implemented in the Scott Dam Area.

There is a nest within 400 ft. of Forest Service Road M8 within the Analysis Area. Access to Scott Dam would be from Elk Mountain Road/County Road 301 to the north, Forest Service Road M1 (Simmons Road) from County Road 301 to Scott Dam Road, and Scott Dam Road (refer to Section 2.1.2, Applicant's Proposal and Map 2-8). Only a 1.2 mi. section of Forest Road M8 would be used to access the new access road south of Scott Dam. This portion of the road is approximately 2.7 mi. from the known northern spotted owl nest, and therefore, the nest would be unaffected by transport of materials to and from the construction areas.

To address and reduce disruption of nesting northern spotted owls during construction to the extent possible, PG&E will implement the Northern Spotted Owl Management Plan. The details of the plan are provided in Section 2.1.2, Applicant's Proposal, Table 2-12. The Northern Spotted Owl Management Plan will require PG&E to coordinate with USFWS and the MNF to obtain the most recent information on suitable habitat and/or nests within 1 mi. of the construction areas. If recent

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nest survey information is unavailable, PG&E will conduct 1 year of protocol-level nest surveys in potentially affected activity centers in the Scott Dam Area the year prior to construction activities.

Following completion of nest surveys, PG&E would conduct a GIS analysis of the location of active nests relative to the timing and location of construction activities (including blasting, helicopter flight paths, heavy equipment use, and vegetation removal) and determine whether nests fall within the USFWS-recommended no-disturbance buffers (USFWS 2020). Based on this analysis, the following avoidance and protection measures would apply:

- If northern spotted owl nests are found within the no-disturbance buffer of the construction area for Project ancillary facilities (i.e., not necessary for dam removal) and recreation facilities, PG&E would modify the timing of construction activities and/or helicopter flight paths in order to maintain the no-disturbance buffer to the extent possible.
- If northern spotted owl nests are found within the no-disturbance buffer of the Scott Dam and ancillary facility (necessary for dam removal) construction area, PG&E would modify the timing of construction activities and/or helicopter flight paths to the extent possible. However, dam removal must occur during the summer/fall prior to high flows to allow adit plug removal and flushing of sediments to occur during high flows and address and reduce potential effects to aquatic resources in the Eel River downstream of Scott Dam. Blasting associated with adit plug removal would be implemented during an appropriate high-flow event (anticipated between December and February). Because these time periods may potentially overlap with the northern spotted owl nesting season (February 1–August 31), nest disturbance may be unavoidable. Through development of the Northern Spotted Owl Management Plan and informal consultation with USFWS, measures to avoid and address and reduce potential disturbance would be further developed and implemented as part of the Proposed Action.

With the implementation of the Northern Spotted Owl Management Plan, as well as General Construction Measures and General Wildlife Measures that provide environmental training and inadvertent discovery procedures, and avoid removal of mature, large trees (35 inches dbh or greater) that have high wildlife value, to the extent possible, adverse direct effects to northern spotted owl would be reduced. However, the potential for nest disturbance, failure, and/or abandonment (particularly as a result of blasting) remains and would be considered a significant unavoidable adverse effect. PG&E will informally consult with USFWS.

Construction may also affect owls foraging or roosting in the area and may result in displacement of adult individuals. However, given that construction will occur in small, localized areas and will be heaviest at Scott Dam, northern spotted owls may be able to shift their foraging patterns, in the short term, to areas with less noise disturbance. Furthermore, non-breeding owls are generally less sensitive to noise disturbance than nesting owls (USFWS 2020). Therefore, any effects to foraging northern spotted owl from construction would be negligible.

With the implementation of the Northern Spotted Owl Management Plan, General Construction Measures, and General Wildlife Measures, potential effects from construction would be reduced. However, construction may potentially result in nest disturbance, failure, and/or abandonment if

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northern spotted owls are nesting within the no-disturbance buffers of the Scott Dam Area and construction activities cannot be modified to avoid disturbance during the nesting season. Therefore, construction activities may result in significant adverse effects to northern spotted owl at Scott Dam.

Cape Horn Dam Area: There is no USFWS-designated critical habitat and no designated activity centers within 1 mi. of the Cape Horn Dam construction areas (USFWS 2012). There are also no known observations of northern spotted owl in the construction areas (CNDDB 2024). While some suitable habitat was mapped as part of studies in 2018 (PG&E 2019a), suitable nesting habitat in this location is patchily distributed and is therefore unlikely to support nesting (refer to Volume III, confidential Maps 2.2.3.5-3a–i). Therefore, although some suitable habitat would be affected by vegetation removal, effects of Phase 1 construction on nesting and foraging spotted owls in the vicinity of Cape Horn Dam would be negligible. There are critical habitat and USFS-designated activity centers within 1 mi. of Trout Creek Campground (USFWS 2012). Trout Creek Campground would not be removed. Therefore, there would be no direct effects to northern spotted owl near Trout Creek Campground.

Indirect Effects

The proposed construction activities at Scott Dam and at Cape Horn Dam could result in a minor loss of suitable nesting habitat for northern spotted owl.

Although construction areas (i.e., work areas, access routes, staging areas, and stockpile areas) will be mostly located within the existing disturbed footprint of Project facilities that do not represent habitat for northern spotted owl, some portions extend into suitable habitat including densely vegetated portions of the construction area south of Scott Dam, east and west of Cape Horn Dam, and southeast of the Fish Screen Facility. Construction activities in these areas may result in removal of approximately 3.35 acres of suitable habitat in the Scott Dam Area and 4.18 acres in the Cape Horn Dam Area (less than 1 percent of suitable habitat for northern spotted owl in the Analysis Area). This would include removal of trees and shrubs. Removal of vegetation and trees would result in a minor loss of nesting habitat for northern spotted owl. To reduce potential effects PG&E will implement the Northern Spotted Owl Management Plan.

In addition, as described in the General Construction Measures, removal of mature, large trees (35 inches dbh or greater) that have high wildlife value would be avoided to the extent possible. Therefore, any potential effects to nesting or foraging habitat from construction would be negligible.

With the implementation of construction measures, proposed construction activities in the Scott Dam Area and the Cape Horn Dam Area would have negligible indirect effects on northern spotted owl habitat.

Phase 2 (Post-facility Removal)

Phase 2a includes the initial temporary physical conditions in the Scott Dam Area, Cape Horn Dam Area (including the former reservoir beds), and Eel River Watershed immediately following completion of Phase 1. Phase 2b is defined to include the long-term resulting conditions following completion of Phase 2a. The Phase 2 Analysis Area for northern spotted owl includes (1) a 0.5-mi.

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buffer around the Scott Dam Area – Restoration Area and Cape Horn Dam Area – Restoration Area, (2) the Eel River from Scott Dam to the Eel River estuary, and (3) the East Branch Russian River from the Potter Valley Powerhouse to Lake Mendocino.

Provided below is a discussion of direct and indirect effects to northern spotted owl resulting from Phase 2 (Post-facility Removal) activities.

Phase 2a

Phase 2a includes the initial temporary physical conditions in the Scott Dam Area, Cape Horn Dam Area (including the former reservoir beds), and Eel River Watershed. Direct and indirect effects to these areas from implementation of Phase 2a activities are described below.

Direct Effects

Scott Dam Area: The noise from construction equipment, human presence, and helicopter use during restoration activities could result in disturbance effects to northern spotted owls nesting or foraging in the Scott Dam Area. Refer to the discussion under Phase 1, above, for a detailed description of how these activities may adversely affect northern spotted owl nesting and foraging.

Noise disturbance in the vicinity of Scott Dam could result in the abandonment of eggs and/or chicks and result in nest failure. USFWS (2020) recommends implementing the following activity-specific no-disturbance buffers during the breeding season (February 1–August 31; USFWS 2011) to avoid impacts to northern spotted owl nests:

- 0.5-mi. no-disturbance buffer (horizontal/vertical) for helicopters; and
- 0.25-mi. no-disturbance buffer for hauling on open roads, use of heavy equipment, rock crushing, and use of fixed-wing aircraft.

Restoration activities would take place within the former reservoir bed (i.e., areas within the existing OHWM of Lake Pillsbury reservoir), Scott Dam construction areas, and former Project ancillary/recreation facility areas.

Based on a preliminary evaluation, there are two USFS-designated activity centers that are located within a 0.5-mi. buffer from the Scott Dam construction areas and the former reservoir bed, and nests may therefore potentially be affected by restoration activities. Active nest locations may change over time, and new activity centers may be designated by the time restoration activities are implemented in the Scott Dam Area.

To address and reduce disruption of nesting northern spotted owls during restoration to the extent possible, PG&E will implement the Northern Spotted Owl Management Plan. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for the goals of the plan. The Northern Spotted Owl Management Plan will require PG&E to coordinate with USFWS and the MNF to obtain the most recent information on suitable habitat and/or nests within 0.5 mi. of the restoration areas. If recent nest survey information is unavailable, PG&E will conduct 1 year of protocol-level nest surveys in potentially affected activity centers in the Scott Dam Area the year prior to construction activities.

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Following completion of nest surveys, PG&E would conduct a GIS analysis of the location of active nests relative to the timing and location of heavy equipment and helicopter use activities under the Restoration Plan or Sediment/Channel Monitoring and Response Plan (including helicopter flight paths and heavy equipment use) and determine whether nests fall within the USFWS-recommended no-disturbance buffers (USFWS 2020). Based on this analysis, the following avoidance and protection measures would apply:

- If northern spotted owl nests are found within the no-disturbance buffer of the Scott Dam Area – Restoration Area, PG&E would modify the timing of restoration activities and/or helicopter flight paths to maintain the no-disturbance buffer. Restoration activities would not proceed within this buffer until a qualified biologist determines that the nest is no longer active.
- If it is determined that restoration activities cannot be modified (timing/location) to provide the no-disturbance buffer, PG&E will informally consult with USFWS to develop site-specific measures that consider the type of restoration activity and the specific location of the nest (topography, slope, etc.).

To further protect northern spotted owl, PG&E will implement General Restoration Measures, which require all contractors and staff to be given instructions on how to comply with site-specific avoidance and protection measures, and General Wildlife Restoration Measures, which require work to stop if special-status species that were previously undiscovered are observed and the observations to be reported to PG&E as soon as practicable. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these restoration measures.

With implementation of the Northern Spotted Owl Management Plan, as well as the General Restoration Measures and General Wildlife Restoration Measures that provide environmental training and inadvertent discovery procedures, direct effects to northern spotted owl in the Scott Dam Area would be negligible.

Cape Horn Dam Area: Because Trout Creek Campground would remain, there would be no restoration activities that could directly affect northern spotted owl at this location. There are no known occurrences and no suitable habitat for northern spotted owl within 0.5 mi. of the remainder of the Cape Horn Dam Area – Restoration Area. Therefore, restoration activities in the vicinity of Cape Horn Dam will not result in direct effects to northern spotted owl.

Eel River Watershed: Phase 2a includes the initial temporary physical conditions in the Eel River Watershed immediately following facility removal. Re-establishment of unimpaired flows to the Eel River would not affect forest habitats utilized by northern spotted owl and would have no direct effect on northern spotted owls under Phase 2a.

Indirect Effects

Scott Dam Area and Cape Horn Dam Area: The Scott Dam Area – Restoration Area and the Cape Horn Dam Area – Restoration Area do not contain USFWS-designated critical habitat and do not provide suitable nesting or foraging habitat for northern spotted owl. Therefore, there would be no indirect effects to northern spotted owl under Phase 2a. Implementation of the Restoration Plan (refer to Phase 2b below) would improve habitat conditions for northern spotted owl over the long term.

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Eel River Watershed: Re-establishment of unimpaired flows to the Eel River would not affect forest habitats utilized by northern spotted owl and would have no indirect effect on northern spotted owls under Phase 2a.

Phase 2b

Provided below is a discussion of resulting conditions following restoration at the Scott Dam Area and Cape Horn Dam Area, in the Eel River Watershed, and in the Russian River Watershed.

Scott Dam Area and Cape Horn Dam Area: Phase 2b includes the resulting conditions following restoration of the Scott Dam Area and Cape Horn Dam Area, including the former reservoir beds. Potential benefits to northern spotted owl under Phase 2b include the long-term restoration of the recreation/ancillary facility construction areas and reduced disturbance from human activities following facility removal.

With implementation of the Restoration Plan, the former bed of Lake Pillsbury reservoir is expected to recolonize with upland and riparian vegetation and return to a riverine system with a mosaic of upland, riparian, and wetland habitats. Implementation of the Restoration Plan would return previously disturbed areas within the former footprint of Project ancillary facilities and recreation facilities to restored native upland habitats.

The conversion of formerly lacustrine habitat to a diverse matrix of habitat types would increase habitat heterogeneity and would likely benefit prey species for northern spotted owl (Irwin et al. 2013; McDonald et al. 2010). An increase in vegetative cover would improve habitat connectivity between suitable forest habitat patches and enhance dispersal opportunities for northern spotted owls in the Analysis Area. In addition, operation and maintenance activities would no longer be required at the dam and at Project ancillary facilities, and recreation use would decrease with the removal of Project recreation facilities. In the long term, increased habitat connectivity and reduced human disturbance in the Scott Dam Area and the Cape Horn Dam Area would benefit northern spotted owl nesting habitat.

Therefore, restoration of the former Lake Pillsbury reservoir bed, removal of certain ancillary/recreation facilities, and elimination of Project operation and maintenance activities would result in a long-term benefit to northern spotted owl.

Eel River Watershed: Re-establishment of unimpaired flows to the Eel River would not affect forest habitats utilized by northern spotted owl and would have no effect on northern spotted owls under Phase 2b.

Russian River Watershed: Re-establishment of unimpaired flows to the East Branch Russian River would not affect forest habitats utilized by northern spotted owl and would have no effect on northern spotted owl under Phase 2b.

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2.2.4.6.4 Other Raptors

Special-status raptor species that are known to occur in the vicinity of the Scott Dam Area include northern (American) goshawk (*Accipiter gentilis* [*A. atricapillus*]) (FSS, SSC), American peregrine falcon (FD, State Delisted, CFP), and osprey. Osprey are also known to occur in the Cape Horn Dam Area. Raptor species for which suitable habitat is present include the golden eagle (*Aquila chrysaetos*) (Eagle Act, CFP), short-eared owl (*Asio flammeus*) (BCC, SSC), long-eared owl (*Asio otus*) (BCC, SSC), and northern harrier (*Circus hudsonius*) (BCC, SSC). Common raptor species (e.g., red-tailed hawk, red-shouldered hawk [*Buteo lineatus*], and Cooper's hawk [*Accipiter cooperii*]) are also known to nest and forage in the Project vicinity. Provided below is a description of potential effects to raptors and their habitats from Phase 1 (Construction) and Phase 2 (Post-facility removal) activities.

***Phase 1* (*Construction*)**

Phase 1 is defined to include construction activities required for the removal of dams, ancillary facilities, and recreation facilities. The Phase 1 Analysis Area for other raptors is defined as a 1-mi. buffer from the boundaries of the Scott Dam and Cape Horn Dam construction areas (see Map 2-8 and Map 2-10 in Section 2.1.2, Applicant's Proposal), Lake Pillsbury reservoir, and Van Arsdale Reservoir. The Analysis Area was selected for consistency with the Analysis Area established for bald eagle and northern spotted owl, as described above.

Provided below is a discussion of potential direct and indirect effects to other raptors and their habitats.

Direct Effects

Noise from construction equipment, human presence, helicopter use, and blasting activities could result in disturbance effects to raptors foraging or nesting in the Analysis Area. Tree removal could also directly affect raptors. Construction activities at Scott Dam will take place over three main periods: the initial low-flow period (June–October), the first high-flow season (November–May), and the first low-flow season after sediment flushing activities (June–October). Construction activities in the Cape Horn Dam Area will take place from March to November (one season). These periods partially overlap with the breeding season for special-status raptors that are known to occur in the Scott Dam and Cape Horn Dam areas, which is typically between February 15 and August 15 for northern (American) goshawk, between February 15 and July 31 for American peregrine falcon, and between March 15 and August 31 for osprey.

As discussed previously, the Proposed Action may require helicopter use during the construction period. Compared to the existing condition in which helicopter use is infrequent, this represents increased potential for disturbance along the helicopter route. A literature review completed by Anderson (2007) compares data from various studies on the response of raptors (including eagles, peregrine falcon, osprey, and red-tailed hawk) to disturbance and noise from helicopters. In the studies reviewed, helicopters elicited a disturbance response (e.g., flushing from nest) more frequently than fixed-wing aircraft; however, adults were typically flushed from nests only when helicopters approached closely or hovered for longer periods of time. A sudden or surprise

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approach may elicit a stronger response from adult raptors at nests than a gradual approach (White and Sherrod 1973).

Blasting may be required during the early breeding season (February) to remove the adit plug and flush sediments at Scott Dam. Available information on the response of raptors to loud noises such as sonic booms is limited, but a study on prairie falcons from a hydroelectric dam construction project in Idaho found that perched falcons flushed in response to blasts but that the majority of incubating falcons often showed no response. Nest-flushing behaviors varied depending on the individual, with some individuals taking short flushing flights and at least one taking a long flight away from the nest before returning (Holthuijzen et al. 1990). Falcons may be more tolerant once eggs have been laid, but blasting early in the nesting season could discourage breeding in a localized area (Holthuijzen et al. 1990).

A further discussion of potential direct construction effects specific to each species or group of species is provided below.

Northern (American) Goshawk, Golden Eagle, and Other Raptors

The Scott Dam and Cape Horn Dam construction areas (work areas, access routes, staging areas, and stockpile areas) are primarily located within the existing disturbed facility footprints. These areas have more open canopy cover conditions than the closed forest canopy conditions preferred by northern (American) goshawk. However, some portions of the construction area extend into densely vegetated areas south of Scott Dam, east and west of Cape Horn Dam, and southeast of the Fish Screen Facility. Construction activities in these areas may result in removal of approximately 3.35 acres of suitable habitat in the Scott Dam Area and 4.18 acres in the Cape Horn Dam Area (less than 1 percent of suitable habitat for northern goshawk in the Analysis Area). Also, northern (American) goshawks and golden eagles are very sensitive to human noise and disturbance from recreation (Morrison et al. 2011; Spaul and Heath 2017) and are therefore unlikely to nest in the immediate vicinity of dams or recreation facilities under existing conditions with intensive human presence during the summer recreation season. While some vegetation removal immediately surrounding the existing facility footprints may be required for construction access, goshawks are very unlikely to nest in the trees surrounding recreation facilities. There are no known active goshawk nests within a 0.25-mi. radius of the Scott Dam or Cape Horn Dam construction areas or Project recreation/ ancillary facilities. Common raptors such as red-tailed hawks may nest in these areas, and noise disturbance and tree removal during construction could result in nest abandonment.

To reduce the potential for effects to active northern goshawk, golden eagle, or other raptor nests, PG&E will implement the Other Raptors Measure (under the Other Raptor Construction Measures), which requires that tree removal be implemented outside the nesting season (i.e., September 1–December 31) to the extent possible. This would address and reduce the potential for disturbance of nesting raptors other than northern goshawk and golden eagle, which are unlikely to nest in the construction areas.

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The Other Raptors Measure also requires a pre-construction raptor survey to be conducted within 500 ft. of all work areas in the year prior to initiation of each construction season. Following completion of surveys, PG&E would conduct a GIS analysis of the location of active nests relative to the timing and location of construction activities (including blasting, helicopter flight paths, and heavy equipment use) and determine whether nests fall within the species-specific protective buffers established in PG&E's existing Avian Protection Plan and/or agency regulations and policies. Based on this analysis, the following avoidance and protection measures would apply:

- If nests are found within the no-disturbance buffer of the construction area for Project ancillary facilities (i.e., not necessary for dam removal) and recreation facilities, PG&E would modify the timing of construction activities and/or helicopter flight paths to maintain the no-disturbance buffer to the extent possible. Construction activities would not proceed within this buffer until a qualified biologist determines that the nest is no longer active or PG&E informally consult with USFWS to obtain authorization to proceed.
- If nests are found within the no-disturbance buffer of the dam and ancillary facility (i.e., necessary for dam removal) construction area, PG&E would modify the timing of construction activities and/or helicopter flight paths to the extent possible. If the timing or location of activities cannot be modified, PG&E would coordinate with resource agencies to determine if a site-specific buffer may be established to protect the nest considering site topography, natural barriers, and the nature of the construction activity.

Because dam removal must occur during the summer/fall prior to high flows (to allow for flushing of sediments to occur during high flows and reduce potential effects to aquatic resources in the Eel River downstream of the dams), it may be determined that a site-specific buffer cannot be established to protect nests, if present, during dam and ancillary facility (necessary for dam removal) removal. With the implementation of the Other Raptor Construction Measures, as well as General Construction Measures and General Wildlife Measures that provide environmental training and inadvertent discovery procedures, adverse direct effects to raptors would be reduced. However, the potential for nest disturbance, failure, and/or abandonment remains and would be a significant unavoidable adverse effect. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these construction measures.

Foraging goshawks, golden eagles, or other common raptors could also be flushed or disturbed by the noise of construction. Any effects from noise would be short term and temporary and would cease after construction. Therefore, effects to foraging northern goshawk, golden eagle, and other common raptors would be temporary and negligible.

With the implementation of construction measures, effects to northern (American) goshawks, golden eagles, and other common raptors from construction activities in the Scott Dam Area and the Cape Horn Dam Area would be reduced. However, construction may potentially result in nest disturbance, failure, and/or abandonment if raptors are nesting within the no-disturbance buffers and construction activities cannot be modified to avoid disturbance during the nesting season. Therefore, implementation of the Proposed Action may result in significant adverse effects to raptors nesting at Scott Dam and Cape Horn Dam.

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American Peregrine Falcon

American peregrine falcons typically nest on cliffs or human structures that mimic cliff habitat. A pair of peregrine falcons was observed in the vicinity of Sunset Campground (Scott Horn Dam Area) in 2018 (PG&E 2019a). American peregrine falcon may potentially forage in the Cape Horn Dam Area, but this area lacks suitable cliff structures for nesting.

As required by the American Peregrine Falcon Measure (under the Other Raptor Construction Measures), the year prior to construction and in each subsequent construction period, PG&E will survey Scott Dam and any other cliff-nesting habitat present within 500 ft. of construction areas in the Scott Dam Area to determine whether nests are present that would unavoidably be affected by proposed blasting and dam removal. In the unlikely event an American peregrine falcon nest is located within 500 ft. of the Scott Dam Area construction areas or is nesting on Scott Dam or ancillary facilities (necessary for dam removal), PG&E will install nest exclusion devices outside the peregrine falcon nesting season (i.e., August 1–February 14) and prior to the initial low-flow season (Year 1) construction activities to prevent initiation of nesting in the year of construction.

For construction at Scott Dam Area recreation facilities and ancillary facilities (not necessary for dam removal), if an active American peregrine falcon nest is identified within 500 ft. of the construction areas, PG&E will establish a 500-ft. protective no-disturbance buffer that will be maintained until a qualified biologist determines that the nest is no longer active, consistent with PG&E's existing Avian Protection Plan. To further protect American peregrine falcon, PG&E will also implement General Construction Measures, which require all contractors and staff to be given instructions on how to comply with site-specific avoidance and protection measures, and General Wildlife Measures, which require work to stop if special-status species that were previously undiscovered are observed and the observations to be reported to PG&E as soon as practicable. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these construction measures.

Foraging American peregrine falcon could also be flushed or disturbed by the noise of construction. Any effects from noise would be short term and temporary and would cease after construction.

Therefore, with the implementation of construction measures, direct effects to American peregrine falcon nests from construction activities in the Scott Dam Area and the Cape Horn Dam Area would be negligible.

Osprey

Ospreys typically nest on large trees but can also nest on human structures (e.g., power poles and transmission towers) that mimic tree habitat. There are records of osprey in the vicinity of both construction areas (CNDDB 2024), and ospreys were observed at Lake Pillsbury reservoir in 2018 (PG&E 2019a). There is some potential for establishment of osprey nests near construction areas or on Project powerline/communication line poles that would be removed as part of the Proposed Action. Therefore, construction activities could potentially result in direct removal of an osprey nest or abandonment of the nest as a result of construction activities.

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To address and reduce the potential impact to nesting ospreys from construction activities, PG&E will implement the Osprey Measure (under the Other Raptor Construction Measures), which requires that osprey surveys be conducted concurrently with bald eagle surveys (as described above) in the year prior to construction and prior to each subsequent construction period. The Osprey Measure also includes requirements to protect nests at the dams and during recreation and ancillary facility removal, as well as during removal of Project powerlines/communication lines; a discussion of each is provided below.

To minimize effects to osprey potentially nesting in the vicinity of the construction areas, tree removal would be conducted between September 1 and December 31, outside the general nesting season for all special-status birds. If an osprey nest is identified on a PG&E facility, PG&E will remove the nest prior to the nesting season (i.e., September 1–March 14) to encourage nesting outside of the construction areas. In the unlikely event a new nest is established within 300 ft. of the construction areas during the construction period, PG&E will develop site-specific no-disturbance buffers to be maintained until a qualified biologist has determined that the nest is no longer active, consistent with PG&E's existing Avian Protection Plan. Compared to other species, ospreys are more tolerant of human disturbances and will place their nests in areas with recreation activity or heavy traffic (Harmata et al. 2007). Because of this tolerance, if a nest is located within 300 ft. of the dams, a qualified biologist with stop-work authority will be onsite when construction commences to monitor the behavior of ospreys and to determine the level of monitoring that would be needed during the construction period. With the implementation of the Osprey Measure, construction effects to nests would be negligible.

To the extent possible, recreation facilities and ancillary facilities would be removed outside the general nesting season (i.e., September 1–December 31). If construction must occur during the nesting season and an active osprey nest is located within 300 ft. of the removal area, the Osprey Measure establishes a no-disturbance buffer during the nesting season (March 15–August 31), consistent with PG&E's existing Avian Protection Plan. The no-disturbance buffer would be maintained until a qualified biologist has determined that the nest is no longer active. If it is determined that the buffer cannot be maintained, an alternate site-specific buffer that considers site topography, natural barriers, and the nature of the construction activity will be developed and implemented as part of the Proposed Action. With the implementation of the Osprey Measure, construction effects at Project ancillary and recreation facilities would be negligible.

Some Project powerlines will be removed as part of decommissioning. If an active osprey nest is identified on Project powerline or communication line poles, the pole will remain in place until the nest is no longer active, as determined by a qualified biologist. If work must be conducted in a subsequent year, PG&E will remove the pole and the nest outside the osprey nesting season (i.e., September 1–March 14). With the implementation of the Osprey Measure, construction effects from powerline/communication line removal would be negligible.

To further protect osprey, PG&E will also implement General Construction Measures, which require all contractors and staff to be given instructions on how to comply with site-specific avoidance and protection measures, and General Wildlife Measures, which require work to stop if special-status species that were previously undiscovered are observed and the observations to be

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reported to PG&E as soon as practicable. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these construction measures.

With the implementation of construction measures, potential direct effects to osprey from removal of nests or noise disturbance during construction would be negligible.

Indirect Effects

Potential indirect effects to raptors in the Analysis Area include potential effects to forest habitat and to aquatic foraging habitat (e.g., for osprey and American peregrine falcon). Cliff-nesting habitat for American peregrine falcon and golden eagle would not be affected by construction activities.

The proposed construction activities would result in minimal effects to nesting habitat for raptors because the majority of the construction areas (work areas, access routes, staging areas, and stockpile areas) overlap the existing disturbed facility footprints. However, some tree removal may be required along existing roads to ensure passage of large construction vehicles and equipment (e.g., barges), to establish new access roads, and within the construction area to allow for equipment access and staging. Minimal removal of individual trees may also be required to allow for removal of ancillary and recreation facilities. Removal of a total of 7.53 trees and vegetation would not significantly alter nesting habitat for raptors within the larger Analysis Area. In addition, as described in the General Construction Measures, removal of mature, large trees (35 inches dbh or greater) that have high wildlife value and may be used as perches, roosts, or nesting structures would be avoided to the extent possible. Therefore, any potential effects to nesting habitat from construction would be negligible.

Tree removal may also be required for the temporary extension of an existing road off Scott Dam Road to provide access to a temporary barge launch at the downstream terminus of the existing plunge pool below the dam, to allow the construction of temporary access road on the south side of Scott Dam, and to allow equipment access and staging within the Scott Dam construction area. Tree removal would also be required to allow access in the vicinity of Cape Horn Dam and to allow equipment access and staging within the Cape Horn Dam construction area. Removal of trees associated with construction activities could reduce the availability of nesting habitat for raptors, although these localized areas are relatively small compared to the availability of potential nesting trees in the Analysis Area. Therefore, any potential effects to nesting habitat from construction would be negligible.

Foraging habitat for aquatic foraging raptors (e.g., osprey and American peregrine falcon) may be affected by the drawdown and by potential sedimentation or runoff of hazardous materials associated with construction that could affect water quality in the reservoirs, the Eel River downstream of the dams, and associated wetland and riparian habitats. As described in detail for bald eagles, the potential for effects to aquatic foraging habitats would be addressed and reduced by the drawdown requirements specified in Section 2.1.2, Applicant's Proposal, and implementation of the Construction Water Quality and Water Temperature Monitoring Plan, Construction Erosion Prevention Plan, Water Quality and Erosion Control Measures, Hazardous Materials Handling Measures, Stormwater Pollution Prevention Plan, applicable USFS BMPs, and Riparian and Wetland Protection Measures. With the implementation of these measures, proposed construction activities in the Scott Dam Area would have negligible indirect temporary effects on

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aquatic foraging habitat for raptors. Effects following dam removal (including sedimentation in the Eel River) are addressed under Phase 2 (Post-facility Removal).

With the implementation of construction measures, proposed construction activities in the Scott Dam Area and Cape Horn Dam Area would have negligible indirect effects on other raptors.

***Phase 2* (*Post-facility Removal*)**

Phase 2a includes the initial temporary physical conditions in the Scott Dam Area, Cape Horn Dam Area (including the former reservoir beds), and Eel River Watershed immediately following completion of Phase 1. Phase 2b is defined to include the long-term resulting conditions following completion of Phase 2a. The Phase 2 Analysis Area for other raptors includes (1) a 1-mi. buffer around the Scott Dam Area – Restoration Area and Cape Horn Dam Area – Restoration Area, (2) the Eel River from Scott Dam to the Eel River estuary, and (3) the East Branch Russian River from the Potter Valley Powerhouse to Lake Mendocino.

Provided below is a discussion of direct and indirect effects to other raptors resulting from Phase 2 (Post-facility Removal) activities.

Phase 2a

Phase 2a includes the initial temporary physical conditions in the Scott Dam Area, Cape Horn Dam Area (including the former reservoir beds), and Eel River Watershed. Direct and indirect effects to these areas from implementation of Phase 2a activities are described below.

Direct Effects

Scott Dam and Cape Horn Dam Area: Noise from ground-disturbing heavy equipment, human presence, and helicopter use during restoration activities could result in disturbance effects to raptors foraging or nesting in the Analysis Area. Refer to the construction effects section above for a description of how these activities are known to affect nesting and foraging raptors.

Noise disturbance could result in the abandonment of eggs and/or chicks and result in nest failure. To reduce this potential impact, PG&E will implement the Other Raptor Restoration Measures, including the Other Raptors Measure, American Peregrine Falcon Measure, and Osprey Measure. The Other Raptors Measure requires a pre-restoration raptor survey to be conducted within 500 ft. of all work areas in the year prior to initiation of each construction season, the American Peregrine Falcon Measure requires a survey within 500 ft. of all suitable cliff-nesting habitat in the Scott Dam Area, and the Osprey Measure requires osprey surveys be conducted concurrent with bald eagle surveys. Following completion of these surveys, PG&E would conduct a GIS analysis of the location of active nests relative to the timing and location of restoration activities (including helicopter flight paths and heavy equipment use) and determine whether nests fall within the species-specific protective buffers established in PG&E's existing Avian Protection Plan and/or

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agency regulations and policies. Based on this analysis, the following avoidance and protection measures would apply:

- If raptor nests are found within the no-disturbance buffer for heavy equipment use or helicopters under the Restoration Plan or Sediment/Channel Monitoring Response Plan in the Scott Dam Area – Restoration Area, PG&E would modify the timing of restoration activities and/or helicopter flight paths to maintain the no-disturbance buffer. Restoration activities would not proceed within this buffer until a qualified biologist determines that the nest is no longer active.
- If it is determined that restoration activities cannot be modified (timing/location) to provide the no-disturbance buffer for American peregrine falcon and other raptors, PG&E will coordinate with resource agencies to develop site-specific measures that consider the type of restoration activity and the specific location of the nest (topography, slope, etc.).
- If it is determined that restoration activities cannot be modified (timing/location) to provide the no-disturbance buffer for osprey, a qualified biologist with stop-work authority will be onsite when restoration activities commence to monitor the behavior of ospreys and to determine the level of monitoring that would be needed during the restoration period.

To further protect other raptors, PG&E will implement General Restoration Measures, which require all contractors and staff to be given instructions on how to comply with site-specific avoidance and protection measures, and General Wildlife Restoration Measures, which require work to stop if special-status species that were previously undiscovered are observed and the observations to be reported to PG&E as soon as practicable. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these restoration measures.

With implementation of these restoration measures, potential direct effects to other raptors from noise disturbance during restoration would be negligible.

Eel River Watershed: Phase 2a will not directly affect other raptors in the Eel River Watershed.

Indirect Effects

Scott Dam Area: Restoration activities would be limited to the former reservoir bed of Lake Pillsbury reservoir and disturbed areas within the footprint of the former Project ancillary/recreation facilities. Therefore, there would be no effects to habitat for forest- and cliff-nesting raptors under Phase 2a. However, conversion of lacustrine to riverine habitat in the former reservoir bed could result in indirect effects to aquatic foraging raptors such as osprey and American peregrine falcon and to raptors that nest in riparian and wetland habitats.

- **Osprey.** Immediately following dam removal, there would no longer be impounded water behind Scott Dam and water within the former Lake Pillsbury reservoir would be restricted within the historical riverbed. This would result in the loss of available lacustrine foraging habitat for osprey, and stranding of fish would result in a reduction in the overall availability of live fish that represent prey for this species. As described under Phase 2b, osprey are expected to adapt to and utilize Eel River riverine habitat within the former

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reservoir bed over time. A recent study of nesting osprey in the Central Valley of California found that ospreys nesting along rivers had higher reproductive rates than ospreys nesting along reservoirs and ponds (Airola and Estep 2022). However, there remains, in the short term, the potential for abandonment of nesting territories in the Scott Dam Area during Phase 2a, which would represent a significant adverse effect to osprey. The removal of Lake Pillsbury reservoir would also result in a reduction of aquatic foraging habitat following Scott Dam removal.

- **American Peregrine Falcon.** American peregrine falcon feed on a variety of upland, riparian, and wetland birds. As described below, loss of Lake Pillsbury reservoir may displace waterbirds that represent potential prey species and could also result in minor and localized changes in riparian and wetland habitats on the shoreline that represent habitat for prey species. Therefore, changes in reservoir habitat under Phase 2a could result in a temporary and localized reduction in prey availability for peregrine falcon. Upland prey species surrounding the reservoir would be unaffected and would continue to provide a prey source for American peregrine falcon. A temporary and localized reduction in the availability of riparian and wetland birds that are potential prey species would have a negligible effect on American peregrine falcon.

- **Riparian and Wetland-Nesting Raptors.** Portions of the shoreline of Lake Pillsbury reservoir support riparian and wetland vegetation that may provide nesting and foraging habitats for special-status raptors including, but not limited to, short-eared owl, long-eared owl, and northern harrier. The tributary-influenced zones of Lake Pillsbury reservoir support forested wetland habitats, and the northern shoreline of Lake Pillsbury reservoir, which is periodically inundated, supports both wetland and upland vegetation. Several additional small wetlands were also mapped along the reservoir shoreline by Stillwater Sciences during technical studies (PG&E 2019b).

  Wetland habitats in the tributary-influenced zones would likely be preserved following removal of Scott Dam. Vegetation growing along the periodically inundated northern shoreline of the reservoir tolerates periodic changes in water levels under existing conditions and therefore is expected to persist in the near term following removal of Scott Dam but may experience some loss due to the reduction in surface water. Ground disturbance and use of heavy equipment associated with implementation of the Restoration Plan could potentially result in the temporary loss of portions of these habitats as well, particularly if stabilization of soils is required in these habitats along the Eel River channel within the reservoir bed. These effects would be relatively minor and small scale and are not expected to significantly affect riparian and wetland-nesting and foraging raptors.

  In the long term, implementation of the Restoration Plan would restore native riparian and wetland habitats along the Eel River and tributary streams within the former reservoir bed. Refer to Section 2.1.2, Applicant's Proposal, for more details on the goals of the Restoration Plan. Considering that effects to riparian and wetland habitat along Lake Pillsbury reservoir following removal of the dam would be small scale, and with implementation of the Restoration Plan, effects to special-status raptors including but not limited to short-eared owl, long-eared owl, and northern harrier would be negligible.

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Cape Horn Dam Area: Removal of Cape Horn Dam could result in indirect effects to aquatic foraging raptors such as osprey and American peregrine falcon and to raptors that nest in riparian and wetland habitats.

- **Osprey.** Osprey are known to nest and forage in the vicinity of Van Arsdale Reservoir. Under Phase 2a, following drawdown of Lake Pillsbury reservoir and Van Arsdale Reservoir and removal of the dams, water levels would be similar to the historical condition (i.e., confined within the historical Eel River channel). Van Arsdale Reservoir is set within a relatively confined river valley, and the historical Eel River channel is expected to occupy roughly the same surface area as the former reservoir. Therefore, initial effects to fish populations are not expected from drawdown of the reservoir.

  However, the first high-flow event would mobilize coarse sediments from Van Arsdale Reservoir downstream at the same time that millions of cubic yards of fine and coarse sediment from the former Lake Pillsbury reservoir would be mobilized. The release of accumulated sediment would result in temporary adverse effects to fish prey species inhabiting the river channel within the former reservoir during and immediately following the release of sediments from Lake Pillsbury reservoir. Refer to the discussion of indirect effects to bald eagles for further information on fish effects. As described under Phase 2b, fish populations are expected to recover over time. However, there remains, in the short term, the potential for abandonment of nesting territories in the Cape Horn Dam Area during Phase 2a, which would represent a significant adverse effect to osprey.

- **Other Raptors.** American peregrine falcon and other raptors may potentially forage for small birds and mammals in the riparian zone in the Cape Horn Dam Area. Van Arsdale Reservoir is confined within a narrow river valley. Under Phase 2a, following drawdown of Lake Pillsbury reservoir and Van Arsdale Reservoir and removal of the dams, water levels would be similar to the historical condition. The first high-flow event would mobilize coarse sediments from Van Arsdale Reservoir downstream at the same time that millions of cubic yards of fine and coarse sediment from the former Lake Pillsbury reservoir would be mobilized. Aggradation of sediment is likely within portions of the reservoir bed, and new bars may form that promote increased bank erosion and lateral channels. The sediment release is expected to temporarily affect the quantity (surface area) and quality of aquatic foraging habitat for waterfowl. Burial of riparian and wetland vegetation may also temporarily reduce habitat suitability for small birds and mammals; however, these effects are anticipated to be minor. A recent study of dam removals on the Elwha River system saw marginal effects to mature riparian vegetation following sediment burial (Shafroth et al. 2024). Any temporary reductions in habitat suitability would, in turn, reduce foraging opportunities for raptors. Considering that these effects are temporary, minor, and restricted to the immediate vicinity of the former reservoir, short-term changes in habitat suitability for small birds and mammalian prey would have a negligible effect on raptors such as American peregrine falcon or northern harrier potentially foraging in the area.

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Eel River Watershed: Phase 2a includes the initial temporary physical conditions in the Eel River Watershed immediately following facility removal. This includes the approximate 12-mi. section of the Eel River from Scott Dam to Van Arsdale Reservoir, the 38-mi. section of the Eel River below Cape Horn Dam to the Middle Fork Eel River, and the 119-mi. section from the Middle Fork Eel River to the estuary. Restoration activities are limited to the Scott Dam and Cape Horn Dam restoration areas and will not directly affect species in the Eel River Watershed. Potential direct and indirect effects to other raptors in the Eel River Watershed under Phase 2a are provided below.

- **Osprey.** As described above, the initial release of sediments from Scott Dam and Cape Horn Dam will result in short-term adverse effects to downstream fish abundance in the Eel River Watershed the year immediately following dam removal. These effects will be most severe downstream of Scott Dam and Cape Horn Dam and are not anticipated to extend beyond the confluence with the Middle Fork Eel River (refer to Section 2.2.4.4, Fish and Aquatic Resources). To address and reduce potential adverse effects of short-term increases in suspended sediment on fish species, PG&E proposes to implement a Construction Site Water Diversion, Dewatering, and Drawdown Plan and an Aquatic Species Management and Monitoring Plan. The Construction Site Water Diversion, Dewatering, and Drawdown Plan describes the timing and sequencing of drawdown and dam removal, which are designed to flush fine sediments from the historical river channel in the reservoir as rapidly as possible so that the duration of adverse effects on downstream biota is as limited as possible. PG&E's Construction Site Water Diversion, Dewatering, and Drawdown Plan would time the drawdown and mobilization of sediments to coincide with seasonal high flows. PG&E's Aquatic Species Management and Monitoring Plan would include surveys and a rescue and relocation plan to reduce the effects of the Proposed Action on individual fish.

  Even with the implementation of measures to address and reduce potential effects to fish species that represent prey for osprey, there will still be a short-term reduction in fish prey available to osprey following release of sediments from Scott Dam, and impacts to foraging osprey would be a significant adverse effect.

- **Other Raptors.** The sediment release in Phase 2a may indirectly affect special-status raptors such as American peregrine falcon, northern harrier, and short-eared owl that may potentially forage in riparian and wetland areas along the Eel River by affecting small birds and mammals that live in these habitats.

  The effects of sediment release on riparian vegetation present along the Eel River would vary based on site-specific factors including the volume of discharge, distance from the point of release, and geomorphology of the site affected. Deposition of sediment closest to the former dam sites could result in temporary burial of vegetation, particularly low-lying shrubs and herbaceous vegetation in proximity to the river channel. In the Elwha River system, sediment burial did not have measurable effects on the amount of mature riparian vegetation downstream of the removed dams within a 3- to 5-year monitoring period (Shafroth et al. 2024). Effects to riparian habitat would occur primarily in the reach from Scott Dam downstream to the confluence with the Middle Fork Eel River. Sediment deposition is expected to decrease with distance and is expected to have a minimal effect

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downstream of the Middle Fork Eel River and therefore would not result in detectable changes in associated riparian or estuarine habitats in this reach.

Effects to riparian habitat in the Eel River from Scott Dam to the Middle Fork Eel River would be site-specific and would be reduced with distance from the point of release. As described for the effects to bald eagles, the initial sediment release would result in aggradation of coarse sediments and high suspended sediment loads downstream of Scott Dam, which would temporarily affect the quantity (surface area) and quality of aquatic foraging habitat for waterfowl that represent potential prey species for peregrine falcon. Burial of riparian and wetland vegetation may temporarily reduce habitat suitability for small birds and mammals in this reach, but the creation of new channel bars and deposits would provide surfaces for early successional species to colonize rapidly, as was observed in a dam removal study on the Elwha River system (Shafroth et al. 2024). Therefore, Phase 2a will affect aquatic, riparian, and wetland habitats along the Eel River from Scott Dam to the confluence with the Middle Fork Eel River. Because effects are temporary and site-specific and would decrease with distance, they are expected to have a negligible impact on raptors foraging and nesting along this reach. Phase 2a will have no effect on raptors in riparian and estuarine habitats below the Middle Fork Eel River.

Phase 2b

Scott Dam Area: Phase 2b is the resulting conditions following restoration of the Scott Dam Area, including the restoration area and the bed of Lake Pillsbury reservoir. Potential effects to other raptors under Phase 2b include the long-term benefit from restoration of the dam and ancillary/recreation facility sites.

Implementation of the Restoration Plan is expected to benefit osprey and other aquatic foraging raptors. The Eel River will be reestablished within the former reservoir bed of Lake Pillsbury reservoir, and anadromous fish passage will be restored consistent with the Restoration Plan. PG&E will implement the Restoration Plan, including monitoring of the restoration activities. In the long term, the conversion of lacustrine habitat within Lake Pillsbury reservoir to a mosaic of wetland, riparian, and upland habitats found along a restored riverine channel would increase the diversity, health, and distribution of the native fish community, which is expected to benefit aquatic foraging habitat for osprey and other aquatic foraging raptors. However, the removal of Lake Pillsbury reservoir would result in a reduction of aquatic foraging habitat following Scott Dam removal.

Restoration may potentially benefit American peregrine falcon. With implementation of the Restoration Plan, the conversion of lacustrine habitat within Lake Pillsbury reservoir to a mosaic of wetland, riparian, and upland habitats found along a restored riverine channel would benefit habitats for prey resources. Therefore, enhancements to habitat for prey resources may benefit American peregrine falcon foraging over the long term.

In addition, over time, the former reservoir bed of Lake Pillsbury reservoir is expected to be recolonized with upland and riparian vegetation that may provide foraging and/or nesting habitat for other raptors such as short-eared owl, long-eared owl, and northern harrier. To enhance this

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succession process, PG&E will implement the Restoration Plan, which would reestablish the connectivity of the Eel River and tributary streams within the former reservoir bed and would enhance natural vegetation recruitment processes within the former reservoir bed. In the long term, the former reservoir bed would support a mosaic of wetland, riparian, and upland habitats along a restored riverine channel, which is expected to improve foraging habitat for other raptors in the long term. Furthermore, implementation of the Restoration Plan is expected to increase the total amount of riparian habitat within the former Lake Pillsbury reservoir bed compared to the existing condition, in which riparian habitat is restricted to the tributary streams along the shoreline. Long-term monitoring of restoration sites along the Sacramento River has shown that diversity and abundance of birds increase as the sites mature over time (Golet et al. 2013). Additionally, restoration of the recreation and ancillary facility sites would result in increased nesting and foraging upland habitats compared to the existing condition. Therefore, in the long term, implementation of the Proposed Action would have beneficial effects to raptors that nest in riparian and wetland habitats. Refer to Section 2.1.2, Applicant's Proposal, for more details on the goals of the Restoration Plan.

The conversion of former Project ancillary and recreation facility sites and reduced recreation pressure following construction and restoration activities would also reduce the human footprint and disturbance level in the Analysis Area. Reduced human disturbance pressure may benefit raptor nesting in the future. Therefore, over the long term, raptors would benefit from restoration of the former reservoir beds and ancillary/recreation facility sites following facility removal.

Cape Horn Dam Area: Phase 2b is the resulting condition following restoration of the Cape Horn Dam Area, including the restoration area and the bed of Van Arsdale Reservoir.

Implementation of the Restoration Plan is expected to benefit osprey and other aquatic foraging raptors. Over time, the reach of the Eel River formerly within Van Arsdale Reservoir is expected to return to a morphologic condition similar to pre-dam conditions. The river would become a more dynamic channel, formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, deeper pools, and less-dense riparian vegetation. The length of time required for a return to this condition may be a few to several years and would be largely dependent on the magnitude, frequency, and duration of subsequent flood events. PG&E will implement the Restoration Plan, including monitoring the restoration activities. In the long term, the conversion of lacustrine habitat within Van Arsdale Reservoir to a mosaic of wetland, riparian, and upland habitats found along a restored riverine channel would increase the diversity, health, and distribution of the native fish community, which is expected to benefit aquatic foraging habitat for osprey and other raptors in the long term.

The conversion of former Project ancillary and recreation facility sites and reduced recreation pressure following construction and restoration activities would also reduce the human footprint and disturbance level on the landscape. Reduced human disturbance pressure may benefit raptor nesting in the future. Therefore, over the long term, raptors would benefit from restoration of the former reservoir beds and ancillary/recreation facility sites following facility removal.

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Eel River Watershed: In the long term, the return of unimpaired hydrology, natural transport of sediment, and removal of anadromous fish passage barriers would benefit osprey throughout the Eel River Watershed. As described above for bald eagles, the removal of the Scott Dam fish passage barrier and unimpeded fish passage at Cape Horn Dam would be expected to improve the abundance of Chinook salmon and steelhead and allow these species to reach historical riverine habitats located above Scott Dam. Anadromous fish can respond relatively quickly to dam removal projects; a study of salmonid response to the dam removal project on the Elwha River saw fish recolonizing reaches upstream of the dams over the course of a few years (Duda et al. 2021). With the removal of fish passage barriers, anadromous fish populations would reestablish within the watershed upstream of the former Scott and Cape Horn dams. This enhancement of the native anadromous fish community would be expected to benefit osprey foraging.

From Scott Dam downstream to the Middle Fork Eel River, as described above in Section 2.2.4.6.1, the Proposed Action is expected to result in a more dynamic channel and areas with existing overly dense riparian vegetation will be scoured more frequently or buried with sediment deposits, resulting in less-dense vegetation. In the long term, the riparian community, diversity, age class structure, and composition are expected to increase under the unimpaired hydrology, resulting in more complex and diverse riparian communities. This would result in a benefit to small birds and mammals living in these communities, which would, in turn, benefit American peregrine falcon, short-eared owl, long-eared owl, northern harrier, and other raptor species.

The Proposed Action would have minimal effects to river morphology downstream of the Middle Fork Eel River and is not likely to result in detectable long-term changes in associated riparian and estuarine habitats; therefore, effects to habitat for other raptors would be considered negligible.

Russian River Watershed: The approximately 11-mi. stretch of the East Branch Russian River from the Potter Valley Powerhouse to Lake Mendocino is stocked with rainbow trout, which are prey for osprey potentially nesting or foraging in the area. In addition, diversions from the Eel River are currently used to irrigate a wide variety of croplands including, but not limited to, irrigated pastures and hayfields, pears, vineyards, and row croplands (PVID 2024). Riparian and wetland habitats are also present, primarily along the valley portion of the river. These habitats support a variety of small bird and mammal populations that represent prey species for special-status raptors such as American peregrine falcon, short-eared owl, and northern harrier. Short-eared owls and northern harrier are ground nesters that may also use agricultural fields for nesting.

Following removal of Cape Horn Dam under Phase 2a, PG&E would no longer divert water to the Potter Valley Powerhouse, except if temporary pumping is implemented as part of the East Branch Russian River Diversion Plan. Re-establishment of unimpaired flows in the East Branch Russian River would result in an intermittent flow regime, and the majority of the river from the powerhouse to the OWHM of Lake Mendocino (approximately 11 mi.) would be seasonally dry. Stocking would no longer occur, and the trout population would significantly diminish, reducing the suitability of this creek as foraging habitat for osprey.

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The change from a perennial to an intermittent flow regime would result in a change in the location and extent of riparian and wetland habitats, and the reduction or loss of irrigation water is likely to result in the loss of irrigated croplands. Upland habitats and dryland crops that are more tolerant of drier seasonal conditions would become more prevalent in the valley. Changes in the location and extent of these habitats over time may result in some reduction in the suitability of habitat for special-status raptors. For example, loss of irrigated pastures and hayfields, which are used as proxy wetlands by many birds in California, may result in a reduction in potential nesting habitat for short-eared owl and northern harrier. While the composition of small bird and mammal populations present may change as habitats change, overall numbers of species would likely be maintained, and they would continue to provide a prey source.

The Proposed Action, therefore, would result in a minor reduction in the suitability of habitat for special-status raptors in the Russian River Watershed. This effect would be considered negligible.

2.2.4.6.5 Other Special-status Birds, Common Birds, and Game Birds

In addition to raptors, the Project vicinity contains suitable habitat for a variety of special-status birds and other common bird species, including game birds. Refer to Section 2.2.3.5, Wildlife Resources, Table 2.2.3.5-3, for a list of special-status birds and Table 2.2.3.5-6 for a list of game birds that are known to or may potentially occur in the Scott Dam and Cape Horn Dam areas. Provided below is a description of potential effects to other special-status birds, common birds, game birds, and their habitats from Phase 1 (Construction) and Phase 2 (Post-facility Removal) activities.

***Phase 1* (*Construction*)**

Phase 1 is defined to include construction activities required for the removal of dams, ancillary facilities, and recreation facilities. The Phase 1 Analysis Area for other special-status birds or game birds is defined as a 300-ft. buffer from the boundaries of the Scott Dam and Cape Horn Dam construction areas (Map 2-8 and Map 2-10 in Section 2.1.2, Applicant's Proposal), Lake Pillsbury reservoir, and Van Arsdale Reservoir. The Analysis Area also includes riparian habitats along the Eel River downstream of the dams.

Provided below is a discussion of potential direct and indirect effects to other special-status birds or game birds and their habitats, categorized by geographic area.

Direct Effects

In the Scott Dam Area, yellow warbler (*Setophaga petechia*) (SSC) is known to occur near the Pillsbury Pines Day Use Area. The Scott Dam Area also contains suitable habitat for tricolored blackbird (*Agelaius tricolor*) (BCC, ST, SSC), grasshopper sparrow (*Ammodramus savannarum*) (SSC), olive-sided flycatcher (*Contopus cooperi*) (BCC, SSC), least bittern (*Ixobrychus exilis*) (SSC), loggerhead shrike (*Lanius ludovicianus*) (SSC), purple martin (*Progne subis*) (SSC), and bank swallow (*Riparia riparia*) (ST). The Cape Horn Dam Area contains suitable habitat for tricolored blackbird, grasshopper sparrow, olive-sided flycatcher, least bittern, loggerhead shrike, purple martin, bank swallow, and yellow warbler.

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Nesting songbirds could be directly disturbed and/or their nests removed by construction activities that include removal of structures (i.e., dams, ancillary facilities, and recreation facilities) and/or the removal of any vegetation required for construction. Potential effects to nesting birds from removal of structures and vegetation are described further below.

Some common bird species observed in the Analysis Area such as black phoebe (*Sayornis nigricans*) and swallows (*Hirundinidae* spp.) may build nests directly on structures and buildings planned to be removed as part of the Proposed Action. These species typically use the same nest for multiple years. Removal of the structures during the nesting season could result in loss of active nests bearing eggs or chicks. In addition, vegetation removal and trimming will be necessary to improve existing access roads, construct new access roads, and allow for construction implementation and staging. As described above for bald eagle and other raptors, dam removal activities will require overlap with the general nesting bird season to allow for flushing of sediments to occur during high flows and address and reduce potential effects to aquatic resources in the Eel River downstream of Scott Dam.

To reduce the potential for active nests to be removed during Phase 1 construction, PG&E will implement the Other Special-status Birds and Game Birds Construction Measures, which require a qualified biologist to survey for existing nests at Scott Dam and Cape Horn Dam the year prior to construction. If nests are found, they will be removed outside the nesting season (September 1–February 14), and if nests are established on the dam or other PG&E facilities to be removed, exclusion devices will be installed to prevent new nest construction.

To address and reduce the potential for active nests to be removed during construction at Project ancillary and recreation facilities, the Other Special-status Birds and Game Birds Construction Measures require PG&E to conduct facility removal outside the nesting season to the extent possible. If facility removal outside the nesting season is not possible, a qualified biologist will conduct a survey for active nests on structures to be removed. If a nest is identified during the survey, the nest will be removed prior to the avian nesting season and exclusion devices will be installed to prevent new nesting before the facility is removed. With the implementation of the Other Special-status Birds and Game Birds Construction Measures, potential effects to nesting birds from construction activities would be addressed and reduced. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these measures.

Additionally, approximately 0.6 acre of riparian vegetation will be removed for extension of the existing road off Scott Dam Road that provides access to the temporary barge launch at the downstream terminus of the existing plunge pool below the dam. An additional 0.04 acre of riparian vegetation would be removed for construction of the new access road south of Scott Dam (off of Elk Mountain Road). Riparian vegetation will also be removed for construction of a temporary access road at Cape Horn Dam (approximately 0.3 acre) and during construction activities adjacent to the Fish Screen Facility (approximately 0.18 acre). Riparian thickets provide nesting habitat for a variety of special-status songbirds that could potentially occur in the Scott Dam Area and Cape Horn Dam Area including tricolored blackbird, purple martin, and yellow warbler; a variety of common bird species protected under the MBTA; and game birds such as California quail (*Callipepla californica*). Upland vegetation may also require trimming and

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removal prior to Project ancillary and recreation facility removal. To protect nests in vegetation, PG&E will implement the Other Special-status Birds and Game Birds Construction Measures, which require PG&E to conduct vegetation clearing outside the general avian nesting season (i.e., September 1–February 14) to the extent possible. If vegetation removal must occur during the nesting season, then a pre-construction nesting survey will be conducted prior to vegetation removal and active nests would be protected with site-specific avoidance buffers, as appropriate. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these measures.

To further protect other special-status birds and game birds, PG&E will also implement General Construction Measures, which require all contractors and staff to be given instructions on how to comply with site-specific avoidance and protection measures, and General Wildlife Measures, which require work to stop if special-status species that were previously undiscovered are observed and the observations to be reported to PG&E as soon as practicable. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these construction measures.

With the implementation of construction measures, direct effects to other nesting special-status birds and game birds from nest removal or noise disturbance in the Scott Dam Area and Cape Horn Dam Area would be temporary and negligible.

Indirect Effects

As described previously, the majority of construction work areas, access routes, staging areas, and stockpile areas are located within the footprint of existing facilities. However, vegetation removal will be required for the extension of the existing road off Scott Dam Road, establishment of the new access road south of Scott Dam (off of Elk Mountain Road), and implementation of construction activities within the construction areas. Construction activities in these areas could result in removal of approximately 3.35 acres of potential nesting habitat in the Scott Dam Area and 4.18 acres in the Cape Horn Dam Area. This would include removal of trees and shrubs.

In addition, approximately 0.64 acre of riparian vegetation would be removed in the Scott Dam Area for extension of the existing road, establishment of the new access road south of Scott Dam, and implementation of construction activities within the construction areas. Some vegetation removal may also be required for the construction of a new temporary road to provide access to work areas near Cape Horn Dam (approximately 0.3 acre) and during construction activities near the Fish Screen Facility (approximately 0.18 acre). Upland vegetation will also be trimmed or removed

To address and reduce effects to other special-status birds and game birds, PG&E will implement the Other Special-status Birds and Game Birds Measure and Riparian and Wetland Protection Measure. These measures require nest protection during vegetation, dam, and recreation facility removal and that riparian vegetation removal be limited to the extent possible and riparian vegetation outside of construction work areas be flagged for avoidance. PG&E will obtain a CWA Section 404/401 permits/certification and implement all the conditions of the permits, including riparian protection measures. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of this measure. With the implementation of this measure, effects from riparian vegetation removal would be considered negligible.

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Lake Pillsbury reservoir provides suitable foraging habitat for a variety of waterfowl such as mallards (*Anas platyrhynchos*, PG&E 2019a). Foraging habitat in the reservoir may be affected by the drawdown that would take place during the initial low-flow season. Lake Pillsbury reservoir would be drawn down to approximately 10,000 ac-ft by October of the initial low-flow season, which would reduce the potential area for waterfowl foraging. However, as described in Section 2.1.2, Applicant's Proposal, the drawdown would occur slowly, with the drawdown rate being restricted to between 1 and 2 ft. per day, giving waterfowl time to adjust and find alternative foraging habitats. Therefore, effects to foraging habitat from the reservoir drawdown would be negligible.

Use of ground-disturbing construction equipment could result in the degradation of water quality in downstream aquatic habitats from sedimentation or runoff of hazardous materials during work within Lake Pillsbury reservoir, Van Arsdale Reservoir and the Eel River downstream of the reservoirs. Degradation of water quality could, in turn, affect aquatic macroinvertebrates that represent prey species for aquatic foraging birds such as swallows and martins. As described in detail above for bald eagles, the potential for effects to aquatic foraging habitats would be addressed and reduced by the drawdown requirements specified in Section 2.1.2, Applicant's Proposal and the implementation of the Construction Water Quality and Water Temperature Monitoring Plan, Construction Erosion Prevention Plan, Water Quality and Erosion Control Measures, Hazardous Materials Handling Measures, Stormwater Pollution Prevention Plan, and applicable USFS BMPs, and Riparian and Wetland Protection Measures. With the implementation of these measures, proposed construction activities in the Scott Dam Area would have negligible indirect effects on aquatic foraging habitat for other special-status birds and game birds. Effects following dam removal (including sedimentation in the Eel River) are addressed under Phase 2 (Post-facility Removal).

With the implementation of proposed measures, construction activities in the Scott Dam Area and Cape Horn Dam Area would have negligible indirect effects on nesting and aquatic foraging habitat for other special-status birds and game birds.

Phase 2 (Post-facility Removal)

Phase 2a includes the initial temporary physical conditions in the Scott Dam Area, Cape Horn Dam Area (including the former reservoir beds), and Eel River Watershed immediately following completion of Phase 1. Phase 2b is defined to include the long-term resulting conditions following completion of Phase 2a. The Phase 2 Analysis Area for other special-status birds or game birds includes (1) the Scott Dam Area – Restoration Area and Cape Horn Dam Area – Restoration Area, (2) the Eel River from Scott Dam to the Eel River estuary, and (3) the East Branch Russian River from the Potter Valley Powerhouse to Lake Mendocino.

Provided below is a discussion of potential direct and indirect effects to other special-status birds and game birds and their habitat post-facility removal.

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Phase 2a

Phase 2a includes the initial temporary physical conditions immediately following facility removal.

Direct Effects

Scott Dam Area and Cape Horn Dam Area: Most restoration activities will take place within the dewatered beds of Lake Pillsbury reservoir and Van Arsdale Reservoir, as well as the disturbed footprint of former Project ancillary/recreation facilities, and will not directly affect special-status birds or game birds. However, as described in the Restoration Plan, restoration activities may require the active collection of plant material to support restoration of native habitats within the former reservoir beds. This may include collection of native willow cuttings or collection of native seeds. Refer to Section 2.1.2, Applicant's Proposal, for more details on the goals of the Restoration Plan. If active nests are present in collection areas, nests could potentially be removed and/or disturbed. To address and reduce this impact, PG&E will implement the Other Special-status Birds and Game Birds Restoration Measures, which require that plant collection occur outside the general avian nesting season to the extent possible. If plant collection must be conducted during the breeding season, a nest survey will be conducted in the collection areas and avoidance buffers implemented if nests are found. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these restoration measures. With the implementation of these measures, any direct effects to bird nests resulting from restoration activities would be negligible.

Eel River Watershed: Outside of the Scott Dam and Cape Horn Dam restoration areas described above, no direct restoration activities would occur within the Eel River Watershed. Therefore, use of heavy equipment for restoration activities would have no direct effects on other special-status birds nesting downstream in the watershed.

Indirect Effects

Scott Dam Area: Lake Pillsbury reservoir provides suitable foraging habitat for a variety of waterfowl such as mallards (PG&E 2019a). After dam removal, Lake Pillsbury reservoir will no longer impound water and lacustrine foraging habitat would be converted into riverine habitat and large areas of bare exposed sediment. This habitat conversion may result in the displacement of foraging waterfowl in the short term before restoration activities can improve riparian and wetland habitats within the former reservoir bed. Therefore, there may be adverse effects to foraging habitat for waterfowl during Phase 2a activities.

The shoreline of Lake Pillsbury reservoir is dominated primarily by upland vegetation including Douglas-fir–ponderosa pine forest, mixed chaparral, and annual grasslands. Riparian and other water-dependent habitats are limited and include forested wetland habitats that occupy the tributary-influenced zones of Lake Pillsbury reservoir and the northern shoreline of Lake Pillsbury reservoir, which is periodically inundated and supports both wetland and upland vegetation. Several additional small wetlands were also mapped along the reservoir shoreline by Stillwater Sciences (PG&E 2019b).

Upland habitats would not be affected by drawdown of the reservoir; therefore, Phase 2a will have no effect on special-status species such as grasshopper sparrow and olive-sided flycatcher that use upland habitats. Tributary streams will continue to support forested wetland habitats in the

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tributary-influenced zones, and these habitats would likely persist following removal of Scott Dam. Other wetland areas, including the vegetation growing along the periodically inundated northern shoreline of the reservoir, tolerate periodic changes in water levels under existing conditions and therefore are expected to persist in the near term following removal of Scott Dam, but they may experience some loss due to the reduction in surface water. Minor reductions in the extent of wetland habitats along the margins of the reservoir during Phase 2a would have a negligible effect on special-status and game birds potentially using these areas, including, but not limited to, yellow warbler, purple martin, and bank swallow.

Cape Horn Dam Area: Van Arsdale Reservoir is confined within a narrow river valley. Under Phase 2a, following drawdown of Lake Pillsbury reservoir and Van Arsdale Reservoir and removal of the dams, water levels would be similar to the historical condition (i.e., confined within the historical Eel River channel). The first high-flow event would mobilize coarse sediments from Van Arsdale Reservoir downstream at the same time that millions of cubic yards of fine and coarse sediment from the former Lake Pillsbury reservoir would be mobilized. Aggradation of sediment is likely within portions of the reservoir bed, and new bars may form that promote increased bank erosion and lateral channels. The sediment release is expected to temporarily affect the quantity (surface area) and quality of aquatic foraging habitat for waterfowl. Burial of riparian and wetland vegetation may temporarily reduce habitat suitability for other birds, such as yellow warbler or least bittern, in this reach.

Under existing conditions, Van Arsdale Reservoir supports forested wetlands as well as several small emergent wetlands, which may provide habitat for some riparian-nesting birds. While dam removal could result in minor reductions in the extent of forested and emergent wetlands because of reduced water levels or from burial in sediment, new riparian vegetation may also become established on the new depositional surfaces (Shafroth et al. 2002, 2024). A 2024 review of several studies on the Elwha River system noted that new surfaces within the former reservoirs were rapidly colonized, particularly in areas of fine sediment, within 3 to 5 years after dam removal (Shafroth et al. 2024). Additionally, sediments trapped behind Scott Dam upstream may also contain seed sources that could facilitate rapid vegetation colonization within Van Arsdale Reservoir, as was observed downstream of the Glines Canyon Dam in the Elwha River system (Shafroth et al. 2024). Therefore, effects to special-status birds resulting from temporary and minor changes in riparian and wetland habitat in the Cape Horn Dam Area would be negligible.

Eel River Watershed: The sediment release in Phase 2a may indirectly affect special-status birds by affecting their habitats. As described in Section 2.2.4.6.1 above, the effects of sediment release on riparian vegetation along the Eel River that represents potential habitat for special-status birds would occur primarily in the reach from Scott Dam downstream to the confluence with the Middle Fork Eel River and would vary based on site-specific factors including the volume of discharge, distance from the point of release, and geomorphology of the site affected. The duration of erosion of upstream sediment during the initial high-flow event following dam removal was estimated to take from 1 to 8 days depending on the rate of discharge.

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The effects of sediment release under Phase 2a, therefore, may result in temporary effects to waterfowl and to bird species that use riparian habitats in and along the Eel River from Scott Dam to the confluence with the Middle Fork Eel River. Effects would be site-specific and would be reduced with distance from the point of release. As described for effects to bald eagles, the initial sediment release would result in aggradation of coarse sediments and high suspended sediment loads downstream of Scott Dam, which would temporarily affect the quantity (surface area) and quality of aquatic foraging habitat for waterfowl. Burial of riparian and wetland vegetation may temporarily reduce habitat suitability for other birds, such as yellow warbler or least bittern, in this reach, but the creation of new channel bars and deposits would provide surfaces for early successional species to colonize rapidly, as was observed in a dam removal study on the Elwha River system (Shafroth et al. 2024). Because Phase 2a would not result in detectable changes in associated riparian or estuarine habitats downstream of the Middle Fork Eel River, there would be no effect to species along this reach, including species potentially present in the Eel River estuary such as western snowy plover (*Charadrius nivosus nivosus*) and western yellow-billed cuckoo (*Coccyzus americanus*).

Phase 2a will affect aquatic, riparian, and wetland habitats along the Eel River from Scott Dam to the confluence with the Middle Fork Eel River. Because effects are temporary and site-specific and would decrease with distance, they are expected to have a negligible impact on special-status birds along this reach. Phase 2a will have no effect on special-status birds below the Middle Fork Eel River.

Phase 2b

Scott Dam Area: Phase 2b is the resulting conditions following restoration of the Scott Dam Area, including the restoration area and the bed of Lake Pillsbury reservoir. In the long term, the conversion of lacustrine habitat within Lake Pillsbury reservoir to a mosaic of wetland, riparian, and upland habitats found along a restored riverine channel would increase the diversity and health of riparian and wetland ecosystems, which is expected to benefit nesting and foraging habitat for other special-status birds and game birds in the long term. Furthermore, implementation of the Restoration Plan is expected to increase the total amount of riparian habitat within the former Lake Pillsbury reservoir bed compared to the existing condition in which riparian habitat is restricted to the tributary streams along the shoreline. Following dam removal on the Elwha River system, rapid revegetation occurred on fine sediments within a 3- to 5-year monitoring period following removal of two dams, including the development of alder, cottonwood, and willow thickets within the former reservoir beds (Shafroth et al. 2024). However, areas with coarser sediments revegetated more slowly (Shafroth et al. 2024). Long-term monitoring of restoration sites along the Sacramento River has shown that diversity and abundance of birds increase as the sites mature over time (Golet et al. 2013). Additionally, restoration of the recreation and ancillary facility sites would result in increased nesting and foraging upland habitats compared to the existing condition. Therefore, in the long term, implementation of the Proposed Action would have beneficial effects to other special-status birds and game birds. Refer to Section 2.1.2, Applicant's Proposal, for more details on the goals of the Restoration Plan.

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Cape Horn Dam Area: Phase 2b is the resulting conditions following restoration of the Cape Horn Dam Area, including the construction restoration area and the bed of Van Arsdale Reservoir. Under Phase 2b, restoration of the dam and ancillary facility sites would result in a long-term benefit to special-status birds.

Following mobilization of sediments, PG&E will restore the former reservoir bed consistent with the Restoration Plan. Refer to Section 2.1.2, Applicant's Proposal, for more details on the goals of the Restoration Plan. The focus of the restoration would be stabilization of the new river channel including native plantings, as necessary. Over time, the reach of the Eel River within Van Arsdale Reservoir is expected to return to a morphologic condition similar to pre-dam conditions. Similar to the patterns observed following dam removal in the Elwha River system (Shafroth et al. 2024), the river would become a more dynamic channel, formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, deeper pools, and less-dense riparian vegetation. In other areas, the formation of new sediment bars may provide surfaces for the establishment of young riparian vegetation (Shafroth et al. 2002, 2024). The length of time required for a return to this condition may be a few to several years and would be largely dependent on the magnitude, frequency, and duration of subsequent flood events. While the density of mature riparian vegetation decreased, increased diversity of riparian plant species and age class structure was observed within 3 to 5 years following dam removal on the Elwha River system (Shafroth et al. 2024). Therefore, the restored Eel River in this area would continue to provide aquatic and riparian habitat for special-status birds. Furthermore, implementation of the Restoration Plan would enhance upland habitats in former ancillary facility footprints that would provide additional habitat for special-status birds and other game birds compared to the existing condition. Therefore, in the long term, implementation of the Proposed Action would benefit other special-status birds and game birds.

Eel River Watershed: Phase 2b is the resulting conditions in the Eel River following restoration. From Scott Dam downstream to the Middle Fork Eel River, the Proposed Action is expected to result in a more dynamic channel, formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, deeper pools, and less-dense riparian vegetation. It is likely that the currently over-coarsened sediment gradation in the reach will become less coarse with the renewed sediment supply. Long-term aggradation may occur that raises the bed elevation profile, though much of the sediment initially deposited will likely be remobilized in subsequent floods and transported farther downstream. Temporary filling of pools may occur, and more pronounced sediment bars may form that will promote development of a more sinuous channel. Areas with existing overly dense riparian vegetation will be scoured more frequently or buried with sediment deposits, resulting in less-dense vegetation. In the Elwha River system, large patches of stable, mature riparian vegetation in the reach between two removed dams were scoured, and new channel bars formed that allowed the establishment of early successional species (Shafroth et al. 2024). In other areas, the formation of new sediment bars may provide surfaces for establishment of young riparian vegetation (Shafroth et al. 2002, 2024). In the long term, the riparian community, diversity, age class structure, and composition are expected to increase under the unimpaired hydrology, resulting in more complex and diverse riparian communities. For example, within 3 to 5 years following monitoring on the Elwha River system, native species diversity on the Elwha River reach between the two former dams increased by 31 percent after dam removal (Shafroth et

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al. 2024). These changes to riparian habitat in the Eel River would have a neutral to beneficial effect on special-status birds.

The Proposed Action would have minimal effects to river morphology downstream of the Middle Fork Eel River, is not likely to result in detectable long-term changes in associated riparian and estuarine habitats, and would therefore have no effect on special-status birds.

Russian River Watershed: Under existing conditions, PG&E diverts water from the Potter Valley Powerhouse into the 11-mi. East Branch Russian River, which runs from the powerhouse through an alluvial valley (i.e., Potter Valley) and up through more mountainous terrain to Lake Mendocino, formed where the East Branch meets the mainstem Russian River. Diversions into the East Branch Russian River, based on monthly average, typically ranged between about 150 cfs to 225 cfs, with maximum flows of about 300 cfs for the period of record (see Section 2.2.3.1, Water Use and Hydrology), although in recent years they have been much lower (see Figure 2.2.3.1-15). Since 1908, diversions from the Eel River have been used to irrigate a wide variety of croplands in Potter Valley including, but not limited to, irrigated pastures and hayfields, pears, vineyards, and row croplands (PVID 2024). Riparian and wetland habitats are also present, primarily along the valley portion of the river. The river and surrounding natural and agricultural lands may support aquatic foraging birds such as swallows and martins, and birds such as least bittern and yellow warbler may use riparian and wetland habitats. Colonies of tricolored blackbird are known to utilize irrigated hayfields in the valley (CNDDB 2024).

Following removal of Cape Horn Dam under Phase 2a, PG&E would no longer divert water to the Potter Valley Powerhouse. As described in Section 2.2.4.6.1 above, reestablishment of unimpaired flows in the East Branch Russian River from the powerhouse to the OHWM of Lake Mendocino (approximately 11 mi.) would result in substantially lower flows than current flow diversions during the late summer and fall. This would result in an alteration in the location and extent of riparian and wetland habitats, and the reduction or loss of irrigation water is likely to result in the loss of irrigated croplands. Upland habitats and dryland crops that are more tolerant of drier seasonal conditions would become more prevalent in the valley. While the degree of changes resulting from the Proposed Action is unknown, changes in the location and extent of these habitats may potentially reduce the amount and/or suitability of these habitats for some special-status birds. Potential loss of the irrigated hay fields and pastures could reduce or eliminate habitat for tricolored blackbird colonies that have been documented in the area, which would represent a potentially significant adverse effect for this species. Effects would likely be negligible for other species. For example, swallows and martins can also forage over upland habitats. In addition, an increase in upland habitats over time, such as grassland or oak woodland habitats, could provide habitat for upland species such as olive-sided flycatcher. Therefore, implementation of Phase 2a and Phase 2b would result in significant adverse effects to tricolored blackbirds and negligible effects to other special-status birds along the East Branch Russian River.

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2.2.4.6.6 Special-status Bats

The Project vicinity contains suitable habitat for a variety of special-status bat species. A comprehensive roost survey was conducted at the dams, Project ancillary facilities, and Project recreation facilities in 2018 (PG&E 2019a). Refer to Section 2.2.3.5, Wildlife Resources, Table 2.2.3.5-5, for a comprehensive list of Project facilities that were evaluated as providing suitable roosting habitat and were observed to contain bat roosts. Provided below is a description of potential effects to special-status bats and their habitats from Phase 1 (Construction) and Phase 2 (Post-facility Removal) activities.

***Phase 1* (*Construction*)**

Phase 1 is defined to include construction activities required for the removal of dams, ancillary facilities, and recreation facilities. The Phase 1 Analysis Area for special-status bats is defined as the Scott Dam and Cape Horn Dam construction areas (Map 2-8 and Map 2-10 in Section 2.1.2, Applicant's Proposal). The Analysis Area also includes aquatic foraging habitats such as Lake Pillsbury reservoir, Van Arsdale Reservoir, and the Eel River downstream of the dams.

Provided below is a discussion of potential direct and indirect effects to special-status bats and their habitat.

Direct Effects

Special-status bat roosts—including night roosts, day roosts, and maternity roosts—could potentially be disturbed by dam removal and ancillary/recreation facility removal. Several facilities that were identified as potentially supporting bat roosts (PG&E 2019a) will be removed, which could result in the removal of active bat roosts if still present.

Night roosts were identified at Scott Dam and the exterior of the Potter Valley Powerhouse; Conduit No. 2 Lower Wood Stave, Steel Pipe, and Components; and Conduit No. 1 72-inch Butterfly Valve House, Standpipe, and Surge Chamber Vent. Bats use night roosts as temporary resting locations when they are actively foraging at night. Construction will take place during the day; therefore, individuals would not be directly disturbed during construction activities. However, because the dam will be removed, the roost location will be eliminated.

Day roosts were identified at restroom buildings at several of the Scott Dam Area recreation facilities, including Fuller Grove Group Campground, Fuller Grove Day Use Area and Boat Launch, Navy Campground, Pillsbury Pines Day Use Area and Boat Launch, Pogie Point Campground, and Trout Creek Campground (note that the restrooms at Trout Creek Campground in the Cape Horn Dam Area and Navy Campground and Pogie Point Campground in the Scott Dam Area would be left in place). In the Cape Horn Dam Area, a day roost of the common species Yuma myotis (*Myotis yumanensis*) was discovered in a cabana outbuilding in the Potter Valley Powerhouse Complex, and an unknown bat species was observed day roosting in the Fish Attraction Facility (Fish Hotel) (personal communication, A. Anderson, Aquatic Biologist, PG&E, with Robyn Smith, Janelle Nolan & Associates Environmental Consulting, 2024). Removal and/or partial removal of the ancillary facilities could potentially result in the removal of active bat day roosts.

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A maternity roost of Yuma myotis was identified in the VAFS Facility Motor Control Building. There is also some potential for maternity roosts to be present in recreation facilities that would be removed. Maternity roosts containing non-volant young are particularly vulnerable because young may not be able to escape when the buildings are removed.

Special-status bats may also roost in large trees or snags with appropriate thermal features (e.g., cavities, exfoliating bark) that are present within the construction areas.

To address and reduce potential effects to maternity and day roosts in facilities, PG&E will implement the Special-status Bat Construction Measure, which includes conducting a pre-construction survey for bat roosts in Project recreation and ancillary facilities that were identified as supporting suitable bat roosting habitat. These surveys would be conducted during the maternity season (i.e., May 1–August 31) in the year prior to construction. To the extent possible, PG&E will remove structures that contain bat roosts outside the maternity roosting season (i.e., September 1–April 30). If PG&E cannot remove structures outside the maternity roosting season, then PG&E will install exclusion measures and deterrents on the structures prior to the start of the maternity season (before April 15) to discourage occupancy and/or coordinate with resource agencies on the best method to humanely evict bats. If a day roost were discovered, PG&E would exclude individuals prior to the removal of the facility.

Several facilities that will be left in place in the Cape Horn Dam Area have underground components that could be attractive for bat roosting. The Special-status Bat Construction Measure also includes an inspection of any underground structures that will be left in place or capped for the presence of bats. If bats are present, PG&E will humanely evict all bats before capping and/or decommissioning the facility.

To protect special-status bats potentially roosting in vegetation to be removed, PG&E will implement General Construction measures, which include a measure that states large trees and snags (e.g., 35 inches dbh or greater) that have high value for wildlife, including roosting bats, would be avoided to the extent possible. Furthermore, as described above under Other Special-Status Birds, Common Birds, and Game Birds (Section 2.2.4.6.5), PG&E would conduct vegetation clearing outside the general avian nesting season (i.e., September 1–February 14) to the extent possible. This time period is also outside the maternity roosting season (i.e., May 1–August 31), and would also protect maternity-roosting bats.

To further protect special-status bats, PG&E will also implement General Construction Measures, which require all contractors and staff to be given instructions on how to comply with site-specific avoidance and protection measures, and General Wildlife Measures, which require work to stop if special-status species that were previously undiscovered are observed and the observations to be reported to PG&E as soon as practicable. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these construction measures. With the implementation of these measures, direct effects to roosting bats from removal of roosts would be negligible.

Construction would take place during daylight hours and would not directly affect the foraging activities of bats, which are nocturnal.

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Indirect Effects

Indirect effects to special-status bats include effects to roosting habitat and aquatic foraging habitat. Each is discussed further below.

Although the majority of construction work areas, access routes, staging areas, and stockpile areas are located within the existing developed and disturbed footprint of Project facilities, some portions extend into suitable roosting and foraging habitat for special-status bats. This includes densely vegetated portions of the construction area south of Scott Dam, east and west of Cape Horn Dam, and southeast of the Fish Screen Facility. Construction activities in these areas may result in removal of approximately 3.35 acres of potential roosting and foraging habitat in the Scott Dam Area and 4.18 acres in the Cape Horn Dam Area. In addition, some limited tree removal may be required along existing roads or prior to removal of ancillary or recreation facilities. Removal of trees could alter habitat for tree-roosting bats. Bats typically select the largest available trees or snags for roosts that have features such as cavities or sloughing bark. As described above, dams and recreation facilities that may be suitable for use by roosting bats would be removed.

In order to address and reduce impacts to habitat for tree-roosting bats, PG&E would implement General Construction Measures, including a measure that states large trees and snags (e.g., 35 inches dbh or greater) that have high value for wildlife, including roosting bats, would be avoided to the extent possible. Following completion of construction, the construction areas would be restored and would continue to provide habitat for roosting bats (refer to the Phase 2 – Post-facility Removal section below). Therefore, impacts to roosting habitat for special-status bats would be negligible.

Many bat species forage for flying insects and aquatic macroinvertebrates over water. Use of ground-disturbing construction equipment could result in the degradation of water quality from sedimentation or runoff of hazardous materials, which would, in turn, affect the availability of aquatic macroinvertebrate prey. As described in detail above for bald eagles, the potential for effects to aquatic foraging habitats would be addressed and reduced by the drawdown requirements specified in Section 2.1.2, Applicant's Proposal, and the implementation of the Construction Water Quality and Water Temperature Monitoring Plan, Construction Erosion Prevention Plan, Water Quality and Erosion Control Measures, Hazardous Materials Handling Measures, Stormwater Pollution Prevention Plan, applicable USFS BMPs, and Riparian and Wetland Protection Measures. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these construction measures. With the implementation of construction measures, potential indirect effects to aquatic foraging habitat would be negligible.

With the implementation of construction measures, proposed construction activities in the Scott Dam Area would have negligible effects on roosting and aquatic foraging habitat for special-status bats.

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Phase 2 (*Post-facility Removal*)

Phase 2a includes the initial temporary physical conditions in the Scott Dam Area, Cape Horn Dam Area (including the former reservoir beds), and Eel River Watershed immediately following completion of Phase 1. Phase 2b is defined to include the long-term resulting conditions following completion of Phase 2a. The Phase 2 Analysis Area for special-status bats includes (1) the Scott Dam Area – Restoration Area and Cape Horn Dam Area – Restoration Area, (2) the Eel River from Scott Dam to the Eel River estuary, and (3) the East Branch Russian River from the Potter Valley Powerhouse to Lake Mendocino.

Provided below is a discussion of potential direct and indirect effects to special-status bats and their habitat following facility removal.

Phase 2a

Phase 2a includes the initial temporary physical conditions in the Cape Horn Dam Area, Scott Dam Area, and Eel River Watershed, including the restoration areas and the former reservoir beds, immediately following facility removal.

Direct Effects

Scott Dam Area: Following completion of construction, PG&E will restore areas affected by the removal of the dam and ancillary and recreation facilities. These areas do not support roosting habitat, and, therefore, use of heavy equipment or ground disturbance associated with restoration activities would not directly affect roosting bats. Special-status bats may potentially forage over uplands in the vicinity of the restoration areas. Bats typically forage at dawn and dusk. Restoration activities would be restricted to daylight hours and therefore would not result in disturbance of overland foraging bats. Therefore, restoration activities conducted under Phase 2a would not result in direct effects to special-status bats.

Cape Horn Dam Area: As described above for Scott Dam, restoration areas do not provide suitable roosting habitat, and construction activities would be conducted during daylight hours. Therefore, restoration activities would not result in disturbance to bats foraging at dawn and dusk.

Eel River Watershed: Outside of the Scott Dam and Cape Horn Dam restoration areas described above, no direct restoration activities would occur within the Eel River Watershed. Therefore, use of heavy equipment or helicopters for restoration activities would have no direct effects on other special-status bats in the watershed.

Indirect Effects

Scott Dam Area and Cape Horn Dam Area: Many bat species forage over water. Immediately following dam removal, Lake Pillsbury reservoir and Van Arsdale Reservoir would no longer impound water and would revert to riverine habitat, with large areas of exposed sediment in Lake Pillsbury reservoir. This rapid alteration of habitat could result in a temporary reduction in the availability of some invertebrate prey species for special-status bats.

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Under Phase 2a, following drawdown of Lake Pillsbury reservoir and Van Arsdale Reservoir and removal of the dams, water levels would be similar to the historical condition (i.e., confined within the historical Eel River channel). Portions of the narrow reservoir bed would be exposed, and the surface and subsurface water source for shoreline riparian vegetation would be reduced. The first high-flow event would mobilize coarser sediments from Van Arsdale Reservoir downstream at the same time that millions of cubic yards of fine and coarse sediment from the former Lake Pillsbury reservoir would be mobilized. Aggradation of sediment is likely within portions of the reservoir bed, and new bars may form that promote increased bank erosion and lateral channels. The nature of the changes will vary depending on the width and slope of any given portion of the reservoir bed. Relatively wide and low-gradient portions of the narrow reservoir bed will experience more sediment deposition than narrower and steeper reaches.

Increased bedload sediment transport and deposition within the remaining Eel River channel could affect aquatic macroinvertebrate prey by increasing physiological stress, reducing growth rates, or causing direct mortality (Orr et al. 2008; Reid and Anderson 2000). However, moist, bare soil areas; ponded water remaining on the dewatered reservoir bed; and remaining riparian and wetland habitats along the margins of the former reservoir bed would continue to provide habitat for a wide variety of aquatic and terrestrial invertebrates. Therefore, while facility removal may temporarily alter the types of prey species available for special-status bats, overall availability of prey is not expected to be reduced. Therefore, indirect effects to foraging bats would be negligible.

Eel River Watershed: Phase 2a is not expected to indirectly affect special-status bats in the Eel River Watershed. Sediment transport modeling of the dam removal (refer to Section 2.2.4.8, Geomorphology) indicates that most coarse sediment will be deposited prior to the confluence with the Middle Fork Eel River. In addition, some of the suspended fine sediment may deposit and alter channel or floodplain morphology in this reach, at least temporarily until subsequent high-flow events can resuspend it and transport it farther downstream. Flow from major tributaries downstream will diminish the effect of the elevated sediment load, and it is likely that alterations to the existing channel morphology will become difficult to distinguish downstream of the confluence with the Middle Fork Eel River (located 38 mi. downstream of Van Arsdale Reservoir).

As described previously, increased bedload sediment transport and deposition within the Eel River channel could affect aquatic macroinvertebrate prey by increasing physiological stress, reducing growth rates, or causing direct mortality (Orr et al. 2008; Reid and Anderson 2000). However, moist, bare soil areas and remaining riparian and wetland habitats would continue to provide habitat for a wide variety of aquatic and terrestrial invertebrates. Therefore, under Phase 2a, while there may be a temporary alteration in the types of prey species available for special-status bats, overall availability of prey is not expected to be reduced. Therefore, indirect effects to foraging bats would be negligible.

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Phase 2b

Phase 2b is the resulting conditions following restoration of the Scott Dam Area and Cape Horn Dam Area and downstream conditions in the Eel River Watershed and Russian River Watershed.

Scott Dam Area and Cape Horn Dam Area: Potential effects to special-status bats under Phase 2b include the long-term benefit from restoration of the former reservoir beds and Project ancillary/recreation facility sites. With implementation of the Restoration Plan, the conversion of lacustrine habitat within Lake Pillsbury reservoir to a mosaic of wetland, riparian, and upland habitats found along a restored riverine channel would increase the diversity and health of riparian and wetland ecosystems and the aquatic macroinvertebrate community. Additionally, restoration of the recreation and ancillary facility sites would result in increased upland roosting and upland habitats compared to the existing condition. The conversion of Van Arsdale Reservoir to a restored riverine channel that allows for natural sediment transport dynamics would benefit riparian and wetland habitats and aquatic macroinvertebrate prey resources for special-status bats. Additionally, restoration of the recreation and ancillary facility sites would result in increased upland roosting and upland habitats compared to the existing condition. Therefore, implementation of the Proposed Action at the Scott Dam Area and the Cape Horn Dam Area would benefit roosting and foraging habitat for special-status bats in the long term.

Eel River Watershed: From Scott Dam downstream to the Middle Fork Eel River, the Proposed Action is expected to result in a more dynamic channel, formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, deeper pools, and less-dense riparian vegetation. It is likely that the currently over-coarsened sediment gradation in the reach will become less coarse with the renewed sediment supply. Long-term aggradation may occur that raises the bed elevation profile, though much of the sediment initially deposited will likely be remobilized in subsequent floods and transported farther downstream. Temporary filling of pools may occur, and more pronounced sediment bars may form that will promote development of a more sinuous channel. Areas with existing overly dense riparian vegetation will be scoured more frequently or buried with sediment deposits, resulting in less-dense vegetation. In the Elwha River system, large patches of stable, mature riparian vegetation in the reach between the two removed dams were scoured, and new channel bars formed that allowed the establishment of early successional plant species (Shafroth et al. 2024). In other areas, the formation of new sediment bars may provide surfaces for establishment of young riparian vegetation (Shafroth et al. 2002, 2024). In the long term, the riparian community, diversity, age class structure, and composition are expected to increase under the unimpaired hydrology, resulting in more complex and diverse riparian communities. For example, within 3 to 5 years following monitoring on the Elwha River system, native plant species diversity on the reach between the two former dams increased by 31 percent after dam removal (Shafroth et al. 2024). These changes in the Eel River would have a neutral to beneficial effect on special-status bats and on the aquatic and terrestrial invertebrate species that constitute their diet.

The Proposed Action would have minimal effects to river morphology downstream of the Middle Fork Eel River, is not likely to result in detectable long-term changes in associated riparian and estuarine habitats, and would have no effect on special-status bats.

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Russian River Watershed: Under existing conditions, PG&E diverts water from the Potter Valley Powerhouse into the 11-mi. East Branch Russian River, which runs from the powerhouse through an alluvial valley (i.e., Potter Valley) and up through more mountainous terrain to Lake Mendocino, formed where the East Branch meets the mainstem Russian River. Diversions into the East Branch Russian River, based on monthly average, typically ranged between about 150 cfs to 225 cfs, with maximum flows of about 300 cfs for the period of record (see Section 2.2.3.1, Water Use and Hydrology) although in recent years they have been much lower (see Figure 2.2.3.1-15). Since 1908, diversions from the Eel River have been used to irrigate a wide variety of croplands in Potter Valley including, but not limited to, irrigated pastures and hayfields, pears, vineyards, and row croplands (PVID 2024). Riparian and wetland habitats are also present, primarily along the valley portion of the river. The area, therefore, provides a wide variety of habitats that may be used by special-status bats. For example, the river supports aquatic macroinvertebrates, while riparian, wetland, and cropland habitats would support a variety of other terrestrial and flying insects that may represent prey for bat species. Large trees and snags along the river may provide roosting habitat for tree-roosting bats.

Following removal of Cape Horn Dam under Phase 2a, PG&E would no longer divert water to the Potter Valley Powerhouse. As described in Section 2.2.4.6.1 above, the East Branch Russian River will have very low flows seasonally from the powerhouse to the OHWM of Lake Mendocino (approximately 11 mi.) under natural flow conditions (e.g., 1 cfs; see Table 2.2.3.1-15 in Section 2.2.3.1, Water Use and Hydrology). This would result in an alteration in the location and extent of riparian and wetland habitats, and the reduction or loss of irrigation water is likely to result in the loss of irrigated croplands. Upland habitats and dryland crops that are more tolerant of drier seasonal conditions would become more prevalent in the valley. Changes in the location and extent of these habitats may result in a change in the types of invertebrate prey available. For example, fewer aquatic macroinvertebrates would be present during the summer, when the creek is dry (although pooled water would likely remain in some areas), and the proportion of insects typical of upland habitats may increase over time. However, overall prey availability would likely be maintained. Riparian habitat may be reduced in some areas, but valley oaks and other trees that can tolerate seasonal flows would be expected to persist. Some large trees may be affected by the reduction of surface water, potentially resulting in increased availability of large snags that can be used by wildlife, including roosting bats. Therefore, implementation of the Proposed Action may affect special-status bats in the Russian River Watershed; however, effects would be negligible.

2.2.4.6.7 Mesocarnivores

The Project vicinity contains suitable habitat for two special-status mesocarnivores: the West Coast Distinct Population Segment of fisher (*Pekania pennanti*) (FSS, SSC) and the Pacific marten (also known as Humboldt marten) (*Martes caurina*) (FSS, ST). Provided below is a description of potential effects to mesocarnivores from Phase 1 (Construction) and Phase 2 (Post-facility Removal) activities.

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Phase 1 (*Construction*)

Phase 1 is defined to include construction activities required for the removal of dams, ancillary facilities, and recreation facilities. The Analysis Area for special-status mesocarnivores is defined as a 0.5-mi. buffer from the boundaries of the Scott Dam and Cape Horn Dam construction areas (see Map 2-8 and Map 2-10, Section 2.1.2, Applicant's Proposal). This buffer encompasses the construction work areas plus a disturbance buffer to account for any disturbance effects to mesocarnivores present in adjacent forested habitat.

Provided below is a discussion of potential direct and indirect effects to special-status mesocarnivores and their habitat.

Direct Effects

Suitable habitat for both fisher and marten were mapped as part of studies completed in 2018 (PG&E 2019a). There is suitable habitat within the Scott Dam and Cape Horn Dam construction area footprints near the Project dams and reservoirs(PG&E 2019a). This includes densely vegetated portions of the construction area that are present south of Scott Dam, east and west of Cape Horn Dam, and southeast of the Fish Screen Facility. Therefore, special-status mesocarnivores may potentially forage and den within the Analysis Area.

Potential direct effects to special-status mesocarnivores include disturbance from construction activities (including helicopter use, blasting, and vegetation removal) and the potential for vehicle collisions on construction routes.

The construction area overlaps with suitable denning and foraging habitat for fisher and Pacific martens. Although the majority of construction work areas, access routes, staging areas, and stockpile areas are located within the existing developed and disturbed footprint of Project facilities, some portions extend into suitable habitat. Due to the shy nature of these species and known tendencies to avoid more open areas (Slauson et al. 2016; Wengert 2013), fishers and Pacific martens would not likely den or forage in the developed and disturbed areas under existing conditions. However, noise from construction equipment, human presence, use of explosives to remove the adit plug and flush sediments (at Scott Dam only), and helicopter use could result in disturbance effects to mesocarnivores in suitable habitat in the Analysis Area.

There is some potential for fisher or marten dens to be present in the Analysis Area, and, based on existing literature, loud noises from construction have the potential to alter behavior and adversely affect breeding. The Proposed Action may require helicopter use during the construction period. Compared to the existing condition in which helicopter use is infrequent, this represents an increase in the potential for disturbance of these species along the helicopter route. Recent studies in Oregon indicate that fishers within 2 kilometers (1.2 mi.) of helicopter logging operations change their behavior in response to the presence of helicopters and may not return to areas for up to 2 weeks post-treatment (USFS 2020). Blasting associated with the removal of the adit plug at Scott Dam may result in similar disturbance effects. Noise-related effects would be temporary and limited to the period of construction; however, some potential remains for the Proposed Action to result in adverse effects to breeding mesocarnivores.

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PG&E may need to improve existing access roads, construct new access roads, and remove vegetation (including trees) in preparation for construction. Some tree removal may be required along existing access roads to ensure passage of large construction vehicles and equipment (e.g., barges), to establish new access roads, and within the construction area to allow for equipment access and staging. Minimal removal of individual trees may also be required to allow for removal of ancillary and recreation facilities. Reproductive dens are usually located in cavities in large, live or dead trees in forest stands with dense canopy cover and a complex structure. Female fishers appear to avoid moderate- and high-traffic roads when selecting den sites and tend to den away from paved and gravel roads (Thompson, C., unpublished data in USFS 2020). Fishers and martens are unlikely to select denning trees adjacent to a road or in a developed recreation facility. However, denning may occur in the densely vegetated portions of the construction area that are present south of Scott Dam, east and west of Cape Horn Dam, and southeast of the Fish Screen Facility. Therefore, tree removal could directly affect denning mesocarnivores. To address and reduce this potential impact, PG&E will avoid removal of large trees and snags (35 inches dbh or larger) that provide high value for wildlife, including fisher and marten, to the extent possible. To the extent possible, removal of trees would also occur outside the denning season (July 1–February 28). Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of this measure. With the implementation of General Construction Measures and the Special-status Mesocarnivore Construction Measures, potential effects to denning mesocarnivores from tree removal would be negligible.

Vehicle strikes are also known to be a significant source of mortality for mesocarnivores in some areas (USFS 2020). To reduce the potential for vehicle strikes, PG&E will implement the Special-status Mesocarnivores Construction Measure, which restricts speed limits within the construction areas. To further protect special-status mesocarnivores, PG&E will also implement General Construction Measures, which require all contractors and staff to be given instructions on how to comply with site-specific avoidance and protection measures, and General Wildlife Measures, which require work to stop if special-status species that were previously undiscovered are observed and the observations to be reported to PG&E as soon as practicable. The General Wildlife Measures also require that all construction materials, spoils, or other debris (e.g., trash) that could attract mesocarnivores be removed from the construction areas after completion of construction. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these construction measures. With the implementation of these measures, potential effects to mesocarnivores from vehicle strikes and attractants (i.e., construction-generated trash) would be negligible.

With the implementation of construction measures, direct effects to special-status mesocarnivores from tree removal, vehicle strikes, and attractants would be negligible. There remains, however, some potential for adverse effects to denning mesocarnivores resulting from noise disturbance (e.g., helicopters and blasting).

Indirect Effects

The proposed construction activities in the Scott Dam and Cape Horn Dam areas could result in the minor loss of denning and foraging habitat for special-status mesocarnivores. Although construction areas (work areas, access routes, staging areas, and stockpile areas) will be mostly located within the existing disturbed footprint of Project ancillary/recreation facilities, some portions extend into suitable habitat including densely vegetated portions of the construction area south of Scott Dam,

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east and west of Cape Horn Dam, and southeast of the Fish Screen Facility. Construction activities in these areas may result in removal of approximately 3.35 acres of suitable habitat in the Scott Dam Area and 4.18 acres in the Cape Horn Dam Area (less than 1 percent of suitable habitat for fisher and marten in the Analysis Area). This would include removal of trees and shrubs. In addition, as described above, some limited tree removal may be required along existing roads or prior to removal of ancillary or recreation facilities, but fishers are unlikely to den in the direct vicinity of developed roads and facilities. Removal of vegetation and trees would result in a minor loss of denning and foraging habitat for fisher and Pacific marten. To reduce potential effects removal of mature, large trees and snags (35 inches dbh or greater) that have high wildlife value and that represent potential denning structures for mesocarnivores would be avoided to the extent possible and any removal would be restricted to outside the denning season (July 1–February 28). Therefore, effects to denning habitat would be negligible.

Some riparian vegetation removal (approximately 0.6 acre) may be required for the construction of a new temporary road off Scott Dam Road to provide access to the temporary barge launch at the downstream terminus of the existing plunge pool below the dam. An additional 0.04 acre riparian vegetation may be removed for construction of the new access road south of Scott Dam (off of Elk Mountain Road). Riparian vegetation removal may also be required for the construction of a new temporary road to provide access to work areas near Cape Horn Dam (approximately 0.3 acre) and during construction activities near the Fish Screen Facility (approximately 0.18 acre). Special-status mesocarnivores are known to use riparian corridors for dispersal and movement (USFS 2020). Removal of riparian vegetation associated with construction activities would result in very minor changes in the availability of dispersal habitat for special-status mesocarnivores in the Analysis Area. Furthermore, this riparian habitat is located near the existing development at Scott Dam and Cape Horn Dam, which special-status mesocarnivores would likely avoid under existing conditions because of routine human presence. To reduce this potential effect, PG&E will implement the Riparian and Wetland Protection Measure, which requires that riparian vegetation removal be limited to the extent possible and that riparian outside of construction areas be flagged for avoidance. PG&E will also obtain CWA permits and implement all conditions of the permits (including riparian protection). Therefore, any potential effects to riparian dispersal habitat from construction would be negligible.

Phase 2 (*Post-facility Removal*)

Phase 2a includes the initial temporary physical conditions in the Scott Dam Area, Cape Horn Dam Area (including the former reservoir beds), and Eel River Watershed immediately following completion of Phase 1. Phase 2b is defined to include the long-term resulting conditions following completion of Phase 2a. The Phase 2 Analysis Area for special-status mesocarnivores includes (1) a 0.5-mi. buffer around the Scott Dam Area – Restoration Area and Cape Horn Dam Area – Restoration Area, (2) the Eel River from Scott Dam to the Eel River estuary, and (3) the East Branch Russian River from the Potter Valley Powerhouse to Lake Mendocino.

Provided below is a discussion of potential direct and indirect effects to mesocarnivores and their habitat following facility removal.

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Phase 2a

Phase 2a includes the initial temporary physical conditions in the Analysis Area immediately following facility removal.

Direct Effects

Scott Dam Area and Cape Horn Dam Area: Potential direct effects to special-status mesocarnivores include disturbance associated with restoration activities and the potential for vehicle collisions on restoration routes.

As described above, the majority of restoration work areas, access routes, staging areas, and stockpile areas are located within the existing disturbed footprint of Project facilities. Due to the shy nature of these species and known tendencies to avoid more open areas (Slauson et al. 2016; Wengert 2013), fishers and Pacific martens would not likely den or forage in these areas under existing conditions. However, noise from ground-disturbing heavy equipment, human presence, and helicopter use could result in disturbance effects to mesocarnivores in suitable habitat in the Analysis Area. Studies in Oregon indicate that fishers within 2 kilometers (1.2 mi.) of helicopter logging operations change their behavior in response to the presence of helicopters and may not return to areas for up to 2 weeks post-treatment (USFS 2020). Therefore, there is some potential for loud noises from restoration to alter behavior and to adversely affect breeding. This effect would be temporary and limited to the period of restoration activities; however, some potential remains for the Proposed Action to result in adverse effects to breeding mesocarnivores.

In addition, restoration activities would result in an increase in the number of vehicles traveling along local roads and restoration area access routes. Vehicle collisions are also known to be a significant source of mortality for mesocarnivores in some areas (USFS 2020). To reduce the potential for vehicle strikes, PG&E will implement the Special-status Mesocarnivores Restoration Measure, which restricts speed limits within the restoration areas. To further protect special-status mesocarnivores, PG&E will also implement General Restoration Measures, which require all contractors and staff to be given instructions on how to comply with site-specific avoidance and protection measures, and General Wildlife Restoration Measures, which require work to stop if special-status species that were previously undiscovered are observed and the observations to be reported to PG&E as soon as practicable. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these restoration measures.

With the implementation of post-facility removal measures, direct effects to special-status mesocarnivores from vehicle strikes would be negligible. There remains, however, some potential for adverse effects to denning mesocarnivores resulting from noise disturbance (e.g., helicopters and use of heavy equipment).

Eel River Watershed: Restoration activities are limited to the Scott Dam and Cape Horn Dam restoration areas and will not directly affect species in the Eel River Watershed. Therefore, use of heavy equipment or helicopters for restoration activities would have no direct effects on special-status mesocarnivores in the watershed.

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Indirect Effects

Scott Dam Area and Cape Horn Dam Area: The Scott Dam Area – Restoration Area and Cape Horn Dam Area – Restoration Area are located within the former reservoir bed of Van Arsdale Reservoir and in disturbed areas associated with Project ancillary facility sites. These areas do not contain suitable habitat for special-status mesocarnivores. Therefore, there would be no indirect effects to mesocarnivores under Phase 2a.

Eel River Watershed: Under Phase 2a, following drawdown of Lake Pillsbury reservoir and Van Arsdale Reservoir and removal of the dams, water levels would be similar to the historical condition (i.e., confined within the historical Eel River channel). Portions of the narrow reservoir bed would be exposed, and the surface and subsurface water source for shoreline riparian vegetation would be reduced. The first high-flow event would mobilize coarser sediments from Van Arsdale Reservoir downstream at the same time that millions of cubic yards of fine and coarse sediment from the former Lake Pillsbury reservoir would be mobilized. Aggradation of sediment is likely within portions of the reservoir bed, and new bars may form that promote increased bank erosion and lateral channels. The nature of the changes will vary depending on the width and slope of any given portion of the reservoir bed. Relatively wide and low-gradient portions of the narrow reservoir bed will experience more sediment deposition than narrower and steeper reaches.

Potential effects to mesocarnivores under Phase 2a include temporary modification of dispersal habitat following dam removal and the initial sediment release; however, these effects will be localized and negligible.

Phase 2b

Scott Dam Area: Phase 2b is the resulting conditions following restoration of the Scott Dam Area, including the restoration area and the bed of Lake Pillsbury reservoir. Under Phase 2b, restoration of the former reservoir bed of Lake Pillsbury reservoir and Project ancillary/recreation facility sites would result in a long-term benefit to mesocarnivores.

Under current conditions, Lake Pillsbury reservoir does not represent suitable habitat and may represent a dispersal barrier for mesocarnivores that require forested habitats with dense vegetation cover for dispersal. Over time, the former reservoir bed of Lake Pillsbury reservoir is expected to recolonize with upland and riparian vegetation. To further enhance this succession process, PG&E will implement the Restoration Plan, which would enhance the connectivity of the Eel River and tributary streams within the former reservoir bed and would enhance natural vegetation recruitment processes within the former reservoir bed. In the long term, the conversion of lacustrine habitat within Lake Pillsbury reservoir to a mosaic of wetland, riparian, and upland habitats found along a restored riverine channel would provide a dispersal corridor for mesocarnivores and would potentially provide additional denning and foraging habitat in upland areas. Refer to Section 2.1.2, Applicant's Proposal, for more details on the goals of the Restoration Plan. Additionally, the conversion of former Project ancillary and recreation facility sites to natural habitats and reduced recreation pressure following construction and restoration activities would also reduce the human footprint and disturbance level on the landscape, which would benefit

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mesocarnivores. Therefore, implementation of the Proposed Action would have beneficial effects to mesocarnivores and their habitat in the long term.

Cape Horn Dam Area: Phase 2b is the resulting conditions following restoration of the Cape Horn Dam Area, including the restoration area and the bed of Van Arsdale Reservoir. Under Phase 2b, restoration of the dam and ancillary facility sites would result in a long-term benefit to mesocarnivores.

As described above for Scott Dam, the implementation of the Restoration Plan would enhance natural vegetation recruitment processes within the former Van Arsdale Reservoir bed. Furthermore, implementation of the Restoration Plan would enhance riparian habitats that represent potential dispersal habitat for mesocarnivores. Mesocarnivores are also expected to benefit from the reduced human presence on the landscape once Project ancillary facilities are removed. Therefore, in the long term, the Proposed Action is expected to have a beneficial effect on mesocarnivores.

Eel River Watershed: From Scott Dam downstream to the Middle Fork Eel River, as described above in Section 2.2.4.6.1, the Proposed Action is expected to result in a more dynamic channel, and areas with existing overly dense riparian vegetation will be scoured more frequently or buried with sediment deposits, resulting in less-dense vegetation. In the long term, the riparian community, diversity, age class structure, and composition are expected to increase under the unimpaired hydrology, resulting in more complex and diverse riparian communities.

The Proposed Action would have minimal effects to river morphology downstream of the Middle Fork Eel River and is not likely to result in detectable long-term changes in associated riparian and estuarine habitats.

Restoration of unimpaired river flow conditions, and associated variable effects on riparian habitat, would have a minor, neutral, or beneficial effect on special-status mesocarnivores.

Russian River Watershed: Under existing conditions, PG&E diverts water from the Potter Valley Powerhouse into the 11-mi. East Branch Russian River, which runs from the powerhouse through an alluvial valley (i.e., Potter Valley) and down through more mountainous terrain to Lake Mendocino, formed where the East Branch meets the mainstem Russian River. Diversions into the East Branch Russian River, based on monthly average, typically ranged between about 150 cfs to 225 cfs, with maximum flows of about 300 cfs for the period of record (see Section 2.2.3.1, Water Use and Hydrology) although in recent years they have been much lower (see Figure 2.2.3.1-15). Since 1908, diversions from the Eel River have been used to irrigate a wide variety of croplands in Potter Valley including, but not limited to, irrigated pastures and hayfields, pears, vineyards, and row croplands (PVID 2024). Riparian and wetland habitats are also present, primarily along the valley portion of the river. While the croplands in Potter Valley do not present habitat for special-status mesocarnivores, there is some potential for these species to use the riparian corridor along the creek as a dispersal corridor between forest habitats on the mountains and hills surrounding the valley. Larger riparian trees and snags may provide resting structures for these species.

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Following removal of Cape Horn Dam under Phase 2a, PG&E would no longer divert water to the Potter Valley Powerhouse. As described in Section 2.2.4.6.1 above, the East Branch Russian River will have very low flows seasonally from the powerhouse to the OHWM of Lake Mendocino (approximately 11 mi.) under natural flow conditions (e.g., 1 cfs; see Table 2.2.3.1-15 in Section 2.2.3.1, Water Use and Hydrology). As a result, riparian habitat may be reduced in some areas, but valley oaks and other trees that can tolerate seasonal flows would be expected to persist and would continue to provide cover within the riparian corridor. Some large trees may be affected by the reduction of surface water, potentially resulting in increased availability of large snags that can be used by wildlife, including special-status mesocarnivores. Therefore, implementation of the Proposed Action may affect special-status mesocarnivores in the Russian River Watershed; however, effects would be negligible.

2.2.4.6.8 Tule Elk or Other Game Mammals

Tule elk are known to occur on the north shore of Lake Pillsbury reservoir and in the community of Potter Valley along the East Branch Russian River. In addition to tule elk, suitable habitat for a variety of other game mammal species such as black-tailed deer (*Odocoileus hemionus columbianus*) and black bear (*Ursus americanus*) is also present. Provided below is a description of potential effects to tule elk and other game mammals from Phase 1 (Construction) and Phase 2 (Post-facility Removal) activities.

***Phase 1* (*Construction*)**

Phase 1 is defined to include construction activities required for the removal of dams, ancillary facilities, and recreation facilities. The Phase 1 Analysis Area for tule elk and other game mammals is defined as a 0.5-mi. buffer from the boundaries of the Scott Dam and Cape Horn Dam construction areas (see Map 2-8 and Map 2-10 in Section 2.1.2, Applicant's Proposal). This buffer was determined based on a study that measured avoidance distances from motorized and un-motorized recreation activities on public forests (Wisdom et al. 2018). The Analysis Area also includes the Eel River 500 ft. downstream of the dams.

Provided below is a discussion of potential direct and indirect effects to tule elk and other game mammals and their habitat.

Direct Effects

Scott Dam Area: The noise from construction equipment, human presence, use of explosives, and helicopter use could result in disturbance effects to tule elk or other game mammals foraging in the Analysis Area. These noise effects could result from both the construction activities (including helicopter use and blasting) associated with Scott Dam removal and the removal of Project recreation facilities and ancillary facilities around Lake Pillsbury reservoir.

Studies on the effect of general construction noise on elk have found that elk may increase their daily movements and alter habitat usage but that construction noises did not affect overall home ranges (Martin 2011). Adults and calves may seek out topographic barriers in response to construction disturbances (Kuck et al. 1985).

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Construction may require helicopter use in the Scott Dam Area and may require the use of the Gravelly Valley Landing Field, where elk are known to occur (PG&E 2019a). Elk have been shown to be more resilient than other ungulates to helicopter noise (Brown et al. 2012), but increased helicopter use compared to the existing condition may shift their foraging behavior and cause the elk to retreat to more forested habitats (Kuck et al. 1985; Martin 2011).

Elk may also respond to novel blasting noises and heavy machinery, causing them to increase their daily movements (Olsson et al. 2007). However, elk have been shown to habituate quickly to loud noises and return to habitats from where they had been flushed (Olsson et al. 2007). Overall, elk have been shown to be more sensitive to pedestrian activities of humans such as recreation than activities associated with construction or mining (Kuck et al. 1985).

Considering that tule elk are primarily known to use the north side of Lake Pillsbury reservoir, which is approximately 2.5 mi. from Scott Dam and ancillary facility (necessary for dam removal) construction areas where blasting will be conducted; that elk are relatively tolerant of helicopter noise; that elk may be more affected by pedestrian human activities than the use of heavy equipment; and that construction would be short term and temporary, direct effects to tule elk from construction activities in the Scott Dam and ancillary facility (necessary for dam removal) construction areas would be negligible. To protect tule elk, PG&E will also implement General Construction Measures, which require all contractors and staff to be given instructions on how to comply with site-specific avoidance and protection measures, and General Wildlife Measures, which require work to stop if special-status species and tule elk that were previously undiscovered are observed and the observations to be reported to PG&E as soon as practicable. The General Wildlife Measures also require, upon completion of construction, that PG&E remove all construction materials, spoils, and other debris (e.g., trash) that could attract scavenging game mammals such as bears. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these construction measures.

Several Project recreation facilities are distributed on the north side of Lake Pillsbury reservoir where tule elk are known to occur. Use of helicopters, noise from ground-disturbing construction activities, and increased human presence during construction may result in flushing and disturbance of tule elk on the north side of Lake Pillsbury reservoir. However, construction would be short term and temporary, and therefore, these effects would be negligible.

Other game mammals such as black-tailed deer may be flushed from construction areas, but these effects are expected to be temporary (restricted to the construction period), and therefore, direct effects to other game mammals from construction activities would also be negligible. Effects following dam removal (including the potential for stranding in exposed sediments within the former reservoir bed of Lake Pillsbury reservoir) are addressed under Phase 2 (Post-facility Removal).

Cape Horn Dam Area: As described above, noise from ground-disturbing equipment and helicopter use during construction could result in disturbance effects to game mammals. Game mammals may be temporarily flushed or change their foraging patterns in response to human noise. However, these effects are expected to be short term and temporary (restricted to the construction

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period), and therefore, disturbance effects to other game mammals from construction activities would be negligible.

Indirect Effects

Scott Dam Area: The majority of construction work areas, access routes, staging, and stockpile areas are located within the existing disturbed footprint of Project ancillary/recreation facilities. Work in pre-existing disturbed areas would not affect suitable foraging habitat for tule elk and other game mammals. Although some portions of the construction area extend into densely vegetated upland areas (i.e., south of Scott Dam, east and west of Cape Horn Dam, and southeast of the Fish Screen Facility), tule elk mostly forage on emergent herbaceous vegetation along the north shore of Lake Pillsbury reservoir and along tributary streams (PG&E 2019a).

Drawdown of Lake Pillsbury reservoir during construction could result in the degradation of riparian and wetland foraging habitat along the north shore of the reservoir. Lake Pillsbury reservoir would be drawn down to approximately 10,000 ac-ft by October of the initial low-flow season. However, as described in Section 2.1.2, Applicant's Proposal, the drawdown would occur slowly, with the drawdown rate being restricted to between 1 and 2 ft. per day, giving tule elk time to adjust and find alternative foraging habitats. The slow drawdown rate would likely also continue to support foraging resources in the short term. Therefore, effects to foraging habitat from the reservoir drawdown during construction would be negligible. However, in the long term, the removal of Lake Pillsbury reservoir and the conversion of lacustrine habitat to riverine habitat may have more significant impacts on tule elk foraging (refer to the Phase 2a [Post-facility Removal] discussion below).

Riparian vegetation provides important foraging habitat for tule elk and other game mammals. Some riparian vegetation removal may be required for the construction of a new temporary road off Scott Dam Road to provide access to a temporary barge launch at the downstream terminus of the existing plunge pool below the dam (approximately 0.6 acre). Riparian vegetation may also be removed for construction of the new access road south of Scott Dam (off of Elk Mountain Road) (approximately 0.04 acre). As described above under other special-status birds and game birds, PG&E would implement the Riparian and Wetland Protection Measure to address and reduce disturbance of riparian foraging habitat for game mammals. With implementation of this measure, effects to riparian foraging habitat from vegetation removal would be considered negligible.

Cape Horn Dam Area: As described above under the Scott Dam Area, construction activities also have the potential to indirectly affect riparian foraging habitat for game mammals. Some riparian vegetation removal may be required for the construction of a new temporary road to provide access to work areas near Cape Horn Dam (approximately 0.3 acre) and for construction activities near the Fish Screen Facility (approximately 0.18 acre). To address and reduce effects to riparian foraging habitats for game mammals, PG&E will implement the Riparian and Wetland Protection Measure, as described above under the Scott Dam Area. With implementation of measures, potential indirect effects to game mammal foraging habitat from vegetation removal would be negligible.

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Phase 2 (Post-facility Removal)

Phase 2a includes the initial temporary physical conditions in the Scott Dam Area, Cape Horn Dam Area (including the former reservoir beds), and Eel River Watershed immediately following completion of Phase 1. Phase 2b is defined to include the long-term resulting conditions following completion of Phase 2a. The Phase 2 Analysis Area for tule elk and other game mammals includes (1) a 0.5-mi. buffer around the Scott Dam Area – Restoration Area and Cape Horn Dam Area – Restoration Area, (2) the Eel River from Scott Dam to the Eel River estuary, and (3) the East Branch Russian River from the Potter Valley Powerhouse to Lake Mendocino.

Provided below is a discussion of potential direct and indirect effects to tule elk, other game mammals, and their habitat from post-facility removal activities.

Phase 2a

Phase 2a includes the initial temporary physical conditions immediately following facility removal.

Direct Effects

Potential direct effects to tule elk and other game mammals from Phase 2a activities include disturbance during implementation of restoration activities and potential stranding or entrapment in eroding and exposed sediments within the reservoir beds.

Scott Dam Area: Noise from ground-disturbing construction equipment and helicopter use associated with restoration activities could result in disturbance of tule elk or other game mammals foraging in the vicinity. Helicopters engaged in restoration activities may require the use of the Gravelly Valley Landing Field, where elk are known to spend time (PG&E 2019a). Based on telemetry studies from CDFW, the Lake Pillsbury reservoir tule elk herd mostly uses habitat along the northern shore of Lake Pillsbury reservoir (Bush et al. 2021). As described above, tule elk are relatively resilient to and tolerant of helicopter use but may shift their foraging behavior and retreat to more forested parts of their habitat if helicopter use is frequent. To protect tule elk and other game mammals during active restoration activities, PG&E will implement General Restoration Measures, which require all contractors and staff to be given instructions on how to comply with site-specific avoidance and protection measures, and General Wildlife Restoration Measures, which require work to stop if wildlife is present that may be negatively impacted by restoration activities. Work will not be resumed until the animal(s) has moved out of harm's way. Refer to Section 2.1.2, Applicant's Proposal, Table 2-12, for additional details of these restoration measures. With the implementation of these measures, effects would be reduced, but activities under the Restoration Plan and Sediment/Channel Monitoring and Response plan may require multiple years of work; therefore, noise disturbance to tule elk from active restoration activities would be an adverse effect.

Conditions within Lake Pillsbury reservoir immediately following dam removal could present a risk for elk or other game mammals foraging in the area. For example, rapid drawdown of water and movement of sediments following removal of the adit plug could result in destabilization of the reservoir shoreline, resulting in collapse of the shoreline or landslides. Rapid downcutting and erosion of sediments could also result in steep and unstable slopes along the channel of the Eel

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River and other tributaries within the reservoir bed. The depth of channel downcutting is expected to be greatest, and occur most rapidly, in the lower portion of Lake Pillsbury reservoir, where the sediment texture is relatively fine-grained and the deposit depths are generally thickest (refer to Section 2.2.4.8, Geomorphology, for more information). These conditions could cause animals to fall and become trapped.

Dam removal will also result in large areas of exposed sediments throughout the reservoir. USGS studies indicate that the upper reaches of the reservoir are characterized by deposits of relatively coarse sediment deposits 9 to 18 ft. thick while the downstream portion of the reservoir has a relatively uniform 3- to 5-ft.-thick deposit of predominantly silt and clay (Porterfield and Dunnam 1964, as cited in Geosyntec 2020). Deer were observed trapped in the dewatered Iron Gate Reservoir associated with the Klamath River Dam Removal project, presumably as they attempted to reach water sources (Howard 2024). There is, therefore, some potential for tule elk or other large game mammals to sink into and become entrapped in exposed sediments, leading to injury or mortality.

Following removal of Scott Dam, significant shoreline erosion within the former reservoir bed of Lake Pillsbury reservoir is not expected to occur because the slow and controlled drawdown during Phase 1 to the 1,861.7-ft. reservoir elevation level matches the typical minimum reservoir storage level PG&E uses to avoid bank failure. As described above under Phase 1, drawdown rates of 1 and 2 ft. per day are proposed, consistent with the USSD's *Guidelines for Dam Decommissioning Projects* (USSD 2015). Therefore, once the adit plug is removed, the rapid dewatering is not expected to create significant erosion in areas exposed by the drawdown. In addition, noise disturbance from restoration activities in the former reservoir bed, particularly helicopter use, may discourage tule elk or other game mammals from attempting to cross the exposed reservoir bed while active restoration activities are being implemented. However, the risk to tule elk and other game mammals from post-removal sediment instability and exposed sediments remains.

To address and reduce the potential for adverse effects to tule elk and other game mammals following removal of Scott Dam, PG&E will implement the Wildlife Stranding Measure, which requires coordination with resource agencies on the best methods to identify high-risk areas and installation of wildlife deterrents and/or protective barriers to limit stranding in unstable areas or where deep sediment is exposed. With the implementation of these measures, potential direct effects to tule elk and other game mammals from injury, burial, or stranding would be reduced. However, considering that reservoir bed conditions during the first several years following dam removal are uncertain and may change frequently and rapidly depending on weather and other factors, and considering the difficulties inherent in excluding tule elk or other game mammals from large areas following removal of the dam, there is some potential for adverse effects to elk or other game mammals.

Cape Horn Dam Area: As described above, noise from ground-disturbing equipment and helicopter use during restoration could result in disturbance effects to game mammals. Game mammals may be temporarily flushed or change their foraging patterns in response to human noise. However, these effects are expected to be short term and temporary (restricted to the restoration period), and therefore, disturbance effects to other game mammals from construction activities would be negligible.

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Exposure of sediments and erosion following dam removal would be minimal in the former Van Arsdale Reservoir bed for several reasons. Following removal of Cape Horn Dam, sediment would be eroded by fluvial processes until pre-dam elevations have been attained. While no sediment modeling has been conducted, several factors indicate that the process of sediment erosion from Van Arsdale Reservoir will be different from that of Lake Pillsbury reservoir. Van Arsdale Reservoir has no visible fine sediments but, rather, a stream channel bed composed of gravel, cobble, and boulders (Geosyntec 2000). The volume and depth of impounded sediment are far lower than in Lake Pillsbury reservoir. Additionally, the valley width is much narrower than in Lake Pillsbury reservoir, which will limit or preclude the channel from extensively migrating into and eroding lateral deposits as it downcuts to the pre-dam elevations. Sediment releases during high flows following removal of Scott Dam would result in some deposition of coarse sediments in the former Van Arsdale Reservoir, but the majority of sediment is expected to be transported farther downstream. Considering these factors, the potential for injury or death of game mammals from stranding or burial in the reservoir bed following dam removal is minimal. To further address and reduce this potential effect, PG&E will implement the Wildlife Stranding Measure, which includes coordination with resource agencies and development of appropriate deterrents to avoid stranding, if necessary. Considering that post-dam removal conditions in the Van Arsdale Reservoir bed will pose less risk for stranding of wildlife, and with the implementation of the above measure, direct effects from stranding would be negligible.

Eel River Watershed: Release and aggradation of sediments downstream of Scott Dam could potentially increase the risk for burial or entrapment of elk or large game mammals. The duration of erosion of upstream sediment during the initial high-flow event following dam removal was estimated to take from 1 to 8 days depending on the rate of discharge. Based on sediment transport modeling of the Proposed Action (refer to Section 2.2.4.8, Geomorphology), it is expected that the majority of coarse sediment will be deposited prior to the confluence with the Middle Fork Eel River. In addition, some of the suspended fine sediment may deposit and alter channel or floodplain morphology in this reach, at least temporarily until subsequent high-flow events can resuspend sediment and transport it farther downstream. While the risk of game mammal stranding is reduced in the Eel River as compared to Lake Pillsbury reservoir, some risk remains, but direct effects would be considered negligible.

Indirect Effects

Scott Dam Area: Suitable upland and riparian foraging habitats are present along the shoreline of Lake Pillsbury reservoir. Based on studies conducted by PG&E in 2018, these intermittently inundated areas support a wide variety of species that tule elk are known to forage on, including, but not limited to, filarees (*Erodium* spp.), smooth cat's ear (*Hypochaeris glabra*), Parish's spike rush (*Eleocharis parishii*), and curly dock (*Rumex crispus*). In addition, tule elk were observed foraging on floating pondweed (*Potamogeton natans*). Of these, Parish's spike rush was the most abundant species and was present in March, July, and September. Living Parish's spike rush followed the waterline, with plants in higher elevations drying out first, appearing dependent on water input from Lake Pillsbury reservoir (PG&E 2019a).

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Historically, the extent and condition of the shoreline habitats used by foraging tule elk have fluctuated but have generally persisted during drawdown of the reservoir or drought. These foraging habitats are, therefore, expected to persist in the first year or longer following dam removal. Similarly, other riparian and upland foraging habitats may exhibit localized changes (e.g., from shoreline erosion) immediately following dam removal but are expected to persist in the near-term.

PG&E will implement the Restoration Plan to restore native riparian and wetland habitats along the Eel River and tributary streams within the former reservoir bed. Refer to Section 2.1.2, Applicant's Proposal, for more details on the goals of the Restoration Plan. In the short term, before habitats recover, there may be a reduction in the total availability of riparian and wetland foraging habitats for tule elk and other game mammals resulting from the loss of Lake Pillsbury reservoir. However, tule elk are able to forage in a wide variety of habitats and are expected to use other areas while riparian vegetation recovers through the course of restoration. The length of vegetation recovery may vary based on the substrate. For example, following dam removal on the Elwha River system, rapid revegetation occurred on fine sediments within a 3- to 5-year monitoring period following removal of two dams, including the development of alder, cottonwood, and willow thickets within the former reservoir beds (Shafroth et al. 2024). However, areas with coarser sediments revegetated more slowly (Shafroth et al. 2024).

PG&E would implement the Tule Elk Management Plan to monitor tule elk habitat use in the Scott Dam Area following dam removal and during restoration. With implementation of the Tule Elk Management Plan, any effects to tule elk and other game mammals from alteration of foraging habitat on the shoreline of Lake Pillsbury reservoir would be short term and negligible.

Cape Horn Dam Area: Van Arsdale Reservoir supports forested wetlands, as well as several small emergent wetlands, within the confines of the relatively narrow valley, which may provide foraging habitat for tule elk and other game mammals. Under Phase 2a, following drawdown of Lake Pillsbury reservoir and Van Arsdale Reservoir and removal of the dams, water levels would be similar to the historical condition (i.e., confined within the historical Eel River channel). The first high-flow event would mobilize coarse sediments from Van Arsdale Reservoir downstream at the same time that millions of cubic yards of fine and coarse sediment from the former Lake Pillsbury reservoir would be mobilized. Aggradation of sediment is likely within portions of the reservoir bed, and new bars may form that promote increased bank erosion and lateral channels. The nature of the changes will vary depending on the width and slope of any given portion of the reservoir bed. While sediment releases could result in minor reductions in the extent of forested and emergent wetlands because of reduced water levels or from burial in sediment, new riparian vegetation may also become established on new depositional surfaces (Shafroth et al. 2002, 2024). A 2024 review of several studies on the Elwha River system noted that new surfaces within the former reservoirs were rapidly colonized, particularly in areas of fine sediment, within 3 to 5 years after dam removal (Shafroth et al. 2024). Additionally, sediments trapped behind Scott Dam upstream may also contain seed sources that could facilitate rapid colonization within Van Arsdale Reservoir, as was observed downstream of the Glines Canyon Dam in the Elwha River system (Shafroth et al. 2024). Therefore, effects to tule elk and other game mammals resulting from minor changes in riparian and wetland foraging habitat in the Cape Horn Dam Area would be negligible.

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Eel River Watershed: Tule elk and other game mammals may potentially forage in riparian and wetland habitats along the Eel River. As described in Section 2.2.4.6.1 above, the effects of sediment release on riparian vegetation along the Eel River, that represents potential foraging habitat for tule elk, would primarily occur in the reach from Scott Dam downstream to the confluence with the Middle Fork Eel River and would vary based on site-specific factors including volume of discharge, distance from the point of release, and the geomorphology of the site affected. Sediment deposition is expected to decrease with distance, is expected to have a minimal effect downstream of the Middle Fork Eel River, and, therefore, would not result in detectable changes in associated riparian or estuarine habitats in this reach. Temporary effects to riparian and wetland habitats along the Eel River from Scott Dam to the Middle Fork Eel River would have a negligible effect on foraging habitats for game mammals.

Phase 2b

Scott Dam Area: Phase 2b is the resulting conditions following restoration of the Scott Dam Area, including the restoration area and the bed of Lake Pillsbury reservoir. Under Phase 2b, restoration of the dam and ancillary/recreation facility sites would result in a long-term benefit to tule elk and other game mammals.

Over time, the former reservoir bed of Lake Pillsbury reservoir is expected to recolonize with riparian, wetland, and upland vegetation and return to a riverine system. To further enhance this succession process, PG&E will implement the Restoration Plan, which would enhance the connectivity of the Eel River and tributary streams within the former reservoir bed and would enhance natural vegetation recruitment processes within the former reservoir bed. As described under Phase 2a above, there may be a short period of time when foraging habitat may be reduced following dewatering of Lake Pillsbury reservoir and removal of Scott Dam. Within Lake Pillsbury reservoir itself, the open lacustrine habitat does not provide a foraging resource for tule elk under existing conditions. Following removal of the dam, formerly inundated areas will recolonize (through active and passive revegetation) with diverse vegetation, and the total area available for tule elk foraging will increase. In the long term, the conversion of lacustrine habitat within Lake Pillsbury reservoir to a mosaic of wetland, riparian, and upland habitats found along a restored riverine channel would increase the diversity and health of riparian and wetland ecosystems, which is expected to benefit foraging habitat for tule elk and other terrestrial game mammals in the long term. Implementation of the Restoration Plan would increase the amount of riparian habitat within the former reservoir bed compared to the existing condition in which riparian habitat is mostly restricted to the tributary streams along the shoreline.

Additionally, developed recreation and ancillary facilities would be restored to native upland habitats, and human disturbance pressure would be reduced on the landscape. Therefore, implementation of the Proposed Action, including the Restoration Plan, would have beneficial effects to tule elk and other game mammals over the long term. Refer to Section 2.1.2, Applicant's Proposal, for more details on the goals of the Restoration Plan.

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Cape Horn Dam Area: Phase 2b is the resulting conditions following restoration of the Cape Horn Dam Area, including the restoration area and the bed of Van Arsdale Reservoir.

As described above, the implementation of the Restoration Plan would enhance natural vegetation recruitment processes within the former Van Arsdale Reservoir bed. The reach of the Eel River currently buried under sediment impounded by Cape Horn Dam is expected to return to a morphologic condition similar to pre-dam conditions and as described for the upstream reach nearer Scott Dam (refer to Section 2.2.4.8, Geomorphology). Similar to the patterns observed following dam removal in the Elwha River system (Shafroth et al. 2024), the river would become a more dynamic channel, formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, deeper pools, and less-dense riparian vegetation. In other areas, the formation of new sediment bars may provide surfaces for the establishment of young riparian vegetation (Shafroth et al. 2002, 2024). The length of time required for a return to this condition may be a few to several years and would be largely dependent on the magnitude, frequency, and duration of subsequent flood events. While the density of mature riparian vegetation decreased, increased diversity of riparian species and age class structure was observed within 4 to 5 years following dam removal on the Elwha River system (Shafroth et al. 2024). Over time, the restored river channel will be part of a broader mosaic of native habitat for tule elk and other game mammals. Therefore, in the long term, implementation of the Proposed Action, including the Restoration Plan, would benefit tule elk and other game mammals.

Eel River Watershed: From Scott Dam downstream to the Middle Fork Eel River, as described above in Section 2.2.4.6.1, the Proposed Action is expected to result in a more dynamic channel and areas with existing overly dense riparian vegetation will be scoured more frequently or buried with sediment deposits, resulting in less-dense vegetation. In the long term, the riparian community, diversity, age class structure, and composition are expected to increase under the unimpaired hydrology, resulting in more complex and diverse riparian communities.

The Proposed Action would have minimal effects to river morphology downstream of the Middle Fork Eel River and is not likely to result in detectable long-term changes in associated riparian and estuarine habitats.

Restoration of unimpaired river flow conditions, and associated variable effects on riparian habitat, would have a minor, neutral, or beneficial effect on tule elk and other game mammals.

Russian River Watershed: Under existing conditions, PG&E diverts water from the Potter Valley Powerhouse into the 11-mi. East Branch Russian River, which runs from the powerhouse through an alluvial valley (i.e., Potter Valley) and up through more mountainous terrain to Lake Mendocino, formed where the East Branch meets the mainstem Russian River. Diversions into the East Branch Russian River, based on monthly average, typically ranged between about 150 cfs to 225 cfs, with maximum flows of about 300 cfs for the period of record (see Section 2.2.3.1, Water Use and Hydrology), although in recent years they have been much lower (see Figure 2.2.3.1-15). Since 1908, diversions from the Eel River have been used to irrigate a wide variety of croplands in Potter Valley including, but not limited to, irrigated pasture, hayfields, pears, vineyards, and other row crops (PVID 2024). Riparian and wetland habitats are also present, primarily along the valley portion of the river. Cropland, riparian, and wetland habitats may also

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provide foraging habitat for tule elk and other game mammals. Tule elk, specifically, are known to forage in irrigated hayfields and pastures in Potter Valley.

Following removal of Cape Horn Dam under Phase 2a, PG&E would no longer divert water to the Potter Valley Powerhouse. As described in Section 2.2.4.6.1 above, the East Branch Russian River will have very low flows seasonally from the powerhouse to the OHWM of Lake Mendocino (approximately 11 mi.) under natural flow conditions (e.g., 1 cfs; see Table 2.2.3.1-15 in Section 2.2.3.1, Water Use and Hydrology). This would result in an alteration in the location and extent of riparian and wetland habitats, and the reduction or loss of irrigation water is likely to result in the loss of irrigated croplands. Upland habitats and dryland crops that are more tolerant of drier seasonal conditions would become more prevalent in the valley. Changes in the location and extent of riparian and wetland habitats, the potential loss of croplands, and the increase in upland habitats that may provide fewer foraging options may reduce foraging habitat for tule elk and other game mammals over the long term. Therefore, there may be adverse effects to tule elk and other game mammals that depend on riparian, wetland, and irrigated agricultural habitats along the East Branch Russian River.

2.2.4.6.9 Environmental Measures

To avoid or reduce effects to wildlife resources during construction, PG&E will obtain, prepare, and/or implement the following measures. A complete list of construction measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- General Construction Measures;
- Invasive Weed Construction Measures;
- General Wildlife Measures;
- Riparian and Wetland Protection Measures;
- Bald Eagle Conservation Plan;
- Northern Spotted Owl Management Plan;
- Other Raptor Construction Measures (including Osprey Measure, American Peregrine Falcon Measure, and Other Raptors Measure);
- Other Special-status Birds and Game Birds Construction Measures;
- Special-status Bats Construction Measures;
- Special-status Mesocarnivores Construction Measure; and
- Monarch Butterfly Construction Measures.

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To reduce potential effects to wildlife resources post-facility removal (Phase 2), PG&E will implement the following post-facility removal measures. A complete list of environmental measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- General Restoration Measures;
- Restoration Plan;
- Invasive Weed Restoration Measures;
- General Wildlife Restoration Measures;
- Wildlife Stranding Measure;
- Bald Eagle Conservation Plan;
- Northern Spotted Owl Management Plan;
- Other Raptor Restoration Measures (including Osprey Measure, American Peregrine Falcon Measure, and Other Raptors Measure);
- Other Special-status Birds and Game Birds Restoration Measures;
- Special-status Mesocarnivores Restoration Measures; and
- Tule Elk Management Plan.

2.2.4.6.10 Unavoidable Adverse Effects

Unavoidable adverse effects to wildlife resources are described below, organized by species.

- Bald Eagle
  - Potential nest abandonment at Scott Dam and Cape Horn Dam from the noise of construction activities (Phase 1);
  - Reduction in foraging habitat quality at Cape Horn Dam from construction activities (Phase 1);
  - Potential nest territory abandonment and loss of foraging habitat from the loss of Lake Pillsbury reservoir following removal of Scott Dam (Phase 2a);
  - Potential nest territory abandonment from changes to foraging habitat in Van Arsdale Reservoir following facility removal (Phase 2a); and
  - Adverse effects to fish prey resources from the release of sediments into the Eel River following dam removal (Phase 2a).
- Northern Spotted Owl
  - Potential nest abandonment in the Scott Dam Area from construction activities (Phase 1).

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- Other Raptors
  - Potential nest abandonment at Scott Dam and Cape Horn Dam from the noise of construction activities (Phase 1);
  - Reduction in osprey foraging habitat from the loss of Lake Pillsbury reservoir following Scott Dam removal (Phase 2a);
  - Adverse effects to fish prey resources for osprey from the release of sediments into the Eel River following dam removal (Phase 2a); and
  - Alteration of aquatic foraging habitat for osprey in the East Branch Russian River following Cape Horn Dam removal because diversions to the East Branch Russian River would no longer occur under the Proposed Action (Phase 2b).

- Other Special-status Birds or Game Birds
  - Loss of lacustrine foraging habitat for waterfowl from loss of Lake Pillsbury reservoir following facility removal (Phase 2a); and
  - Alteration of aquatic, riparian, wetland, and agricultural nesting and foraging habitat for tricolored blackbird along the East Branch Russian River because diversions to the East Branch Russian River would no longer occur under the Proposed Action (Phase 2b).

- Mesocarnivores
  - Potential disturbance to dens from construction or restoration activities (Phases 1 and 2b).

- Tule Elk and Other Game Mammals
  - Potential shifts in behavior resulting from noise disturbance during implementation of restoration activities in the former reservoir bed of Lake Pillsbury reservoir (Phase 2a);
  - Potential stranding in exposed sediments within the former Lake Pillsbury reservoir and in the Eel River immediately downstream of the dams (Phase 2a); and
  - Alteration of riparian, wetland, and agricultural foraging habitat in the East Branch Russian River because diversions to the East Branch Russian River would no longer occur under the Proposed Action (Phase 2b).

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2.2.4.6.11 References

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2.2.4.7 Geology and Soils

This section describes the potential effects on geology and soils, including groundwater, that could occur because of the Proposed Action described in PG&E's Application for Surrender of License and Decommissioning Plan for the Potter Valley Hydroelectric Project, which is described in Section 2.1.2, Applicant's Proposal. The information presented in Section 2.1.2 includes a description of PG&E's decommissioning activities, including the removal of Project facilities and post-removal restoration activities, to be implemented under the Proposed Action.

Potential effects are separated into construction and deconstruction effects (Phase 1) and post-facility removal effects (Phase 2). Post-facility removal effects are split into two subphases: Phase 2a – Initial Condition and Preliminary Restoration and Phase 2b – Resulting Conditions and Restoration. Refer to Section 2.2.4.1, Analytical Approach, for a description of each phase.

Effects were determined by analyzing the potential changes to geology and soils, including groundwater, that could result from activities to be implemented under the Proposed Action (Section 2.1.2, Applicant's Proposal) as compared to the No-Action Alternative (existing condition) (Section 2.1.1).

Final effects determinations consider measures (i.e., construction measures and post-facility removal measures) included to avoid or mitigate impacts associated with the Proposed Action (refer to Section 2.1.2.2, Proposed Environmental Measures). Unavoidable adverse effects are discussed at the end of this section.

Effects of the Proposed Action to geomorphic processes and form that could occur during deconstruction (i.e., removal) of the Project dams and associated facilities and removal of Project recreation facilities (Phase 1) and to sediment transport and the geomorphic response of the Eel River and its tributaries to the removal of the dams (Phase 2) are presented in Section 2.2.3.7, Geomorphology, and are not discussed in this section.

2.2.4.7.1 Phase 1: Short-term Construction Effects

This section discusses potential short-term effects to geology and soils that could occur during deconstruction and removal of the Project dams and associated facilities and removal of the Project recreation facilities in the Scott Dam (Lake Pillsbury reservoir) Area, Cape Horn Dam (Van Arsdale Reservoir) Area, and Eel River Watershed.

Scott Dam Area

Under Phase 1 of the Proposed Action, several temporary construction access roads and staging areas would be constructed. Lake Pillsbury reservoir would be dewatered, and Scott Dam would be removed. In addition, certain Project recreation facilities surrounding Lake Pillsbury reservoir and associated features (e.g., water supply wells, water distribution lines, etc.) would be removed. The following potential effects to geology and soils resulting from construction activities

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associated with removal of Scott Dam and associated facilities, and Project recreation facilities and features, were evaluated:

- Potential soil erosion from construction activities, which could increase sedimentation and turbidity in the Eel River;
- Potential release of naturally occurring asbestos (NOA) during construction, if present in serpentine rock and disturbed, into the air;
- Accidental spill of fuels or other toxic materials could cause soil contamination;
- Potential activation of a known landslide upgradient and south of Scott Dam with removal of the dam and dewatering of Lake Pillsbury reservoir;
- Potential activation of landslides downgradient of Scott Dam with the dewatering of Lake Pillsbury reservoir;
- Potential unstable slopes, which could lead to slope failure and increased sedimentation, with dewatering of Lake Pillsbury reservoir; and
- Potential increased likelihood of soil erosion from exposure of previously submerged slopes with dewatering of Lake Pillsbury reservoir.

These potential effects are discussed further in the following subsections.

Construction-related Soil Erosion

Under the Proposed Action, temporary construction access roads and staging areas would be constructed to facilitate removal of Scott Dam and certain Project recreation facilities. Construction and grading of the temporary access roads and staging areas and facility removal would involve the use of heavy equipment and ground-disturbing activities that have a high likelihood of causing erosion, especially along any unpaved temporary access routes and in areas dominated by unconsolidated Quaternary sediments.

Erosion from the construction areas and the resulting runoff could temporarily impact water quality in the Eel River upstream and downstream of Scott Dam by increasing sedimentation and turbidity, both of which are considered adverse impacts. Accordingly, PG&E would implement a Construction Erosion Prevention Plan and BMPs to minimize and control soil erosion to protect water quality during construction. In addition, PG&E would obtain applicable resource agency and construction permits. With these measures, the potential for excessive soil erosion and sedimentation, and related water quality impacts are considered negligible. See Section 2.2.4.3, Water Quality, for analysis of water quality effects.

Exposure to Naturally Occurring Asbestos

Serpentine rock has been mapped north of Scott Dam (see Section 2.2.3.6, Geology and Soils, Map 2.2.3.6-7). Serpentine rock can contain NOA, and construction activities could disturb this serpentine rock. If serpentine rock contains NOA and it is disturbed, broken, or crushed, asbestos

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fibers could be released into the air, exposing construction workers and posing a potential health risk. See Section 2.2.4.15, Air Quality, for analysis of the potential for exposure to NOA.

Soil Contamination from an Accidental Spill of Fuel or Other Toxic Materials

Construction activities associated with the removal of Scott Dam and certain Project recreation facilities would involve the use of heavy equipment, machinery, and vehicles. Soil contamination has the potential to occur from accidental spills of fuels or other materials used in heavy equipment operations during construction activities. The potential for soil contamination is considered an adverse impact. Accordingly, PG&E would implement hazardous materials handling measures to avoid or minimize the risk of soil contamination from accidental spills. These measures would include the following: implementing construction-related BMPs to control spills; having emergency cleanup equipment readily available onsite; and implementing a Spill Prevention, Control, and Countermeasures (SPCC) Plan with protocols for preventing spills and managing incidents should they occur. In addition, PG&E would obtain applicable resource agency and construction permits. The potential for soil contamination from construction would be reduced to a negligible level with adherence to the SPCC Plan and construction-related BMPs.

Landslide Instability

As shown on Map 2.2.3.6-7, an existing landslide is located on the south side of Lake Pillsbury reservoir, immediately upstream of Scott Dam. In the past, elevated groundwater levels initiated movement of the landslide and imposed an additional load on the dam. The landslide was subsequently instrumented with inclinometers that can be remotely monitored to provide early warning of significant movement near the dam. The landslide has not shown any movement in recent years. However, construction activities associated with dewatering of the Lake Pillsbury reservoir and the removal of Scott Dam could reactivate this landslide, as discussed below.

Removal of the dam would involve significant ground disturbance from the use and storage of large, heavy construction machinery and from drilling, blasting, and cutting through the dam. Activities associated with removal of the dam could produce significant vibrations, and if large, heavy construction equipment is stored within the limits of the landslide, that would increase the weight of the landslide mass, and reactivation of the landslide could occur. In addition, if heavy equipment were to travel across the landslide or be positioned within the landslide mass, this could also trigger reactivation. The sudden reactivation of this landslide could pose a significant safety risk to workers in the vicinity and, potentially, Scott Dam. In addition, reactivation of this landslide could potentially introduce a large quantity of sediment to the work area that would need to be removed or otherwise flushed downstream. The potential risks to worker safety and to the dam, as well as the potential to introduce sediment to the work area, are considered significant impacts.

Although the landslide is instrumented with inclinometers and movement can be remotely monitored, the inclinometers cannot prevent reactivation of the landslide from occurring. Therefore, PG&E would develop a Scott Dam Slope Stability Monitoring Plan. The plan would include evaluation of the slope stability under both existing conditions and dynamic conditions during the dewatering of the Lake Pillsbury reservoir. Mitigation may be required if the landslide

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is deemed unstable. Dam safety reviews, including review of the Slope Stability Monitoring Plan, will be required prior to FERC approval. Implementing these measures would reduce the risks associated with reactivation of this landslide to negligible levels.

Slope Instability Surrounding Lake Pillsbury Reservoir

Under Phase 1 of the Proposed Action, Lake Pillsbury reservoir would be partially dewatered to facilitate the removal of Scott Dam. Slope instability around Lake Pillsbury reservoir could contribute additional sediment into the Eel River upstream of Scott Dam and its tributaries.

The west and east shorelines of Lake Pillsbury reservoir consist mainly of Quaternary sedimentary deposits. These Quaternary deposits appear to be generally stable. However, as the reservoir is dewatered and saturation levels in the sedimentary deposits would be reduced, the slopes surrounding Lake Pillsbury reservoir could become unstable, leading to slope failures. Large-scale slope failures would not be expected, but small-scale, shallow slope failures could occur, leading to increased sedimentation to the Eel River and its tributaries upstream of Scott Dam. The amount of sediment contributed through slope failures would not be expected to be significant compared to the amount of sediment that has already accumulated in Lake Pillsbury reservoir. Therefore, increased sedimentation from small slope failures is considered negligible compared to existing conditions. The potential for slope failure would be reduced as the once-saturated soils dry and new vegetative growth takes root.

Erosion of Slopes Surrounding Lake Pillsbury Reservoir

Under the Proposed Action, water levels in Lake Pillsbury reservoir would be lowered to facilitate the removal of Scott Dam. Water surface elevations would continue to decline after the dam is removed. Without the impoundment, the denuded slopes surrounding Lake Pillsbury reservoir and the exposed reservoir bed would be susceptible to water and wind erosion, especially as the soils dry.

The geologic map of Lake Pillsbury reservoir (Map 2.2.3.6-7) shows older Quaternary alluvial deposits present on the slopes east and west and of Lake Pillsbury reservoir and “harder rock” that includes an ophiolitic mélange of sedimentary rocks, metasandstone, and serpentine rocks on slopes that border Lake Pillsbury reservoir on the south. Quaternary deposits on the slopes east and west of Lake Pillsbury reservoir, which would be barren as the reservoir recedes, would be more susceptible to both water and wind erosion than the “hard” rocks on slopes that border Lake Pillsbury reservoir to the south.

Significant rainfall events would likely increase rilling, gullying, and sheet flow, particularly off steep slopes. These processes would lead to increased sediment loads and turbidity in the Eel River and its tributaries upstream of Scott Dam. This situation would persist until restoration activities are implemented and new vegetation is established (discussed further under Phase 2 below). Increased sedimentation into the Eel River is considered an adverse impact. Given the extent of shoreline that would be exposed, implementing large-scale interim erosion control measures around the entire reservoir is not practical. However, to reduce the potential for erosion and sedimentation, PG&E would monitor for excessive erosion and would implement a

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Construction Erosion Prevention Plan that would include erosion control measures (e.g., straw waddles), where necessary. In addition, PG&E would implement a Restoration Plan as soon as practicable after dewatering begins. With these measures, the potential for slope erosion and increased sedimentation into the Eel River would be reduced to negligible levels.

The exposed, denuded slopes surrounding Lake Pillsbury reservoir would also be vulnerable to wind erosion as they dry. Wind erosion could increase airborne particulate matter and adversely impact local air quality. Air quality impacts and associated measures are discussed in Section 2.2.4.15, Air Quality.

Cape Horn Dam Area

Under Phase 1 of the Proposed Action, Cape Horn Dam and select associated facilities would be removed and Van Arsdale Reservoir would be dewatered. Implementation of Phase 1 of the Proposed Action could result in the following potential impacts relative to existing conditions:

- Potential soil erosion from construction activities, which could increase sedimentation and turbidity in the Eel River;
- Accidental spill of fuels or other toxic materials could cause soil contamination; and
- Potential increased likelihood of soil erosion from exposure of previously submerged slopes and reservoir bed with dewatering of Van Arsdale Reservoir.

These potential impacts are discussed below. Given the relatively small footprint, shallow depth of the existing reservoir, and relatively gentle slopes surrounding Van Arsdale Reservoir, impacts related to slope stability are not expected.

Construction-related Soil Disturbance

Under Phase 1 of the Proposed Action, Cape Horn Dam and select associated facilities and features would be demolished and removed. Van Arsdale Reservoir will be dewatered. The activities associated with the removal of these facilities are described in detail in Section 2.1.2.1.1, Decommission Plan. Demolition, removal of the existing facilities, and dewatering of the reservoir would involve the use of heavy equipment and ground-disturbing activities that have a high likelihood of causing erosion, especially along unpaved temporary access routes and in areas dominated by unconsolidated Quaternary sediments.

Erosion from the construction areas and the resulting runoff could temporarily impact water quality in the Eel River downstream of the work and staging areas by increasing sedimentation and turbidity, both of which are considered adverse impacts. Accordingly, PG&E would implement a Construction Erosion Prevention Plan and BMPs to minimize and control soil erosion to protect water quality during construction. In addition, PG&E would obtain applicable resource agency and construction permits. With these measures, the potential for excessive soil erosion, sedimentation, and related water quality impacts is considered negligible. See Section 2.2.4.3, Water Quality, for analysis of water quality effects.

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Soil Contamination from an Accidental Spill of Fuel or Other Toxic Materials

Construction activities associated with the removal of Cape Horn Dam would involve the use of heavy equipment, machinery, and vehicles. Soil contamination has the potential to occur from accidental spills of fuels or other materials used in heavy equipment operations during construction activities. The potential for soil contamination is considered an adverse impact. Accordingly, PG&E would implement hazardous materials handling measures to avoid or minimize the risk of soil contamination from accidental spills. These measures would include the following: implementing construction-related BMPs to control spills; having emergency cleanup equipment readily available onsite; and implementing an SPCC Plan with protocols for preventing spills and managing incidents should they occur. In addition, PG&E would obtain applicable resource agency and construction permits. The potential for soil contamination from construction would be reduced to a negligible level with adherence to the SPCC Plan and construction-related BMPs.

Erosion of Slopes Surrounding Van Arsdale Reservoir

Under the Proposed Action, the majority of Cape Horn Dam would be removed and the remainder would no longer be capable of impounding water. Without the impoundment, the denuded slopes surrounding Van Arsdale Reservoir and the exposed reservoir bed would be susceptible to water and wind erosion, especially as the soils dry.

Significant rainfall events would likely increase rilling, gullying, and sheet flow, particularly off steep slopes. These processes would lead to increased sediment loads and turbidity in the Eel River upstream of the former Cape Horn Dam site. This situation would persist until restoration activities are implemented and new vegetation is established (discussed further under Phase 2 below). Increased sedimentation into the Eel River is considered a significant impact. Given the extent of shoreline that would be exposed, implementing large-scale interim erosion control measures around the entire reservoir would not be practical. However, to reduce the potential for erosion and sedimentation, PG&E would monitor for excessive erosion and would implement a Construction Erosion Prevention Plan that includes erosion control measures, where necessary, similar to those described above. In addition, PG&E would implement a Restoration Plan as soon as practicable after dewatering begins. With these measures, the potential for slope erosion and increased sedimentation into the Eel River would be reduced to negligible levels.

The exposed, denuded slopes surrounding the dewatered Van Arsdale Reservoir would also be vulnerable to wind erosion as they dry. Wind erosion could increase airborne particulate matter and adversely impact local air quality. Air quality impacts and associated measures are discussed in Section 2.2.4.15, Air Quality.

Eel River Watershed

Implementation of Phase 1 of the Proposed Action could result in the following potential impacts relative to existing conditions:

- Flows downstream of the dams during construction and dewatering of the reservoirs could result in erosion of the streambanks downstream of the dams.

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Streambank Erosion

The streambanks along the Eel River mostly consist of unconsolidated, erodible sediments that are prone to erosion. As shown on Map 2.2.3.6-7, the Eel River corridor downstream of Scott Dam is made up of erodible streambank materials including alluvial soils that border the river, alluvial terrace deposits that are currently above the river, and a veneer of colluvium and residual (e.g., in situ) soils of the various rock types—serpentine, sandstone, shale—that occur on the steep backslopes that border the Eel River. In addition, large landslide deposits are present on both sides of the river, approximately 1.5 mi. downstream of the dam. These alluvial and landslide deposits are unconsolidated and therefore prone to erosion and movement.

Drawdown of the reservoir would result in a release from Scott Dam of up to 400 cfs into the Eel River for a period of 2 to 4 months (see Section 2.2.4.2, Water Use and Hydrology), which are higher flows than would occur under existing conditions. In addition, following the drawdown and dam lowering/spillway notching, natural flows would pass over the dam area into the Eel River (there would be no storage). The streambanks and existing landslides would be susceptible to erosion during high flows.

The potential to erode or activate landslides downstream of Scott Dam would not be exacerbated by the dewatering of Lake Pillsbury reservoir or sediment sluicing through the adit relative to existing conditions. Dewatering would occur within the range of flows that have historically occurred in the Eel River. Flows that spill over the Scott Dam area would not be higher than flows that have historically occurred. Similarly, flows that spill over or around Cape Horn Dam as it is removed would not be higher than flows that have historically occurred. Bank erosion and erosion of existing landslides related to high-flow events are expected to be the same as under existing conditions, and therefore, the Proposed Action would have a negligible effect on streambank erosion downstream of the dams during construction.

East Branch Russian River

Implementation of Phase 1 of the Proposed Action could result in the following potential impact relative to existing conditions:

- Potential temporary stoppage of diversion water from the Eel River to Potter Valley could affect groundwater levels during construction.

Potential Groundwater Level Effects

The construction area at Cape Horn Dam would be dewatered after PG&E's installation of cofferdams upstream of Van Arsdale Intake and downstream of Cape Horn Dam, which would eliminate flow diversions to the East Branch Russian River. Any reduction of diversion water from the Eel River to the East Branch Russian River could create a greater demand on groundwater resources in Potter Valley. A greater demand could lower the water table and adversely affect at least some groundwater wells in Potter Valley, leading to higher pumping costs; the need for newer, stronger pumps; and in worst-case scenarios, the need to drill deeper wells. These outcomes would adversely affect private property owners who rely on wells for their water supply. Under

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the Proposed Action, PG&E would develop the East Branch Russian River Diversion Plan that could include temporary pumping to the diversion tunnel, if needed, to provide diversions to the East Branch Russian River during construction. With implementation of this plan, the Proposed Action construction (Phase 1) effects on groundwater would be negligible.

2.2.4.7.2 Phase 2: Post-facility Removal Effects

Phase 2 includes the initial, temporary physical conditions immediately following removal of the dams (Phase 2a) and Phase 2b (long-term phase) that generally encompasses the recovery phase of the decommissioning effort. During Phase 2b, Scott Dam and Cape Horn Dam would have been removed, Lake Pillsbury reservoir would have been dewatered, and restoration activities at these areas would have been initiated. The potential effects of implementing Phases 2a and 2b of the Proposed Action (i.e., post-facility removal effects) are discussed in the following subsections, organized by phase.

Phase 2a: Initial Condition and Preliminary Restoration

Under the Proposed Action, dewatering and sediment sluicing after dam removal could result in the following impacts related to geology and soils in the Eel River:

- The exposed slopes around the former Lake Pillsbury reservoir and Van Arsdale Reservoir could be subject to erosion and slope instability, which could cause increased sedimentation into the Eel River;
- Erosion of streambanks below the dams after initial dam removal;
- The release of sediment-laden water after the removal of Scott Dam and Cape Horn Dam could result in increased sediment loading in the Eel River. This is addressed in Section 2.2.4.8, Geomorphology; and
- Deposited sediment below the dams adjacent to the channel may be susceptible to erosion during subsequent flows. This is addressed in Section 2.2.4.8, Geomorphology.

The potential effects to geomorphic processes in the Eel River are addressed in Section 2.2.4.8, Geomorphology.

Scott Dam Area and Cape Horn Dam Area

Erosion and Slope Instability

Immediately after removal of Scott Dam and Cape Horn Dam, water would no longer be impounded and formerly inundated areas would be become riverine in nature. The areas that are no longer submerged by water would be barren until restoration efforts are successful and new vegetation takes hold. During this time, the barren slopes would be subject to wind and water erosion and slope instability, which could increase sedimentation into the Eel River. As discussed above, PG&E would implement a Construction Erosion Prevention Plan to minimize erosion and sedimentation into the Eel River until restoration efforts are effective. Implementing a Construction Erosion Prevention Plan would reduce the potential for slope erosion to negligible levels.

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Eel River Watershed

Streambank Erosion

As discussed above, the streambanks along the Eel River mostly consist of unconsolidated, erodible sediments, including landslides and rockfalls, and erosion is common in the Eel River downstream of Scott Dam and downstream of Cape Horn Dam (PG&E 2021). The streambanks would be susceptible to erosion during and after removal of the dams.

As part of rapid dam removal, the adit tunnel plug at the base of Scott Dam would be blasted open (approximately 7,000-cfs capacity) to initiate sediment flushing during the first high-flow season following dam lowering and spillway notching. When the adit plug is removed, there would be a release of approximately 7,000 cfs or more from Scott Dam for multiple days depending on inflow conditions. Assuming less than 14,000 ac-ft of storage behind the dam when the adit is blasted open, the storage would drain in one day or less; however, it is anticipated that the adit plug would be removed when reservoir inflows are high. Therefore, the release from the dam would add an additional day of 7,000 cfs to the flows resulting from a multiple-day storm event. The No-Action Alternative 1-year, 2-year, 5-year, and 10-year high-flow events at Scott Dam are 304 cfs, 7,420 cfs, 16,500 cfs, and 24,700 cfs, respectively (refer to Section 2.2.3.1, Water Use and Hydrology, Table 2.2.3.1-8). The peak annual inflow at Scott Dam reaches 7,000 cfs in approximately 70 percent of years and reaches 5,000 cfs in approximately 90 percent of years. The release of 7,000 cfs due to adit plug removal would be well within the No-Action high-flow hydrology.

Since flows will not exceed the historical high-flow range, the potential to erode or activate landslides downstream of Scott Dam would not be exacerbated by removal of the dam. Similarly, the erosion of unconsolidated sediments in the Eel River downstream of Cape Horn Dam would not be exacerbated by removal of the dam or sediment flushing relative to existing conditions. Therefore, implementation of the Proposed Action would have no effect on bank stability in the Eel River relative to existing conditions.

Phase 2b: Resulting Conditions and Restoration

Phase 2b is the resulting conditions following restoration. Implementation of Phase 2b of the Proposed Action could result in the following potential effects to soils and geology:

- Reduced soil instability and potential for erosion with implementation of the Restoration Plan in the Scott Dam and Cape Horn Dam areas;
- Reduced water surface elevations in the former Lake Pillsbury reservoir could reduce groundwater levels in the vicinity of the reservoir, thereby affecting local groundwater wells;
- Removing Scott Dam would reduce seismic and landslide risks;
- Erosion of the Eel River streambanks below the dams over the long term; and
- Reduced diversion water to Potter Valley could reduce the amount of groundwater aquifer storage in the Potter Valley groundwater basin, thereby affecting local groundwater levels.

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Scott Dam Area

Erosion and Slope Stability

Under the Proposed Action, PG&E would implement the Restoration Plan. The restoration activities would stabilize the soils at the former dam site, work and staging areas, and former recreation facilities, thereby reducing the potential for erosion. In addition, revegetation of the former reservoir bed would reduce the potential for erosion and slope failures on the slopes surrounding the former exposed reservoir bed, especially after natural vegetation is established. These benefits would also apply to areas around the Project facilities, roads, recreation facilities, and shoreline that would be exposed following dam removal and vulnerable to erosion. With implementation of the Restoration Plan, the Proposed Action would have a beneficial effect on soils and slope stability in the Scott Dam Area relative to existing conditions.

Potential Groundwater Level Effects

The connectivity between groundwater and Lake Pillsbury reservoir is currently unknown. Given the absence of information, it is assumed that groundwater in the vicinity of Lake Pillsbury reservoir is charged and supported by water contained in Lake Pillsbury reservoir. Assuming this connectivity, groundwater levels may decline after the removal of Scott Dam.

The location of known wells in the vicinity of Lake Pillsbury reservoir that could be affected by dewatering of the reservoir are shown in Map 2.2.3.6-11 and the list of potential wells that could be impacted are tabulated in Appendix 2.2.3.6-A. In addition, the PG&E campgrounds are also supported by water systems supplied by groundwater. Sunset Campground is supported by a water system, and another water system serves the remaining campgrounds, including Pogie Point, Sunset, Oak Flat, and Navy Camp campgrounds that are not proposed for removal. It is assumed that lowering the water table could adversely affect at least some wells, leading to higher pumping costs; the need for newer, stronger pumps; and in worst-case scenarios, the need to drill deeper wells. These outcomes would adversely affect private property owners who rely on wells for their water supply. Therefore, the potential effect on groundwater due to the dewatering of Lake Pillsbury reservoir is considered an unavoidable adverse impact.

Seismic and Landslide Risks

Scott Dam is located in a region that is considered seismically active. As explained in detail in Section 2.2.3.6, Geology and Soils, the Bartlett Springs fault, located east of Scott Dam, is the most significant seismic feature near the Project (PG&E 2016). The Bartlett Springs fault is considered active by the California Geological Survey and has the potential to cause significant ground shaking and surface rupture in the vicinity of Scott Dam. Significant ground shaking and surface rupture could jeopardize Scott Dam.

Removal of Scott Dam would alleviate the potential seismic risks associated with movement on the Bartlett Springs fault. Therefore, the removal of Scott Dam and its impoundment (Lake Pillsbury reservoir) under the Proposed Action are considered a beneficial effect compared to existing conditions.

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Elevated groundwater-initiated movement of the landslide adjacent to and upgradient of Scott Dam (Map 2.2.3.6-7). With the removal of Scott Dam, water levels in Lake Pillsbury reservoir would be restored to pre-dam levels and groundwater in the vicinity of Lake Pillsbury reservoir should also decline. Declining groundwater levels should reduce the risk of landslide movement.

Cape Horn Dam Area

Erosion and Slope Stability

Restoration activities to be implemented as part of the Proposed Action would stabilize the soils at the former dam site and reservoir and work and staging areas, thereby reducing the potential for erosion. In addition, revegetation of the former inundation zone would reduce the potential for erosion in the former exposed reservoir area, especially after natural vegetation is established. Restoration activities would also be implemented for areas around the Project facilities, access roads, and shoreline that are currently exposed and vulnerable to erosion under existing conditions. With implementation of the Restoration Plan, the Proposed Action would have a beneficial effect on soils and slope stability in the Cape Horn Dam Area relative to existing conditions.

Eel River Watershed

Streambank Erosion

After both Scott Dam and Cape Horn Dam are removed, there would be no ability to capture, store, or regulate periodic flood flows. However, future flood flows are anticipated to be within the range of historical events. Consequently, bank erosion related to high-flow events is expected to be the same as in the past, and no effects relative to existing conditions are anticipated.

East Branch Russian River

Potential Groundwater Level Effects

Following removal of Scott Dam and Cape Horn Dam, natural (unimpaired) hydrology would pass through the Eel River below Scott Dam. Altered hydrology in the Eel River would substantially affect flows in the East Branch Russian River. Under the Proposed Action, there would be no diversions from the Eel River to the East Branch Russian River (see Section 2.2.4.2, Water Use and Hydrology). Any reduction of diversion water from the Eel River to Potter Valley could create a greater demand on groundwater resources in Potter Valley. A greater demand could lower the water table and adversely affect at least some groundwater wells in Potter Valley, leading to higher pumping costs; the need for newer, stronger pumps; and in worst-case scenarios, the need to drill deeper wells. These outcomes would adversely affect private property owners who rely on wells for their water supply. Therefore, the potential effect on groundwater due the elimination of diverted flows is considered an unavoidable adverse impact.

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2.2.4.7.3 Construction and Environmental Measures

To avoid or reduce effects related to geology and soils during construction, PG&E would obtain, prepare, and/or implement the following measures and plans. These measures and plans would be applied during implementation of both Phase 1 and Phase 2 of the Proposed Action, as appropriate. A complete list of construction measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Standard BMPs designed to minimize and control soil erosion and sedimentation into the Eel River
- Construction Erosion Prevention Plan with measures that are designed to control erosion and sedimentation into the Eel River
- Hazardous Materials Measures to avoid or minimize the risk of soil contamination from accidental spills, including implementing construction-related BMPs to control spills, having emergency cleanup equipment readily available onsite, and implementing an SPCC Plan with protocols for preventing spills and managing incidents should they occur
- Scott Dam Slope Stability Monitoring Plan
- Public Safety Measures
- Restoration Plan

To avoid or reduce effects related to geology and soils during Phase 2, PG&E would obtain, prepare, and/or implement the following measures and plans. A complete list of measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Construction Erosion Prevention Plan
- Restoration Plan

2.2.4.7.4 Unavoidable Adverse Effects

Reducing the water surface elevation in Lake Pillsbury reservoir and eliminated diversions to the East Branch Russian River could reduce groundwater levels in the vicinity of the Lake Pillsbury reservoir and in Potter Valley, thereby affecting local groundwater wells.

2.2.4.7.5 References

PG&E (Pacific Gas and Electric Company). 2021. Cape Horn Dam supporting technical information document, revision 1, dated January.

———. 2016. Regional geology and tectonics for the PG&E northern area hydroelectric system, Potter Valley area hydro, Lake and Mendocino counties, California.

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2.2.4.8 Geomorphology

This section describes the potential effects to geomorphology that could occur because of the Proposed Action described in PG&E's Application for Surrender of License and Decommissioning Plan for the Potter Valley Hydroelectric Project, which is described in Section 2.1.2, Applicant's Proposal. Section 2.1.2 includes a description of decommissioning Project facility modifications, including restoration activities, to be implemented under the Proposed Action.

Potential effects are separated into construction and deconstruction effects (Phase 1) and post-facility removal effects (Phase 2). Post-facility removal effects are split into two subphases: Phase 2a – Initial Conditions and Preliminary Restoration and Phase 2b – Resulting Conditions and Restoration.

Effects were determined by analyzing the potential changes to geomorphology that could result from activities to be implemented under the Proposed Action (see Section 2.1.2, Applicant's Proposal) as compared to the No-Action Alternative (existing condition) (see Section 2.1.1, No Action Alternative). Final effects determinations consider construction measures and post-facility measures (see Section 2.1.2.2, Proposed Environmental Measures) included to avoid or mitigate impacts associated with the Proposed Action. Unavoidable adverse effects are discussed at the end of this section.

2.2.4.8.1 Phase 1: Short-term Construction Effects

This section discusses potential short-term construction-related effects to geomorphic processes and form that could occur during deconstruction (i.e., removal) of the Project dams and associated facilities and removal of the Project recreation facilities. The discussion is organized by the following four regions: Scott Dam (Lake Pillsbury reservoir) Area, Cape Horn Dam (Van Arsdale Reservoir) Area, Eel River Watershed, and Russian River Watershed.

The following potential effects to geomorphology resulting from construction-related activities were evaluated:

- Scott Dam Area
  - Potential erosion and sediment delivery to the Eel River from construction activities, including installation of dewatering infrastructure may affect channel morphology; and
  - Potential Lake Pillsbury reservoir bed and shoreline erosion resulting from reservoir drawdown may affect channel morphology.
- Cape Horn Dam Area
  - Potential erosion and sediment delivery to the Eel River from construction activities, including installation of dewatering infrastructure, may affect channel geomorphology.
- Eel River Watershed
  - Changes in flows in the Eel River during construction may affect channel morphology.

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- Russian River Watershed
  - Changes in flows in the East Branch Russian River during construction may affect channel morphology.

Scott Dam Area

Erosion and Sediment Delivery to the Eel River from Construction Activities

Under Phase 1 of the Proposed Action, several temporary access roads and staging and stockpile areas would be constructed and Scott Dam would be removed. In addition, certain Project recreation facilities surrounding Lake Pillsbury reservoir and all associated features (e.g., water supply wells, water distribution lines) would be removed. Construction work would include lowering and notching the upper portion of the dam and potentially placing clean rubble in the plunge pool area (pending analyses during engineering design). An adit tunnel (capacity of approximately 7,000 cfs) would be constructed at the base of the spillway, incorporating a temporary plug approximately 8 to 10 ft. from the upstream dam face. At the downstream terminus of the adit tunnel, a channel would be constructed through the spillway apron and concrete buttress to facilitate a continuous pathway for sediment transport from the adit tunnel to the river downstream once flushing begins. Sediment would be dredged from the upstream side of the dam at the location of the adit tunnel to facilitate sediment flushing when the adit plug is removed. A full description of the activities associated with the removal of these facilities is provided in Section 2.1.2.1.1, Decommissioning Plan.

Removal of Scott Dam and other infrastructure has the potential to temporarily erode and deliver sediment to Lake Pillsbury reservoir and the Eel River and its tributaries as a result of exposing and creating unstable slopes, toppling unstable material, and exposing sediment sources to rainfall and potential erosion from adjacent flowing channels.

Temporary access routes and barge launch (if needed) construction required for construction activities would have the potential to destabilize slopes, compact soils, and remove vegetative cover, exposing soil to rainfall and concentrated runoff. These actions can lead to increased erosion and delivery of sediment into channels or flood-prone areas.

Activities associated with the establishment of construction staging and storage areas, such as grading, stockpiling materials, etc., have the potential to temporarily convey sediments into channels and flood-prone areas. During the establishment of construction staging and storage areas, sediment would be disturbed to create workable ground surfaces. Disturbed areas have the potential to erode on a temporary basis during construction activities and can be transported by storm runoff events into waterways. Stockpile areas also create relatively large piles of unvegetated and unconsolidated sediment that increases the potential for erosion and sediment delivery resulting in sedimentation (defined here as the settling of sediment particles that form an accumulation at a given location).

Installation of dewatering infrastructure has the potential to create a temporary disturbance that would increase erosion and sediment delivery to water bodies. Ground excavation, construction, and water diversion associated with the installation of a cofferdam could cause an increase in

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sedimentation and instability of the local channel bed and banks. Water bypassed around the work area could be conveyed in pipes and discharged in a concentrated flow that could exceed erosion thresholds, thereby causing erosion and sedimentation downstream of the discharge location. The dewatering and drawdown of Lake Pillsbury reservoir is discussed separately below.

Erosion and sediment delivery from removal of Project infrastructure, construction and use of temporary access routes, and construction and use of staging and stockpile areas have the potential to temporarily increase sediment loads to the Eel River and its tributaries. To address and reduce potential erosion and sediment delivery during these construction activities, PG&E would implement several measures, including BMPs designed to minimize and control soil erosion and sedimentation; a Construction Erosion Prevention Plan; and a Stormwater Pollution Prevention Plan (SWPPP). In addition, PG&E would obtain applicable resource agency and construction permits (USACE Section 404; SWRCB Section 401). With implementation of these construction measures, activities associated with Project infrastructure removal would have a negligible effect on erosion or potential channel sedimentation and alteration of geomorphic processes and form in the Eel River.

Bed and Shoreline Erosion during Reservoir Drawdown

The reservoir storage at the start of the drawdown period (June) would be approximately 50,000 ac-ft at an elevation of 1,900 ft., which is the maximum water surface elevation under PG&E's current flow variance. At the completion of the drawdown in October, the dam crest elevation would be lowered nearly 40 ft. to an elevation of 1,861.7 ft. at approximately 10,000 ac-ft of storage. During the dam lowering, a large notch (approximately 10–15 ft. deep and approximately 150–200 ft. wide; overall discharge capacity between 15,000 and 40,000 cfs depending on head) could be constructed in the spillway.

PG&E typically uses an elevation of 1,861.7 ft. (10,000 ac-ft) as a minimum storage level in Lake Pillsbury reservoir to avoid the potential for bank failure, plugging of the needle valve outlet, and release of sediment-laden water to downstream reaches. During the 2013–2016 drought, the reservoir elevation reached as low as approximately 10,000 ac-ft storage in both the 2013 and 2015 water years (see Section 2.2.3.1, Water Use and Hydrology, Figure 2.2.3.1-17). No appreciable channel downcutting and erosion of reservoir sediment were observed during this period. Prior to removal of the adit plug, the Lake Pillsbury reservoir drawdown rate is proposed to be between about 1 and 2 ft. per day, which is consistent with the USSD Guidelines for Dam Decommissioning Projects (USSD 2015). It is possible that this proposed drawdown rate exceeds the rate during the 2013–2014 drought or that high flows could enter the reservoir as it is being drawn down, which could lead to more channel erosion than observed during the drought.

Sediment eroded from the coarse top-set delta deposits at the upstream end of the reservoir would likely be redistributed and deposited within the reservoir's impoundment and would not be transported past the notched dam. There are likely small amounts of fine sediment also embedded in the top-set delta, and erosion of this fine sediment (e.g., silt and clay) has the potential to be transported through the needle valve or over the notched spillway, which could increase suspended sediment concentrations in the Eel River downstream.

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Under the Proposed Action during the initial low-flow season activities (June–October), depending on site conditions, drawdown rates higher than those proposed could increase the risk of inducing landslides along the reservoir shoreline (USSD 2015) (see Map 2.2.4.8-1 and Section 2.2.4.7, Geology and Soils). Although, the reservoir would be drawn down to an elevation within the historical range and within the range of the typical minimum reservoir storage levels PG&E uses to avoid bank failure, there is still the potential for erosion during rainfall events that could increase rilling, gullying, and sheet flow, particularly off steeper slopes (see Section 2.2.4.7, Geology and Soils). It would be an objective to maintain drawdown rates within historical parameters to the extent possible to avoid effects. As described in Volume II, Section 2.1.2, Applicant's Proposal, the dam removal design will be approved by FERC Dam Safety prior to initiation of dam removal activities. To reduce the risks associated with shoreline erosion and landsliding, PG&E would develop a Scott Dam Slope Stability Monitoring Plan. See Section 2.2.4.7, Geology and Soils, for further discussion of the proposed resource protection measures. PG&E would develop and implement a Construction Site Water Diversion, Dewatering, and Drawdown Plan. PG&E would also monitor for excessive erosion and would implement a Construction Erosion Prevention Plan that would include erosion control measures (e.g., straw waddles), where necessary. In addition, PG&E would implement a Restoration Plan as soon as practicable after dewatering begins. With these measures, the potential for slope erosion and increased sedimentation into the Eel River would be reduced to negligible levels.

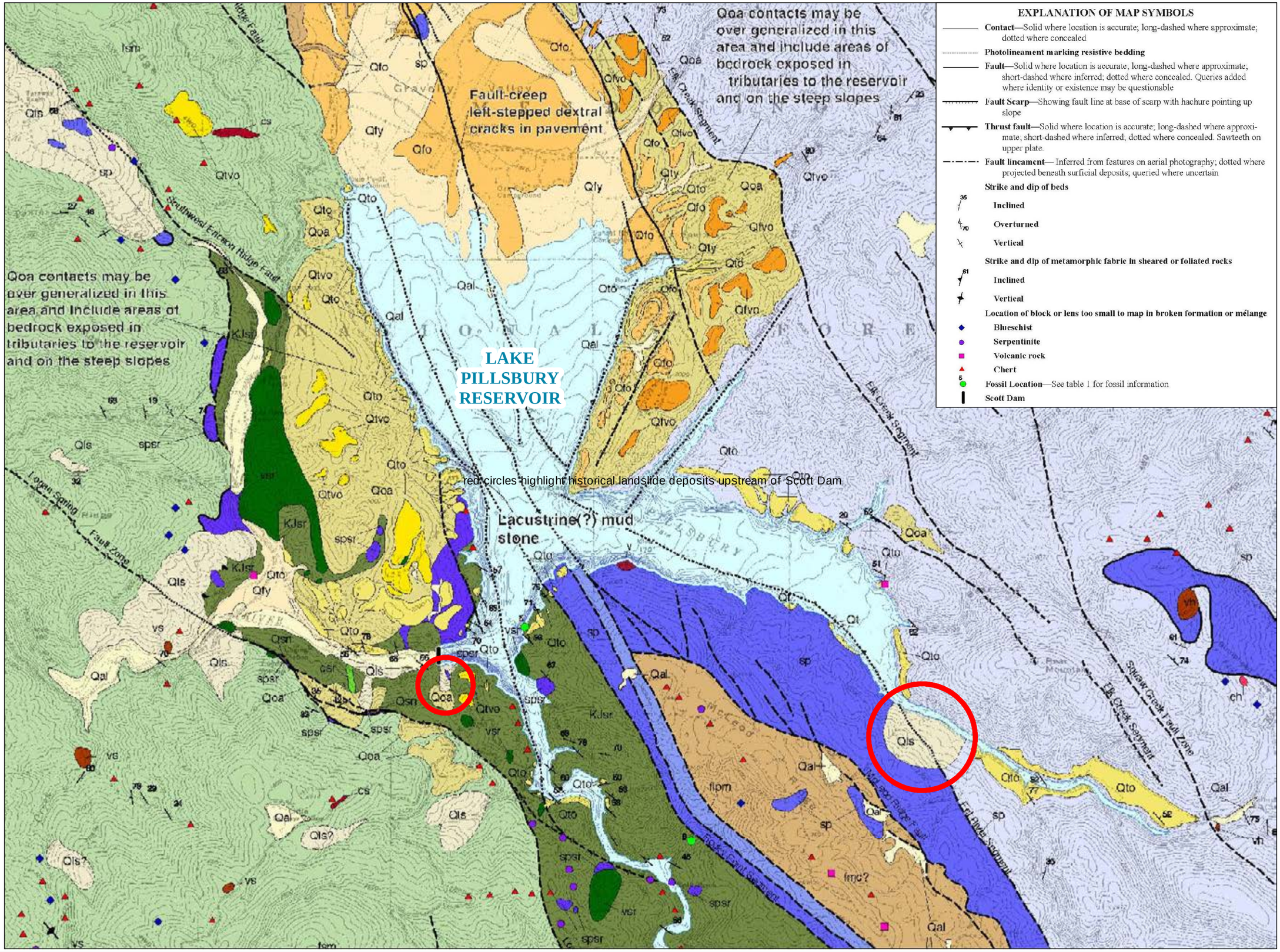
Cape Horn Dam Area

Erosion and Sediment Delivery to the Eel River from Construction Activities

Under the Proposed Action, Cape Horn Dam and select associated facilities and features would be demolished and removed by construction activities occurring upstream and downstream of the dam. A temporary access road would be constructed, and a bypass flow channel would be constructed with an upstream temporary cofferdam that would be removed when the channel is completed. Two channel-spanning cofferdams would be installed, one upstream and the other downstream of the dam. A bypass flow channel would be excavated and armored through the earthen embankment to pass Eel River flows around the dewatered work area and downstream during construction. The bypass channel would be designed to protect against potential erosion. The concrete dam, the earthen portion of the dam, and the fish hotel/exclusion barrier would be removed. At the end of construction, the cofferdams would be removed. A full description of the activities associated with the removal of these facilities is provided in Section 2.1.2.1, Surrender of License.

Demolition and removal of the existing facilities at Cape Horn Dam would involve similar construction activities as previously described for Scott Dam and would also create similar adverse geomorphic impacts to the Eel River and its tributaries in the Cape Horn Dam Area. These activities could also increase sediment concentrations at the diversion to the East Branch Russian River, potentially requiring sediment management actions to enable diversions to continue during construction. Under the Proposed Action, the short-term construction and deconstruction activities for both Cape Horn Dam and Scott Dam would occur during the same construction season. While this would create the potential for higher temporary increases in total sediment concentrations from construction activities, the overall environmental effect may be lower than if the dams were removed in separate years since the duration of elevated sediment concentrations would be lower.

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EXPLANATION OF MAP SYMBOLS

- **Contact**—Solid where location is accurate; long-dashed where approximate; dotted where concealed
- **Photolineament marking resistive bedding**
- **Fault**—Solid where location is accurate; long-dashed where approximate; short-dashed where inferred; dotted where concealed. Queries added where identity or existence may be questionable
- **Fault Scarp**—Showing fault line at base of scarp with hachure pointing up slope
- **Thrust fault**—Solid where location is accurate; long-dashed where approximate; short-dashed where inferred; dotted where concealed. Sawteeth on upper plate.
- **Fault lineament**— Inferred from features on aerial photography; dotted where projected beneath surficial deposits; queried where uncertain

Strike and dip of beds

- **Inclined** (35)
- **Overturned** (70)
- **Vertical**

Strike and dip of metamorphic fabric in sheared or foliated rocks

- **Inclined** (61)
- **Vertical**

Location of block or lens too small to map in broken formation or mélange

- **Blueschist**
- **Serpentinite**
- **Volcanic rock**
- **Chert**
- **Fossil Location**—See table 1 for fossil information (5)
- **Scott Dam**

Geologic Map Units

Qsn	Siliceous and calcareous sinter deposits
Qfy	Young alluvial fan deposits and surfaces
Qfo	Old alluvial fan deposits and surfaces
Qfvo	Very old alluvial fan deposits and surfaces
Qal	Alluvium
Qt	Alluvial stream terrace deposits, undivided
Qty	Young alluvial stream terrace deposits and surfaces
Qto	Old alluvial stream terrace deposits and surfaces
Qtvo	Very old alluvial stream terrace deposits and surfaces
Qoa	Older alluvial deposits, undivided
Qls	Landslide deposits
KJsr	Ophiolitic mélange and sedimentary rocks of Split Rock
spsr	Blocks and lenticular bodies of ultramafic rock
csr	Blocks of chert
vsr	Blocks of mafic volcanic and plutonic rocks
fmc	Mélange of the Central Belt
v	Mafic volcanic rocks
fsm	Metasedimentary rocks of Sanhedrin Mountain
cs	Blocks and lenses of metachert associated with metavolcanic rocks
vs	Blocks and intercalated lenses of metavolcanic rocks
fhm	Metasandstone and argillite of Hull Mountain
flpm	Metasandstone of Hull Mountain
sp	Ultramafic rocks and serpentinite of the Coast Range Ophiolite
water	water

Historical landslide deposits

DATA SOURCE:
Geologic map of the Bartlett Springs Fault Zone in the Vicinity of Lake Pillsbury and Adjacent Areas of Mendocino, Lake, and Glenn Counties, California:
U.S. Geological Survey Open-File Report 2010-1301
[http://pubs.usgs.gov/of/2010/1301].

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PG&E Potter Valley Project
FERC Project No. 77

Map 2.2.4.8-1

Geologic map of the Lake Pillsbury reservoir area.

0 0.25 0.5 Miles

Projection: UTM Zone 11
Datum: NAD 83

Date: 7/17/2025

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During the drawdown at Scott Dam, minimum instream flows would continue to be released into the Eel River below Cape Horn Dam, and high flows would flow over the dam after it is notched. During construction at the Cape Horn Dam Area, the flow bypass channel would ensure that flows would be passed downstream to the Eel River. Thus, flows under the Proposed Action would be similar to the existing condition, and there would be no effect on flows important for geomorphic processes and form in the Cape Horn Dam Area.

To address and reduce potential erosion from construction activities in the Cape Horn Dam Area, PG&E would implement the Construction Erosion Prevention Plan. PG&E would also implement the Sediment/Channel Monitoring and Response Plan. This plan will include measures to monitor the river channel downstream of Scott Dam including the Cape Horn Dam Area during drawdown. One objective of the proposed Sediment/Channel Monitoring and Response Plan is to identify diversions that could be affected by the Proposed Action and address potential sediment issues at these water intakes. PG&E would also develop and implement the Construction Site Water Diversion, Dewatering, and Drawdown Plan. This plan will define measures such as the magnitude and timing of the drawdown. In addition, PG&E would obtain applicable resource agency and construction permits (USACE Section 404; SWRCB 401). With implementation of these construction measures, activities associated with reservoir drawdown would have a negligible effect on erosion or potential channel sedimentation and alteration of geomorphic processes and form in the Cape Horn Dam Area.

Eel River Watershed

Changes in Flow during Construction

Construction activities at Scott Dam would temporarily impact hydrology in the Eel River downstream of Scott Dam. The drawdown of the reservoir using the low-level outlet needle valve would result in a release from Scott Dam of up to 400 cfs into the Eel River for a period of 2 to 4 months. The increase in flow above existing conditions depends on the water year type and minimum instream flow requirements (see flow rates during the initial drawdown compared to under existing conditions in Table 2.2.4.2-1 (Section 2.2.4.2, Water Use and Hydrology). For the months of June through October, under the existing condition, the flow released into the Eel River downstream of Scott Dam typically ranges from 47 cfs to 320 cfs. Under the Proposed Action, the flow would be approximately 400 cfs. An increase in flow during these months of up to 400 cfs would have no effect on geomorphic process or form in the Eel River.

Russian River Watershed

Changes in Flow during the Lake Pillsbury Reservoir Drawdown

Construction activities at Scott Dam and dewatering of the construction area at Cape Horn Dam have the potential to impact hydrology in the East Branch Russian River upstream of Lake Mendocino. The drawdown of the reservoir using the low-level outlet needle valve would result in a release from Scott Dam of up to 400 cfs into the Eel River for a period of 2 to 4 months. The timing of the drawdown would be coordinated with water demands in the East Branch Russian River to the extent possible, which could result in a diversion of up to 130 cfs in the East Branch Russian River and release of 270 to 400 cfs to the Eel River below Cape Horn Dam. The increase in flow above existing

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conditions depends on the water year type and minimum instream flow requirements (see flow rates during the drawdown and under existing conditions in Table 2.2.4.2-1, Section 2.2.4.2, Water Use and Hydrology). However, during construction in the Cape Horn Dam Area, two channel-spanning cofferdams would be installed across the Eel River: one upstream of the Van Arsdale Diversion and the other downstream of Cape Horn Dam and the fish exclusion barrier. If the upstream cofferdam is installed in the Eel River above the Van Arsdale Diversion, it would not be operable and diversions into the East Branch Russian River would cease.

For the months of June through October, under the existing condition, the flow released into the East Branch Russian River typically ranges from 10 cfs to 80 cfs. Under the Proposed Action, the flow would range from 0 to 130 cfs during the drawdown (see Table 2.2.4.2-1 in Section 2.2.4.2, Water Use and Hydrology). Based on the flood frequency values in Table 2.2.3.1-17 (Section 2.2.3.1, Water Use and Hydrology), which shows the existing condition (impaired) flood frequency flows in the East Branch Russian River at USGS gage #11461500 near Calpella, California, the 1-year event is 311 cfs and the 2-year event is 3,350 cfs. Even if the flow is increased to 130 cfs during the construction months, flows of this level and greater are frequently diverted into the East Branch Russian River (see Table 2.2.3.1-16 in Section 2.2.3.1, Water Use and Hydrology). If the upstream cofferdam is installed upstream of the Van Arsdale Diversion, PG&E would develop an East Branch Russian River Diversion Plan that could include temporary pumping to the diversion tunnel, if needed, to provide diversions to the East Branch Russian River during construction. Therefore, changes in hydrology during construction would have no effect on geomorphic process or form in the East Branch Russian River.

2.2.4.8.2 Phase 2: Post-facility Removal Effects

Post-facility removal effects to geomorphology resulting from physical changes may occur following removals of the dams and recreation facilities/ancillary facilities (Phase 2) compared to the No-Action Alternative (existing condition). The following effects from initial temporary condition and preliminary restoration (Phase 2a) and resulting physical conditions and restoration (Phase 2b) were evaluated:

- Erosion of Lake Pillsbury reservoir sediment and transport downstream after dam removal may affect channel morphology (Phase 2a)
  - Erosion of Lake Pillsbury reservoir sediment and shoreline erosion;
  - Transport, deposition, and remobilization of sediment in the Eel River between Scott Dam and Cape Horn Dam;
  - Erosion of Van Arsdale Reservoir sediment;
  - Transport, deposition, and remobilization of sediment in the Eel River downstream of Cape Horn Dam; and
  - Diversion of sediment to the East Branch Russian River.

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- Reestablishment of geomorphic and sediment processes after dam removals may affect channel morphology (Phase 2b)
  - Mainstem Eel River and tributaries in the former Lake Pillsbury reservoir area;
  - Eel River between Scott Dam and Cape Horn Dam; and
  - Eel River downstream of Cape Horn Dam.
- Potential increase in 100-year floodplain elevations in the Eel River could occur (Phase 2b).
- Potential increase in sediment concentration and sand and gravel transport at the NERF may affect operability of the pump and water diversions to the East Branch Russian River (Phase 2b).
- Potential changes in flows in the East Branch Russian River may affect channel morphology (Phase 2b).

Phase 2a: Initial Condition and Preliminary Restoration

The sediment transport and geomorphic response of the Eel River and its tributaries to removal of Scott Dam and Cape Horn Dam are presented separately for different reaches from Lake Pillsbury reservoir to the Eel River downstream of Cape Horn Dam. However, for clarity, the focused discussion of the effects of elevated suspended sediment concentrations and analogies from other recent dam removal projects is presented for all reaches combined at the end of this section.

Analysis Methods

Multiple studies performed by Stillwater Sciences to estimate the volume of erodible sediment in Lake Pillsbury reservoir, and to assess the processes by which the eroded sediment would be transported and deposited downstream as a result of dam removal, are referenced in this section. The following is a summary of each study's objectives, with more details provided in the subsequent sections.

1. **Conceptual Sediment Erosion Model:** The volume and general locations of impounded sediment within Lake Pillsbury reservoir that would be eroded and transported downstream were estimated by development of a conceptual model (Stillwater Sciences et al. 2021a).
2. **Suspended Sediment Transport Model:** A two-phase conceptual model (TPCM) was developed for modeling fine sediment erosion following rapid base level control lowering and incision into reservoir sediment due to draining of Lake Pillsbury reservoir as part of dam removal (Stillwater Sciences 2021a). The purpose of the model was to assess the general magnitude and duration of high suspended sediment concentration downstream of Scott Dam.
3. **Sand Transport Model:** The Dam Removal Express Assessment Model 1 (DREAM-1) sediment transport model was used to simulate the erosion and downstream transport and deposition of sand from Lake Pillsbury reservoir (Stillwater Sciences 2021b).

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4. **Gravel Transport Dynamics:** Sediment pulse evolution theory and observations of previous dam removals were used to predict the transport and deposition of gravel downstream of Scott Dam (Stillwater Sciences 2021b).

Volume of Erodible Sediment and Erosion of Lake Pillsbury Reservoir Sediment after Scott Dam Removal

The following describes the key Scott Dam removal activities related to sediment erosion and transport. PG&E is proposing the rapid dam removal approach to decommission Scott Dam (McMillen Jacobs Associates 2021). Rapid dam removal entails expedited removal of Scott Dam (approximately 2 years in duration depending on site conditions and flows). Following pre-established protocols related to river flow forecasting, the adit plug would be removed using explosives or similar method during or preceding an anticipated flood event of sufficient magnitude to rapidly evacuate fine sediment deposits from the reservoir (likely between December and March). The capacity of the tunnel and channel is considered suitable for evacuating Phase 1 (defined below) sediments (primarily silt and clay) within a few days of opening the tunnel portal at the upstream end (Stillwater Sciences 2021a, as reported in McMillen Jacobs Associates 2021).

Lake Pillsbury Reservoir – Volume of Erodible Sediment

Using the mapping methods and sediment texture assumptions described in Section 2.2.3.7.3, Reservoir Sedimentation (see Section 2.2.3.7, Geomorphology), Stillwater Sciences et al. (2021a) estimated 21 million cy is impounded within Lake Pillsbury reservoir and comprises approximately 56 percent silt and clay, 34 percent sand, and 10 percent gravel.

Stillwater Sciences et al. (2021a) also estimated the volume and general locations of impounded sediment that would be eroded and transported downstream by developing a conceptual sediment erosion model that incorporated prior dam removal observations and professional judgement. The model is based on observations from other dam removals (e.g., Glines Canyon Dam on the Elwha River, Tannery Brook Dam on Tannery Brook, Condit Dam on the White Salmon River) as well as observations of downcutting at the head of Lake Pillsbury reservoir in 2014, during a period of drought. The conceptual model modeled anticipated channel downcutting processes on three stream branches in Lake Pillsbury reservoir with different gradients and levels of confinement—mainstem Eel River upstream of the Rice Fork, the Rice Fork, and Salmon and Squaw Valley creeks.

The Stillwater Sciences et al. (2021a) conceptual model estimated that the 12 million cy of impounded sediment in Lake Pillsbury reservoir could potentially be mobilized downstream of Scott Dam following dam removal. The volume estimate does not account for sediment accumulation since the 2015 bathymetric survey. Figure 2.2.4.8-1 shows how the estimated depth of downcutting into the impounded sediment could vary spatially within Lake Pillsbury reservoir. Details on the estimated volumes of erodible sediment from the three stream branches in Lake Pillsbury reservoir are provided below.

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Mainstem Eel River Upstream of the Rice Fork

The removal of Glines Canyon Dam on the Elwha River in Washington was used as a process model example for the mainstem Eel River upstream of the Rice Fork. Based on the model, the Eel River is expected to migrate across a relatively wide valley as it downcuts through impounded sediment in response to the removal of Scott Dam (see Figure 3-27 in Stillwater Sciences et al. 2021a). Hydraulic geometry relationships were used to estimate bankfull channel widths, which were then used in other relationships to estimate the width of the migrating braiding/meander belt. As the river downcuts, it would be expected to create elevated terraces with side slopes at the angle of repose (assumed to be 1:1). The conceptual model assumed the river would eventually downcut to the elevation and location of the 1921/1922 pre-dam surface. The model did not assume that the braiding/meander belt would migrate fully across the width of the impounded sediment. Instead, the 1921/1922 contour map was used to digitize the estimated pre-dam valley wall, active channel, and floodplain benches, and with professional judgement, the planform boundary/lateral limit of erodible sediment was determined. Impounded sediment outside of this boundary would not be eroded and would remain in place.

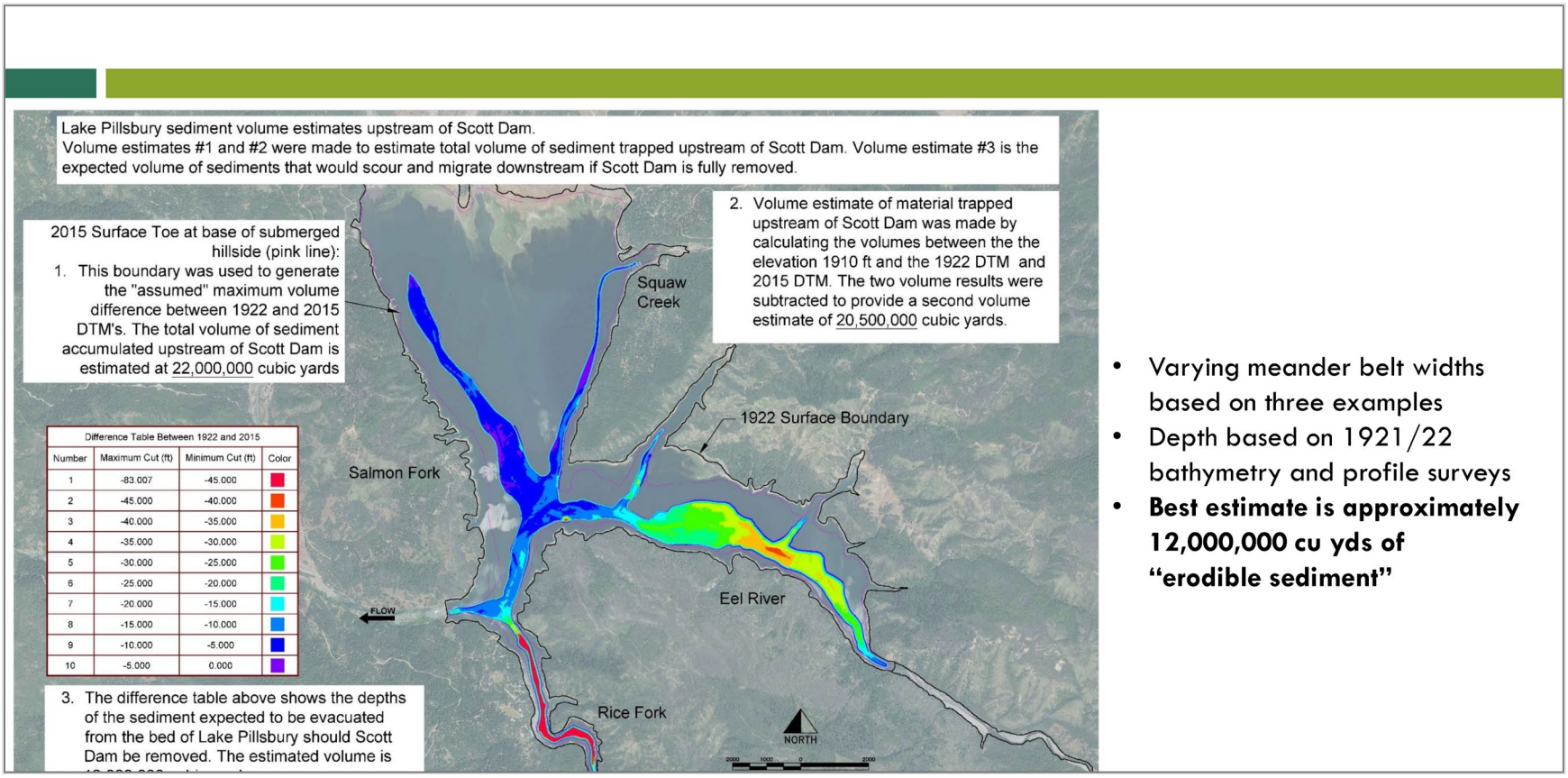
Rice Fork

The removal of Condit Dam on the White Salmon River in Washington was used as a process model example for the Rice Fork. A key difference of this stream branch's conceptual model compared to the mainstem Eel River upstream of the Rice Fork is that in the Rice Fork, the estimated braiding/meander belt width was at least as wide as the valley bottom determined from the 1921/1922 contour map (see Figure 3-27 in Stillwater Sciences et al. 2021a). As is visible in Figure 2.2.4.8-1, the width of the mainstem Eel River valley bottom is considerably wider than that of the Rice Fork. The model assumed nearly 100 percent of the impounded sediment would be mobilized and transported downstream when the dam is removed because there would not be sufficient space for lateral migration of a braiding/meander belt to occur that would create terraces of uneroded sediment as the river downcuts to the pre-dam surface.

Salmon Creek and Squaw Valley Creek

The removal of Tannery Brook Dam on Tannery Brook in New Hampshire was used as a process model example for the Salmon Creek and Squaw Valley Creek branch. Like the model for the mainstem Eel River upstream of the Rice Fork, the conceptual model for these two creeks assumed the braiding/meander belt width was less than the 1921/1922 valley bottom width, and therefore not all the impounded sediment would have the potential to be mobilized. The low gradient and low valley confinement of these stream branches mean they are expected to evolve similarly to the Eel River in which some of the impounded sediment would be outside of the braiding/meander belt width and not be eroded.

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Source: California Trout et al. 2021.

Figure 2.2.4.8-1. Lake Pillsbury reservoir eroded sediment volume estimates.

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Fine-grained Sediment Transport

This section describes the potential for rapid incision and erosion of Lake Pillsbury reservoir's bottom-set deposit, primarily composed of silt, clay, and fine sand, following removal of the dam (see Figure 2 in Stillwater Sciences 2021a). Erosion and transport of the top-set deposit, likely primarily composed of gravel and coarse sand, is discussed in subsequent sections.

Under the Proposed Action, the removal of the dam would result in the flushing of a large volume of sediment downstream of the remnant reservoir into the Eel River, likely in a single high-flow season (McMillen Jacobs Associates 2021). Stillwater Sciences (2021a) developed a TPCM for fine sediment erosion of the bottom-set sediment deposit following rapid base level control lowering due to draining of Lake Pillsbury reservoir following dam removal. The purpose of the model was to assess the general magnitude of suspended sediment concentration and duration of high suspended sediment concentration impact in the Eel River downstream of Scott Dam (Stillwater Sciences 2021a). Based on the modeling, opening the large adit tunnel at the base of Scott Dam, with approximately 70 ft. of head and potential for base level change, would be expected to cause a rapid increase in shear stress due to the significantly elevated local bed slope that would be created as flow quickly erodes through the reservoir sediment upstream of the adit (Stillwater Sciences 2021a). A relatively narrow and oversteepened channel would initially form in the impounded sediment near the base level lowering at the adit. Channel headcutting would propagate upstream into the impounded sediment and cause continued erosion and sediment evacuation to occur. The impounded sediment would provide an essentially unlimited supply of sediment. The potential volume of fine-grained sediment that would initially be eroded would be "transport limited" (limited by the hydraulic sediment transport carrying capacity of the flow) and would not be limited by the sediment supply (volume of sediment available to be eroded in the remnant reservoir bed) (Stillwater Sciences 2021a). This period of erosion was termed "Phase 1 erosion" by Stillwater Sciences.

Assumptions on the water discharges available, width of the active channel during downcutting, gradient of the channel during downcutting, and other parameters used as input in the TPCM were described by Stillwater Sciences (2021a). Primary modeling assumptions are described as follows:

- The TPCM analysis assumed the same 12 million cy of erodible sediment available for fluvial transport downstream as determined from the conceptual erosion model described above (Stillwater Sciences et al. 2021a), which was based on 2015 bathymetry. The 2015 estimates were not extrapolated to account for the additional sediment accumulation in Lake Pillsbury reservoir that would occur until Scott Dam removal because the increase was assumed to be small compared to the existing impounded sediment volume and the accuracy of the analyses was only on the "order-of-magnitude level" (Stillwater Sciences 2021a). Based on the reservoir sediment volumes reported in Section 2.2.3.7.3, Reservoir Sedimentation, and Figure 2.2.3.7-1 (see Section 2.2.3.7, Geomorphology), the average annual reduction in reservoir storage capacity from 1921 to 2023 was 403,792 cy per year.
- Although both fine and coarse sediment are expected to be eroded in the 12 million cy estimate, the TPCM assumes 12 million cy of fine-grained sediment would be eroded during Phase 1 erosion. As described in Section 2.2.3.7.3, it is estimated that the

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impounded sediment comprises approximately 56 percent fine silt and clay, 34 percent sand, and 10 percent gravel). Assuming all the sediment to be fine grained is a conservative approach that likely overestimates the duration of the turbidity impact compared to the actual impact duration (Stillwater Sciences 2021a). A particle size of 0.011 millimeter (mm) (silt size class) was used as the representative particle size based on 26 samples collected by the USGS in 1964 (Porterfield and Dunnam 1964). Stillwater Sciences (2021a) considered this a conservative overestimate (i.e., provides an estimated longer duration turbidity impact) of the volume of fine-grained sediment available for the suspended sediment concentration analysis since not all of the 12 million cy of erodible sediment would be fine grained, and much of it is located in top-set deposits that would not be eroded by the processes assumed in the TPCM.

When the channel formed through this rapid downcutting reaches the pre-dam historical channel or other non-erodible surface that prevents further downcutting or lateral channel migration, the source of fine-grained erodible sediment would be no longer accessible and the sediment transport would become supply limited, termed "Phase 2 erosion" (Stillwater Sciences 2021a). The primary source of sediment during Phase 2 erosion would be gravity-driven bank slumping as water drains from the sediment deposits (Stillwater Sciences 2021a). The duration of bank slumping would be primarily determined by how quickly the water would drain from the bank sediment deposits until it reaches a water content that enables sediment deposit stability. Another source of sediment during Phase 2 erosion would be local surface erosion during precipitation, but this amount would be expected to be insignificant and negligible considering the area of newly exposed land (<2,300 acres) is a small percentage (approximately 1 percent) of the natural sediment production supplied from the much larger area (approximately 289 $mi.^2$) of the upstream watershed (Stillwater Sciences 2021a).

The results of the TPCM are presented for three different discharge scenarios in Table 2.2.4.8-1. The duration of erosion of 12 million cy of Phase 1 erosion fine sediment was calculated to range from 0.8 day at a discharge of 5,000 cfs to 7.7 days at a discharge of 1,000 cfs. The calculated sediment concentration at a discharge of 5,000 cfs (900,000 mg/L) would be nearly twice as high as it would be at 1,000 cfs (457,800 mg/L). By comparison, the peak suspended sediment concentration at USGS gage #11477000, Eel River at Scotia (located near the estuary and upstream of the confluence with the Van Duzen River), of just greater than 10,000 mg/L was measured only three times over the period of record, 1959 to 1979 (see Figure 9 in Stillwater Sciences 2021a). Stillwater Sciences (2021a) also calculated results for an improbable scenario in which the total estimated impounded sediment volume of 21 million cy was eroded to demonstrate that the duration required to evacuate the sediment would still only be 13.5 days at the low discharge scenario (1,000 cfs) and 1.4 days at the high discharge scenario (5,000 cfs) (Table 2.2.4.8-1).

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Table 2.2.4.8-1. Calculated magnitude of suspended sediment concentration and duration of 12 million cy of Phase 1 fine sediment erosion.

Water Discharge (cfs)	1,000	2,000	5,000
12 Million cy of Erodible Sediment			
Maximum suspended sediment concentration (mg/L)	457,800	612,500	900,000
Duration of Phase 1 erosion (days)	7.7	2.9	0.8
21 Million cy of Erodible Sediment			
Maximum suspended sediment concentration (mg/L)	457,800	612,500	900,000
Duration of Phase 1 erosion (days)	13.5	5.0	1.4

Source: Stillwater Sciences (2021a): Table 1

Based on the 0.011 mm size particle with settling velocity of 3.58×10^{-4} ft./second used in the TPCM analysis, Stillwater Sciences (2021a) reported the majority of the fine-grained sediment eroded from Lake Pillsbury reservoir would be transported past the dam without settling, there would be minimal potential for deposition along the Eel River downstream of the dam, and the reservoir deposit would be transported directly to the Eel River estuary (Stillwater Sciences 2021b). This assumption essentially means the suspended sediment would be transported as wash load.

Since the volume of fine-grained sediment available for Phase 2 erosion was uncertain, estimates ranging from 0 to 10 million cy of sediment were analyzed to determine the maximum possible duration (number of days) the suspended sediment load would exceed 5,000 mg/L (see Figure 10 in Stillwater Sciences 2021a). For example, under a scenario of 2 million cy of Phase 2 erosion at a water discharge of 2,000 cfs, the duration would likely be about 2 days. Since the impounded sediment would be very deep (> 40 ft. in certain locations), it is likely that Phase 1 erosion would account for the majority of sediment erosion (Stillwater Sciences 2021a). Based on similar analysis performed for the Matilija Dam removal project in the Ventura River Watershed, Stillwater Sciences (2021a) stated that Phase 2 erosion in Lake Pillsbury reservoir would be a very small amount and last for a limited duration.

It is important to note that the erosion analysis performed by Stillwater Sciences (2021a) mainly addressed erosion of the bottom-set deposit primarily composed of silt, clay, and fine sand (see Figure 2 in Stillwater Sciences 2021a). When this erosion concludes, erosion of the top-set deposit, likely primarily composed of gravel and coarse sand, would continue during subsequent high-flow events and provide a source of fine sediment from within the coarser sediment matrix. Continued erosion of the top-set deposit would result in a significantly longer period of sediment concentrations above background conditions. It is estimated that, at a minimum, a 2-year flood would need to occur through a drawn down reservoir to erode these sediments before background suspended sediment concentrations during subsequent high-flow events would be obtained. This 2-year flood would mobilize the coarse sediment and release the fines trapped within the coarse sediment.

The duration of high sediment concentrations would also be extended by the time it takes to drain the reservoir after the detonation of the adit and would depend upon the streamflows at the time of the detonation. It is estimated that there would be approximately 10,000 ac-ft of storage remaining

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behind the dam, and the outlet capacity of the tunnel used for the drawdown is 7,000 cfs. The 2-year flood in the Eel River at this location has a peak discharge of over 11,000 cfs. Therefore, depending on how much of the inflow that exceeds 7,000 cfs is stored within the reservoir below the elevation of the notched spillway, it is possible that it could take some time to drain the reservoir and there could be a delayed flush of fine sediment after the initial tunnel opening.

Further discussion of increased suspended sediment concentrations and observations from previous dam removal projects are provided below.

Sand Transport

Stillwater Sciences (2021b) used the DREAM-1 sediment transport model to simulate the reach-averaged erosion, transport, and deposition of sand deposits in the Eel River eroded from Lake Pillsbury reservoir in response to Scott Dam removal. The DREAM-1 model has been used on many other dam removal planning projects.

The model's grain-size distribution was based on an average of the USGS (i.e., from Porterfield and Dunnam 1964) samples with a distribution of 0.0625 to 4 mm and a geometric mean of 0.34 mm (medium sand). Sediment in the model was transported as undifferentiated bed material load, and the sediment transport capacity was determined from Brownlie's (1982) bed material equation (Cui et al. 2006). The model assumed finer particles such as silt and clay were treated as wash load that was transported downstream without re-deposition once entrained by the flow (see discussion above about fine grained sediment transport) (Cui et al. 2006). The DREAM-1 model was not designed for dam removal simulations where silt and clay are a major percentage of the reservoir deposit since silt and clay would act as a cohesive agent to slow erosion of reservoir sediment (Cui et al. 2006). The primary model input parameters were (1) pre-dam longitudinal channel profile extending 3.8 river miles (RMs) on the Eel River and 2.1 miles (mi.) on the Rice Fork, upstream of Scott Dam; (2) channel longitudinal profile and active channel width downstream of Scott Dam; (3) impounded sediment deposit thickness and size gradation; (4) long-term average annual sand supply; and (5) daily average discharge. Full details on the model input parameters are described in the Stillwater Sciences report (2021b). The downstream boundary condition for the model was the Middle Fork Eel River. It is important to note that the modeling assumed that Cape Horn Dam was still in place.

The current condition model with both dams in place was run for a 10-year period and showed minimal sand deposition in the reach from Scott Dam to Cape Horn Dam (see Figure 15 in Stillwater Sciences 2021b). Maximum sand deposition of up to 6 in. was predicted in Van Arsdale Reservoir, and the deposit was only stored temporarily until it was flushed over Cape Horn Dam during high flows (Stillwater Sciences 2021b). It is noted that local sand deposition of several feet in local scour holes could occur within the reach.

The analysis of Scott Dam removal in this section is focused on the model run that assumed a 15-ft.-diameter tunnel in Scott Dam (represented as T15 in the Stillwater Sciences 2021b report). Model runs were simulated for wet, median, and dry water years with different starting reservoir pool levels.

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The model showed that the sand deposit in Lake Pillsbury reservoir would have a rapid rate of erosion following dam removal (see Figure 17 in Stillwater Sciences 2021b). In a wet year simulation, nearly 3 million tons of cumulative sand were eroded and transported past Scott Dam within the first several days, with 3.6 million tons eroded and transported within about 60 days. The rate of erosion decreased dramatically after 60 days and slowly reached about 4.2 million tons within 1,500 days of model simulation. For a dry year simulation, the trend in the rate of sand transport was similar. It took about 50 days to erode and transport 1.5 million tons of cumulative sand and 350 days to reach 3.6 million tons.

The DREAM-1 model simulation results included longitudinal profile graphs that showed temporal downcutting of the channels into the impounded sediment in Lake Pillsbury reservoir. For the wet year scenario, the mainstem Eel River and Rice Fork channels were shown to downcut to their pre-dam elevations within 1 week of dam removal throughout most of the modeled sediment deposit except for about 1 mi. immediately upstream of Scott Dam (see Figure C-15 in Stillwater Sciences 2021b). Model results predicted that within 1 year, both channels would have essentially downcut to the pre-dam elevations throughout the entire thickness of the deposit upstream of the dam. The rate of downcutting and return to pre-dam elevations were slower for the dry year scenario (see Figure C-47 in Stillwater Sciences 2021b). The modeling predicted that after 1 week, the Rice Fork would have eroded to pre-dam elevations beginning about 1.6 mi. upstream of Scott Dam and the Eel River eroded to pre-dam elevations about 3 mi. upstream of the dam. Similar to the wet year scenario, after 1 year the channels had returned to their pre-dam elevations throughout the entire deposit.

Gravel Transport

Based on the assumption that gravel is typically about 5 to 10 percent of total sediment production (which is primarily composed of sand, silt, and clay), Stillwater Sciences (2021b) estimated that approximately 2 million cy of gravel is currently deposited in Lake Pillsbury reservoir.

Sediment pulse evolution and experience gained from previous dam removal projects indicate that erosion and transport of the gravel deposit would primarily occur by dispersion (i.e., the deposit gradually spreads and "melts away" over time), with a limited range of downstream deposition (see Figure 9 in Stillwater Sciences 2021b). Since the gravel is primarily located in the reservoir's top-set deposit at least a mile or two upstream of Scott Dam, gravel deposition following dam removal would likely occur within the eroded channel formed in the Lake Pillsbury reservoir area currently occupied by fine-grained sediment and would be unlikely to extend beyond the low-gradient channel reach within the first 2 mi. downstream of Scott Dam (Stillwater Sciences 2021b).

Geomorphic Response in Lake Pillsbury Reservoir

As the Eel River downcuts in the exposed reservoir bed, it is expected to create elevated terraces with side slopes at the angle of repose (assumed to be 1:1). It is likely that the morphology of the actively downcutting river would be a relatively low-gradient, sinuous, and widely braided channel, especially in areas of impounded coarse-grained sediment where the valley width is wide. The conceptual model (described previously) assumes the Eel River and its tributaries would eventually steepen in gradient as they downcut to elevations, locations, and channel widths like those observed in 1921/1922

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pre-dam topography (Stillwater Sciences et al. 2021a). The sediment modeling described above predicts most of the sand erosion and downcutting to pre-dam reservoir elevations would occur within 60 days to a year after dam removal, depending on post-Scott Dam breaching water year type and hydrology. Although dependent upon the pattern of flood flows following dam removal, observations from other dam removal projects suggest it could take 2 to 5 years for the channel to return to its pre-dam location (Stillwater Sciences et al. 2021b). Because of high sediment loads, the initial channel morphology may not include topographic complexity, such as large pools, but as the sediment supply diminishes it is likely that better defined pools and riffles would form (Stillwater Sciences et al. 2021b). It was also noted that a rapid dam removal approach, as opposed to a phased approach, would result in more rapid downcutting into the impounded sediment with less time for the river to laterally migrate and erode deposits and resulting in more sediment remaining as terraces of floodplain deposits (Stillwater Sciences 2021b).

Bed and Shoreline Erosion from Rapid Dam Removal

During the first high-flow season (likely between November and May, depending on river flow forecasting), under the Proposed Action, the adit plug in Scott Dam would be detonated and rapid draining of the remaining impounded water would occur, likely within a few days (Stillwater Sciences 2021a, as reported in McMillen Jacobs Associates 2021). There is potential for embankment slope failures or potential landslides along the shoreline due to reservoir lowering during the final rapid draining of the reservoir that could deliver additional sediment to the drained reservoir. In particular, there is a historical landslide deposit on the upstream, left abutment of the dam (Gannett Fleming Inc. 2024) and a historical landslide deposit on the south side of the Eel River arm of Lake Pillsbury reservoir near the top of the reservoir (Map 2.2.4.8-1). See Section 2.2.3.6, Geology and Soils, for a more detailed discussion of slope stability in the reservoir.

Some qualitative assumptions of the potential shoreline erosion due to the proposed rapid removal of Scott Dam are presented below. These assumptions are informed by the previously described conceptual modeling of the potential erosion of reservoir sediment during a rapid removal of the dam (Stillwater Sciences et al. 2021a). As described above, the rapid removal would result in an estimated erosion of 12 million cy of impounded sediment in Lake Pillsbury reservoir. The amount of erosion would likely vary along the existing shoreline. The depth of channel downcutting would be expected to be greatest, and occur most rapidly, in the lower portion of Lake Pillsbury reservoir, where the sediment texture is relatively fine grained and the deposit depths are generally thickest. Shorelines in these locations may be most susceptible to instability and higher rates of erosion, particularly near the historical landslide just upstream of the dam. Rapid removal could cause instability of the landslide location (see Section 2.2.4.7, Geology and Soils). In the relatively confined valley of the Rice Fork, the conceptual erosion model suggests that nearly 100 percent of the impounded sediment would be mobilized and transported downstream, and elevations and slopes along the existing shoreline in this valley would be likely to return to pre-dam conditions (Stillwater Sciences et al. 2021a).

As described in Section 2.1.2, Applicant's Proposal, the dam removal design will be approved by FERC Dam Safety prior to initiation of dam removal activities. To reduce the risks associated with the landslide upstream of Scott Dam, PG&E would develop a Scott Dam Slope Stability Monitoring Plan. See Section 2.2.4.7, Geology and Soils, for further discussion of the proposed resource protection measures.

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At other locations along the reservoir shoreline, such as the mainstem Eel River upstream of Rice Fork and in the Gravelly Valley area of Salmon Creek and Squaw Valley Creek, a braiding/meander belt is expected to form and downcut and laterally migrate and erode sediment across a portion of the pre-dam valley width (Stillwater Sciences et al. 2021a). Some of the impounded sediment would be outside of the braiding/meander belt width and not be eroded. The shoreline elevations and slopes in these locations outside of the braiding/meander belt would nearly match the profile of the impounded sediment observed in recent bathymetry surveys. The exposed substrate would be unvegetated initially, and gravitational-driven slumping of side slope material may occur at locations where the slope of the exposed substrate is greater than the angle of repose necessary for sediment stability. The potential for slumping would be relatively high as water drains from the deposits following reservoir draining and would be influenced by the rate of draining. The potential for instability would subside as water content decreases. The sediment deposits would reduce in volume and height as they dry and consolidate, further reducing the potential for gravitational failure. These areas would also be susceptible to erosion from precipitation runoff over the newly exposed surface, especially until vegetative cover is reestablished.

At locations where the braiding/meander belt erodes into or near the existing shoreline, flows after dam removal would be expected to create elevated terraces with steep side slopes at the angle of repose (Stillwater Sciences et al. 2021a). These areas would undergo similar erosion processes until slope angles are reduced to stable levels for the substrate and vegetation reestablishes.

To address and reduce potential erosion during reservoir drawdown, PG&E would implement the Construction Erosion Prevention Plan. PG&E would also implement the Sediment/Channel Monitoring and Response Plan. This plan will include measures to monitor the formation of new channels within Lake Pillsbury reservoir during drawdown. PG&E would also develop and implement the Construction Site Water Diversion, Dewatering, and Drawdown Plan. This plan will define measures such as the magnitude and timing of the drawdown. In addition, PG&E would obtain applicable resource agency and construction permits (USACE Section 404; SWRCB Section 401). With implementation of these construction measures, activities associated with reservoir drawdown would have a negligible effect on erosion or potential channel sedimentation and alteration of geomorphic processes and form.

Observations from Previous Dam Removals

Although there are differences in dam removal approach, geomorphic setting, regional hydrology, and the volume and gradation of trapped sediments, previous dam removal projects provide useful comparisons of the ranges of observed rates of erosion of impounded sediment behind these dams.

Klamath River Dam Removals

Approximately 13.1 million cy of sediment were estimated to be trapped in the reservoirs formed by J.C. Boyle (990,000 cy), Copco No. 1 (7,440,000 cy), and Iron Gate (4,710,000 cy) dams removed from the Klamath River in 2024 (U.S. Bureau of Reclamation 2012). The grain size of the sediment behind the Klamath dams was reported as 79 percent silt and clay, 18 percent sand, and 3 percent gravel or larger (Gathard Engineering Consulting 2006).

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With similarities to the proposed dam removal approach for Scott Dam, the Klamath River dam removals are an example of a rapid dam removal approach in which water levels from the reservoirs were quickly drained by opening low-level gates or blasting tunnels near the base of the dams. On January 11, 2024, the low-level tunnel was used to drain Iron Gate Reservoir slowly over several weeks. Shortly thereafter, on January 16, 2024, a 10-ft.-diameter tunnel was blasted at the base of J.C. Boyle Dam located upstream of Iron Gate Dam. On January 23, 2024, a 12-ft.-diameter tunnel was blasted at the base of Copco No. 1 Dam, located between Iron Gate and J.C. Boyle dams.

Hydraulic modeling and sediment transport analysis performed as part of planning studies for the Klamath River dam removals predicted that about half of the impounded sediment behind the dams would naturally erode and be transported out of the reservoir areas in a median water year (U.S. Bureau of Reclamation 2012). The pattern of reservoir sediment erosion observed on the Klamath River varied depending on several variables, such as distance upstream from the dam breach, valley confinement, and whether erosion was in the mainstem river or its tributaries. In general, the mainstem river rapidly incised through the impounded sediment and laterally eroded sediment across a braiding/meander belt as it ultimately downcut to its pre-dam location and elevation profile. The width of the eroded belt varied with location and did not always extend across the full width of the impounded sediment deposit. Terrace deposits remain in the portions of the pre-dam valley beyond the limits of the eroded belt. In the tributaries, the rapid rate of channel incision seemed to outpace erosion from lateral migration as the channel downcut. This resulted in formation of terrace deposits up to 15 ft. higher than the new channel profiles. Heavy machinery, including excavators, was used at some locations following the dam breaches as part of *assisted sediment evacuation* work along the mainstem river and tributaries to push recently exposed terrace deposits into the flowing channels so it could be transported downstream, thus increasing the amount of evacuated impounded sediment. Additional discussion of Klamath River suspended sediment concentrations is presented in the Elevated Suspended Sediment Concentrations section.

Elwha River Dam Removals

On the Elwha River in Washington, two dams (Elwha Dam and Glines Canyon Dam) were simultaneously removed through a phased approach. The Elwha Dam (located 4.9 mi. upstream of the mouth at the Strait of Juan de Fuca) trapped about 6.5 million cy of sediment in Lake Ardwell and Glines Canyon Dam (13.4 mi. upstream of the mouth) about 21 million cy of sediment in Lake Mills (Warrick et al. 2015). The sediment gradation was 54 percent sand, gravel, and cobble and 46 percent silt and clay (Randle et al. 2015). The water levels at Lake Aldwell and Lake Mills were gradually lowered from June 2011 to October 2012 through a series of progressive dam notches beginning in September 2011 (East et al. 2015). By mid-March 2012, the water in Lake Aldwell was entirely drained and coarse-grained sediment prograding downstream was being transported past the former dam site (East et al. 2015). Lake Mills was entirely drained of water in October 2012, and around October 14, 2012, the prograding reservoir sediment began overtopping the remaining ~52 ft. of Glines Canyon Dam (East et al. 2015).

The slopes of the alluvial sections of the river were 0.4 percent in the lower reach and 0.7 to 0.8 percent in the middle reach between the two dams (East et al. 2015). Approximately 32 percent of the combined reservoir sediment was eroded over 2 years (East et al. 2015), and 65 percent was

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eroded at the end of the fifth year (Ritchie et al. 2018). During these 5 years, approximately 10 percent of the eroded sediment was deposited in the river channel and floodplain, 26 percent was deposited in and near the coastal delta (13.4 mi. downstream of Glines Canyon Dam), and the remaining 64 percent was transported offshore (Ritchie et al. 2018).

Erosion of sediment from the Elwha River dams exceeded predictions from both numerical and physical models, which had predicted less than half of the stored reservoir sediment would erode (Ritchie et al. 2018). These observations demonstrate the limitations of modeling to accurately predict the magnitude of lateral erosion of reservoir deposits (Ritchie et al. 2018). In general, the modeling provided reasonably accurate predictions of the general patterns of sediment erosion, transport, and deposition, but were less accurate in terms of the short-term magnitude and timing of these processes (Warrick et al. 2015).

The morphologic response of the Elwha River downstream of the dams included a smoothing of the longitudinal profile as pools filled with sediment and the river aggraded substantially and developed a more braided pattern (Ritchie et al. 2018). During the second year of dam removal, the river began to incise into the newly deposited sediment, and a rapid decrease in channel braiding was observed as the sediment pulse diminished (see Figure 4 in Ritchie et al. 2018). Within the first 2 years of dam removals, only approximately 4 percent of the eroded silt and clay sediment deposited in the river and 7 percent in the coastal system, with about 89 percent of the fine-grained sediment being transported far offshore of the delta due to the energetic coastal environment (Warrick et al. 2015). Although the vast majority of silt and clay was transported all the way to the ocean, the extent of the observed deposits contrasted with the assumption that silt and clay would entirely bypass the river system (Draut and Ritchie 2015). By 18 months after dam removals, silt and clay deposits on the channel margins and floodplain were commonly over 1.6 ft. thick and included deposition in the interstitial spaces of cobbles. Researchers studying the dam removals noted that even in short and steep drainages such as the Elwha River, future planning should recognize that even though silt and clay fluvial sedimentation may be a small proportion of the total amount of sediment deposited, it may be hydrologically or ecologically impactful (Warrick et al. 2015). Additional discussion of Elwha River suspended sediment concentrations is presented below.

Marmot Dam and Condit Dam Removals

On the Sandy River in Oregon, approximately 58 percent of the sediment behind Marmot Dam was eroded over 2 years in response to a rapid dam removal approach that created a large and sudden lowering of the base water level, which resulted in upstream propagation of major knickpoints into the impounded sediment (East et al. 2015).

The 125-ft.-tall Condit Dam on the White Salmon River in Washington impounded a fine-grained sediment gradation of 35 percent silt and clay, 60 percent sand, and 5 percent gravel (Wilcox et al. 2014). The dam was removed in October 2011 through a rapid approach by blasting a 16-ft.-wide hole in the base of the dam that resulted in release of 2.1 million cy of sediment during a rapid reservoir drawdown. The reservoir's water and ~10 percent of its sediment evacuated within 90 minutes of blasting, and approximately 55 percent of the reservoir sediment was eroded over only 15 weeks. Rapid incision into the impounded sediment was followed by mass-movement of

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the predominantly fine-grained sediment. The mass erosion delivered sediment faster than fluvial processes of channel incision and knickpoint migration could have delivered sediment (Wilcox et al. 2014). Additional discussion of White Salmon River suspended sediment concentrations is presented below.

Eel River—Scott Dam to Cape Horn Dam

This section discusses changes in Eel River between Scott Dam and Cape Horn Dam that would occur primarily due to evacuation of erodible sediment from Lake Pillsbury reservoir and a return to unimpaired hydrology after Scott Dam is removed.

Fine Sediment Transport

As previously discussed, millions of cubic yards of fine-grained sediment (silt and clay) are expected to be evacuated from Lake Pillsbury reservoir during several days of high flows immediately following removal of Scott Dam (Stillwater Sciences 2021a). The Stillwater Sciences (2021a) TPCM erosion and suspended sediment concentration analysis assumed finer particles such as silt and clay are treated as wash load that would be transported downstream without re-deposition once entrained by the flow (Cui et al. 2006). How much of the fine-grained sediment would be transported in suspension through this reach is uncertain. The vast majority is expected to be transported through the reach, but because of the large volumes, a still-significant volume may deposit and alter channel or floodplain morphology—at least temporarily until subsequent high-flow events can resuspend it and transport it farther downstream. As previously noted, on the Elwha River, the observed silt and clay deposition within the interstitial spaces of coarser substrate and on the channel margins and floodplain were somewhat contrary to the assumption that silt and clay would entirely bypass the river system (Draut and Ritchie 2015).

Sand Transport

The more significant geomorphic change to the Eel River downstream of Scott Dam would be related to transport and deposition of Lake Pillsbury reservoir eroded sand through the reach. The DREAM-1 modeling, which assumed Cape Horn Dam and Van Arsdale Reservoir impounded sediment would still be in place, predicted sand deposition in the reach from Scott Dam to Cape Horn Dam could initially be several feet thick and concentrated in Van Arsdale Reservoir, primarily between Cape Horn Dam (RM 156.8) to about 3 mi. upstream to RM 160. The modeling showed that sand deposition under the wet year scenario reached a maximum thickness of nearly 11 ft. at RM 158 in Van Arsdale Reservoir (at Pioneer Bridge), just upstream of Cape Horn Dam, but only persisting for the first few days after dam removal (see Figure C-16 in Stillwater Sciences 2021b). At 400 days after dam removal, the thickness increased again at RM 158 to about 4 ft. and by 800 days it reduced to about 0.4 ft.

The sand deposition was more pronounced for the dry year scenario, with a maximum thickness of 13 to 19 ft. between RM 158 and RM 162. The sediment deposit would persist for about 300 days before subsequent storm events could remobilize it and transport it farther downstream (see Figure C-48 in Stillwater Sciences 2021b). For both the wet and dry year scenarios, it is likely the maximum thickness of the deposited sediment would be substantially less if Cape Horn Dam was not in place since the channel slope through the reach would be steeper and capable of

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transporting a higher volume of sand. The deposits were predicted to be remobilized and transported farther downstream after subsequent flow events and to vanish from the reach after an approximate 5-year event (see Figure C-48 in Stillwater Sciences 2021b).

The sand deposition would temporarily adversely affect channel morphology. It would likely lead to partial or complete filling of pools and burial of coarse channel substrate that would diminish aquatic habitat. The elevated sediment deposition would be temporary as subsequent flood events through restored, unimpaired Eel River hydrology following the dam removals would remobilize most of the deposited sand and flush accumulated sediment from pools and coarse channel substrate. Stillwater Sciences (2021b) also commented that if a gravel transport model were developed, the predicted combined sediment deposition would not simply be the sum of simulated sand deposition and simulated gravel deposition. Rather, the total combined gravel and sand deposition would likely be only slightly higher than the modeled sand deposition since the deposition of gravel would largely displace rather than add to the deposited sand.

Infrastructure Effects

The sediment deposition has the potential to impact infrastructure located downstream of Scott Dam. The two bridges in the reach from Scott Dam to Cape Horn Dam that would experience predicted increases in bed elevation based on the DREAM-1 sand deposition modeling following Scott Dam removal are Soda Creek Bridge and Pioneer Bridge (see Table 2.2.4.8-2). The bridge deck low chord elevations are from Table 5, and the Eel River channel thalweg elevations at the bridges are interpolated from Figure 5 in the Stillwater Sciences (2021c) report. The maximum sediment deposition thickness is listed for the bridges as well as comments on the range of sediment thickness over the duration it is predicted to persist for the dry year scenario. The approximate distance from the Eel River channel bed thalweg to the bridge low chord elevation is 34 ft. at both bridges. The maximum sand deposit thickness is 4 ft. at Soda Creek Bridge and 13 ft. at Pioneer Bridge. The predicted 13 ft. of deposition at Pioneer Bridge is likely an overestimate since the Proposed Action states both Scott Dam and Cape Horn Dam would be removed during the same construction season, and thus the backwater effect created by Cape Horn Dam and Van Arsdale Reservoir would be less than assumed in the DREAM-1 modeling. Sand deposition would be predicted to temporarily reduce conveyance capacity at the Eel River bridges, but the top elevations of the deposited sand are predicted to be well below the bridge decks (Table 2.2.4.8-2).

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Table 2.2.4.8-2. Modeled sand deposition at Eel River bridges.

Bridge	River Mile	Bridge Low Chord Elevation[a] (NAVD88 ft.)	Eel River Thalweg Elevation[b] (ft.)	Maximum Sand Deposit Thickness[c] (ft.)	Range and Duration of Sand Deposition (ft.)
Soda Creek Bridge	167.5	1,734	1,700	4	2 to 4 ft. of deposition for ~300 days
Pioneer Bridge	157.9	1,529	1,495	13	6 to 13 ft. of deposition for ~325 days followed by 2 ft. for 700 days
Hearst-Willits Road Bridge	144.8	1,328	1,300	4	Duration not reported
Eight Mile Bridge	126.2	1,040	1,010	0.5	Duration not reported

a From Table 5 in Stillwater Sciences (2001c).
b Interpolated from Figure 5 in Stillwater Sciences (2001c).
c Interpolated from Stillwater Sciences (2021b) DREAM-1 sand transport model for the 15-ft.-diameter tunnel, dry hydrology scenario T15(D), Figures C-48 and C-50.

Stillwater Sciences (2021c) investigated the potential impact of sedimentation on flood levels by developing a one-dimensional Hydrologic Engineering Center River Analysis System (HEC-RAS) model for the 49-mi. reach of the Eel River between Scott Dam (RM 168.5) and the Middle Fork Eel River confluence (RM 119.4). This reach includes four bridge crossings, and the model assumed Cape Horn Dam was still in place.

The channel bottom elevations were increased by 14 ft. for the cross-sections within the reach where sediment deposition was predicted to be the highest, between Cape Horn Dam (RM 156.8) and RM 160, to represent the modeled sediment deposition from the DREAM-1 model.[1] The 2-year event for the post-Scott Dam removal unimpaired hydrologic condition was selected for analysis with the adjusted elevations since this event does not have sufficient capacity to erode and transport downstream the entire 14 ft. of accumulated sediment (i.e., the sediment deposit would persist through the flood and reduce flow conveyance capacity) (Stillwater Sciences 2021c). The results show the water surface elevation profile for the 2-year event would be lower than the existing 100-year flood water surface elevations and lower than the Pioneer Bridge (see Figure 7 in Stillwater Sciences 2021c). With the adjusted bed elevations, the distance from the 2-year event water surface elevation to the bridge low chord is 14 ft. at Soda Creek Bridge and 9 ft. at Pioneer Bridge.

A similar scenario with 14 ft. of bed sediment accumulation was not modeled for the unimpaired 100-year flood since it is likely that the accumulated sediment would be flushed out prior to the peak of the 100-year event (Stillwater Sciences 2021c). They also state that the probability of a

[1] The 14 ft. of deposition is based on a Scott Dam vertical notching alternative that is no longer being considered as the Proposed Action is a 15-ft.-diameter tunnel.

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100-year event occurring over the duration for which the accumulated sediment is predicted to persist would be low. Furthermore, the modeling indicated that most of the accumulated sediment would be flushed out of the reach by a relatively frequent peak flow event such as the 5-year flood event, which would restore flow conveyance prior to a higher magnitude peak flow event flowing through the reach (Stillwater Sciences 2021c).

The 2-year event scenario modeled by Stillwater Sciences (2021c) for a vertical dam notching alternative does not exactly represent the conditions for the Proposed Action's approach of a 15-ft.-diameter tunnel in Scott Dam. As previously described, the thickness of sediment deposition following removal of Scott Dam with the 15-ft.-diameter tunnel approach during a dry year scenario is predicted to be greatest in the reach between Cape Horn Dam (RM 156.8) and 5 mi. upstream to RM 162, which includes Pioneer Bridge (RM 158). The sand deposition would be more pronounced for the dry year scenario, with a maximum thickness of 13 to 19 ft. between RM 158 and RM 162. The sediment deposit would persist for about 300 days before subsequent storm events remobilize it and transport it farther downstream. Even with the differences in sediment deposit characteristics, the conclusions are similar to those stated by Stillwater Sciences (2021c):

1. Deposition of sand in the Eel River downstream of Scott Dam would decrease conveyance capacity at the existing bridges until the accumulated sediment is transported downstream. Accounting for the predicted sediment deposition, at the 2-year event there would be approximately 9 ft. of freeboard remaining between the flood's water surface elevation and the low chords of the Soda Creek and Pioneer bridges.
2. The reduced flood conveyance is not likely to apply to higher magnitude, less frequent, flood events as the 5-year flood event is predicted to mobilize the majority of the accumulated sediment out of the reach, and all of the sediment would likely be flushed out during a 100-year event.

Even though the modeling suggests sedimentation would not be problematic for bridge infrastructure or increasing flood risk, given the inherent uncertainty in hydraulic and sediment transport modeling, it is feasible that sedimentation could create an adverse effect. Sediment deposition also has the potential to adversely impact other infrastructure along the river, such as water intakes or diversions, whereby they become buried or plugged and become inoperable or require ongoing management. To address and reduce the potential impacts to infrastructure, PG&E would develop and implement the Sediment/Channel Monitoring and Response Plan. The plan would include measures for monitoring potential sediment deposition and reductions in flow conveyance at the bridge locations that may occur during drawdown and notching of the dam. One objective of the proposed Sediment/Channel Monitoring and Response Plan is to identify diversions that could be affected by the Proposed Action and address potential sediment issues at these water intakes. PG&E would also develop and implement the Flood Monitoring Plan, which will establish monitoring of water levels and flood risks, define measures to protect downstream infrastructure and surrounding areas, and define a process for addressing any potential issues. With implementation of these measures, potential effects to infrastructure from sand deposition during construction are considered negligible.

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Gravel Transport

The supply of gravel size and coarser sediment to this reach would increase when Scott Dam is removed and the Eel River and its tributaries downcut and laterally migrate into and erode sediment impounded by Lake Pillsbury reservoir. Based on a qualitative assessment, Stillwater Sciences (2021b) predicted that following Scott Dam removal, most of the deposition of the eroded gravel would be expected to occur within the eroded channel formed within Lake Pillsbury reservoir's fine-grained deposits and unlikely to extend much farther than the low-gradient channel reach within the first 2 mi. downstream of Scott Dam (Stillwater Sciences 2021b).

The analysis cited the removal of Marmot Dam on the Sandy River, Oregon, in which deposition of nearly all the gravel occurred within 1 mi. of the dam (Stillwater Sciences 2021b). On the Elwha River dam removals, however, appreciable amounts of coarse substrate were transported over 13 mi. from the dam into the coastal zone (Warrick et al. 2015). The 0.7 to 0.8 percent channel slope in the middle reach between the two Elwha River dams was higher than the typical slope of the Eel River, which is 0.3 percent or less. Eroded sand from the Lake Pillsbury reservoir deposit is predicted to be transported farther downstream than gravel (Stillwater Sciences 2021b). The DREAM-1 modeling also assumes Cape Horn Dam is still in place.

Given the inherent uncertainties in modeling sediment transport in response to dam removal and the diverse geomorphic responses observed in previous dam removal projects, the timeframe over which sediment supply would remain elevated and how far downstream the effects would extend are not definitively known. Stillwater Sciences et al. (2021b) estimated that most of the erosion and generation of coarse sediment supply from Lake Pillsbury reservoir would occur within the first 2 to 5 years, until the channels reach their pre-dam elevations and erosion rates stabilize, though the timeframe is an estimate since the gravel content within the volume of erodible sediment in Lake Pillsbury reservoir is unknown, and the nature of subsequent flood events available to erode and transport sediment following dam removal cannot be predicted.

For the first several years, the increase in the combined coarse sand and gravel supply to the Eel River downstream of Scott Dam would be greater than it was during the many decades the dam trapped the coarse sediment supply and greater than it was before the dam was built. It is probable that aggradation would occur within portions of the reach. Long-term aggradation may occur that raises the bed elevation profile, though, as indicated by the DREAM-1 modeling, much of the sand sediment initially deposited would likely be remobilized in subsequent floods and transported farther downstream. A beneficial effect of removing Scott Dam is the currently over-coarsened sediment gradation in the reach would become less coarse with the renewed sand and gravel supply. New bars may form that promote natural fluvial processes, such as increased bank erosion, lateral channel movement, and uprooting of dense riparian vegetation.

The nature of the changes would vary depending on the valley width and slope of a given sub-reach. Relatively wide and low-gradient reaches would experience more sediment deposition than narrower and steeper reaches. The amount of aggradation would be expected to decrease overall in a downstream direction as the distance from the sediment source increases and additional flow inputs from tributaries within the reach would provide additional ability to transport the sediment farther downstream (Stillwater Sciences et al. 2021b).

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Van Arsdale Reservoir and Cape Horn Dam Area Sediment Erosion

Approximately 40,000 to 50,000 cy of sediment would be excavated to provide access for the creation of the control section in the dam and to construct the new pump station and conveyance pipe. The remainder, however, would be flushed down the river by high flows once the cofferdams have been removed. After construction activities related to dam removal through November of the first year have been completed and the construction cofferdams have been removed, the remaining impounded sediment in Van Arsdale Reservoir would be allowed to be transported downstream by fluvial processes during subsequent high-flow events.

If 1.7 million cy of sediment has been trapped behind Cape Horn Dam (McMillen Jacobs Associates 2021) and 40,000 to 50,000 cy of sediment are mechanically excavated as part of dam removal activities, then approximately 1.65 million cy of sediment would need to be eroded by fluvial processes to attain pre-dam elevations.

Several factors indicate the process of sediment erosion from Van Arsdale Reservoir would be different from Lake Pillsbury reservoir. Van Arsdale Reservoir has no visible fine sediments, but rather a stream channel bed composed of gravel, cobble, and boulders (Geosyntec 2000). The volume and depth of impounded sediment is far lower than in Lake Pillsbury reservoir. Additionally, the valley width is much narrower than in Lake Pillsbury reservoir, which would limit or preclude the channel from extensively migrating into and eroding lateral deposits as it downcuts to the pre-dam elevations. The process of a rapid rate of channel incision into fine-grained deposited sediments described for Lake Pillsbury reservoir is unlikely to occur to the same extent in Van Arsdale Reservoir. There may be small amounts of fine sediment trapped within the coarse sediment deposit that would be suspended into the flow as the coarse sediment is eroded. There would be a small increase in suspended load resulting from this.

Eel River Downstream of Cape Horn Dam

The effects described downstream of Cape Horn Dam are largely based on sediment transport modeling performed by Stillwater Sciences for removal of Scott Dam. The modeling did not include removal of Cape Horn Dam. Some factors suggest that the predicted sediment transport and channel response described in the following sections would not be appreciably different if removal of Cape Horn Dam was also included in the analysis:

- Cape Horn Dam only has an estimated erodible sediment volume of 1.65 million cy of sediment, compared to 12 million cy of erodible sediment stored in Lake Pillsbury reservoir behind Scott Dam.
- The Van Arsdale Reservoir impounded sediment is predominantly sand and gravel based on one composite sample collected (Geosyntec 2000), and most of the reservoir was noted to have no visible fine sediments, but rather a stream bed composed of gravel, cobble, and boulders (Geosyntec 2000). Therefore, the sediment eroded from the reservoir would likely increase sand and gravel supply and create relatively lower additional silt and clay supply.

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- The sediment supply in the Eel River downstream of Cape Horn Dam has not decreased to the same extent as the reach downstream of Scott Dam since it is hypothesized (Stillwater Sciences et al. 2021b) that most sediment supplied to the Eel River by Soda Creek and other smaller tributaries is transported through Van Arsdale Reservoir and over Cape Horn Dam based on the presence of active bars on the reservoir's inside bend and concrete abrasion on the east side of the dam.

Based on the Proposed Action, both Cape Horn Dam and Scott Dam would be lowered during the same construction season, and the bulk of the impounded sediment erosion would occur during the same high-flow events following dam removal. While this would create the potential for higher temporary increases in total sediment concentrations, the overall environmental effect may be lower than if the dams were removed in separate years since the duration of elevated sediment concentrations would be lower.

Fine-Grained Sediment Transport

As previously discussed, Stillwater Sciences (2021a) stated finer particles such as silt and clay would be transported as wash load downstream without re-deposition once entrained by the flow (Cui et al. 2006). However, the same caveats previously described apply to this reach as well.

The extent of fine-grained sediment deposition would be reduced downstream of Cape Horn Dam since flow inputs from major tributaries downstream of Cape Horn Dam, including Tomki Creek (4 mi. downstream, 64 mi.^{2} drainage area) and Outlet Creek (26 mi. farther downstream, 162 mi.^{2} drainage area), would diminish the effect of the elevated fine-grained sediment load. It is likely some of the suspended sediment delivered to the reach may deposit and alter channel or floodplain morphology, at least temporarily, until subsequent high-flow events can resuspend it and transport it farther downstream. The major input of flow and sediment from the Middle Fork Eel River (located 55 mi. downstream of Cape Horn Dam) would appreciably dilute the contribution of fine-grained sediment, and it may be difficult to detect a change from the existing condition once the spike in turbidity subsides in the days immediately following the dam removals.

Sand Transport

Downstream of Cape Horn Dam, the DREAM-1 sand transport model showed the thickness of the sand deposits would vary based on distance from Scott Dam and channel morphology. Some locations (e.g., pools) would experience high deposition while other reaches (e.g., riffles) would have little to no deposition (Stillwater Sciences 2021b). The model predicted a maximum sand deposit thickness of 3 ft. at RM 155 just downstream of Cape Horn Dam (RM 156.8) for a wet year scenario (see Figure C-18 in Stillwater Sciences 2021b) and 4 ft. for a dry year scenario (see Figure C-18 in Stillwater Sciences 2021b). The sand deposit thickness was 3.5 to 4 ft. thick as far downstream as RM 146, between the Salt Creek and Thomas Creek confluences. The maximum sand deposit thickness generally decreased to about 1.75 ft. at RM 129, with no modeled sand deposition downstream of RM 126 at the confluence with Outlet Creek and extending to the downstream end of the analysis at the Middle Fork Eel River confluence (see Figure C-18 in Stillwater Sciences 2021b). In the reach between Cape Horn Dam and the Middle Fork Eel River, prominent sand deposition at a given location was predicted to last for a few days to several weeks,

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depending on wet or dry conditions and the sequence of storm events, before being mobilized and transported farther downstream (Stillwater Sciences 2021b).

It is expected that sand deposition would temporarily adversely affect channel morphology. It would likely lead to partial or complete filling of pools and burial of coarse channel substrate that would diminish aquatic habitat. The elevated sediment deposition would be temporary as subsequent flood events through restored, unimpaired Eel River hydrology following the dam removals would remobilize most of the deposited sand and flush accumulated sediment from pools and coarse channel substrate.

Infrastructure Effects

The sediment deposition has the potential to impact infrastructure located downstream of Cape Horn Dam. The two bridges in the reach from Cape Horn Dam to the Middle Fork Eel River confluence that are predicted to experience increases in bed elevation from the DREAM-1 sand deposition modeling following Scott Dam removal are listed in Table 2.2.4.8-2. Details of the methods used to analyze the potential for sand impacts at the bridges are previously described for the reach from Scott Dam to Cape Horn Dam. Two bridges, Hearst-Willits Road Bridge and Eight Mile Bridge, are included in the reach downstream of Cape Horn Dam. The approximate distance from the Eel River channel bed thalweg to the low chord elevation at these bridges is approximately 30 ft. The maximum sand deposit thickness is 4 ft. at Hearst-Willits Road Bridge and 0.5 ft. at Eight Mile Bridge. Sand deposition is predicted to temporarily reduce conveyance capacity at the Eel River bridges, but the top elevations of the deposited sand are predicted to be well below the bridge decks (Table 2.2.4.8-2).

The same conclusions previously presented for the reach from Scott Dam to Cape Horn Dam apply to this reach:

1. Deposition of sand in the Eel River downstream of Cape Horn Dam would decrease conveyance capacity at the existing bridges until the accumulated sediment is transported downstream. Accounting for the predicted sediment deposition, at the 2-year event there would be ample freeboard remaining between the flood's water surface elevation and the low chords of the bridges.
2. The reduced flood conveyance is not likely to apply to higher magnitude, less frequent flood events as the 5-year flood event is predicted to mobilize the majority of the accumulated sediment out of the reach, and all of the sediment would likely be flushed out during a 100-year event (Stillwater Sciences 2021c).

Even though the modeling suggests sedimentation would not be problematic for bridge infrastructure or increasing flood risk, given the inherent uncertainty in hydraulic and sediment transport modeling, it is feasible that sedimentation could create an adverse effect. Sediment deposition also has the potential to adversely impact other infrastructure along the river, such as water intakes or diversions, whereby they become buried or plugged and become inoperable or require ongoing management. The potential for an adverse effect in the reach downstream of Cape Horn Dam is less than in the reach between Scott Dam and Cape Horn Dam. To address and

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reduce the potential impacts to infrastructure, PG&E would develop and implement the Sediment/Channel Monitoring and Response Plan. The plan would include measures for monitoring potential sediment deposition and reductions in flow conveyance at the bridge locations that may occur during drawdown and notching of the dam. PG&E would also develop and implement the Flood Monitoring Plan, which will establish monitoring of water levels and flood risks, define measures to protect downstream infrastructure and surrounding areas, and define a process for addressing any potential issues. With implementation of these measures, potential effects to infrastructure from sand deposition are considered negligible.

Gravel Transport

The supply of gravel size and coarser sediment to the Eel River downstream of Cape Horn Dam would increase when Cape Horn Dam and Scott Dam are removed. The same uncertainties described for the reach between the two dams, including the total volume of increased coarse sediment and the rate it would be delivered into the reach and routed downstream, also apply to this reach.

A beneficial effect of removing Scott Dam and Cape Horn Dam is the currently over-coarsened sediment gradation in the reach would become less coarse with the renewed combined coarse sand and gravel supply. Long-term aggradation may occur that raises the bed elevation profile, though, as indicated by the DREAM-1 modeling, much of the sediment initially deposited would likely be remobilized in subsequent floods and transported farther downstream. More pronounced sediment bars would form that would promote development of a more sinuous channel. Areas with existing overly dense riparian vegetation due to flow and sediment regulation would be scoured more frequently or buried with sediment deposits, resulting in less dense vegetation. The nature of the changes would vary depending on the valley width and slope of a given sub-reach. Relatively wide and low-gradient reaches would experience more sediment deposition than narrower and steeper reaches.

The previously described flow and coarse sediment contributions from major tributaries downstream of Cape Horn Dam would diminish the effect of the elevated gravel load. It is likely that alterations to the existing channel morphology would become difficult to distinguish downstream of the confluence with the Middle Fork Eel River.

Downstream Restoration Project Effects

Several restoration projects have recently been implemented or are in progress in the lower Eel River (see Section 2.2.3.7, Geomorphology). As discussed above and in Section 2.2.4.3, Water Quality, blasting of the adit and removal of Scott Dam will result in a large flush of sediment in the Eel River below Scott Dam. A very large flush of sediments would travel down the Eel River from Scott Dam and cause high turbidity along the entire Eel River to the ocean. As the highly turbid water travels down the Eel River to the mouth of the Eel River estuary, suspended sediments would be diluted from tributary inflows and some suspended sediment would settle out along the way in the riverbed, including in the estuary. These sediments will be remobilized with subsequent high-flow events, possibly over the course of several years, until they make their way out of the system. PG&E would implement the Estuary Protection Plan, which would include water quality

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monitoring in the estuary prior to, during, and after the dam removals and monitor for potential sedimentation in the estuary that may occur from removal of the dams, as well as define a process for developing additional measures, if needed. In addition, the timing of the removal of the dams would be designed to reduce any related potential impacts to sensitive species. While there will be an initial increase in turbidity and suspended sediment and the potential for deposition within the riverbed and estuary, the change to natural conditions with the removal of the dams, overall, is considered to be a beneficial effect on the Eel River and to downstream restoration projects. With implementation of these measures, potential effects to downstream restoration projects from sediment deposition are considered negligible.

Russian River Watershed

During the rapid removal of Scott Dam, minimum instream flows would continue to be released into the Eel River below Cape Horn Dam when flow is available, and natural flows would be passed when natural flows are less than the minimum flow. Removal of the dams would restore flows in the Eel River and East Branch Russian River to unimpaired natural conditions. No diversions would occur at the Van Arsdale Diversion/Cape Horn Dam. The potential geomorphic effect of a return to unimpaired hydrology in the East Branch Russian River is discussed in the Phase 2b resultant condition section below.

Elevated Suspended Sediment Concentrations

It is estimated that about 12 million cy of the estimated 21 million cy of total impounded sediment within Lake Pillsbury reservoir could potentially be mobilized downstream of Scott Dam following dam removal (Stillwater Sciences et al. 2021a) (also see Section 2.2.4.3, Water Quality).

Opening the large adit tunnel at the base of Scott Dam would initiate draining of the reservoir and rapid incision and erosion of the impounded sediment in Lake Pillsbury reservoir. This action is predicted to erode the majority of the bottom-set sediment deposit primarily composed of silt, clay, and fine sand over the course of several days (Stillwater Sciences 2021a). The modeled suspended sediment concentration is as high as 900,000 mg/L at a discharge of 5,000 cfs (Stillwater Sciences 2021a). This concentration is higher than what has been observed on some other dam removal projects (as reported below) but is not unprecedented. For example, the Condit Dam removal on the White Salmon River in Washington resulted in hyperconcentrated slurries with suspended sediment concentration (C_s with units of mg/L) levels up to 850,000 mg/L (32 percent sediment by volume). Sediment concentrations measured from previous dam removal projects are described below to provide context for the range of concentration magnitudes and durations that could occur on the Eel River.

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Measured Sediment Concentrations from Other Dam Removals

Klamath River

USGS gage #11516530, Klamath River below Iron Gate Reservoir, measures flow discharge (cfs) and C_s[2] continuously at 15-minute intervals (see Figure 2.2.4.8-2). Prior to the dam removals, the C_s of the relatively clear water releases from Iron Gate Dam were typically less than 10 mg/L with a peak of approximately 70 mg/L. The discharge in early January, prior to the dam removal activities, was around 1,000 cfs and the C_s was around 1 mg/L. On January 27, 16 days after the gate at Iron Gate Dam was opened to initiate the sequence of dam removal events, the discharge at the gage reached its peak at 3,500 cfs, and on January 29 the C_s peaked at 7,290 mg/L. By mid-February (about a month after lowering of the reservoirs began), discharge returned to approximately 1,000 cfs and fluctuated between 1,000 cfs and 1,700 cfs until the end of the available gaging record in October 2024. The levels of suspended sediment concentrations did not decrease as quickly as discharge. From the peak of 7,290 mg/L, C_s levels gradually decreased to about 30 mg/L by late May, but then gradually increased again to nearly 5,000 mg/L in late August in response to cofferdam removals on August 28, 2024, at the former Iron Gate and Copco No. 1 dam sites. As of this writing, suspended sediment concentration records are only available through October 7, 2024. It is noted that the C_s levels in the Klamath River upstream of Iron Gate Dam likely greatly exceeded the levels measured downstream of Iron Gate Dam. A slurry flow was likely to have formed downstream of Copco No. 1 Dam after the rapid drawdown of Copco Reservoir and then largely deposited in Iron Gate Reservoir, which had not been fully drawdown yet.

USGS gage #11520500, Klamath River near Seiad Valley, is located about 63 mi. downstream of the Iron Gate gage (drainage area of 4,630 mi.^{2}) and has a drainage area of 6,940 mi.^{2}, which is a 50 percent increase in area compared to Iron Gate gage. For the measurement record prior to the dam removals, sediment concentrations at the Seiad Valley gage fluctuated widely with discharge, reaching typical lows of around 3 mg/L and highs of nearly 9,000 mg/L. Concentrations during low-flow periods were often around 20 mg/L. An increase in C_s levels from the Klamath River dam removals was observed in the Seiad Valley measurements, which had a similar pattern of rapid increase in January 2024 to approximately 4,000 mg/L, which was lower than peak concentrations measured during storm events prior to the dam removals.

[2] Suspended sediment concentration, water, unfiltered, estimated by regression equation, milligrams per liter [from an EXO2 multiparameter instrument]. Sediment concentration data is listed by the USGS as provisional and subject to revision.

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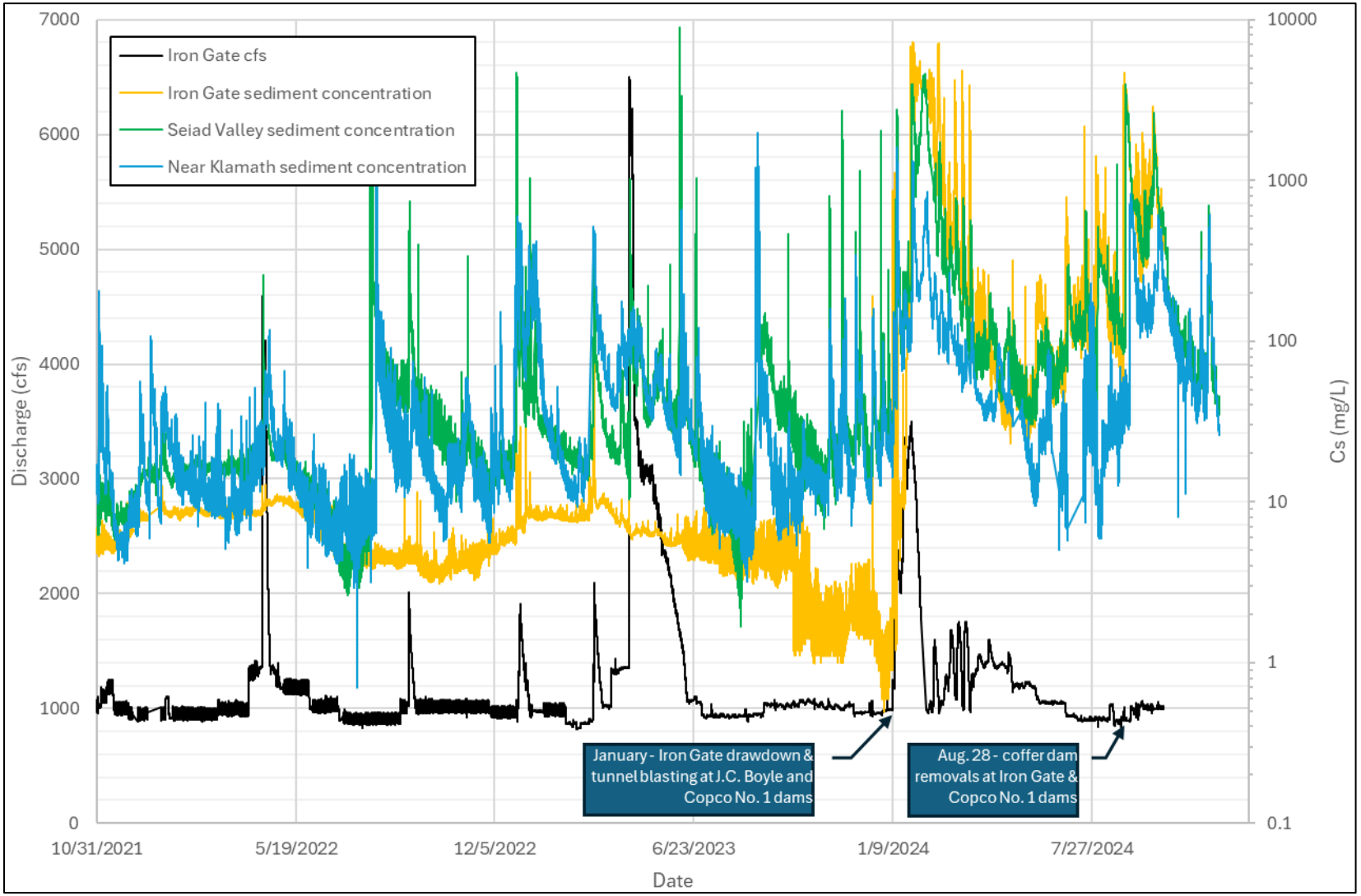


Figure 2.2.4.8-2. Klamath River suspended sediment concentrations and discharge at USGS gages in response to the dam removals.

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The peak was followed by a gradual decrease to 40 mg/L by late May, but then steadily increased again to nearly 4,000 mg/L in late August 2024 in response to cofferdam removals. As of this writing, suspended sediment concentration records are only available through December 2, 2024, at which time the C_s levels were approximately 40 mg/L. This is similar to the typical C_s level of 20 mg/L prior to the dam removals (which are expected to have been unnaturally low due to former sediment impoundment at the upstream dams).

USGS gage #11530500, Klamath River near Klamath, is located about 122 mi. downstream of the Iron Gate gage (6 mi. from the ocean) and has a drainage area of 12,100 mi.^{2}, which is a 161 percent increase in area compared to the Iron Gate gage. For the measurement record prior to the dam removals, sediment concentrations at the Klamath gage fluctuated with discharge, reaching typical lows of around 5 mg/L and highs of 1,600 mg/L. Concentrations during low-flow periods were often around 20 mg/L. Sediment concentration increased to about 1,600 mg/L following the dam removals in January 2024. This level was not higher than levels measured during storm events prior to the dam removals. The C_s levels progressively decreased to about 10 mg/L by July 2024. Similar to measurements at both the Iron Gate and Seiad Valley gages, the C_s levels subsequently steadily increased to 700 mg/L in early September 2024 in response to cofferdam removals. As of this writing, suspended sediment concentration records were only available through December 2, 2024, at which time the C_s levels were approximately 40 mg/L, which is slightly above the typical C_s level of 15 mg/L prior to the dam removals.

Elwha River

The draining of water from Lake Mills at Glines Canyon Dam resulted in increases in C_s levels, typically less than 1,000 mg/L. Appreciable increases in sediment concentrations occurred when the reservoir delta sediment deposits prograded to the dam and began spilling sediment over the spillway. The C_s peaked at over 5,000 mg/L in May 2012 after Elwha Dam began spilling coarse sediment. The sediment concentrations increased markedly after prograding sediment began spilling over Glines Canyon Dam. The average daily concentration exceeded 1,000 mg/L for 214 days and exceeded 5,000 mg/L for 56 days cumulatively (Warrick et al. 2015). At the highest flow of approximately 7,500 cfs, C_s peaked at over 10,000 mg/L (Warrick et al. 2015). The spike in sediment concentrations adversely impacted a water treatment facility in the lower reach and led to a pause in the removal of Glines Canyon Dam to allow the Elwha River to redistribute sediment within the former Lake Mills and along the fluvial channels (East et al. 2015). Within the first 2 years of the dam removals, only approximately 4 percent of the eroded silt and clay sediment deposited in the river and 7 percent in the coastal system, with about 89 percent of the fine-grained sediment being transported far offshore of the delta due to the energetic coastal environment (Warrick et al. 2015).

Condit Dam – White Salmon River

At Condit Dam, the rapid drawdown, combined with the predominantly fine-grained reservoir sediment, resulted in hyperconcentrated slurries with C_s levels up to 850,000 mg/L (32 percent sediment by volume) that lasted about 2 hours (Wilcox et al. 2014). Within 15 weeks after blasting, it is estimated that more than 60 percent of the impounded sediment had eroded. Most of the sediment eroded from the reservoir was transported downstream as suspended load. Wilcox et al.

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(2014) state that hyperconcentrated flows similar to those that occurred at Condit Dam could occur at other dam removals where impounded reservoir sediment is fine-grained, deposits are thick and impoundments deep, and the dam is breached rapidly.

Implications for the Eel River

Although the coastal environment at the mouth of the Eel River is not directly comparable to the Elwha River's, it is expected that most of the Eel River's fine-grained silt and clay sediment would be transported as wash load downstream without re-deposition once entrained by the flow. However, it is likely some of the fine sediment would deposit within the interstitial spaces of coarser substrate and on the channel margins and floodplain, thus altering channel or floodplain morphology, at least temporarily until subsequent high-flow events could resuspend it and transport it farther downstream.

One rationale for the Proposed Action rapid dam removal approach is that it would limit the duration of elevated turbidity and suspended sediment concentrations that would likely be detrimental to aquatic organisms downstream. In other words, the rapid removal approach would likely lead to higher concentrations compared to a staged removal approach (e.g., Elwha River), but the adverse effect would not last as long.

Removing Scott Dam and Cape Horn Dam will have a short-term unavoidable adverse effect on suspended solids and turbidity in the Eel River for a period of several days up to several months for which no mitigation is possible. This effect is likely to extend along the entire length of the Eel River down to the mouth of the Eel River estuary. This action will also have a smaller long-term effect of increased turbidity during high-flow events as the remainder of the sediments are mobilized and carried out to the ocean. PG&E will implement the Water Quality and Water Temperature Monitoring Plan. This plan will include monitoring of water quality, including turbidity, and define appropriate response actions. PG&E would also implement the Sediment/Channel Monitoring and Response Plan. This plan will include measures to monitor channel conditions and define appropriate response actions. In addition, PG&E would implement the Estuary Protection Plan, which will include measures to monitor turbidity in the estuary.

Spill through Notched Scott Dam Spillway

At the completion of Lake Pillsbury reservoir's drawdown in October, the dam crest elevation would be lowered approximately 40 ft. and a large notch (approximately 10–15 ft. deep and 150–200 ft. wide; overall discharge capacity between 15,000 and 40,000 cfs depending on head) would be constructed in the spillway. This capacity would be in addition to the 7,000 cfs capacity of the adit tunnel.

The previous discussion of expected channel sedimentation from coarse sediment transport and deposition modeling (Stillwater Sciences 2021b) includes a wet year scenario simulation that starts January 3, 1995, with unimpaired mean daily discharge of 329 cfs and then a rapid increase to 24,046 cfs for a few days (approximately 10 percent exceedance probability).

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The potential exists for a large storm to deliver high runoff into Lake Pillsbury reservoir that exceeds the 24,046 cfs peak of the sediment model during the removal of Scott Dam, while the dam's crest is lowered and notched. At USGS gage #11470500, Eel River below Scott Dam, which measures impaired flows, for 101 years of records from 1923 through 2023 there have been 11 different years in which the maximum mean annual discharge for the year exceeded 24,046 cfs (up to as high as 45,300 cfs on December 22, 1964). If such an event occurred, the erosion of impounded sediment, and the erosion of and deposition in the Eel River downstream, could be greater than predicted by the sediment modeling.

Phase 2b: Resulting Condition and Restoration

Reestablishment of Sediment Supply

Removal of Scott Dam would restore unimpaired hydrology and increase the contributing drainage area and sediment supply for the Eel River downstream of the dam. For example, at Cape Horn Dam, the existing drainage area contributing coarse sand and gravel would increase from 56 mi.^{2} to 345 mi.^{2} post-removal (Stillwater Sciences 2021b). The sand sediment supply is estimated to increase from 11,830 ton/year to 72,860 ton/year downstream of Scott Dam (Stillwater Sciences 2021b). Stillwater Sciences (2021b) ran the DREAM-1 sand transport model for a 10-year simulation to simulate long-term transport and deposition conditions in the Eel River following Scott Dam removal. Based on the analysis, which assumed removal of Scott Dam but not Cape Horn Dam, the maximum reach-averaged amount of sand predicted to accumulate during periods with low flood flows is an increase from 6 in. with Scott Dam in place to approximately 3 ft. with Scott Dam removed, focused primarily within Van Arsdale Reservoir. The accumulated sand would then be flushed downstream during larger floods (see Figure 25 in Stillwater Sciences 2021b). Minimal sand deposition was predicted between Cape Horn Dam and the Middle Fork Eel River confluence (the predicted maximum was less than 4 in. and should be interpreted as no significant additional sand deposition in this reach) (Stillwater Sciences 2021b).

Stillwater Sciences (2021b) also commented that if a gravel transport model were developed, the predicted combined sediment deposition would not simply be the sum of simulated sand deposition and simulated gravel deposition. Rather, the total combined gravel and sand deposition would likely be only slightly higher than the simulated sand deposition since the deposition of gravel would largely displace rather than add to the deposited sand.

Removal of Cape Horn Dam is not expected to appreciably change the long-term sediment supply since the reservoir currently has a low trap efficiency, with most incoming sediment transported through the impoundment and past Cape Horn Dam (PG&E 2005; Stillwater Sciences et al. 2021a). However, removal of Cape Horn Dam would likely slightly reduce the above reported increase in long-term sand deposition in the reach upstream of the dam since the Eel River channel slope and sediment transport capacity within Van Arsdale Reservoir would increase compared to the assumptions used in the DREAM-1 model with Cape Horn Dam in place.

As described in the following section, implementation of the Proposed Action and reestablishment of sediment supply would have a beneficial effect on the geomorphic processes and form of the Eel River.

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Reestablishment of Geomorphic Processes and Form

As the Eel River and tributaries downcut into the impounded sediment within Lake Pillsbury reservoir and Van Arsdale Reservoir, it could take many years until the resultant channel morphology resembles its pre-dam condition. Ideally, natural fluvial processes would do most of the work to restore channel form, and direct action would be limited. There is the potential that following the adit demolition and dam removal large volumes of sediment remain in the reservoir bed that may adversely affect resultant channel and floodplain morphology, including the potential for instabilities in the channel profile that may affect fish passage or increase channel instability.

If large volumes of sediment remain in the reservoir bed that may adversely affect channel form and fish passage, PG&E would develop measures included in the Restoration Plan, including a process for identifying and implementing measures, perhaps using mechanical means, to maximize sediment erosion over a condensed duration. The Restoration Plan would define a process for identifying and implementing measures to remove the fish passage impediments or barriers and improve hydraulic connectivity. The Restoration Plan would also include measures for identifying and implementing measures to stabilize residual sediments, including seeding or planting to encourage native plant establishment and provide soil cover and erosion protection. PG&E would also develop and implement the Sediment/Channel Monitoring and Response Plan to identify locations where natural fluvial processes are not eroding as much sediment as anticipated and may adversely affect resultant channel and floodplain morphology; locations where there may be ongoing issues with bank instability and channel incision that may adversely affect habitat and fish passage; and locations within Lake Pillsbury reservoir where unvegetated and unstable surfaces are forming that would require stabilization measures.

The anticipated geomorphic response of the Eel River for the different reaches is discussed below.

Lake Pillsbury Reservoir Area

Channel morphologies that evolve in the locations currently buried under Lake Pillsbury reservoir sediment would likely resemble reaches observed upstream and downstream of Lake Pillsbury reservoir, although they would not exhibit characteristics of flow and sediment regulation (e.g., overly coarse substrate, minimal sediment bars, dense riparian vegetation that constricts the channel) observed downstream of Scott Dam and Cape Horn Dam.

The estimated channel slopes of the mainstem Eel River and its primary tributaries that form in the former Lake Pillsbury reservoir are presented below. The channel slopes were estimated from the channel longitudinal profiles created from the 1921/1922 pre-dam bathymetry (Figure 8 in Stillwater Sciences 2021b and profiles in California Trout et al. 2021). The analysis assumes the channel elevations return to similar elevations as those in 1921/1922. Based on general relationships developed for channel reach morphology and slope (Montgomery and Buffington 1997), the channels that return to pre-dam slopes of less than approximately 1.5 percent may exhibit pool and riffle morphology and slopes greater than 1.5 percent may develop into plane-bed channels with relatively coarser substrate.

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Mainstem Eel River Upstream of the Rice Fork

The mainstem Eel River for the first 12,270 ft. upstream of Scott Dam has a 0.27 percent slope. The slope steepens to 0.60 percent for the next 2,150 ft. and then steepens appreciably to 2.08 percent for a relatively short 475-ft.-long reach. For the uppermost 3,100 ft. of the channel profile within Lake Pillsbury reservoir, the channel slope decreases to 0.16 percent.

Rice Fork

From an initial station located 1,400 ft. upstream of Scott Dam, the Rice Fork for the first 1,430 ft. extending upstream has a 0.15 percent channel slope. The slope steepens to 0.44 percent for the next 6,800 ft. and then steepens appreciably to 1.83 percent for the final 1,090 ft. of the profile.

Salmon Creek

From an initial station located 1,600 ft. upstream of Scott Dam, Salmon Creek for the first 1,770 ft. extending upstream has a 0.14 percent channel slope. The slope steepens to 0.70 percent for the final 12,170 ft. of the profile.

Squaw Valley Creek

From an initial station located at the confluence with the mainstem Eel River, Squaw Valley Creek for the first 800 ft. extending upstream has a 0.13 percent channel slope. The slope steepens to 1.19 percent for the next 3,200 ft. and then decreases to 0.72 percent for the final 5,800 ft. of the profile.

Horsepasture Gulch

From an initial station located at the confluence with the mainstem Eel River, Horsepasture Gulch for the first 2,800 ft. extending upstream has a 1.29 percent channel slope. The slope steepens to 3.00 percent for the next 200 ft. of the profile.

Eel River—Scott Dam to Cape Horn Dam

The increased supply of coarse sediment would be accompanied by a return to unimpaired hydrology once Scott Dam is removed. This would increase the magnitude, frequency, and duration of flood events necessary to do geomorphic work and maintain a dynamic channel. For example, it is predicted that the 2-year recurrence interval event would increase by 38 percent, from 7,420 cfs to 10,242 cfs, at Scott Dam (refer to Section 2.2.3.1, Water Use and Hydrology, Table 2.2.3.1-8).

When the sediment load stabilizes in the years following Scott Dam removal, the Eel River morphology in this reach would likely resemble current conditions upstream of Lake Pillsbury reservoir, including a more dynamic channel formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, deeper pools, and less dense riparian vegetation (Stillwater Sciences et al. 2021b).

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Van Arsdale Reservoir and Cape Horn Dam Area

The reach of the Eel River currently buried under sediment impounded by Cape Horn Dam is expected to return to a morphologic condition similar to pre-dam conditions and as described for the upstream reach nearer Scott Dam. An exception would be the short segment of the Eel River that would be converted into the proposed control section with the NERF pump station. The channel elevations would be stabilized in this area to facilitate water diversions to the NERF pump station and to provide fish passage. The structure would be designed to allow sediment transported from upstream to continue unimpeded downstream past the structure.

The river would become a more dynamic channel formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, deeper pools, and less dense riparian vegetation. The length of time required for a return to this condition may be a few to several years and would be largely dependent on the magnitude, frequency, and duration of subsequent flood events.

Eel River Downstream of Cape Horn Dam

As described for the river reach downstream of Scott Dam, when the sediment load stabilizes in the years following Cape Horn Dam removal, the Eel River morphology in this reach would likely include a more dynamic channel formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, deeper pools, and less dense riparian vegetation. Removal of Scott Dam and Cape Horn Dam would increase the magnitude, frequency, and duration of flood events necessary to do geomorphic work and maintain a dynamic channel. For example, it is predicted that the 2-year recurrence interval event would increase by 36.4 percent from 8,962 cfs to 12,221 cfs, at Cape Horn Dam (refer to Section 2.2.3.1, Water Use and Hydrology, Table 2.2.3.1-10).

The change in channel-forming flows, such as the 2-year event, would diminish farther downstream in the Eel River Watershed. For example, at USGS gage #11475000, Eel River at Fort Seward, located downstream of the confluence with the North Fork Eel River, it is predicted that the 2-year recurrence interval event would increase by only 6.3 percent, from 70,567 cfs to 74,988 cfs (refer to Section 2.2.3.1, Water Use and Hydrology, Table 2.2.3.1-12).

Implementation of the Proposed Action would have a beneficial effect on the geomorphic processes and form of the Eel River for the above-described reaches.

Potential Increases in 100-Year Flood Elevations

Pioneer Bridge, roads, and other infrastructure around Van Arsdale Reservoir are outside the estimated 100-year flood inundation extents (Stillwater Sciences 2021c). Currently, Pioneer Bridge's total vertical freeboard measured from the Eel River thalweg is 35 ft. and is 11 ft. at the modeled 100-year flood (Stillwater Sciences 2021c). It is predicted that the 100-year recurrence interval event would increase by 4.8 percent at Scott Dam, from 45,300 cfs to 47,469 cfs, and would increase by 4.3 percent at Cape Horn Dam, from 50,087 cfs to 52,256 cfs (refer to Section 2.2.3.1, Water Use and Hydrology, Table 2.2.3.1-10). A 4.3 percent to 4.8 percent increase in discharge for the 100-year flood would not significantly reduce the available freeboard at the bridges.

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As stated above, the long-term analysis of a 10-year period representative of post-Scott Dam removal conditions showed the maximum reach-averaged amount of sand predicted to accumulate during periods with low flood flows would be an increase from the current 6 in. with Scott Dam in place to approximately 3 ft. with the removal of Scott Dam (Stillwater Sciences 2021b). Since the accumulated sand would be flushed downstream during subsequent larger floods, it is unlikely the additional sand would adversely increase the 100-year flood risk (Stillwater Sciences 2021c). The risk would be even lower with removal of Cape Horn Dam and lowering of Eel River channel elevations after impounded sediment is transported downstream.

An increase in gravel transport rates throughout the system is expected as the natural supply of gravel would no longer be trapped behind Scott Dam. However, the measurable changes to bed elevation due to removal of Scott Dam are expected be primarily in the first 10 mi. downstream of Scott Dam (Stillwater Sciences 2021b). Increases in bed elevations that do occur would likely restore bed elevations to similar conditions prior to degradation from trapping of gravel and cobble in Lake Pillsbury reservoir.

To address and reduce the potential impacts to infrastructure, PG&E would develop and implement the Sediment/Channel Monitoring and Response Plan. The plan would include measures for monitoring potential sediment deposition and reductions in flow conveyance at the bridge locations that may occur during drawdown and notching of the dam. PG&E would also develop and implement the Flood Monitoring Plan, which will establish monitoring of water levels and flood risks, define measures to protect downstream infrastructure and surrounding areas, and define a process for addressing any potential issues. With implementation of these measures, and given the available freeboard at the bridges, potential effects to infrastructure from sand deposition during construction are considered negligible.

Potential Increased Sediment Concentration and Sand and Gravel Transport at the NERF

Clear-water releases from Scott Dam keep sediment concentrations in the reach downstream of the dam relatively low compared to what they would be without impoundment of flow and sediment in Lake Pillsbury reservoir. The reestablishment of sand and gravel supply following Scott Dam removal would increase sediment concentrations and transport of sand and gravel in the reach that includes the NERF. As previously described, removal of Scott Dam and reestablishment of the sediment supply is estimated to increase sand supply from 11,830 ton/year to 72,860 ton/year downstream of Scott Dam (Stillwater Sciences 2021b). The supply of gravel would also be increased. Much of the increased gravel supply is predicted to initially deposit not much farther downstream than the low-gradient channel reach within the first 2 mi. of Scott Dam (Stillwater Sciences 2021b), but in the long-term the increased gravel supply would eventually result in increased gravel transport past the pump station. In addition to increased sediment loads and concentrations, the Eel River would be more dynamic in this reach. Increased sediment bars would form that could shift in location over time, thus shifting the location of the low-flow channel.

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Potential East Branch Russian River Channel Response to Altered Flows

As discussed in Section 2.2.4.2, Water Use and Hydrology, following removal of Scott Dam, natural (unimpaired) hydrology would pass through the Eel River downstream to Cape Horn Dam. Stored water would not be present to maintain the current Reasonable and Prudent Alternative minimum instream flows in the Eel River or the East Branch Russian River when the natural hydrology is not sufficient to meet those requirements, and flow would no longer be diverted to the East Branch Russian River after removal of Scott Dam. This would have the potential to alter geomorphic processes and form in the East Branch Russian River.

Diversion of Eel River flow to the East Branch Russian River has increased flows in the East Branch Russian River compared to what they were under the unimpaired condition. Table 2.2.3.1-17 (Section 2.2.3.1, Water Use and Hydrology) lists unimpaired (no diversions) and impaired (with diversions) flood frequency flows in the East Branch Russian River at USGS gage #11461500 near Calpella, California, for water years 1942 to 2017. The drainage area at the gage is 92.2 mi.^{2}. For comparison, the drainage area of the East Branch Russian River upstream of Lake Mendocino and Cold Creek is approximately 73 mi.^{2}. For the 2-year through 50-year events, the peak flow for the impaired condition would be reduced by 4.8 percent to 8.4 percent for the unimpaired condition. The difference would be more appreciable for the 1-year event, in which the unimpaired flow (74 cfs) is 76.2 percent less than the impaired flow (311 cfs).

The geomorphic and riparian condition along the East Branch Russian River has evolved to the impaired flow condition over the century. Relatively large and infrequently occurring floods, such as the 2-year and higher flow events, are often important for geomorphic processes that maintain channel form, such as flushing sediment from pools, controlling vegetation encroachment into the channel through bed scour and vegetation uprooting or burying with bar sediment deposition, and bank erosion. The reduction in peak flow for the 2-year and higher flow events of about 6 percent would cause a small reduction in these channel-forming processes but would be unlikely to cause pronounced channel narrowing or other geomorphic change to occur. The large reduction in the 1- to 1.5-year flood may result in less frequent mobilization of sediment that could increase the duration for which fines accumulate in pools before being flushed out by a flood. Similarly, new vegetation could start to become more established on bars and channel margins. These potential effects are considered to have a negligible effect; however, since large flood flows would still occur on the East Branch Russian River under the Proposed Action, changes to geomorphic process that do occur would cause the river to adjust in geomorphic form to a condition more similar to its unimpaired, natural condition prior to receiving increased flows from Eel River diversions.

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2.2.4.8.3 Construction and Environmental Measures

Short-term Construction (Phase 1)

To avoid or reduce effects to geomorphic processes and form during construction, PG&E would obtain, prepare, and/or implement the following measures. A complete list of construction and environmental measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Construction BMPs
- SWPPP
- Water Quality and Water Temperature Monitoring Plan
- Sediment/Channel Monitoring and Response Plan
- Construction Erosion Prevention Plan
- Construction Site Water Diversion, Dewatering, and Drawdown Plan
- East Branch Russian River Diversion Plan
- Restoration Plan
- Adherence to measures included in following permits:
  - USACE Section 404 CWA Permit
  - SWRCB Section 401 CWA Water Quality Certification

Post-facility Removal (Phase 2)

To reduce potential effects to geomorphic processes and form post-facility removal (Phase 2), PG&E would continue to implement the same environmental measures described above for Phase 1. In addition, PG&E would prepare and implement the following environmental measures. A complete list of construction and environmental measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Estuary Protection Plan
- Flood Monitoring Plan
- Sediment/Channel Monitoring and Response Plan, which will include the following:
  - Bridges: Monitor sediment deposition to assess for problematic levels of flow conveyance reduction and monitor for potential scour at bridges in the event of a large flow from notching Scott Dam.
  - Water Intakes or Diversions: Monitor any structures that could become inoperable due to potential sediment deposition or scour.
  - Floodplains and Terraces: Monitor potential sedimentation that extends beyond the channel and into higher elevation surfaces with land uses incompatible with sediment deposition.

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- Water Quality and Water Temperature Monitoring Plan
- Restoration Plan

2.2.4.8.4 Unavoidable Adverse Effects

Implementation of the Proposed Action would result in the following unavoidable adverse impacts.

Phase 1: Short-Term Construction

There are no other unavoidable adverse effects to geomorphic processes and form as a result of Project facility modifications to be implemented under the Proposed Action during the construction period.

Phase 2a: Initial Condition and Preliminary Restoration

Unavoidable adverse effects related to water quality, including sediment concentrations and turbidity, are described in Section 2.2.4.3, Water Quality.

Unavoidable adverse effects to geomorphic processes and form include the following:

- Temporary alteration of Eel River channel and/or floodplain morphology from sediment deposition after deconstruction of the dams until subsequent high-flow events can resuspend the sediment and transport it farther downstream;
- Potential short-term adverse effects to bridge infrastructure located downstream of Scott Dam and Cape Horn Dam from sediment deposition; and
- Potential short-term adverse effects to other infrastructure along the river, such as water intakes or diversions being buried or plugged and becoming inoperable or requiring ongoing management due to sediment deposition.

Phase 2b: Resulting Condition and Restoration

There are no long-term unavoidable adverse effects to geomorphology.

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2.2.4.9 Land Use

This section describes the potential effects to land use that could occur because of the Proposed Action described in Pacific Gas and Electric Company's (PG&E's) Application for Surrender of License and Decommissioning Plan for the Potter Valley Hydroelectric Project (Project) (see Section 2.1.2, Applicant's Proposal. Section 2.1.2 includes a description of decommissioning Project facilities and restoration goals to be met as part of the Proposed Action.

Potential effects are separated into construction effects (Phase 1) and post-facility removal effects (Phase 2). The effects are determined by analyzing the changes in land use that may result from activities to be implemented under the Proposed Action compared to the No-Action Alternative (existing condition) (Section 2.1.1).

Final effects determinations consider construction measures and post-facility measures included to avoid or mitigate impacts associated with the Proposed Action (refer to Section 2.1.2.2, Proposed Environmental Measures). Unavoidable adverse effects are discussed at the end of this section.

2.2.4.9.1 Phase 1: Short-term Construction Effects

The following potential short-term effects to land use resulting from Project facility modifications during the construction phase were evaluated:

- Changes in land use from the development of construction work areas and staging areas and removal of recreation facilities and other ancillary facilities;
- Potential fire risk during construction;
- Potential damage to roads as a result of construction activities; and
- Potential effects and requirements for non-hazardous waste disposal.

Potential construction effects would be similar in the Scott Dam and Cape Horn Dam areas and are therefore discussed together. There would be no potential effects from short-term construction activities on the East Branch Russian River watershed, and therefore, it is not discussed further below.

Scott Dam and Cape Horn Dam Areas

Changes in Land Use from the Development of Construction Work Areas and Staging Areas and Removal of Recreation Facilities and Other Ancillary Facilities

The construction area for Scott Dam and Cape Horn Dam removals and associated facilities/features includes all areas necessary for construction, including the construction work area, site access improvements, staging areas, and stockpile areas (see Section 2.1.2.1, Surrender of License, Tables 2-8 and 2-10 for a summary of the decommissioning of Project facilities and features in the Scott Dam and Cape Horn Dam areas). The development of these staging areas would temporarily alter the land use to construction for the duration of construction actions. For the recreation facilities and construction work areas within the FERC Project boundary, PG&E would be subject to the terms and conditions outlined in the existing license for the Project. For

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construction activities outside the FERC Project boundary, if necessary, PG&E would obtain appropriate authorization from the landowner.

Some of the Project recreation facilities (i.e., campgrounds and day-use areas), and ancillary facilities, would be removed, and the sites would be restored. Pogie Point, Sunset Point, Oak Flat, and Navy Camp campgrounds are not proposed to be removed. Construction and removal activities are anticipated to last for approximately 2 years in duration depending on site conditions. After removal and construction actions have been completed, Project recreation facility sites and associated construction work areas, staging areas, and stockpile areas would be restored, as described in the Restoration Plan. The use of these areas for recreation and transportation would cease while the areas are restored to natural conditions.

To reduce potential land use effects from construction and facility removal activities, PG&E would implement best management practices (BMPs), including limiting work, staging, and stockpile areas to minimize disturbance and limiting locations of access and staging to currently developed routes and previously disturbed areas to the extent practical.

PG&E would implement the Construction Recreation Plan that will include public notification measures at Project recreation sites, which would include announcements and postings of the Project construction schedule and closure areas, along with educational signage that informs communities about Project activities.

Impacts to land use from construction work and staging areas, and from removal of recreation facilities and other ancillary facilities, would be negligible with implementation of the Restoration Plan, BMPs, and any other required permit conditions.

Other potential effects from construction activities, such as impacts to traffic, noise, and water quality, are discussed in other sections (see Section 2.2.4.17, Traffic; Section 2.2.4.16, Noise; and Section 2.2.4.3, Water Quality).

Potential Fire Risk during Construction

Construction sites are subject to fire risks from the use of combustible fuels and ignition sources from equipment. A fire that occurs during construction can result in injury to workers; structural damage; destruction of machinery, equipment, or materials; and a delay in Project completion.

To ensure safety and avoid or minimize the risk of fire during construction activities, a Construction Fire Plan would be created, which would outline strategies for fire prevention, detection, and response, ensuring that all personnel are trained and equipped to handle potential fire hazards effectively. This plan would be implemented in addition to PG&E's standard protocols. PG&E actively implements measures to prevent fires on Project lands in accordance with Article 27 from the FERC license and various internal PG&E standards, including EMER-4102S (formerly TD-1464S) – Preventing and Mitigating Fires While Performing PG&E Work. These plans include specific procedures that staff must implement when conducting work to prevent fires based on Fire Potential Index. PG&E keeps basic fire suppression equipment in all company vehicles and at many Project facilities. Fire suppression equipment includes fire

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extinguishers, water mules, and hand tools such as shovels, McLeod tool (rakehoe), and other tools. Motorized equipment and vehicles have spark arrestors, preventing unintended fire ignition due to sparks.

Potential impacts to fire risks from construction are reduced to a negligible level with implementation of the Construction Fire Plan, in addition to PG&E's standard fire prevention and mitigation protocols.

Potential Damage to Roads as a Result of Construction Activities

The use of heavy construction vehicles, including haulers and large trucks, may accelerate the wear of roadways, particularly on unpaved roadways such as Scott Dam Road and Upper Scott Dam Access Road. Wear could include potholes, cracks, and uneven surfaces and could lead to repairs being needed sooner than under the No-Action Alternative. Prior to construction, the construction contractor would prepare a Construction Transportation Management Plan, which may include requirements to harden heavily used parking area surfaces. A Post-construction Road Restoration Plan would be implemented with measures to assess road conditions prior to construction and actions to remediate damage imparted by PG&E's decommissioning construction activities. Prior to construction, PG&E will obtain permits from the California Department of Transportation (Caltrans), county, and USFS, as applicable, and will comply with all measures outlined in the permits.

While the use of heavy construction vehicles could potentially increase the wear of roads and result in road damage, construction measures include requirements to address and remediate such damage. Therefore, road damage resulting from construction vehicle use is considered negligible. PG&E will follow all applicable regulations and laws in the development of the construction plans regarding management of construction debris, and therefore, potential effects resulting from non-hazardous waste disposal are considered negligible.

2.2.4.9.2 Phase 2: Post-facility Removal Effects

The following initial temporary conditions and preliminary restoration (Phase 2a) and resulting physical conditions and restoration (Phase 2b) potential effects to land use resulting from physical changes that may occur following removal of the dams and recreation facilities/ancillary facilities (Phase 2) compared to the No-Action Alternative (existing condition) were evaluated:

- Potential flooding from accumulated sediment;
- Potential damage to bridges and road crossings due to flooding;
- Loss of the Lake Pillsbury reservoir water source for fire suppression;
- Potential changes to land use associated with removal of FERC jurisdictional boundaries;
- Potential changes from termination of the FERC Boundary and jurisdiction;
- Potential effects on W&SR designation;

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- Potential effects on fire suppression in Potter Valley from the loss of water diversions from the Eel River; and
- Potential changes in agricultural practices in the Russian River Watershed from the loss of water diversions from the Eel River.

The relevant potential effects are discussed by region below (Scott Dam Area, Cape Horn Dam Area, Eel River Watershed, and East Branch Russian River Watershed). Where impacts in one region are similar to those in another, the discussion references the previous section to avoid redundancy.

Scott Dam and Cape Horn Dam Areas

Potential Flooding from Accumulated Sediment and Potential Damage to Bridges and Road Crossings Due to Flooding

Dam removals may lead to hydrological and geomorphic changes with potential effects to both the surrounding environment and infrastructure. As described in Section 2.2.4.2, Water Use and Hydrology, and Section 2.2.4.8, Geomorphology, when a dam is removed, sediment that has accumulated in the reservoir over time is released downstream, which is deposited on the riverbed and surrounding areas. This deposition can reduce the capacity of the river and floodways to transport water during periods of high rainfall, which can potentially cause localized flooding in areas that were previously unaffected. These changes can heighten the risk of flooding at downstream structures, such as bridges and road crossings. Flooding effects may include undermining the structural integrity of infrastructures, such as erosion around bridge supports and road foundations, making them more vulnerable to damage.

Deposition of sand in the Eel River downstream of Scott Dam would decrease conveyance capacity of the river at the existing bridges until the accumulated sediment is transported downstream.

Potential adverse effects may occur to infrastructure located downstream of Scott Dam from sediment deposition. Potential adverse effects may also occur to other infrastructure along the river, such as water intakes or diversions being buried or plugged and becoming inoperable or requiring ongoing management from sediment deposition (see Section 2.2.3.1, Water Use and Hydrology).

However, plans would be developed to mitigate such potential effects. The Sediment/Channel Monitoring and Response Plan would monitor sediment deposition to assess for problematic levels of flow conveyance reduction and monitor for potential scour at bridges in the event of a large flow from notching Scott Dam, allowing for timely interventions if necessary. The Restoration Plan would address rehabilitating affected ecosystems and restoring natural habitats to promote resilience against flooding. Additionally, the Flood Monitoring Plan would establish protocols for monitoring water levels and flood risks, enabling proactive measures to protect infrastructure and surrounding areas. Together, these plans would help manage and mitigate potential effects of dam removal effectively (also see Section 2.2.4.8, Geomorphology).

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Potential impacts associated with flooding risks, and potential damages to bridges and road crossings due to flooding, are considered minor with adherence to conditions contained within the Sediment/Channel Monitoring and Response Plan and Flood Monitoring Plan.

Loss of the Lake Pillsbury Reservoir Water Source for Fire Suppression

Lake Pillsbury reservoir has provided a water resource to firefighting operations for state and federal firefighting agencies in recent years. The loss of Lake Pillsbury reservoir could cause a loss of this source of water for fire suppression, particularly for local fire suppression needs, and would increase use of other sources of water, such as Clear Lake, which is about 49 miles from Lake Pillsbury reservoir.

In general, fire prevention and fuels management in the Project vicinity are the responsibility of USFS, the California Department of Forestry and Fire Protection (CAL FIRE), and Lake and Mendocino counties. The MNF will continue wildfire risk reduction projects in the area, including prescribed fire when conditions permit (Moore 2023). CAL FIRE has stated that it uses all available water sources when responding to incidents in the greater Lake County region, including Lake Pillsbury reservoir and Clear Lake (Tyler 2023). Clear Lake is a much larger body of water and offers a more central location for use on incidents throughout the region (Tyler 2023). CAL FIRE recently expanded its aerial firefighting capabilities using the S-70i FIREHAWK helicopter, which allows for larger amounts of water to be drawn from Clear Lake and delivered more quickly to incidents within the region (Tyler 2023).

Therefore, while Lake Pillsbury reservoir water used for fire suppression would be lost, it would be substituted with other sources of water such as Clear Lake or Lake Mendocino, located about 20 miles from Lake Pillsbury reservoir. Large fires located closer to Lake Pillsbury reservoir may involve longer response times due to sourcing water from other locations (such as the river or other, more distant water sources such as Lake Winawa [a much smaller lake] and Lake Sonoma [about 75 miles from Lake Pillsbury reservoir]). The restored Eel River also could potentially be a viable local source of water. Additionally, Lake Pillsbury reservoir currently provides a firebreak. Transitioning from a lacustrine to riverine environment could reduce the effectiveness of the firebreak, as lakes and reservoirs act as natural barriers against fires while rivers may not offer the same protection. Therefore, the loss of the reservoir could weaken the firebreak if surrounding upland vegetation regrows and becomes more fire-prone. Riparian and meadow habitats along the restored Eel River in the former reservoir footprint would also continue to function as effective fuel breaks.

The Proposed Action may have minimal effects to fire suppression on larger fires, as other nearby sources of water are available and are currently being used (e.g., Clear Lake and Lake Mendocino). However, the Proposed Action may result in unavoidable adverse impacts to local fire suppression to properties near Lake Pillsbury reservoir due to the loss of Lake Pillsbury reservoir as a water source. Longer fire response times may occur when sourcing water from other locations (such as the Eel River or other, more distant water sources).

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Changes to Land Use Associated with the Removal of FERC Jurisdictional Boundaries

Land use within the FERC Project boundary is currently primarily hydropower generation and recreation, both of which are managed in accordance with the articles and conditions outlined in the Project license, associated management plans, and several special use authorizations and memoranda of agreement between PG&E and the Mendocino National Forest.

The removal of FERC jurisdictional boundaries means the lands would no longer be under FERC jurisdiction and, as a result, would no longer be subject to the terms and conditions of the FERC license or be used for potential power generation. These areas would be managed by current land use owners which includes PG&E, USFS, and private entities. Potential impacts to changes to land use associated with removal of FERC jurisdictional boundaries are considered negligible.

For PG&E-owned Project lands, all of which are under existing conservation agreements, the removal of FERC jurisdictional boundaries would put those lands fully under the conservation agreement, as their inclusion in the FERC boundary may have entailed some exclusions from the agreements. A conservation easement for 5,660 acres of PG&E-owned land, of which approximately 2,234 acres are within the FERC Project boundary, was recorded on June 28, 2022, to permanently protect beneficial public values.

The removal of FERC jurisdictional boundaries means the lands would no longer be under FERC jurisdiction and thus not be subject to the terms and conditions of the FERC license. Potential impacts to changes to land use associated with the removal of FERC jurisdictional boundaries are considered negligible.

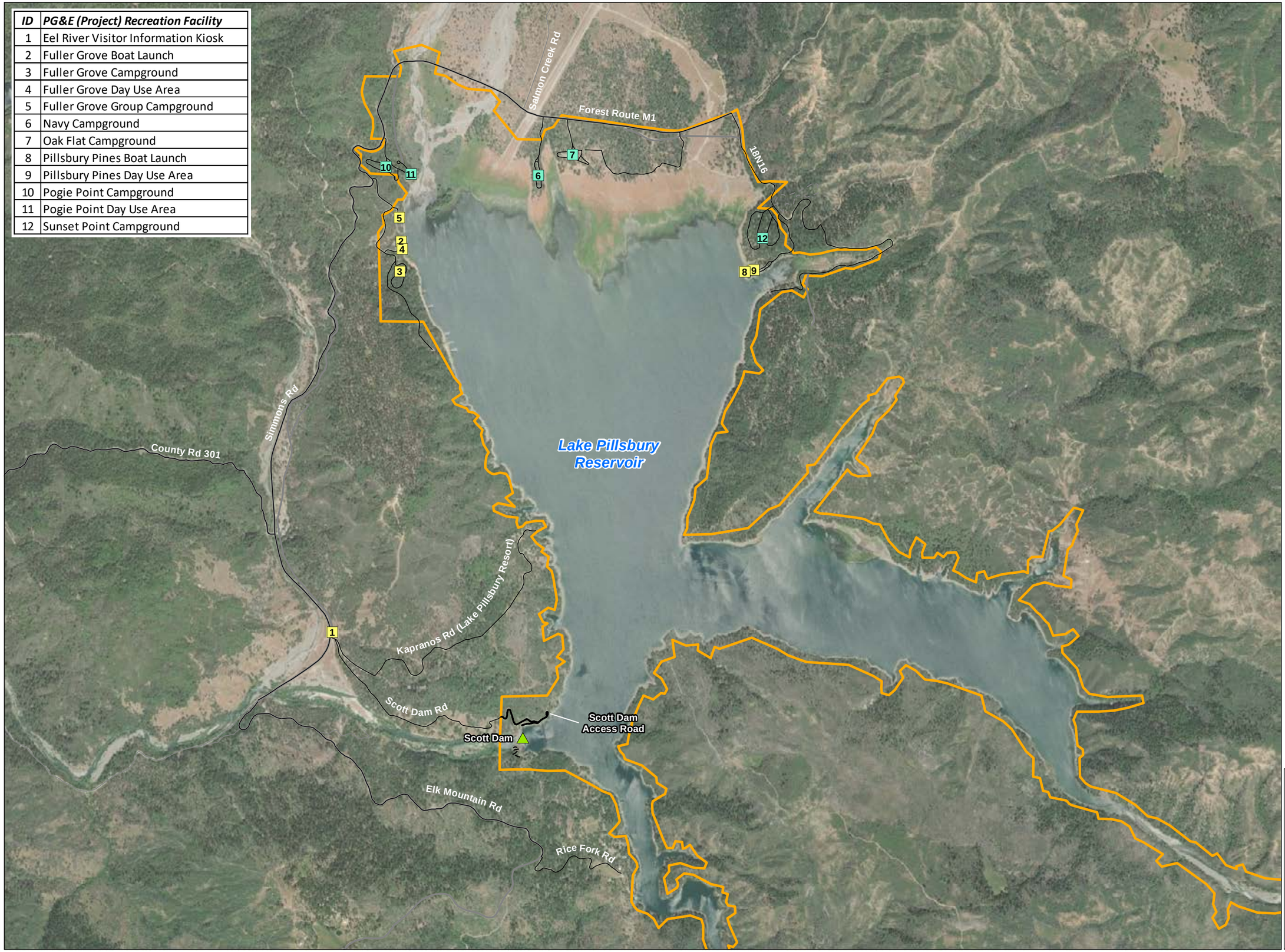
Termination of FERC Boundary and Jurisdiction

Pogie Point, Sunset, Oak Flat, Navy Camp, and Trout Creek campgrounds are not proposed to be removed. Map 2.2.4.9-1 shows the Project recreation facilities in the Scott Dam Area and identifies those that will be left in place or removed and restored.

The removal of FERC jurisdictional boundaries means the facilities would no longer be under FERC jurisdiction and, as a result, would no longer be subject to the terms and conditions of the FERC license. For the facilities that would be kept in place, land use and management activities on private land would be consistent with land management objectives and policies outlined in the county general plans and related county ordinances. The land use and management of the facilities on lands administered by the MNF must be consistent with the goals, direction, and prescriptions contained in the MNF LRMP. Therefore, the overall impact of the removal of Project recreation facilities from FERC jurisdiction is considered negligible.

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ID	PG&E (Project) Recreation Facility
1	Eel River Visitor Information Kiosk
2	Fuller Grove Boat Launch
3	Fuller Grove Campground
4	Fuller Grove Day Use Area
5	Fuller Grove Group Campground
6	Navy Campground
7	Oak Flat Campground
8	Pillsbury Pines Boat Launch
9	Pillsbury Pines Day Use Area
10	Pogie Point Campground
11	Pogie Point Day Use Area
12	Sunset Point Campground



PG&E Project Features

- Dam
- FERC Project Boundary

Other Features

- Access Road
- General Access Road
- Other Road
- Access Trail
- General Access Trail

Decommissioning Plan

Facilities

- Remove and restored
- Left in place

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PG&E Potter Valley Project

Map 2.2.4.9-1

Proposed decommissioning of Project recreation facilities in the Scott Dam area.

0 1,000 2,000 Feet

Projection: UTM Zone 10 N
Datum: NAD 83

Date: 7/17/2025

C:\Users\kgabel\OneDrive - Stantec\gisnt\185706343\map\RecreationMaps\Map 2.2.4.9-1_LakePillsbury_RecDecom_11i17i_10.mxd

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Eel River Watershed

Potential Flooding from Accumulated Sediment and Potential Damage to Bridges and Road Crossings Due to Flooding

Potential flooding effects from accumulated sediment, and potential damage to bridges and road crossings due to flooding in the Eel River Watershed area, are similar to those for the Cape Horn Dam Area but would be further diminished with increasing distance downstream from Cape Horn Dam.

Potential Effects on Wild and Scenic River Designation

The Eel River from 300 ft. downstream of the Cape Horn Dam[1] to the mouth at the Pacific Ocean, and several of its primary tributaries, is protected as part of the National W&SR System. Section 2.2.3.10, Aesthetic Resources, Map 2.2.3.10-1, shows the location of each designated Eel River segment, and Table 2.2.3.10-1 identifies the specific classifications and ORVs that pertain to each designated Eel River segment. The ORV for all the segments on the main stem of the Eel River is Fish. Potential impacts of the initial temporary conditions and preliminary restoration and resulting physical conditions and restoration potential effects to fish resulting from physical changes that may occur following removal of the dams are discussed in Section 2.2.4.4, Fish and Aquatic Resources. Potential effects to other resources, including aesthetics, wildlife, and recreation, are discussed in Sections 2.2.4.11, 2.2.4.6, and 2.2.4.10, respectively. In the long term, removal of the dams will support the free-flowing nature of the river and would benefit fish and aquatic species, and impacts are considered beneficial and would not change the W&SR designation of the Eel River.

East Branch Russian River Watershed

Potential Effects on Fire Suppression from the Loss of Diversions from the Eel River

Under the Proposed Action, removal of the dams and reservoirs on the Eel River and cessation of diversion flows to the East Branch Russian River and return to the natural flow regime could have an adverse effect on water supply for fire suppression. The water diverted from the Eel River and released from the Potter Valley Powerhouse into the East Branch Russian River has been identified as an important water source for fire suppression (City of Cloverdale 2025). Under the Proposed Action, natural (unimpaired) flows in the East Branch Russian River would be considerably less during dry summer months (as low as 1 cfs) compared to existing conditions (see Section 2.2.4.2, Water Use and Hydrology, and Section 2.2.4.4, Fish and Aquatic Resources). A reduction in flows could adversely affect water supply for fire suppression along the East Branch Russian River. However, as described in Section 2.2.5, Cumulative Effects, operation of the NERF would divert water to the East Branch Russian River for use by ERPA. Once completed, operation of the NERF will result in the long-term diversion of water from the Eel River into the East Branch Russian River. If interbasin transfers of water occurred and/or if alternative water strategies can be achieved, this effect would be negligible.

[1] Note that the National W&SR System website refers to Cape Horn Dam as Van Arsdale Dam.

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Potential Changes in Agricultural Practices in the Russian River Watershed from Reduced Water Flows from the Eel River

Post-construction, there would be reduced water flows into the Russian River from the loss of diversion through the Van Arsdale Intake to Potter Valley Powerhouse, which may affect agricultural practices in the Russian River Watershed (also see Section 2.2.4.14, Socioeconomic Resources). Agricultural practices may change as a result, including developing or sourcing alternative water supplies (potentially requiring new infrastructure or additional costs), planting alternative crops, and changes in planting, irrigating, and harvesting techniques. Depending on the magnitude of water reductions, some water-intensive agricultural operations may cease altogether. However, if inter-basin transfers of water occurred (see Section 2.2.5, Cumulative Effects) and/or if alternative water strategies can be achieved, this effect would be negligible.

2.2.4.9.3 Construction and Environmental Measures

To avoid or reduce effects to land use during construction, PG&E would obtain, prepare, and/or implement the following measures. A complete list of construction measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Forest Service Use Permit conditions (for temporary use; for lands not within the FERC Project boundary)
- Restoration Plan
- BMPs
  - Limit work areas to minimize disturbance
  - Limit location of staging and access to developed routes and previously disturbed areas to the extent practical
- Construction Recreation Plan
- Construction Fire Plan
- Construction Transportation Management Plan
- Post-construction Road Restoration Plan
- County and/or Caltrans transportation permit measures
- USFS road permit conditions (if needed)

To reduce potential effects to land use post-facility removal, PG&E would implement the following environmental measures. A complete list of environmental measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Water and sediment measures (see Section 2.2.4.2, Water Use and Hydrology, and Section 2.2.4.8, Geomorphology)
- Restoration Plan

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- Sediment/Channel Monitoring and Response Plan
- Flood Monitoring Plan

2.2.4.9.4 Unavoidable Adverse Effects

The Proposed Action may result in unavoidable adverse effects to local fire suppression to properties near Lake Pillsbury reservoir and the East Branch Russian River due to the replacement of Lake Pillsbury reservoir and diverted flows from the Eel River to the East Branch Russian River with other sources of water, including the Eel River, as a water source, resulting in potentially longer fire response times. If interbasin transfers of water occurred (see Section 2.2.5, Cumulative Effects) and/or if alternative water strategies can be achieved, this effect would be negligible.

2.2.4.9.5 References

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2.2.4.10 Recreation Resources

This section describes the potential effects to recreation resources that could occur because of the Proposed Action described in PG&E's Application for Surrender of License and Conceptual Decommissioning Plan for the Potter Valley Hydroelectric Project, which is described in Section 2.1.2, Applicant's Proposal. Section 2.1.2 includes a description of decommissioning Project facility modifications, including restoration activities, to be implemented under the Proposed Action.

Potential effects are separated into construction effects (Phase 1) and post-facility removal effects (Phase 2). The effects are determined by analyzing the changes in recreation that may result from activities to be implemented under the Proposed Action compared to the No-Action Alternative (existing condition) (Section 2.1.1, Applicant's Proposal).

Final effects determinations consider construction measures and post-facility measures included to avoid or mitigate impacts associated with the Proposed Action (refer to Section 2.1.2.2, Proposed Environmental Measures). Unavoidable adverse effects are discussed at the end of this section.

2.2.4.10.1 Phase 1: Short-term Construction Effects

The following potential effect to recreation resulting from Project facility modifications was evaluated:

- Reduction in recreation opportunities and experience during construction

The relevant potential effects are discussed by region below (Scott Dam Area, Cape Horn Dam Area, Eel River Watershed, and East Branch Russian River Watershed). Where impacts in one region are similar to those in another, the discussion references the previous section to avoid redundancy. The potential effects to recreation related to the removal of the recreation facilities are analyzed in Phase 2.

Potential effects from construction activities, such as impacts to traffic, noise, water quality, and land use, are discussed in other sections (see Section 2.2.4.17, Traffic; Section 2.2.4.16, Noise; Section 2.2.4.3, Water Quality; and Section 2.2.4.9, Land Use). Potential effects that relate to flow rely on the hydrologic modelling information provided in Section 2.2.4.2, Water Use and Hydrology.

Scott Dam Area

Some of the Project recreation facilities (i.e., campgrounds and day-use areas), ancillary facilities, and associated access roads in the Scott Dam Area would be removed, and the sites would be restored, as described in the Proposed Action. Pogie Point, Sunset, Oak Flat, and Navy Camp campgrounds are not proposed to be removed; see Table 2.2.3.9-1 for information on these recreation facilities. The locations of the Project recreation facilities are shown in Figure 2.3.3.9-2.

Table 2-8 provides a summary of decommissioning of Project facilities and features and Project recreation facilities in the Scott Dam Area. Construction activities associated with the removal of the recreation facilities and ancillary features are anticipated to last for approximately two

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construction seasons and would occur at the same time as the dam removal construction activities, depending on site conditions. In addition, there are several recreation facilities in the Scott Dam Area that are owned by entities other than PG&E including a resort and residences with long-term U.S. Forest Service (USFS) leases with boat docks operated under agreements with PG&E (see Table 2.2.3.9-2). During construction at Scott Dam, Lake Pillsbury reservoir would be drawn down to approximately 10,000 acre-feet by October of the initial low-flow season, which would result in the reduction of fishing and other reservoir-based recreation opportunities.

A site-specific engineering design would be developed for PG&E's recreation facilities to be decommissioned that would include the following:

- Detailed description of facility decommissioning
- Agency consultation process to determine underground utilities that would be left in place
- Construction schedule
- Public access and signage requirements during construction
- Agency review and modification, if appropriate, of environmental measures considering site-specific engineering design
- Public notification

The construction area for Project recreation facility removal includes the facility footprint plus an established buffer (see Section 2.1.2, Applicant's Proposal) to encompass the construction work area, staging areas, and stockpile areas.

PG&E will restrict public access in construction areas and close Project recreation facilities, roads, and trails to public access during construction (including Project recreation facilities that will be removed and those recreation facilities that will remain). Day use, camping, hiking, fishing, swimming, off-highway vehicle (OHV) use, and boating in the Scott Dam Area, including at non-Project recreation facilities, would be impacted. Other locations offering similar lake-based recreational opportunities are a 45-minute to 2-hour drive from Lake Pillsbury reservoir and include Clear Lake, Lake Sonoma, and Lake Mendocino, among others.

A Construction Recreation Plan would be developed and implemented that will include public notification measures, such as announcements and postings of the Project construction schedule and closure areas, and educational signage that informs recreationists about Project activities. PG&E will also develop a Public Safety Plan that will include measures to address and reduce potential safety risks to the public during construction. However, unavoidable adverse effects to recreation opportunities would still occur from the drawdown of Lake Pillsbury reservoir and recreational access and use being restricted during construction.

While recreation will be closed in the Project area, use of helicopters, noise from ground-disturbing construction activities, and increased human presence during construction may result in disturbance to game species, affecting wildlife viewing and hunting. However, construction would

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be short term and temporary, and therefore, these effects would be negligible (see Section 2.2.4.6, Wildlife Resources, for additional evaluation of potential effects to wildlife).

Cape Horn Dam Area

As discussed in Section 2.2.3.9, Recreational Resources, recreation opportunities in the Cape Horn Dam Area are limited due to private land ownership and access constraints. The only developed recreation facility in the vicinity of Cape Horn Dam is Trout Creek Campground, which is located on the north side of the Eel River, approximately 3.7 river mi. upstream of Cape Horn Dam. Trout Creek Campground is not proposed to be removed. This facility consists of 13 family campsites, 1 double-occupancy site, and 1 walk-in group site that can accommodate up to 18 people. Trout Creek Campground primarily supports stream-based recreation activities such as swimming, wading, and canoeing. Fishing is not allowed on the Eel River between Cape Horn Dam and Scott Dam (see Section 2.2.3.9, Recreational Resources).

Trout Creek Campground is located approximately 3.7 mi. upstream of Cape Horn Dam. No construction activity will occur in the vicinity of Trout Creek Campground. In addition, the Eel River in the vicinity of Trout Creek Campground will not be dewatered to facilitate construction. The same range of flows that recreation visitors currently experience will be present during construction at Cape Horn Dam. Furthermore, construction activities at Cape Horn Dam will not impede access to Trout Creek Campground. Recreation visitors will continue to be able to use Trout Creek Campground as they do now. Recreationists in the Cape Horn Dam area would be informed through measures in the Construction Recreation Plan. Therefore, construction at Cape Horn Dam will have no effect on recreation use or opportunities on the Eel River compared to existing conditions.

Eel River Watershed

Construction activities at Scott Dam would temporarily affect flows in the Eel River downstream of the dam. Drawdown of the reservoir would result in a release from Scott Dam of up to 400 cfs into the Eel River for a period of 2 to 4 months (see Table 2.2.4.2-1). The potential increase in flow above existing conditions depends on the water year type and associated minimum instream flow requirements (see Section 2.2.4.2, Water Use and Hydrology). Following the drawdown and dam lowering/spillway notching, natural flows would pass over the dam into the Eel River (there would be no storage). During times of low natural flow, this would result in less flow below Scott Dam than under existing conditions, and during times of high natural flow, this would result in more flow below Scott Dam than under existing conditions due to the lack of the ability of Scott Dam to impound water.

Potential effects to water quality and aquatics during Phase 1 are discussed in Section 2.2.4.3, Water Quality, and Section 2.2.4.4, Fish and Aquatic Resources, respectively. The characteristics of aquatic riverine habitat downstream of Scott Dam during Phase 1 are expected to remain largely unchanged.

There may be short-term, temporary effects to recreational fishing opportunities in the Eel River downstream of Cape Horn Dam due to changes in water levels. Recreational boating and other stream-based recreation activities may also be affected by a change in flows and water quality

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during the construction period. PG&E will develop and implement a Construction Recreation Plan that will include measures for public notifications of changes in flow conditions during the Phase 1 construction activities. PG&E will develop and implement a Public Safety Plan that will identify potential public safety risks and measures that will be implemented during construction to minimize risks. With the implementation of these measures during Phase 1 construction activities, potential effects to recreation resources would be considered negligible.

East Branch Russian River Watershed

Although no construction activities will occur in the East Branch Russian River Watershed, Phase 1 activities may alter flows and water quality (see Section 2.2.4.2, Water Use and Hydrology, and Section 2.2.4.3, Water Quality), potentially affecting fish and recreational fishing. Recreation access is limited due to private property, steep banks, and dense vegetation, though some day-use activities—such as angling, swimming and wading—occur at bridge crossings and accessible spots. Recreational boating also takes place and may be impacted by changes in flow and water quality during construction.

To address and reduce potential effects to aquatic resources in the East Branch Russian River during Phase 1, PG&E would develop an East Branch Russian River Diversion Plan that could include pumping to the diversion tunnel, if needed, to provide diversions to the East Branch Russian River during construction. These flows during Phase 1 construction activities may result in water diverted to the East Branch Russian River being warmer than average, similar to a warm, dry year but likely within the range of historical temperatures and, therefore, would not affect aquatic resources. With implementation of the East Branch Russian River Diversion Plan, water would continue to be diverted to the East Branch Russian River during construction, and therefore, potential effects to recreation resources are considered negligible.

2.2.4.10.2 Phase 2: Post-facility Removal Effects

The following initial temporary conditions and preliminary restoration (Phase 2a) and resulting physical conditions and restoration (Phase 2b) potential effects to recreation resulting from physical changes that may occur following removals of the dams and recreation facilities/ancillary facilities (Phase 2) compared to the No-Action Alternative (existing condition) were evaluated:

- Transition of lake-based recreation to riverine recreation opportunities in the Scott Dam Area and Cape Horn Dam Area;
- Potential increase in uncontrolled OHV use in Lake Pillsbury reservoir;
- Permanent loss of some Project recreation facilities in the Scott Dam Area;
- Potential of reduced recreation opportunities in the Eel River due to increased turbidity after dam removal;
- Potential changes in stream-based recreation use and opportunities along the Rice Fork and Eel River;
- Potential impacts to wildlife viewing and hunting;

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- Potential groundwater level effects to recreation facility water supply; and
- Potential changes in stream-based recreation use and opportunities in the East Branch Russian River.

The relevant potential effects are discussed by region below (Scott Dam Area, Cape Horn Dam Area, Eel River Watershed [including the Upper Eel River and Rice Fork], and East Branch Russian River Watershed). Where impacts in one region are similar to those in another, the discussion references the previous section to avoid redundancy.

Scott Dam Area

Transition from Lake-based Recreation to Riverine Recreation Opportunities

The removal of Scott Dam, Project recreation facilities/ancillary facilities, and loss of Lake Pillsbury reservoir under the Proposed Action would eliminate existing opportunities for reservoir-based recreation activities. Specifically, the existing boat ramps will no longer be functional and reservoir boating and fishing will no longer be available. Some recreation facilities will remain (see campgrounds listed above in Section 2.2.4.10.1), and if so would continue to provide some continued camping and day use activities near the restored river. Some recreation facilities in the Scott Dam Area are owned by entities other than PG&E, including Lake Pillsbury Resort, and their future operations plans are unknown at this time. Over time, lake-based recreation opportunities would likely transition to river-based opportunities, including fishing, boating, swimming, day use, picnicking, and walking/hiking.

Under the Proposed Action, PG&E will implement the Restoration Plan. The plan includes goals to reestablish the historical channels and floodplains of the Eel River, Rice Fork, and other historic tributaries in the former reservoir footprint; revegetate the former reservoir and uplands; reestablish fluvio-geomorphic and vegetation processes along the Eel River in the former reservoir; allow for fish passage in the Eel River upstream of the former Scott Dam location; and promote diverse aquatic habitat for fish and aquatic amphibians, reptiles, and invertebrates by allowing access to historical anadromous fish habitat upstream of the former dam and reestablishing fluvio-geomorphic processes. During restoration of the former reservoir, recreation access may be restricted while construction activities associated with the restoration are ongoing and to promote successful revegetation. Through the implementation of the Restoration Plan, restoration of the former reservoir bed of Lake Pillsbury reservoir would convert a large area of formerly lacustrine habitats to a mosaic of upland, wetland, and riparian habitats found along the restored channel of the Eel River and tributary streams and provide improved access for anadromous fish to tributaries upstream of the former Scott Dam. Implementation of the plan would support the river's restoration, which would result in conditions favorable for river-based recreation in the future. However, unavoidable adverse effects are likely to occur due to a loss in reservoir-based recreational opportunities from the removal of Scott Dam, recreation facilities, and other ancillary facilities and the loss of Lake Pillsbury reservoir. These effects can be offset by providing basic access to support river-based recreation opportunities.

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Potential Increase in Uncontrolled OHV Use in Lake Pillsbury Reservoir

The Lake Pillsbury reservoir area has historically served as a base for OHV use and provided opportunities for a variety of vehicle types, including motorcycles, all-terrain vehicles, dune buggies, side-by-sides, and 4x4s. The USFS, in cooperation with the State of California Off-Highway Vehicle Fund, has developed roads, trails, and facilities for OHV use at PG&E's Oak Flat Campground at Lake Pillsbury reservoir. Travel on National Forest System roads in the Lake Pillsbury reservoir area is managed and controlled by the Mendocino National Forest (MNF) pursuant to regulations contained in 36 CFR 212.51. According to MNF, conflicts between OHV use and other recreation users are common throughout the year and frequently require law enforcement efforts (USFS-MNF 1995). The MNF Land and Resource Management Plan contains management direction aimed at reducing conflicts between OHV users and other recreationists (e.g., trail designations and administrative controls).

The Proposed Action, with the removal of Scott Dam and loss of Lake Pillsbury reservoir, could potentially lead to an increase in uncontrolled OHV use in the newly exposed land areas after the dam is removed, including the former reservoir footprint. During restoration, PG&E would implement the Restoration Plan. This plan will include measures to restrict access during active restoration activities as well as while the area is revegetating. With implementation of access restrictions in the Restoration Plan, the potential for increased OHV use would be reduced to negligible.

Permanent Loss of Some Project Recreation Facilities

Former recreation facility sites would be restored to a natural environment with implementation of the Restoration Plan. This plan would focus on rehabilitating affected ecosystems and restoring natural habitats. The loss of recreational facilities to be closed including the campgrounds and day-use areas would result in loss in camping and day use of the area. Some Project recreation facilities will remain (see campgrounds listed above in Section 2.2.4.10.1) and will provide continued camping and day use opportunities in the Scott Dam area.

There would be unavoidable adverse effects to recreation, including camping and day use, resulting from the permanent loss of some Project recreation facilities in this area (the magnitude of this impact would be reduced if some of the facilities are retained).

Potential Impacts to Wildlife Viewing and Hunting

The Proposed Action, with the removal of Scott Dam and loss of Lake Pillsbury reservoir, could potentially lead to impacts on wildlife viewing and hunting in the vicinity of the reservoir. With the transition of the lacustrine to riverine environment, the wildlife habitat and species present may change. For example, the loss of Lake Pillsbury reservoir may lead to potential bald eagle nest territory abandonment. However, restoration of riverine habitats in the former reservoir footprint and enhancement of native anadromous fish within the Eel River Watershed would lead to a long-term beneficial effect to bald eagle foraging habitat. Potential effects of the Project on wildlife resources, including game species, are described in Section 2.2.4.6, Wildlife Resources.

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Potential Groundwater Level Effects to Recreation Facility Water Supply

Under the Proposed Action, the loss of the Lake Pillsbury reservoir and the potential lowering of the water table could adversely affect some wells located at the recreation facilities at the reservoir, including Project recreation facilities that would remain in place (see Section 2.2.4.7, Geology and Soils). There may be a resulting effect of higher pumping costs; the need for newer, stronger pumps; and in worst-case scenarios, the need to drill deeper wells. Therefore, the potential effect on groundwater (and recreational facility wells) due to the dewatering of Lake Pillsbury reservoir is considered a potential unavoidable adverse impact to recreation facility water supply.

Cape Horn Dam Area

As discussed above, there are limited recreation opportunities in the Cape Horn Dam Area, and the one facility, Trout Creek Campground, will remain in place. Therefore, post-facility removal conditions would have no effect on camping opportunities in the Cape Horn Dam Area.

Transition of Lake-based Recreation to Riverine Recreation Opportunities

As discussed above, recreation opportunities in the Cape Horn Dam Area are limited due to private land ownership and access constraints. However, similar to the Scott Dam Area, with the removal of Cape Horn Dam and Van Arsdale Reservoir, the Eel River would return to a free-flowing river in the Cape Horn Dam Area. This would result in a transition from lake-based recreation to riverine-based recreation activities. Potential effects would be similar to those discussed above for Scott Dam, with the exception that the Cape Horn Dam Area has substantially less reservoir-based recreational opportunities and use than the Scott Dam Area.

Eel River Watershed

Potential Effects to Stream-based Recreation Due to Increased Turbidity after Dam Removal (Phase 2a)

Phase 2a includes the initial temporary physical conditions that would occur immediately following dam removal, including the initial release of stored water and sediment following the removal of the adit plug at Scott Dam and the complete removal of Scott Dam and Cape Horn Dam. Poor water quality and sediment deposition would occur after this initial sediment release, which would continue until the system stabilizes and water quality and sediment transport return to natural conditions.

Removal of Scott Dam and Cape Horn Dam would return the flow of the Eel River to a natural state. Section 2.2.4.2, Water Use and Hydrology, provides details about these changes. Following the removal of Scott Dam and Cape Horn Dam, natural (unimpaired) hydrology would pass through the Eel River downstream below Cape Horn Dam. Stored water would not be present to maintain the current Reasonable and Prudent Alternative minimum instream flows in the Eel River when the natural hydrology is not sufficient to meet those requirements. Flow in the Eel River following removal of Scott Dam compared to flow in the existing condition is discussed in Section 2.2.3.1, Water Use and Hydrology and shown on Figure 2.2.3.1-18. A summary of the average monthly flow is shown on Figure 2.2.4.2-1 in Section 2.2.4.2, Water Use and Hydrology.

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The release and transport of accumulated sediment would result in short-term and temporary adverse effects on aquatic species inhabiting the mainstem of the Eel River downstream of Scott Dam during and immediately following the release of sediments from Lake Pillsbury reservoir. Very high suspended sediment concentrations would occur downstream of the dam removal sites for 1 to 8 days depending on the flow rates at the time of removal. High suspended sediment loads may kill or adversely affect the physiology and behavior of fish and other aquatic biota (see Section 2.2.4.4, Fish and Aquatic Resources, for more detailed information). This, in turn, would adversely affect recreational fishing in the short term. With the removal of the dams and return to natural hydrology and physical river processes, in comparison to the No-Action Alternative, the long-term effects on aquatic biota and fishing opportunities are expected to be permanent, significant, and beneficial (discussed further below).

The initially highly turbid water after dam removal may also affect some recreation users in the Eel River below Scott Dam due to reduced aesthetics of the river. PG&E will develop and implement a Construction Recreation Plan that will include measures for public notifications of changes in flow and water quality conditions following the detonation of the adit plug.

Removing Scott Dam and Cape Horn Dam would have a short-term unavoidable adverse effect on turbidity and suspended sediment in the Eel River that would result in the mortality of aquatic biota, which would, in turn, adversely affect fishing in the Eel River. The timing of dam removal will be designed to minimize effects to sensitive species in the Eel River. The Eel River would return to unimpaired/natural flow (Phase 2b) that existed prior to the construction of Scott and Cape Horn dams, which would benefit recreation resources.

Potential Changes in Stream-based Recreation Use along the Eel River Related to Natural, Unimpaired Flows (Phase 2b)

The removal of the dams would allow increased fish passage and access to riverine habitat (including spawning and rearing areas) above the dams that is expected to increase the numbers of naturally produced salmon, steelhead, and Pacific lamprey in the Eel River (see Section 2.2.4.4, Fish and Aquatic Resources). This is expected to improve angling opportunities in the Eel River, resulting in beneficial effects to recreation.

Removal of the dams also has the potential to affect whitewater boating opportunities in the Eel River Watershed, both upstream and downstream of Scott Dam, as discussed below. The location of the runs discussed in this section are depicted on Map 2.2.3.9-3 and detailed information about each run, including boatable flow ranges, level of difficulty, etc., is provided in Table 2.2.3.9-3.

Upper Eel River Run

The Upper Eel River Run is located upstream of Lake Pillsbury reservoir and is approximately 13 mi. long from an informal put-in located at the Horse Creek confluence to Lake Pillsbury reservoir. There is no formal whitewater boating take-out on Lake Pillsbury. According to AWA, after reaching the reservoir, boaters paddle about five mi. to one of the existing developed boat ramps to take out (most likely either Pillsbury Pines Boat Launch, a Project recreation facility, or Pine Point Day Use Area

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and Boat Launch, a non-Project recreation facility). The boatable flow range for this run was identified by American Whitewater (AW) as 600 to 1,500 cfs (American Whitewater 2025).

Removing Scott Dam and Lake Pillsbury reservoir would expose portions of the Eel River that are currently submerged, which would extend the Eel River Run by about 4.8 mi. assuming the newly exposed river is entirely navigable to the current location of Scott Dam. The gradient, number and location of new rapids, and level of difficulty of the extended run and potential take-out locations along the river is unknown.

Project operations do not affect flows in the Upper Eel River. Accordingly, this run is entirely dependent upon natural, unimpaired flows. The unimpaired hydrology (daily mean flow) was used to tabulate the average number of boating days per month boatable flows (600–1,500 cfs) that were available on this run over the period of record[1]. Table 2.2.4.10-1 summarizes the number of boating days per month, by water year type. As shown, boating flows are typically only available on the Upper Eel Run during the winter and early spring. Boatable flows are not available during the summer months. The removal of Scott Dam and Lake Pillsbury reservoir would have no effect on flows in the Upper Eel River or on boating opportunities related to flow.

Table 2.2.4.10-1. Days flows meet criteria (600–1,500 cfs) by water year type – Upper Eel River Run.

Water Year Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Unimpaired													
Critical Dry	2.1	1.8	2.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	**9.9**
Dry	4.3	4.3	1.5	0.6	0.2	0.0	0.0	0.0	0.0	0.1	0.1	2.2	**13.3**
Normal	5.8	4.5	3.3	1.3	0.1	0.0	0.0	0.0	0.0	0.1	0.6	2.0	**17.6**

Rice Fork Run

The Rice Fork Run is located upstream of Lake Pillsbury. This run is approximately 9 mi. long from an informal put-in located on Road M10 near Bear Creek to Lake Pillsbury reservoir. After reaching the reservoir, boaters paddle about two mi. to an informal boat access at the end of Gravelly Valley Road to take out. The boatable flow range for this run was identified by AW as 600 to 1,500 cfs (American Whitewater 2025).

Removing Scott Dam and Lake Pillsbury reservoir would expose portions of the Rice Fork that are currently submerged, which would extend the Rice Fork Run by about 1.1 mi., assuming the newly exposed river is entirely navigable to its confluence with the Eel River. The gradient, number and location of new rapids, level of difficulty of the extended run, and take-out locations are unknown.

[1] The period of record for the whitewater boating analyses discussed throughout this section is 1911 through 2023.

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Project operations do not affect flows on the Rice Fork. Accordingly, this run is entirely dependent upon natural, unimpaired flows. The unimpaired hydrology (daily mean flow) was used to tabulate the average number of boating days per month boatable flows (600–1,500 cfs) that were available on this run over the period of record. Table 2.2.4.10-2 summarizes the number of boating days per month, by water year type. Like the Upper Eel River, boating flows are typically only available during the winter and early spring. Boatable flows are not available during the summer months. The removal of Scott Dam and Lake Pillsbury reservoir would have no effect on flows on the Rice Fork Run or on boating opportunities related to flow.

Table 2.2.4.10-2. Days flows meet criteria (600–1,500 cfs) by water year type – Rice Fork Run.

Water Year Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Unimpaired													
Critical Dry	1.6	1.0	1.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	**6.4**
Dry	3.3	2.6	0.9	0.4	0.2	0.0	0.0	0.0	0.0	0.2	0.0	1.6	**9.1**
Normal	3.8	3.3	2.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.6	**11.9**

Pillsbury Run

The Pillsbury Run is located on the Eel River between Scott Dam and Van Arsdale Reservoir. This run is approximately 5.7 to 8.8 mi. long, depending upon take-out location. The boatable flow range for this run ranges from 200 cfs to 3,000 cfs, depending upon watercraft type (inflatable kayak [IK], hardshell kayak [HK], or raft).

Project operations affect flows in the Eel River below Scott Dam. Accordingly, both impaired and unimpaired hydrology were used to assess the effect of dam removal on this run. For the purposes of this assessment, the entire boatable flow range (200–3,000 cfs) was used to capture all possible boating days, regardless of watercraft type. Table 2.2.4.10-3 summarizes the number of boating days that were available under impaired conditions as compared to the number of boating days that are expected under unimpaired conditions, and the net difference. As shown, the removal of Scott Dam would result in about 57 more boating days during critically dry water years but fewer boating days during dry and normal water years. Overall, when considering all water year types together, on average, more boating days would be created than lost, resulting in an overall benefit to recreation.

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Table 2.2.4.10-3. Days flows meet criteria (200–6,000 cfs) by water year type – Pillsbury Run.

Water Year Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Impaired													
Critical Dry	9.0	9.0	14.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	**44.5**
Dry	25.8	25.8	28.8	25.8	12.2	1.3	0.0	0.0	0.0	0.9	5.6	14.1	**140.1**
Normal	26.4	26.3	29.3	28.6	24.6	5.3	0.0	0.0	0.0	1.0	7.9	18.6	**167.9**
Unimpaired													
Critical Dry	16.7	19.0	24.5	9.3	0.0	0.0	0.0	0.0	0.0	1.0	8.0	23.0	**101.4**
Dry	23.9	24.6	26.1	21.1	7.8	1.4	0.0	0.0	0.0	0.9	4.3	13.2	**123.4**
Normal	25.6	25.7	29.0	27.3	20.7	5.8	0.1	0.0	0.0	0.9	6.4	16.0	**157.5**
Difference (Unimpaired – Impaired)													
Critical Dry	7.7	10.0	10.5	–0.7	0.0	0.0	0.0	0.0	0.0	1.0	8.0	20.5	**56.9**
Dry	–1.9	–1.2	–2.6	–4.6	–4.4	0.1	0.0	0.0	0.0	0.0	–1.2	–0.9	**–16.8**
Normal	–0.8	–0.5	–0.4	–1.3	–3.9	0.5	0.0	0.0	0.0	–0.1	–1.5	–2.5	**–10.4**

Van Arsdale to Hearst Run

The Van Arsdale to Hearst Run is located on the Eel River between Cape Horn Dam and Hearst Bridge over the Eel River and is approximately 11.6 mi. long. The boatable flow range for this run ranges from 500 cfs to 6,000 cfs, depending upon watercraft type (IK, HK, or raft).

Project operations affect flows in the Eel River below Cape Horn Dam. Accordingly, both impaired and unimpaired hydrology were used to assess how the removal of Scott and Cape Horn dams will affect flows on this run. For the purposes of this assessment the entire boatable flow range (500–6,000 cfs) was used to capture all possible boating days, regardless of watercraft type. Table 2.2.4.10-4 summarizes the number of boating days that were available under impaired conditions as compared to the number of boating days that are expected under unimpaired conditions, and the net difference. As shown, the removal of Scott Dam would result in about 13 to 28 more boating days depending upon water year type, resulting in an overall benefit to recreation.

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Table 2.2.4.10-4. Days flows meet criteria (500–6,000 cfs) by water year type – Van Arsdale to Hearst Run.

Water Year Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Impaired													
Critical Dry	8.2	8.0	14.8	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.5	7.0	**42.1**
Dry	17.0	15.8	16.4	7.9	2.5	0.4	0.0	0.0	0.0	0.2	0.6	9.3	**70.1**
Normal	20.6	19.7	23.4	17.7	7.2	0.7	0.0	0.0	0.0	0.2	1.9	7.5	**98.7**
Unimpaired													
Critical Dry	11.2	11.4	18.9	5.7	0.0	0.0	0.0	0.0	0.0	0.5	3.5	19.0	**70.2**
Dry	18.2	16.8	18.0	9.6	3.5	0.6	0.0	0.0	0.0	0.4	1.9	11.3	**80.4**
Normal	21.2	20.6	24.4	19.5	10.0	1.2	0.0	0.0	0.0	0.5	3.9	10.2	**111.4**
Difference (Unimpaired – Impaired)													
Critical Dry	3.1	3.4	4.1	2.0	0.0	0.0	0.0	0.0	0.0	0.5	3.0	12.0	**28.1**
Dry	1.3	1.0	1.6	1.8	1.1	0.1	0.0	0.0	0.0	0.2	1.3	2.0	**10.4**
Normal	0.7	1.0	1.0	1.8	2.9	0.5	0.0	0.0	0.0	0.3	2.0	2.7	**12.8**

Hearst Run

The Hearst Run is located on the Eel River between Hearst Bridge and the bridge at Outlet Creek and is approximately 18.5 mi. long. The boatable flow range for this run ranges from 500 cfs to 8,000 cfs, depending upon watercraft type (HK or raft).

The impaired and unimpaired hydrology were used to assess how the removal of Scott Dam will affect flows on this run. For the purposes of this assessment the entire boatable flow range (500–8,000 cfs) was used to capture all possible boating days, regardless of watercraft type. Table 2.2.4.10-5 summarizes the number of boating days that were available under impaired conditions as compared to the number of boating days that are expected under unimpaired conditions, and the net difference. As shown, the removal of Scott Dam would result in about 7 to 10 more boating days depending upon water year type, resulting in an overall benefit to recreation.

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Table 2.2.4.10-5. Days flows meet criteria (500–8,000 cfs) by water year type – Hearst Run.

Water Year Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Impaired													
Critical Dry	12.7	14.2	20.6	7.3	0.0	0.0	0.0	0.0	0.0	1.5	6.0	20.0	**82.4**
Dry	20.5	20.0	20.3	10.9	3.5	0.7	0.0	0.0	0.0	0.6	2.0	11.7	**90.2**
Normal	23.0	22.0	25.7	20.8	9.6	1.0	0.0	0.0	0.0	0.4	4.1	11.0	**117.6**
Unimpaired													
Critical Dry	14.2	15.8	21.9	7.0	0.0	0.0	0.0	0.0	0.0	1.5	6.5	22.0	**88.9**
Dry	21.3	20.9	21.5	13.5	4.1	0.8	0.0	0.0	0.0	0.7	2.8	12.1	**97.7**
Normal	23.6	22.8	26.3	22.4	12.4	1.8	0.0	0.0	0.0	0.6	5.3	12.7	**127.9**
Difference (Unimpaired – Impaired)													
Critical Dry	1.5	1.6	1.3	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.0	**6.5**
Dry	0.8	0.9	1.3	2.6	0.5	0.1	0.0	0.0	0.0	0.1	0.8	0.4	**7.5**
Normal	0.6	0.7	0.6	1.6	2.9	0.8	0.0	0.0	0.0	0.2	1.2	1.6	**10.2**

Outlet Creek Run

The Outlet Creek Run is located on the Eel River between the Highway 162 bridge over the Eel River and milepost 14.5 on Highway 162, just above the Middle Fork Eel River confluence and is approximately 6 mi. long. The boatable flow range for this run ranges from 300 cfs to 20,000 cfs, depending upon watercraft type (HK or raft).

The impaired and unimpaired hydrology were used to assess how the removal of Scott Dam will affect flows on this run. For the purposes of this assessment the entire boatable flow range (300–20,000 cfs) was used to capture all possible boating days, regardless of watercraft type. Table 2.2.4.10-6 summarizes the number of boating days that were available under impaired conditions as compared to the number of boating days that are expected under unimpaired conditions, and the net difference. The total number of boating days gained during normal water years is almost equivalent to the number of days lost during critically dry and dry water years, meaning the removal of Scott Dam would have no effect on this run. This is likely because this run is so far down stream of Scott Dam that flows from tributaries diminish the overall effect of Project operations on the flows in this section of the Eel River.

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Table 2.2.4.10-6. Days flow meet criteria (300–20,000 cfs) by water year type – Outlet Creek Run.

Water Year Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Impaired													
Critical Dry	24.4	23.8	29.3	10.0	0.0	0.0	0.0	0.0	0.0	2.0	20.5	25.0	**135.0**
Dry	27.5	26.7	30.0	27.9	11.6	1.8	0.0	0.0	0.0	1.4	7.2	17.0	**151.2**
Normal	28.1	27.1	29.9	28.9	24.7	5.3	0.0	0.0	0.0	1.4	10.3	22.3	**178.2**
Unimpaired													
Critical Dry	23.7	23.7	28.8	10.0	0.0	0.0	0.0	0.0	0.0	2.5	20.0	25.0	**133.6**
Dry	27.4	26.7	30.0	27.8	10.6	2.0	0.0	0.0	0.0	1.6	7.1	16.7	**149.9**
Normal	28.1	27.1	29.9	28.9	24.3	8.2	0.2	0.0	0.1	1.5	10.0	21.7	**180.1**
Difference (Unimpaired – Impaired)													
Critical Dry	–0.8	–0.2	–0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	–0.5	0.0	**–1.4**
Dry	–0.1	0.0	0.0	–0.1	–1.0	0.2	0.0	0.0	0.0	0.1	–0.1	–0.3	**–1.3**
Normal	0.0	–0.1	0.0	0.1	–0.4	2.8	0.2	0.0	0.0	0.0	–0.2	–0.5	**1.9**

Eel River below Middle Fork Confluence Run

This run is located on the Eel River between Dos Rios and the bridge crossing near the town of Alerpoint or Fort Seward and is approximately 47 to 53 mi long, depending upon the take-out used. The boatable flow range for this run ranges from 800 cfs to 10,000 cfs, depending upon watercraft type (IK, HK, or raft).

The impaired and unimpaired hydrology were used to assess how the removal of Scott Dam will affect flows on this run. The entire boatable flow range (800–10,000 cfs) was used to capture all possible boating days, regardless of watercraft type. Table 2.2.4.10-7 summarizes the number of boating days that were available under impaired conditions as compared to the number of boating days that are expected under unimpaired conditions, and the net difference. The total number of boating days gained and lost are almost equivalent, with slightly more days lost during critically dry years than gained during dry and normal years. Similar to the Outlet Creek Run, this is likely because this run is so far down stream of Scott Dam that flows from tributaries creeks diminish the overall effect of Project operations on the flows in this section of the Eel River.

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Table 2.2.4.10-7. Days flows meet criteria (800–10,000 cfs) by water year type – Eel River below Middle Fork Confluence.

Water Year Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Impaired													
Critical Dry	18.0	19.4	24.4	9.7	0.0	0.0	0.0	0.0	0.0	2.0	19.5	22.0	**115.0**
Dry	20.1	20.1	25.8	26.3	12.1	2.2	0.0	0.0	0.0	1.2	4.7	11.0	**123.5**
Normal	19.3	20.3	24.5	26.3	24.9	7.5	0.2	0.0	0.1	1.2	7.7	16.4	**148.6**
Unimpaired													
Critical Dry	17.8	19.0	24.3	9.7	0.0	0.0	0.0	0.0	0.0	2.0	20.0	20.0	**112.7**
Dry	20.2	20.1	26.1	26.1	12.0	2.4	0.0	0.0	0.0	1.2	4.7	10.8	**123.6**
Normal	19.3	20.3	24.5	26.2	24.7	8.5	0.3	0.0	0.1	1.2	7.7	16.2	**149.1**
Difference (Unimpaired – Impaired)													
Critical Dry	–0.3	–0.4	–0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	–2.0	**–2.3**
Dry	0.0	0.0	0.3	–0.1	–0.1	0.2	0.0	0.0	0.0	0.0	0.0	–0.2	**0.1**
Normal	0.0	0.0	0.0	–0.1	–0.2	1.0	0.1	0.0	0.0	0.0	0.0	–0.2	**0.5**

East Branch Russian River Watershed

Change in Angling, Swimming, and Recreation Watercraft Opportunities in the East Branch Russian River

Altered hydrology in the Eel River would change flows in the East Branch Russian River and would have an adverse effect on existing aquatic habitat and some river-based recreation activities. Under the Proposed Action, there would be no diversions from the Eel River to the East Branch Russian River and East Branch Russian River flows would return to natural (unimpaired) conditions with potentially considerably lower flows during dry summer months (as low as 1 cubic foot per second) (see Section 2.2.4.2, Water Use and Hydrology, and Section 2.2.4.4, Fish and Aquatic Resources). According to American Whitewater, the new boating opportunities that would be created on the Eel River both upstream and downstream of Scott Dam outweigh any lost boating opportunities on the Russian River (American Whitewater 2025). A reduction in summer flows during dry periods would likely adversely affect fishing, recreational boating, and swimming opportunities.

2.2.4.10.3 Construction and Environmental Measures

To avoid or reduce effects to recreation resources during construction, PG&E would obtain, prepare, and/or implement the following measures. A complete list of construction measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Construction Recreation Plan with public notification measures
- Public Safety Plan to reduce potential safety risks to the public during construction

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- East Branch Russian River Diversion Plan
- Water Quality and Erosion Control measures (see Section 2.2.4.3, Water Quality)
- Fisheries and aquatic resource measures (see Section 2.2.4.4, Fish and Aquatic Resources)
- Restoration Plan for environmental restoration including measures to restrict access during restoration and revegetation

To reduce potential effects to land use during the initial conditions and preliminary restoration (Phase 2a) and resulting conditions and restoration (Phase 2b), PG&E would implement the following environmental measures. A complete list of environmental measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Fisheries and aquatic resource measures (see Section 2.2.4.4, Fish and Aquatic Resources)
- Restoration Plan for environmental restoration including measures to restrict access during restoration and revegetation

2.2.4.10.4 Unavoidable Adverse Effects

Unavoidable adverse effects to recreation resources include the following:

- Short-term loss of recreation opportunities during construction at Lake Pillsbury reservoir from the drawdown of Lake Pillsbury reservoir and restricted recreation use;
- Loss of recreation opportunities at Lake Pillsbury reservoir with the removal of some PG&E recreation facilities and ancillary features (permanent loss);
- Loss of reservoir-based recreation opportunities at Lake Pillsbury reservoir with the transition of a lacustrine to riverine environment;
- Implementation of the Restoration Plan would support the Eel River's restoration, which would result in conditions favorable for river-based recreation over the long-term;
- Potential effects on groundwater levels due to the dewatering of Lake Pillsbury reservoir could potentially effect recreational facility wells;
- Potential short-term, temporary effects to fishing and other river-based recreation opportunities in the Eel River from high suspended sediment load and aquatic biota mortality; and
- Potential reduction in fishing, recreational boating and swimming opportunities in the East Branch Russian River during low summer flows because water would no longer be diverted to the East Branch Russian River under the Proposed Action.

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2.2.4.10.5 References

American Whitewater. 2025. Comments on Pacific Gas and Electric Company's Draft License Surrender Application for the Potter Valley Hydroelectric Project (P-77). March 4, 2025.

USFS-MNF (U.S. Forest Service, Pacific Southwest Region, Mendocino National Forest). 1995. Mendocino National Forest Land and Resource Management Plan. February. Available at: http://www.fs.usda.gov/detailfull/mendocino/landmanagement/.

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2.2.4.11 Aesthetic Resources

This section describes the potential effects to aesthetic resources that could occur because of the Proposed Action described in PG&E's Application for Surrender of License and Decommissioning Plan for the Potter Valley Hydroelectric Project (Project) (see Section 2.1.2, Applicant's Proposal). Section 2.1.2 includes a description of decommissioning Project facilities and restoration goals to be met as part of the Proposed Action. The restoration of recreational facilities, including campgrounds, day-use areas, and associated roads and trails, is described in detail in Section 2.1.2.

Potential effects are separated into construction effects (Phase 1) and post-facility removal effects (Phase 2). Refer to Section 2.2.4, Environmental Effects, for a description of each phase.

The effects are determined by analyzing the changes in the aesthetic environment that may result from activities to be implemented under the Proposed Action (Section 2.1.2, Applicant's Proposal) compared to the No-Action Alternative (existing condition) (Section 2.1.1, No-Action Alternative).

Final effects determinations consider measures (i.e., construction measures and post-facility removal measures) included to avoid or mitigate impacts associated with implementation of the Proposed Action (refer to Section 2.1.2.2, Proposed Environmental Measures). Unavoidable adverse effects are discussed at the end of this section.

2.2.4.11.1 Phase 1: Short-term Construction Effects

The following potential effects to aesthetic resources resulting from Project facility modifications were evaluated:

- Potential effects to aesthetic resources due to the presence of construction work and staging areas at and around the construction work and staging areas, including the dewatered reservoirs;
- Potential effects on Eel River W&SR status that could result during and from construction; and
- Potential effects on scenic corridors that could result during and from construction.

Potential Effects due to Construction Activities

Under Phase 1 of the Proposed Action, several temporary access roads and staging areas would be constructed, Lake Pillsbury reservoir would be dewatered, and Scott Dam would be removed. In addition, certain Project recreation facilities surrounding Lake Pillsbury reservoir and associated features (e.g., water supply wells, water distribution lines) would be removed. In the Cape Horn Dam Area, cofferdams would be constructed upstream and downstream of the work area and the work area would be dewatered. The dam and select associated facilities and features would be demolished and removed. Equipment staging and work areas at both dams would introduce heavy equipment, fencing, and other materials that would contrast with the natural environment at the construction site.

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Scott Dam itself is not visible from publicly accessible roadways. The construction site may be partially visible from some public viewpoints and recreation areas along the shoreline and potentially through the vegetation from the private residential area south of Scott Dam. Cape Horn Dam is not visible from public roadways due to dense vegetation along Ridgeway Highway. Motorists traveling along Van Arsdale Road may be afforded obstructed views of the construction site. Equipment and materials used for construction include metal, concrete, and high-visibility colors, which may stand out against the colors, textures, lines, and forms of the natural environment. This contrast would draw viewers' attention to the construction elements and temporarily reduce the scenic quality of the area. Additional effects to the visual environment may result from fugitive dust emissions caused by construction activities. This temporary visual impact would be limited to the duration of the two seasons of construction periods associated with the removal of Scott Dam and one season at Cape Horn Dam. Furthermore, PG&E would implement dust control measures during construction as part of General Construction Measures, including emission reduction measures and fugitive dust reduction measures (refer to Section 2.1.2.2, Proposed Environmental Measures).

The VQO classifications for the region surrounding Lake Pillsbury reservoir, as established in the MNF LRMP, are presented on Map 2.2.3.10-2 in Section 2.2.3.10, Aesthetic Resources. In general, the shoreline area surrounding Lake Pillsbury reservoir is designated as Retention VQO. Per USFS guidance for the Retention VQO, impacts of management activities in highly visible foreground areas shall be addressed and reduced through special treatments such as leaving residual vegetation and screening. Project construction activities would not affect the existing vegetation in the Scott Dam Area and would not conflict with the objective for the Retention VQO; therefore, potential effects to the VQO classification during construction are considered negligible.

These visual effects would be temporary and limited to the active construction periods associated with each site: two seasons at Scott Dam and one season at Cape Horn Dam. To reduce potential effects during construction, PG&E would implement General Construction Measures, including limiting construction activities to designated work and staging areas and limiting construction work hours. In summary, the visual quality and character of the landscape viewsheds where construction activities would occur would be reduced compared to existing conditions (i.e., No-Action Alternative) during the period of active construction.

Potential Effects on Wild and Scenic River Designation

The Eel River in the vicinity of Scott Dam is not included in the National or California W&SR systems (National W&SR System 2024); therefore, any visible changes related to construction would have no effect on the Eel River's W&SR designation in the vicinity of Scott Dam.

The Eel River from 100 yards downstream of Cape Horn Dam to its mouth is designated as a WS&R under both the National and California W&SR systems. The segment of the Eel River from 100 yards downstream of Cape Horn Dam to the confluence of Tomki Creek is classified as a "Recreational" river segment (not Wild or Scenic). Removal of Cape Horn Dam would occur upstream of the W&SR segment. In addition, since the Eel River in the vicinity of Cape Horn Dam is not classified as Scenic, any visible changes related to the deconstruction of Cape Horn

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Dam and associated facilities, except for limited components that will be needed for the NERF, would have no effect on the Eel River's W&SR designation.

Potential Effects on Scenic Corridors

There are no state-designated scenic highway segments in the Scott Dam or Cape Horn Dam areas (Caltrans 2024), and neither the Lake County General Plan nor Mendocino County General Plan identify any specific scenic corridors in Lake County (Lake County 2008) or Mendocino County (Mendocino County 2020). Therefore, construction activities would not affect state-designated scenic highways or county-designated scenic corridors.

2.2.4.11.2 Phase 2: Post-facility Removal Effects

Phase 2 includes an initial temporary condition and preliminary restoration (Phase 2a) and resulting physical conditions and restoration (Phase 2b).

Phase 2a includes analysis of the initial temporary physical conditions that would occur immediately following dam and ancillary/recreation facility removal including:

- Loss of the facility or feature (e.g., change from reservoir to river, loss of ancillary facility or recreation facility);
- Initial release of stored water and sediment following removal of the adit plug at Scott Dam and complete removal of Scott Dam and Cape Horn Dam:
  - Pulse hydrology in the Eel River downstream of Scott Dam and Cape Horn Dam until the reservoir is drained; and
  - Sediment load/deposition and turbidity in the Eel River downstream of Scott Dam and Cape Horn Dam;
- Continued degraded water quality and sediment deposition after the initial sediment release until the system stabilizes and water quality and sediment transport return to natural conditions; and
- Ground disturbance, use of heavy equipment, transport of materials to and from the Scott Dam and Cape Horn Dam area restoration areas to allow for restoration of the former dam sites and ancillary/recreation facility sites.

Phase 2b includes analysis of the resulting conditions following dam ancillary/recreation facility removal including:

- Unimpaired hydrology in the Eel River downstream of Scott Dam and Cape Horn Dam;
- Restored sediment transport and water quality in the Eel River downstream of Scott Dam and Cape Horn Dam;

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- Natural hydrology in the East Branch Russian River; and
- Restored former reservoir beds and ancillary/recreation facility sites following facility removal.

The following potential post-facility removal effects to aesthetic resources resulting from physical changes that occur following dam and recreation facility/ancillary facility removal were evaluated:

- Phase 2a
  - Potential effects to aesthetic resources due to dam removal, dewatering of the reservoir, initial denuded former reservoir bed, and initial revegetation in the Scott Dam and Cape Horn Dam areas;
  - Potential effects to aesthetic resources due to the initial release of sediment following removal of the adit plug at Scott Dam and removal of the dams in the Eel River below Scott Dam and Cape Horn Dam;
  - Potential effects on Eel River W&SR status that could result from the sediment release and resultant water quality in the Eel River below Scott Dam and Cape Horn Dam and in the East Branch Russian River; and
  - Potential effects on scenic corridors that could result from the sediment release and resultant water quality in the Eel River Watershed below Scott Dam and in the East Branch Russian River.
- Phase 2b
  - Potential effects to aesthetic resources due to the conversion of a reservoir with lacustrine habitat to a river with riparian habitat and adjacent upland habitat in the Scott Dam and Cape Horn Dam areas;
  - Potential effects to aesthetic resources that could result from the natural hydrologic and geomorphic processes in the Eel River and Russian River from removal of the dams;
  - Potential effects to aesthetic resources due to the restoration of the recreation facilities in the Scott Dam Area;
  - Potential effects on Eel River W&SR status that could result from the natural hydrology and sediment transport in the Eel River and Russian River from removal of the dams; and
  - Potential effects on scenic corridors that could result from the natural hydrologic and geomorphic processes in the Eel River and Russian River from removal of the dams.

A discussion of potential post-facility removal effects to aesthetic resources that could occur as a result of facility removal, with incorporation of measures, is provided below by area, as applicable.

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Scott Dam Area

Phase 2a

Following the removal of Scott Dam, the visual elements associated with the dam that currently disrupt the integrity of the landscape such as contrasting or intrusive lines, shapes, textures, and colors would be minimized or eliminated.

Under existing conditions, when Lake Pillsbury reservoir water levels are low, features such as submerged trees and rocky outcrops within the reservoir bed, as well as the "bathtub ring" around the reservoir, are dominant components of the visual experience. Full-pool conditions do not occur because the maximum water surface elevation is maintained at 10 ft. below full pool to comply with a reservoir restriction. Therefore, the upper 10 ft. of shoreline is exposed. Immediately following the removal of Scott Dam, the bed of Lake Pillsbury reservoir would be exposed, which would constitute a substantial change in visual character compared to existing conditions. In addition, ground disturbance, use of heavy equipment, and transport of materials to and from the Scott Dam restoration areas would occur during initial restoration of the former dam site and ancillary/recreation facility sites. The foregoing changes would result in a temporary reduction in the quality of the visual resources in the Scott Dam Area. However, the impact would be alleviated following restoration and revegetation, as discussed further below.

Phase 2b

During Phase 2b, the exposed reservoir bed would be revegetated and stabilized, and natural flows of the Eel River would be reestablished within the reservoir bed and downstream of the former Scott Dam site. Following restoration activities, the dam site and former reservoir bed would be returned to natural riverine conditions within the landscape, resulting in an overall benefit to visual quality and character as compared to the No-Action Alternative.

The conversion of the Scott Dam Area from a reservoir with lacustrine habitat to a river with riparian habitat and adjacent upland habitat would result in a substantial change to the viewshed. In addition, viewer proximity to the water feature would change. For example, private residences located near the Lake Pillsbury reservoir shoreline have foreground views of the reservoir. Following implementation of the Proposed Action, the residences may have middleground views of the river. The character of the overall viewshed would remain as a natural, vegetated landscape that includes a water feature, although the aesthetic value of the view may vary from person to person. When viewing the same landscape, people's responses to that landscape and proposed visual changes may differ. Their responses are based upon their values, familiarity, concerns, or expectations for that landscape and its scenic quality. Because each person's attachment to, and value for, a landscape is unique, visual changes to that landscape inherently affect viewers differently. Nevertheless, this analysis specifically considers the transition from a denuded reservoir bed immediately following dam removal to a restored area surrounding the natural flows of the Eel River. Implementation of the Proposed Action would result in a minor beneficial effect to aesthetic resources compared to the No-Action Alternative.

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Cape Horn Dam Area

Phase 2a

Under the No-Action Alternative, Van Arsdale Reservoir behind Cape Horn Dam is operated as a run-of-river reservoir and is kept at full pool. Fluctuations in reservoir elevation occur as a result of different flow levels in the Eel River, but not as a function of reservoir storage operations. Following the removal of Cape Horn Dam, the water level of the Van Arsdale Reservoir area would be reduced and additional shoreline would be exposed. The additional shoreline exposure may result in a minor adverse impact to visual resources in the Cape Horn Dam Area. However, the impact would be temporary and would be alleviated following restoration and revegetation, as discussed further below.

Phase 2b

During Phase 2b, the exposed reservoir bed would be revegetated and stabilized, and natural flows of the Eel River would be reestablished within the reservoir bed and downstream of the former Cape Horn Dam site. Following restoration activities, the dam site and former reservoir bed would be returned to natural riverine conditions within the landscape, resulting in an overall benefit to visual quality and character as compared to the No-Action Alternative.

Similar to the discussion for the Scott Dam Area, the conversion of the Cape Horn Dam Area from a reservoir to a river would result in a notable change to the viewshed. The character of the area would remain as a natural, vegetated landscape that includes a water feature, although the aesthetic value of the view may vary from person to person. Nevertheless, this analysis specifically considers the transition from a denuded reservoir bed immediately following dam removal to a restored area surrounding the natural flows of the Eel River.

Overall, implementation of the Proposed Action would result in a minor beneficial effect to aesthetic resources compared to the No-Action Alternative.

Eel River Watershed

Phase 2a

Potential Effects due to the Initial Release of Sediment

During Phase 2a, a large volume of sediment would be released from behind the dams and into the Eel River. PG&E would schedule the adit blast at Scott Dam and the removal of the Cape Horn cofferdams during a period of high flows, which would minimize the duration of elevated suspended solids to the extent possible. A very large flush of sediments would travel down the Eel River from Scott Dam and cause high turbidity along the entire Eel River to the ocean. A much smaller contribution to suspended sediments will be made by the Cape Horn deconstruction 11.7 mi. downstream of Scott Dam. As the highly turbid water travels down the Eel River to the mouth of the Eel River estuary, some suspended sediments will settle out along the way in the riverbed. These sediments will be remobilized with subsequent high flow events, possibly over the course of several years, until they make their way out of the system. This sediment release

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would temporarily reduce the visual quality of views of the Eel River and would be resolved when the sediment has flushed through the Eel River system.

Potential Effects on Wild and Scenic River Designation

The Eel River from 300 ft. below Cape Horn Dam to the mouth at the Pacific Ocean is designated as a National W&SR. However, the ORV for all of the segments on the mainstem of the Eel River is Fish. Adverse impacts to the visual character of the Eel River and along the Eel River Watershed may occur during Phase 2a, primarily due to the increased turbidity from sediment release. However, the Scenery ORV does not apply to any segment on the mainstem of the Eel River and, as a result, the temporary effects to aesthetic resources would not change the W&SR designation of the Eel River.

Potential Effects on Scenic Corridors

Portions of Highway 101 and Highway 20 that extend through the Eel River Watershed are eligible for designation as scenic highway segments (see Map 2.2.3.10-1). However, the segments are considered eligible for designation and have not been formally designated. The portions of Highway 101 and Highway 20 that are eligible as scenic highway segments are located west of the Eel River, near the city of Willits. Direct views of the Eel River are not available to motorists traveling along these roadways, and any effects to aesthetic resources that may occur during Phase 2a would have no impact on the scenic highway segments within the Eel River Watershed area.

Phase 2b

Potential Effects from Natural Hydrology and Sediment Transport below the Dams

Under the resulting physical conditions and restoration (Phase 2b), flows along the Eel River would return to natural conditions and would not be regulated through the use of Scott Dam and Cape Horn Dam and associated reservoirs. Increased turbidity in the Eel River downstream of Scott Dam and Cape Horn Dam would be expected during high flow events for up to several years following their removal. Accumulated sediments that are not immediately mobilized during reservoir drawdown would continue to erode over time, releasing higher concentrations of suspended sediments into the Eel River than would be present under existing conditions. Eventually suspended sediment concentrations would return to normal levels following several years of high flow events. As discussed in Section 2.2.3.2, Water Quality, the Eel River has the highest recorded average annual suspended-sediment yield per square mile of drainage area of any river of its size or larger in the U.S., resulting in high turbidity during high flows under existing conditions. In addition, the natural flows in the river would be different from those under the No-Action Alternative (see Section 2.2.4.2, Water Use and Hydrology). Flows at Scott Dam would be greater in the winter months (November through March), similar through the spring, and lower in the summer months (July through October) under natural conditions compared to the No-Action Alternative. At Cape Horn Dam, flows would be greater during most of the year (November–June) under natural conditions compared to the No-Action Alternative and would be similar in the summer and early fall months. The differences in the water depths at certain times of the year may be noticeable to a casual viewer at some locations. However, while the actual flows would be different, the range of flows under natural conditions would be similar to those that would occur

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under the No-Action Alternative. Therefore, the resulting condition and restoration would have a negligible effect on aesthetics in the Eel River Watershed area.

Potential Effects on Wild and Scenic River Designation

The Eel River Watershed area is generally characterized by steep and heavily forested terrain with minimal development. The Eel River from 300 ft. below Cape Horn Dam to the mouth at the Pacific Ocean is designated as a National W&SR (see Map 2.2.3.10-1). The ORV for all segments on the mainstem of the Eel River is Fish. The Scenery ORV does not apply to any segment on the mainstem of the Eel River. Therefore, the Proposed Action would not result in impacts related to aesthetic resources on a segment of the Eel River that is designated as a National W&SR.

Potential Effects on Scenic Corridors

Portions of Highway 101 and Highway 20 that extend through the Eel River Watershed are eligible for designation as scenic highway segments (Caltrans 2024). However, the segments are considered eligible for designation and have not been formally designated. The portions of Highway 101 and Highway 20 that are eligible as scenic highway segments are located west of the Eel River, near the city of Willits. Direct views of the Eel River are not available to motorists traveling along these roadways, and any effects to aesthetic resources that may occur during Phase 2b would have no impact on the scenic highway segments within the Eel River Watershed area. In addition, the Proposed Action would not result in direct or long-term impacts to the transportation network.

Russian River Watershed

The following discussion incorporates both Phase 2a and Phase 2b.

Potential Effects to Aesthetic Resources from Natural Hydrology and Sediment Transport below the Dams

Implementation of the Proposed Action would restore flows in the East Branch Russian River to unimpaired natural conditions. Views of the Russian River as seen from the Russian River Watershed area would return to natural conditions, resulting in negligible effects related to aesthetic resources.

Potential Effects on W&SR Designation

The watershed is rural in character and features year-round river flow and hilly or mountainous terrain in the upper reaches. No part of the Russian River, including the East Branch Russian River, is included in the National or California W&SR systems (National W&SR System 2024). Therefore, implementation of the Proposed Action would not result in impacts to any segments of National or California W&SR systems.

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Potential Effects on Scenic Corridors

Portions of Highway 101 and Highway 20 that extend through the northern Russian River Watershed are eligible for designation as scenic highway segments (Caltrans 2024). However, the segments are considered eligible for designation and have not been formally designated. In addition, the Proposed Action would not result in direct or long-term impacts to the transportation network. Any public views of the Russian River that are available from portions of the highway would be improved following implementation of the Proposed Action because natural flows along the Russian River would be restored.

2.2.4.11.3 Construction and Environmental Measures

To address and reduce potential effects to visual resources during construction (Phase 1), PG&E would implement the following measure. A complete list of construction measures is provided in Section 2.1.2.2, Proposed Environmental Measures.

- General Construction Measures, including limiting construction activities to designated work and staging areas; limiting construction work hours; and implementing fugitive dust emission reduction measures

No measures for aesthetics are required for Phase 2 of the Proposed Action as no adverse effects have been identified.

2.2.4.11.4 Unavoidable Adverse Effects

Implementation of the Proposed Action would not result in unavoidable adverse effects to aesthetic resources.

2.2.4.11.5 References

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2.2.4.12 Cultural Resources

This section describes the potential effects to cultural resources that could occur because of the Proposed Action described in PG&E's Application for Surrender of License and Decommissioning Plan for the Potter Valley Hydroelectric Project (Project) (see Section 2.1.2, Applicant's Proposal). Section 2.1.2, Applicant's Proposal, includes a description of decommissioning of Project facility modifications, including restoration activities, to be implemented under the Proposed Action.

Potential effects are separated into construction effects (Phase 1) and post-facility removal effects (Phase 2). The effects are determined by analyzing the potential direct and indirect effects to cultural resources that may result from activities to be implemented under the Proposed Action compared to the No-Action Alternative (existing condition) (Section 2.1.1, No Action Alternative).

The Analysis Area includes the following Cultural Resources Study Areas, which are also described in Section 2.2.3.11, Cultural Resources, and depicted in Maps 2.2.3.11-1 to 2.2.3.11-3:

- The FERC Project Boundary Cultural Resources Study Area encompasses the FERC Project boundary and a 0.5-mi. buffer.
- The Eel River Study Area encompasses the Eel River downstream of Scott Dam to the Pacific Ocean including the Eel River estuary (the study area ends at the Pacific Ocean at the estuary because any sediments from dam removal will be flushed and deposited in the river prior to reaching the estuary mouth) and a 0.5-mi. buffer on either side of the Eel River.
- The East Branch Russian River Study Area encompasses the East Branch Russian River to Lake Mendocino plus a 0.5-mi. buffer on either side of the East Branch Russian River

In addition to the FERC Project Boundary Cultural Resources Study Area, the downstream reaches of the Eel and Russian rivers were included as study areas in the evaluation of the affected environment for cultural resources to account for the potential effects of sediment flows from dam removal. PG&E, as delegated by FERC, will develop the APE and any proposed revisions to the study areas in consultation with the SHPO, Tribes, and stakeholders as part of compliance with Section 106 of the NHPA.

2.2.4.12.1 Potential Effects

No resource-specific studies have been conducted to help identify the specific effects of the Proposed Action. However, the Proposed Action qualifies as an "undertaking," as defined in CFR Part 800.16(y), with the potential to affect cultural resources that could qualify as historic properties (36 CFR Part 800.3[a]) and must comply with Section 106 of the NHPA to reduce effects to the properties.

The criterion of adverse effect is defined in Section 106 of the NHPA implementing regulations at 36 CFR Part 800.5(a)(1). An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

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Historic properties are defined as any district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP. The term includes properties of traditional religious and cultural importance to Tribes that meet the criteria for inclusion in the NRHP.

2.2.4.12.2 Phase 1: Short-term Construction Effects

This section evaluates the potential effects of construction activities on cultural resources as a result of implementation of the Proposed Action (Section 2.1, Proposed Action and Alternatives), with incorporation of construction measures.

Construction activities, including dewatering of the reservoirs, required for the decommissioning of Scott Dam and Cape Horn Dam, Project ancillary facilities, and Project recreation facilities in the Scott Dam Area have the potential to affect cultural resources. Based on review of available information listed in Section 2.2.3.11, Cultural Resources, there are cultural resources in both the Scott Dam and Cape Horn Dam areas, including reservoirs, the powerhouse, Project facilities, and associated recreation facilities. Potential adverse effects of Phase 1 short-term construction activities in these areas to cultural resources include:

- Physical destruction of or damage to all or part of the property;
- Effects resulting from the draining of reservoirs that exposes and allows increased access to previously inundated cultural resources, which could result in looting[1] and vandalism;
- Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary of the Interior's standards for the treatment of historic properties (36 CFR Part 68) and applicable guidelines;
- Removal of the property from its historic location;
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance; and
- Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features.

2.2.4.12.3 Phase 2: Post-facility Removal Effects

This section evaluates the potential effects of physical changes that may occur to cultural resources following dam and ancillary/recreation facility removal and the removal of FERC jurisdictional boundaries.

[1] Looting refers to archaeological looting, which is the illicit removal of artifacts from an archaeological site.

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Phase 2a includes analysis of the initial temporary physical conditions that will occur immediately following dam and ancillary/recreation facility removal, including the following:

- Loss of the facility or feature (e.g., loss of reservoir, ancillary facility, or recreation facility).
- Initial release of stored water and sediment following removal of the adit plug at Scott Dam and complete removal of Scott Dam and Cape Horn Dam:
  - Pulse hydrology in the Eel River downstream of Scott Dam and Cape Horn Dam until the reservoir is drained; and
  - Sediment load/deposition and turbidity in the Eel River downstream of Scott Dam and Cape Horn Dam.
- Continued degraded water quality and sediment deposition after the initial sediment release until the system stabilizes and water quality and sediment transport return to natural conditions.
- Ground disturbance, use of heavy equipment, and transport of materials to and from the Scott Dam and Cape Horn Dam restoration areas to allow for restoration of the former dam sites and ancillary/recreation facility sites.

Phase 2b includes analysis of the resulting conditions following dam and ancillary/recreation facility removal, including the following:

- Unimpaired hydrology in the Eel River downstream of Scott Dam and Cape Horn Dam;
- Restored sediment transport and water quality in the Eel River downstream of Scott Dam and Cape Horn Dam;
- Natural hydrology in the East Branch Russian River; and
- Restored former reservoir beds and ancillary/recreation sites following facility removal.

The following potential effects to cultural resources that may occur following dam and ancillary/recreation facility removal compared to the No-Action Alternative (existing condition) were evaluated:

- Physical destruction of or damage to all or part of the property;
- Effects resulting from the draining of reservoirs that exposes and allows increased access to previously inundated cultural resources, which could result in looting and vandalism;
- Effects on known and unknown cultural resources due to natural flows and sediment transport, deposition, and erosion;
- Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary of the Interior's standards for the treatment of historic properties (36 CFR Part 68) and applicable guidelines;

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- Removal of the property from its historic location;
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features; and
- Transfer, lease, or sale of a historic property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

2.2.4.12.4 Construction and Environmental Measures

To avoid or reduce potential effects to cultural resources the following measures will be implemented after the Application for Surrender of License and Decommissioning Plan is filed and prior to FERC's approval of the license surrender and facility removal:[2]

- Develop an APE in consultation with SHPO, Tribes, agencies, and stakeholders;
- Conduct cultural resource studies to identify and evaluate cultural resources for listing in the NRHP and California Register of Historical Resources[3] within the APE; and,
- Develop and implement a Historic Properties Management Plan as stipulated in the PA; the plan will provide for the management of properties identified as eligible for listing in the NRHP. The plan will be reviewed for compliance and consistency with federal and state environmental review requirements.

2.2.4.12.5 Resolution of Adverse Effects

The process for resolving adverse effects or *Finding of Adverse Effect* will follow the Section 106 process pursuant to 36 CFR Part 800.5 for *assessment of adverse effects* and 800.6 for *resolution of adverse effects*. Resolution of an adverse effect, as defined in 36 CFR Part 800.6, requires notifying the Advisory Council on Historic Preservation; consulting with SHPO, Tribes, interested parties, and land-managing agencies; and developing a Section 106 agreement document (typically an MOA or PA that resolves adverse effects).

[2] FERC will develop and execute a programmatic agreement pursuant to 36 CFR 800.14(b)(1)(ii), which stipulates a process for phased identification and evaluation of resources for eligibility for inclusion in the NRHP and, if needed, FERC will develop and execute a MOA for known resources eligible for inclusion in NRHP to establish the terms and conditions agreed upon to resolve adverse effects (see Resolution of Adverse Effects at the end of section).

[3] Resources will also be evaluated under the California Register of Historical Resources for use in the SWRCB's impacts assessment under the California Environmental Quality Act.

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2.2.4.13 Tribal Resources

This section describes the potential effects to Tribal resources that could occur because of the Proposed Action described in PG&E's Application for Surrender of License and Decommissioning Plan for the Potter Valley Hydroelectric Project (Project) (see Section 2.1.2, Applicant's Proposal). Section 2.1.2, Applicant's Proposal, includes a description of decommissioning of Project facility modifications, including restoration activities, to be implemented under the Proposed Action.

Potential effects are separated into construction effects (Phase 1) and post-facility removal effects (Phase 2). The effects are determined by analyzing the potential direct and indirect effects to Tribal resources that may result from activities to be implemented under the Proposed Action compared to the No-Action Alternative (existing condition) (Section 2.1.1, No Action Alternative).

The Analysis Area includes the following Tribal Resources Study Areas that were developed for the Surrender Application (see also Section 2.2.3.12, Tribal Resources):

- FERC Project Boundary Tribal Study Area: FERC Project boundary plus a 5-mi. buffer;
- Eel River Tribal Study Area: Eel River downstream of Scott Dam to Pacific Ocean including estuary plus a 1-mi. buffer on either side of the river; and
- East Branch of the Russian River Tribal Study Area: East Branch Russian River from Potter Valley Powerhouse Tailrace to Lake Mendocino, plus a 1-mi. buffer on either side of the river.

The FERC Project boundary Tribal Study Area where most of the potential direct and indirect effects from Phase 1 construction and Phase 2 post-facility removal may occur includes a 5-mi. study buffer around the FERC Project boundary to provide adequate analysis for Tribal interests and resources. The study areas that include downstream reaches of the Eel River and East Branch Russian River include a 1-mi. buffer on either side of the rivers to encompass any potential effects to Tribal interests and resources from Phase 2 of the Project. PG&E, as delegated by FERC, will develop the APE and any proposed revisions to the study areas in consultation with the SHPO, Tribes, agencies, and other stakeholders as part of Tribal resource studies, development of management plans, and compliance with Section 106 of the NHPA.

2.2.4.13.1 Potential Effects

No resource-specific studies have been conducted to help identify the specific effects of the Proposed Action. However, the Proposed Action qualifies as an "undertaking," as defined in CFR Part 800.16(y), with the potential to affect Tribal resources that could qualify as historic properties (36 CFR Part 800.3[a]) and must comply with Section 106 of the NHPA to reduce effects to the properties.

The criterion of adverse effect is defined in Section 106 of the NHPA implementing regulations at 36 CFR Part 800.5(a)(1). An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in

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the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

Historic properties are defined as any district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP. The term includes properties of traditional religious and cultural importance to Tribes that meet the criteria for inclusion in the NRHP.

2.2.4.13.2 Phase 1: Short-term Construction Effects

This section evaluates the potential effects of construction activities on Tribal resources as a result of implementation of the Proposed Action (Section 2.1.2, Applicant's Proposal), with incorporation of construction measures.

Construction activities, including dewatering of the reservoirs, required for the decommissioning of Scott Dam and Cape Horn Dam, Project ancillary facilities, and Project recreation facilities in the Scott Dam Area, have the potential to affect Tribal resources. Based on review of available information listed in Section 2.2.3.12, Tribal Resources, there is a high likelihood of ethnohistoric village locations, archaeological sites, human remains, Tribal ethnobiological resources (plants, animals, avian and aquatic species, and insects), trails, and important Tribal places being present in both the Scott Dam and Cape Horn Dam areas, including reservoirs, the powerhouse, Project facilities, and associated recreation facilities. Potential adverse effects of Phase 1 short-term construction activities in these areas to Tribal communities include:

- Direct effects through physical destruction or damage to all or part of known and unknown Tribal resources;
- Direct and indirect effects through change to the character, use, or physical and sensory setting of known and unknown Tribal resources that diminishes the religious and cultural significance of the resource;
- Direct effects through disturbance and destruction of human remains;
- Direct effects through exposure and erosion of currently submerged ethnographic villages, archaeological sites, and Tribal resources within and surrounding Lake Pillsbury reservoir and Van Arsdale Reservoir;
- Direct effects through disruption in access and use of ethnobiological resources, ceremonial areas, and other Tribal activities from construction activities; and
- Indirect effects that may affect Tribal communities, cultural activities and resources.

Effects on Flows, Water Quality, and Fish and Other Aquatic Species of Tribal Value

As described in Sections 2.2.4.3 (Water Quality), 2.2.4.7 (Geology and Soils), and 2.2.4.4 (Fish and Aquatic Resources), the construction activities have the potential to temporarily impact water quality in the Eel River downstream of Scott Dam and Cape Horn Dam by increasing sedimentation and turbidity, both of which are considered adverse effects. Potential adverse

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effects of the Proposed Action to flows, water quality, and fisheries from construction activities that may affect Tribal resources include:

- Effects (adverse and beneficial) to native anadromous fish populations such as fall-run Chinook salmon, coho salmon, steelhead trout, and Pacific lamprey, plus freshwater mussels and invertebrates (see Section 2.2.4.4, Fish and Aquatic Resources, for a detailed effects analysis for these species); and
- Direct and indirect effects to water use and hydrology, and water quality related to Tribal communities and Tribal resources (see Section 2.2.4.2, Water Use and Hydrology, and Section 2.2.4.3, Water Quality, for additional information).

2.2.4.13.3 Phase 2: Post-facility Removal Effects

This section evaluates the potential effects of physical changes to Tribal resources that may occur following dam and ancillary/recreation facility removal and the removal of FERC jurisdictional boundaries.

Phase 2a includes analysis of the initial temporary physical conditions that will occur immediately following dam and ancillary/recreation facility removal, including the following:

- Loss of the facility or feature (e.g., loss of reservoir, ancillary facility, or recreation facility).
- Initial release of stored water and sediment following removal of the adit plug at Scott Dam and complete removal of Scott Dam and Cape Horn Dam:
  - Pulse hydrology in the Eel River downstream of Scott Dam and Cape Horn Dam until the reservoir is drained; and
  - Sediment load/deposition and turbidity in the Eel River downstream of Scott Dam and Cape Horn Dam.
- Continued degraded water quality and sediment deposition after the initial sediment release until the system stabilizes and water quality and sediment transport return to natural conditions.
- Ground disturbance, use of heavy equipment, and transport of materials to and from the Scott Dam and Cape Horn Dam restoration areas to allow for restoration of the former dam sites and ancillary/recreation facility sites.

Phase 2b includes analysis of the resulting conditions following dam and ancillary/recreation facility removal, including the following:

- Unimpaired hydrology in the Eel River downstream of Scott Dam and Cape Horn Dam;
- Restored sediment transport and water quality in the Eel River downstream of Scott Dam and Cape Horn Dam;

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- Natural hydrology in the East Branch Russian River; and
- Restored former reservoir beds and ancillary/recreation sites following facility removal.

The following potential effects on Tribal resources of physical changes that may occur following dam and ancillary/recreation facility removal compared to the No-Action Alternative (existing condition) were evaluated.

Scott Dam and Cape Horn Dam Areas

- Direct effects through physical destruction or damage to all or part of known and unknown Tribal resources including human remains from sedimentation and erosion, sediment removal, restoration plans, and post-removal activities;
- Direct and indirect effects through change to the character, use, or physical and sensory setting of known and unknown Tribal resources that diminishes the religious and cultural significance of the resource from sedimentation and erosion, sediment removal, restoration plans, and post-removal activities;
- Direct effects through the change in access and use of ethnobiological resources, ceremonial areas, and other Tribal activities;
- Indirect effects that may affect Tribal communities and cultural activities and resources;
- Direct and indirect effects (adverse and beneficial) to native anadromous fish populations such as fall-run Chinook salmon, coho salmon, steelhead trout, and Pacific lamprey, plus freshwater mussels and invertebrates (see Section 2.2.4.4, Fish and Aquatic Resources, for a detailed effects analysis for these species);
- Direct and indirect effects to water use, hydrology, and water quality related to Tribal communities and Tribal resources (see Section 2.2.4.2, Water Use and Hydrology, and Section 2.2.4.3, Water Quality, for additional information); and
- Direct and indirect effects from the removal of the FERC jurisdictional boundaries when the license is terminated. Transfer, lease, or sale of a historic property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance is considered an adverse effect.

Eel River Watershed

- Direct effects through physical destruction or damage to all or part of known and unknown Tribal resources, human remains, and the Eel River and its tributaries from sediment flows, removal of sediment, and erosion;
- Direct and indirect effects through change to the character, use, or physical and sensory setting of known and unknown Tribal resources that diminishes the religious and cultural significance of the resource from sediment flows, removal of sediment, and erosion;

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- Direct effects through the change in access and use of ethnobiological resources, ceremonial areas, and other Tribal activities within the Eel River Watershed;
- Indirect effects that may affect Tribal communities and cultural activities and resources;
- Direct and indirect effects (adverse and beneficial) to native anadromous fish populations such as fall-run Chinook salmon, coho salmon, steelhead trout, and Pacific lamprey, plus freshwater mussels and invertebrates (see Section 2.2.4.4, Fish and Aquatic Resources, for a detailed effects analysis for these species); and
- Direct and indirect effects to water use, hydrology and water quality related to Tribal communities and Tribal resources (see Section 2.2.4.2, Water Use and Hydrology, and Section 2.2.4.3, Water Quality, for additional information).

Russian River Watershed

- Direct effects through the change in access and use of ethnobiological resources, ceremonial areas, and other Tribal activities within the Russian River Watershed;
- Indirect effects that may affect Tribal communities and cultural activities and resources;
- Direct effects (adverse and beneficial) to native fish species, freshwater mussels, and invertebrates (see Section 2.2.4.4, Fish and Aquatic Resources, for a detailed effects analysis for these species); and
- Effects to water use, hydrology, and water quality related to Tribal communities and Tribal resources (see Section 2.2.4.2, Water Use and Hydrology, and Section 2.2.4.3, Water Quality, for additional information).

2.2.4.13.4 Construction and Environmental Measures

To avoid or reduce potential effects to Tribal resources, the following measures will be implemented after the Application for Surrender of License and Decommissioning Plan is filed and prior to FERC's approval of the license surrender and facility removal:

- PG&E, as delegated by FERC, will consult with SHPO, Tribes, agencies, and other stakeholders to develop an APE for construction effects (Phase 1) and post-facility removal effects (Phase 2).
- PG&E will develop a plan and schedule in consultation with SHPO, Tribes, agencies, and other stakeholders to conduct a Tribal resources study to identify and evaluate Tribal resources for listing in the NRHP and California Register of Historical Resources[1] within the APE for construction effects (Phase 1) and post-facility removal effects (Phase 2). The study will include documentation of TEK as well as information about Tribal connections to lands and rivers and their place in Tribal cosmologies and culture. Evaluation of Tribal

[1] Resources will also be evaluated under the California Register of Historical Resources for use in the SWRCB's impacts assessment under the California Environmental Quality Act.

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resources will incorporate the Tribes' perspective on the role of Tribal resources in the way of life, economy, and culture of the Tribes' community.

- PG&E will develop a management plan, such as an HPMP. The plan will incorporate results from cultural and Tribal resource studies including TEK as well as concurrence on eligibility received from SHPO. The plan may also include additional studies to be conducted after FERC's approval of the license surrender to further identify effects and measures to avoid or mitigate adverse effects to Tribal resources. The plan will be reviewed in consultation with FERC, SHPO, Tribes, agencies, and other stakeholders and will outline implementation procedures such as management roles and responsibilities, Tribal and agency consultation, review requirements, implementation protocols, monitoring, as well as processes for revision of the plan and dispute resolution. The plan will be reviewed for compliance and consistency with federal and state environmental review requirements.

To avoid or reduce potential effects to Tribal water quality and fisheries resources from implementation of the Proposed Action, PG&E would obtain, prepare, and/or implement measures and plans identified in Section 2.2.4.3, Water Quality, and Section 2.2.4.4, Fish and Aquatic Resources, in coordination with Tribes and agencies as appropriate. These measures and plans would be applied during implementation of the Proposed Action. A complete list of measures is included in Section 2.1.2.2, Proposed Environmental Measures. Implementation of the Proposed Action would also include obtaining and implementing resource agency and construction permits in consultation with Tribes, following water quality best management practices, complying with local, state, and federal laws and incorporating TEK, as applicable, into the plans. Some of the plans to be implemented include:

- Restoration Plan
- Construction Site Water Diversion, Dewatering, and Drawdown Plan
- Aquatic Species Management and Monitoring Plan (including pre-construction surveys and fish rescue and relocation)
- Sediment/Channel Monitoring and Response Plan
- East Branch Russian River Diversion Plan
- Water Quality and Water Temperature Monitoring Plan
- Construction Non-native Invasive Aquatic Species Management Plan
- Water quality BMPs
- Hazardous Materials Handling Measures
- Estuary Protection Plan

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2.2.4.13.5 Resolution of Adverse Effects

The process for resolving adverse effects or *Finding of Adverse Effect* will follow the Section 106 process pursuant to 36 CFR Part 800.5 for *assessment of adverse effects* and 800.6 for *resolution of adverse effects*. Resolution of an adverse effect, as defined in 36 CFR Part 800.6, requires notifying the Advisory Council on Historic Preservation; consulting with the SHPO, Tribes, interested parties, and land managing agencies; and developing a Section 106 agreement document (typically a MOA or PA) that resolves adverse effects.

2.2.4.13.6 Beneficial Effects

See Section 2.2.4.4, Fish and Aquatic Resources, and Section 2.2.4.8, Geomorphology, for long-term beneficial effects to native fisheries and Eel River flows and sediment processes.

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2.2.4.14 Socioeconomic Resources

This section describes the potential effects to socioeconomic conditions and values that could occur because of the Proposed Action described in PG&E's Surrender Application for the Potter Valley Hydroelectric Project (Project) (see Section 2.1.2, Applicant's Proposal). Section 2.1.2 includes a description of decommissioning of Project facility modifications, including restoration activities, to be implemented under the Proposed Action.

Potential effects are separated into construction effects (Phase 1) and post-facility removal effects (Phase 2). The effects are determined by analyzing the changes in socioeconomic conditions and values that may result from activities to be implemented under the Proposed Action compared to the No-Action Alternative (existing condition) (Section 2.1.1, No Action Alternative).

Final effects determinations consider construction measures and post-facility removal measures included to avoid or mitigate impacts associated with the Proposed Action (refer to Section 2.1.2.2, Proposed Environmental Measures). Unavoidable adverse effects are discussed at the end of this section.

The following potential effects to socioeconomics resulting from Project facility modifications during construction and post-facility removal were evaluated:

- Water reliability and cost;
- Energy reliability and cost;
- Economic opportunity (income and employment);
- Population and housing effects;
- Recreation value;
- Community way of life;
- Local government stability and fiscal conditions; and
- Habitat and species-related cultural and economic values.

2.2.4.14.1 Phase 1: Short-term Construction Effects

Water Reliability and Cost

The Proposed Action may affect the quality and quantity of water available, which may affect the reliability and cost of water for economic uses in the socioeconomics Analysis Area.

Scott Dam Area

There are no expected effects on water reliability or cost in the Scott Dam Area as there are no known surface or authorized water diversions from the reservoir that would be affected by the Proposed Action. Water from Lake Pillsbury reservoir is currently used for fire suppression; see Section 2.2.4.9, Land Use, for further information on fire suppression.

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Cape Horn Dam Area

There are no expected effects on water reliability or cost in the Cape Horn Dam Area as there are no known surface water diversions from Van Arsdale Reservoir that would be affected by the Proposed Action.

Eel River Watershed

Construction activities at Scott Dam and Cape Horn Dam have the potential to temporarily impact water quality in the Eel River downstream of the dams. Higher sediment and other pollutants in the Eel River Watershed during and immediately after construction (see Section 2.2.4.3, Water Quality) could affect downstream surface water users and increase surface water system maintenance and water treatment costs. However, groundwater is the primary water source in the Eel River Watershed, with minor surface water diversions for agriculture and municipal use from the Eel River. According to the Humboldt County Department of Public Works, surface water consumption constitutes approximately 0.01 percent of the Eel River basin's surface water outflow (Humboldt County Department of Public Works 2022).

Surface water diversions for agricultural use averaged 117 ac-ft annually from 2011 to 2020 (compared to 12,338 ac-ft annually of groundwater pumping for irrigation), while total municipal surface water diversions in the Eel River basin by the City of Rio Dell and Scotia Community Services District averaged 824 ac-ft (compared to 1,733 ac-ft on average of municipal groundwater pumping in this time period for all municipalities in the Eel River basin) (Humboldt County Department of Public Works 2022). If there were adverse effects on water quality in the Eel River during construction, there could be localized adverse effects on water reliability and costs in the City of Rio Dell and Scotia Community Services District.

However, to address and reduce potential impacts to water quality during construction, PG&E would include water quality and erosion control measures that would be implemented at the construction activity locations in the vicinity of Scott Dam and Cape Horn Dam. Construction measures include a Construction Site Water Diversion, Dewatering, and Drawdown Plan, Construction Water Quality and Water Temperature Monitoring Plan, Stormwater Pollution Prevention Plan, Construction Erosion Prevention Plan, and BMPs. PG&E would also implement Hazardous Materials Measures to avoid or minimize the risk of soil contamination from accidental spills that could enter waterways. These measures would include the following: implementing construction-related BMPs to control spills; having emergency cleanup equipment readily available onsite; and implementing an SPCC Plan, with protocols for preventing spills and managing incidents should they occur. PG&E would implement measures for containment of human waste at all construction activity locations, including port-a-johns with secondary containment to prevent contaminants from entering the waterway. In addition, PG&E would obtain applicable resource agency and construction permits. With implementation of these measures, the potential for water quality effects would be negligible for the City of Rio Dell and Scotia Community Services District (as well as elsewhere in the watershed where there may be very limited surface water diversions).

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Russian River Watershed

Water reliability and cost in the Russian River Watershed may be affected during construction if inter-basin transfers of water from the upper Eel River Watershed to the East Branch Russian River cease. Water transfers may occur, or they may cease temporarily during construction (see Section 2.2.4.2, Water Use and Hydrology). During construction, if the upstream cofferdam at Cape Horn Dam is installed in the Eel River above the Van Arsdale Diversion, the diversion would not be operable and diversions into the East Branch Russian River would cease. PG&E would develop an East Branch Russian River Diversion Plan that could include temporary pumping to the diversion tunnel, if needed, to provide diversions to the East Branch Russian River during construction. With this plan, effects on water reliability and cost in the Russian River Watershed are expected to be negligible during construction.

Energy Reliability and Cost

The Proposed Action may affect hydropower generation at various small hydropower plants (non-Project) in the Analysis Area due to possible changes in flows during construction in the Russian River Watershed, which may affect the reliability and cost of energy in this area. Generation at the Potter Valley Powerhouse was discontinued in 2021.

Scott Dam and Cape Horn Dam Areas

There is currently no energy produced from Project facilities, so there is no direct expected effect on local energy production or associated reliability or cost in the Scott Dam or Cape Horn Dam areas.

Eel River Watershed

There are no hydropower facilities in the Eel River Watershed that would be affected by the Proposed Action, so there are no effects on energy reliability or costs in this area.

Russian River Watershed

Water diverted by the Project into the Russian River basin has the ancillary benefit of increasing flows through downstream hydropower production facilities (owned by the City of Ukiah and private entities) and thereby increasing energy production in these facilities. If inter-basin transfers of water occur throughout construction, then the Proposed Action would have no effects on energy reliability and costs. During construction, if the upstream cofferdam at Cape Horn Dam is installed in the Eel River above the Van Arsdale Diversion, the diversion would not be operable and diversions into the East Branch Russian River and its tributaries would cease (see Section 2.2.4.2, Water Use and Hydrology). PG&E would develop an East Branch Russian River Diversion Plan that could include temporary pumping to the diversion tunnel, if needed, to provide diversions to the East Branch Russian River during construction. With the implementation of this plan, the impact on generation at the downstream hydropower production facilities during construction would be negligible.

Potential effects on energy reliability if Project inter-basin transfers cease after dam removal are discussed below in the energy reliability section under Phase 2: Post-facility Removal Effects.

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Economic Opportunity (Income and Employment)

Construction spending could spur short-term local economic activity, directly and indirectly supporting economic opportunity in the four-county socioeconomic Analysis Area (Lake, Mendocino, Sonoma, and Humboldt counties). However, reduction in recreational opportunities during construction could decrease recreation-related economic activity and opportunity in the immediate Project area (this effect would be limited as there are few businesses and amenities in the immediate Project area).

The magnitude of jobs and income supported by construction activities depends on several factors, including the total construction budget, the proportion of the construction budget for labor versus materials/equipment, and the source location of construction labor, equipment, and materials (i.e., sourced locally or from outside the region). The effect on economic opportunity for residents in the Analysis Area would increase with higher levels of total construction spending, higher proportion of budget spent on labor, and higher proportion of labor and materials sourced from within the region. Data on these three key factors are not available for this analysis.

Existing estimates from other sources of possible Project construction spending and associated economic impact from dam removal were obtained. The Bay Area Council Economic Institute (2023) estimated that approximately 800 construction-related jobs could be supported in the region for 1 year (referred to as job-years in the study) during dam removal and restoration (Bay Area Council Economic Institute 2023). This analysis by the Bay Area Council Economic Institute (2023) further estimated that approximately 500 additional jobs lasting for 1 year could be supported in related sectors (indirect and induced effects of spending rippling through other economic sectors), for a total economic impact of approximately 1,300 job-years supported in the region (Table 2.2.4.14-1). The employment estimates by Bay Area Council Economic Institute (2023) were rounded to the nearest 50 jobs as the actual construction spending would likely differ from the estimates used in the study and the actual economic impacts would differ accordingly. Actual employment impacts during construction would vary from these estimates presented in Table 2.2.4.14-1 based on the key factors noted above regarding the magnitude, type, and location of construction spending.

Table 2.2.4.14-1. Potential magnitude of construction-related employment effects in the Analysis Area.

Construction Component	Direct (Job-Years, Construction Sectors)[1]	Induced and Indirect (Job-Years, Other Sectors)[1]	Total Employment (Job-Years, All Sectors)[1]
Scott Dam Removal	500	300	800
Cape Horn Dam Removal	300	200	500
Total	**800**	**500**	**1,300**

Source: Bay Area Council Economic Institute 2023

[1] All employment estimates in this table and in the text have been rounded to the nearest 50 jobs as the actual construction spending will likely differ from the estimates in the 2021 feasibility study and the actual economic impacts will differ from those in the 2023 economic study.

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Not all of these jobs would be supported at the same time, as the dam removal would be phased over time. The construction period for Scott Dam removal would be approximately 2 years, while the construction period for Cape Horn Dam removal would be approximately 1 to 1.5 years. PG&E is expected to initiate the removal of Scott Dam and Cape Horn Dam during the same low-flow season (thus in any 1 year, there could be employment effects from removal of both dams). Table 2.2.4.14-2 combines this construction schedule with the results from the Bay Area Council Economic Institute's economic analysis estimates presented in Table 2.2.4.14-1 to show the potential magnitude of average employment impacts in the Analysis Area during any 1 year. Since two job-years may represent one job supported over two 2 years, it is important to consider the duration of the construction period. This analysis assumes that construction employment would be evenly spread across the construction period. Accordingly, the final columns in Table 2.2.4.14-2 present the results of dividing the total job-year estimates (from Table 2.2.4.14-1) by the duration of the potential construction period to show the potential average number of jobs that may be supported in any 1 year during construction. The final row in the table presents a low range (if dam removal is staggered) and a high range (if both dams are removed simultaneously).

Table 2.2.4.14-2. Potential duration and annual magnitude of construction-related employment effects in the 4-county Analysis Area.

Construction Component	Potential Construction Duration (Years)	Annual Average Direct Construction Employment (Supported in Any 1 Year)	Annual Average Total Employment in all Sectors (Supported in Any 1 Year)
Scott Dam Removal	1.5 to 2.5	200 to 350	300 to 550
Cape Horn Dam Removal	1 to 1.5	200 to 300	300 to 500
Total	**1.5 to 4**	**200 to 650**	**300 to 1,050**

Source: Bay Area Council Economic Institute 2023

Note: All employment estimates in this table and in the text have been rounded to the nearest 50 jobs as the actual construction spending will likely differ from the estimates in the 2021 feasibility study and the actual economic impacts will differ from those in the 2023 economic study.

The effects during construction on economic opportunity by Project region are described below.

Scott Dam Area

Construction economic activity would occur at Scott Dam and would increase employment and jobs in this area. However, given how remote the area is, it is expected that most construction labor, services, and equipment would be sourced from farther away, from more urban areas, limiting the increase in economic activity experienced by current residents and businesses in the Scott Dam Area. There are a few service businesses and lodging facilities/vacation homes in this area that could provide limited services and accommodations to construction workers.

Recreation and tourism-related economic activity in the Scott Dam area may decline or cease altogether during construction because Project recreation facilities would be closed and removed, and vacation homeowners may choose to avoid the area during the construction period. However, there are few amenities and businesses in the Scott Dam Area, which would limit the effects of

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construction on economic opportunity (i.e., the total number of jobs and associated income affected is expected to be minor). Thus, while the overall effect is expected to be minor, there could be adverse effects on economic opportunity for the few businesses near Scott Dam during construction, which could even include ceasing operations for the short term.

Cape Horn Dam Area

Construction-related economic activity would occur at Cape Horn Dam and would increase construction employment and jobs in this area, as described above. However, there are no population centers near the Cape Horn Dam Area that would supply construction labor or specialized materials/equipment for the Proposed Action. As such, the jobs and income supported by construction would likely accrue to residents of other areas, which may include residents of other counties in the Analysis Area.

There is some recreation supported in the Cape Horn Dam Area, which would likely decline or cease during construction as facilities would be closed during the construction period. The Trout Creek Campground would be expected to be closed for the construction period and would open again after work is complete. However, recreation visitation is limited in this area (see Table 2.2.4.14-3). Therefore, negligible effects on economic opportunity are expected for businesses near Cape Horn Dam. In sum, there are expected to be negligible effects on economic opportunity for businesses and households near Cape Horn Dam.

Eel River Watershed

Due to the lack of population centers in the Eel River Watershed that could be used to source construction labor or supplies/services for the Proposed Action, there would likely be negligible effects on economic opportunity in this area.

Economic opportunity in the Eel River Watershed associated with recreation may be affected during construction. Flows in the Eel River are expected to increase during construction, including during the drawdown of the reservoir and after the dam lowering/spillway notching, when natural flows would pass over the dam into the Eel River (as there would be no storage; see Section 2.2.4.2, Water Use and Hydrology, and Table 2.2.4.2-1). If high flows pass over the lowered dam, their magnitude would be expected to be within the range that has occurred under existing conditions (see Section 2.2.4.2, Water Use and Hydrology). As discussed above, PG&E would implement several measures to address and reduce potential effects to water quality during construction, and therefore, the potential for increase in turbidity and suspended sediment and related water quality effects on recreation opportunity are expected to be negligible. The net effect on recreation opportunity during construction is likely negligible as recreation businesses and recreationists may need time to adjust to new flow conditions before visitation and associated recreation spending are affected.

Negligible effects on economic opportunity associated with changes in water supply or water quality for water users are expected in the Eel River Watershed during construction, as the volume of surface water used for economic activities is a small portion of total water use in the watershed.

In sum, the effects of construction on economic opportunity in the Eel River Watershed during construction are expected to be negligible.

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Russian River Watershed

Construction workers, materials, and equipment may be sourced from population centers in the Russian River Watershed, particularly the city of Ukiah. Non-local construction workers may also temporarily relocate and stay in the area, increasing demand for services from local businesses and increasing economic opportunity in the area.

As presented in Section 2.2.4.2, Water Use and Hydrology, if the cofferdam to dewater the work area at Cape Horn Dam is installed upstream of the Van Arsdale Diversion, PG&E would develop an East Branch Russian River Diversion Plan that could include temporary pumping to the diversion tunnel, if needed, to provide diversions to the East Branch Russian River during construction. With the implementation of this plan, the impact on water supply during construction would be negligible.

In sum, the effects on economic opportunity in the Russian River Watershed during construction are expected to be beneficial from construction worker spending and from inter-basin transfers of water during construction.

Population and Housing Effects

To analyze potential population and housing effects during construction, the evaluation below focuses on how increased demand for construction workers (as presented above) may affect population and housing. Employment effects in other sectors, such as restaurants, hotels, and other service industries that support construction work, are much less likely to affect the population and associated housing demand in the region because these jobs are more likely to benefit existing residents and not significantly affect migration to the region.[1] Based on the study by Bay Area Council Economic Institute (2023) and shown in Table 2.2.4.14-2, the direct construction employment at any one time in the Analysis Area may be 200 to 650 workers. A portion of construction workers may be local residents, and a portion may be from elsewhere, moving temporarily to the region during construction and thereby temporarily increasing the local population.

The magnitude of such a short-term population effect would vary depending on the total number of construction jobs, the proportion of construction jobs filled by non-residents who move to the area, and the number of people relocating to the region with each non-local worker. As an illustrative example, if half of construction workers were to be non-local, this would be an increase at any one time of approximately 100 to 325 workers in the Analysis Area. Construction workers may relocate by themselves or with household members. If an average of one additional person accompanied each construction worker, this would be an increase of 200 to 650 people in the Analysis Area. The actual effect on the Analysis Area population during construction may be

[1] This is for several reasons. First, employment in other sectors is likely much more dispersed among many workers. For example, one full-time equivalent job supported in the restaurant sector may actually be experienced as an increase in workload spread across four different workers in four different restaurants, with no actual increase in employment (although there is an increase in income and productivity). Second, firms know that an increase in demand for their services related to the Proposed Action is short term. As such, firms may choose to meet the additional demand without hiring additional workers.

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higher or lower than this potential range of 200 to 650 new residents, depending on the factors noted above.

Scott Dam Area

Summer homes, recreational campgrounds, and other lodging options near Lake Pillsbury reservoir and elsewhere in Lake County may be used by construction workers. There are approximately 300 single-family homes, including the Lake Pillsbury Homesite Tract, Lake Pillsbury Ranch, Rice Fork Residence Tract, and Westshore in the Lake Pillsbury reservoir basin (Lake Pillsbury Alliance n.d.). As of the 2020 census, in Lake County in Census Tract 1 (which extends from Sanhedrin Mountain to the north to Clear Lake in the south and includes Lake Pillsbury reservoir as well as other towns such as Lakeport, Soda Bay, and Clearlake) there are an estimated 1,549 housing units, of which 1,320 were occupied, leaving approximately 229 housing units (or 15 percent) vacant. Local construction workers could rent homes, stay at the local recreational campgrounds, or stay at other lodging in this area. In this case, increased demand for housing and lodging in the area could partially or wholly offset decreased recreation/tourism demand during construction. The net effect on the local population between potential decreased demand from recreation/tourism/vacation homeowners and potential increased demand for construction worker housing is expected to be negligible.

Cape Horn Dam Area

No effect on housing or population is expected in the vicinity of Cape Horn Dam as few if any construction workers are expected to lodge near Cape Horn Dam due to the lack of housing and lodging facilities.

Eel River Watershed

Due to the lack of population centers in the Eel River Watershed near the dams, it is unlikely that many non-local construction workers would lodge in this area. There are little to no expected effects on housing or population in the Eel River Watershed.

Russian River Watershed

Construction workers from outside the region may choose to reside in different locations throughout the Analysis Area, potentially affecting the population and associated lodging or housing demand in nearby towns or communities in any of the Analysis Area counties. Alternatively, if workers are spread among the counties in the Analysis Area, no single town or city would be much affected. The city of Ukiah is a likely base for many relocated construction workers given its proximity and size. As presented in Section 2.2.3.13, Socioeconomic Resources, Table 2.2.3.13-2, the city's population is estimated at approximately 16,500 people. While the construction workforce and associated household members may be much smaller, the maximum population increase of up to 650 people in Ukiah (using the data from the Bay Area Council Economic Institute on construction employment and the assumptions discussed above regarding the proportion of the workforce that may be non-local) if all non-local workers relocate to Ukiah represents approximately 4 percent of the current population.

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With regard to housing, as of the 2020 U.S. census, there were 6,952 housing units in Ukiah, of which 368 or 5 percent were vacant (U.S. Census Bureau 2020). For comparison, across California as a whole, approximately 6 percent of housing units were vacant in the 2020 U.S. census (U.S. Census Bureau 2020). If, on the high side, up to 325 households relocated to Ukiah during construction and chose to live in one of these homes rather than lodge in a motel or hotel, then construction worker households could occupy most of the vacant homes. While increased demand for housing tends to increase housing prices, the effect of temporary construction workers on housing prices in the Analysis Area would likely be minimal, given that a short-term construction project would not likely cause a worker to purchase a house in the area and the number of relocated construction workers relative to the overall population in Ukiah and elsewhere in the Analysis Area would be relatively small. In sum, construction effects on population and housing throughout the Russian River Watershed are expected to be negligible.

Recreation Value

At Scott Dam, construction activities include the initiation of reservoir drawdown after the runoff season when inflows would be generally below 400 cfs. Reservoir storage at the start of the drawdown period (June) would be approximately 50,000 ac-ft. Completion of the drawdown to approximately 10,000 ac-ft of storage at an elevation of 1,861.7 ft. would occur by October. This drawdown would likely affect value associated with certain types of water-based recreation opportunity to recreationists throughout the Analysis Area during construction. The magnitude of effect of the Proposed Action on recreation value depends on how the Proposed Action would change the quality and quantity of recreation opportunity and how this would affect recreation visitation and value to the recreationists per visit. This section estimates change in value to recreators based on the current recreation visitation level (visitor days), estimates of how the number of visitor days may change with the Project, and estimated average value per recreation visitor day.

Scott and Cape Horn Dam Areas

Under the Proposed Action, certain Project recreation facilities would be removed in the Scott Dam Area and recreation activity in the Project area would be prohibited during construction (see Section 2.2.4.10, Recreation Resources). As such, this section estimates the adverse effect of Proposed Action construction on short-term recreation value based on the total value of current recreation visitation that would no longer be available in the Analysis Area.

Estimates of recreation visitation at PG&E recreation facilities, Van Arsdale Reservoir, and Lake Pillsbury reservoir are available in the FERC relicensing PAD for the Project (PG&E 2017) and are presented in Table 2.2.4.14-3 below. Data were collected and reported to FERC by PG&E every 6 years, so the recreation visitation data are available only for 2002, 2008, and 2014. As shown in Table 2.2.4.14-3, recreation visitation at Lake Pillsbury reservoir during that time period varied substantially from year to year, but on average was estimated at approximately 60,000 visitor days (one person for one day) annually, while average visitation at Van Arsdale Reservoir was estimated at approximately 4,000 visitor days annually.

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Table 2.2.4.14-3. Lake Pillsbury reservoir and Van Arsdale Reservoir annual recreation visitation and value (in 2024 dollars) for 2002, 2008, and 2014.

Reservoir/Year	Time Period of Recreation Count	Visitor Days			Estimated Annual Average Recreation Value
		Campers	Day Users	Total	
Lake Pillsbury					
2002	5/1–9/30	67,500	20,300	87,800	$2,630,000
2008	5/1–9/5	35,000	21,500	56,500	$1,700,000
2014	5/1–9/5	22,106	12,444	34,550	$1,040,000
Average		41,535	18,081	59,617	**$1,790,000**
Van Arsdale					
2002	4/26–9/5	500	2,000	2,500	$80,000
2008	5/1–9/5	2,700	2,300	5,000	$150,000
2014	5/1–11/15	1,705	2,836	4,541	$140,000
Average		1,635	2,379	4,014	**$120,000**

Sources: CDPR 2014; PG&E 2017; Rosenberger et al. 2017; USACE 2018

Sources in the economic literature vary in their estimates of the net value to recreationists per visitor day,[2] but for general motorized boating, camping, swimming, and picnicking activities, estimates tend to be between $10 and $50 per day (see CDPR 2014; Rosenberger et al. 2017; USACE 2018). Using an average value or net benefit to recreationists of $30 per visitor day, current recreation visitation at Lake Pillsbury reservoir may have an average recreation value of approximately $1.8 million annually, while recreation value at Van Arsdale Reservoir may have an average recreation value of approximately $0.1 million annually. Assuming that absolutely no recreation would occur at the reservoirs during the construction period, this represents the magnitude of the potential adverse effect on recreation value to recreationists in the Scott Dam and Cape Horn Dam areas. To the extent that recreationists shift recreation to other area reservoirs, lakes, and recreation sites during construction, the overall adverse effect on recreationists may be lower.

Eel River Watershed

Flows in the Eel River are expected to increase during construction (see Section 2.2.4.2, Water Use and Hydrology), which may enhance recreation opportunities in the Eel River. However, water quality would decline temporarily due to sediment released from the Project reservoirs, which could adversely affect recreation and associated economic opportunity. As discussed above, PG&E would implement several measures to address and reduce potential effects to water quality during construction, and, therefore, effects to water quality are considered negligible. If river-based recreation activities are halted on the Eel River during construction, effects on recreation would be adverse. Otherwise, the net effect on recreation during construction is likely negligible

[2] The net value to recreationists, or consumer surplus, is the value of the recreation experience less any costs of the experience such as fees paid for recreation or travel costs.

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as recreation businesses and recreationists may need time to adjust to new flow conditions before visitation and associated recreation spending is affected.

Russian River Watershed

As presented in Section 2.2.4.2, Water Use and Hydrology, if the cofferdam to dewater the work area at Cape Horn Dam is installed upstream of the Van Arsdale Diversion, PG&E would develop an East Branch Russian River Diversion Plan that could include temporary pumping to the diversion tunnel, if needed, to provide diversions to the East Branch Russian River during construction. With the implementation of this plan, the impact on the value of recreation during construction would likely be negligible.

Community Way of Life

The addition of temporary construction workers for a short period of time may affect community identity and community way of life. However, given the relatively small number of expected construction workers at any one time as a percent of the city of Ukiah or other locations within the Analysis Area where temporary workers may reside, the effects of population change on the community way of life throughout the Analysis Area are expected to be negligible. Other types of effects on community way of life are expected throughout the Analysis Area, as described below.

Scott Dam Area

Residents, visitors, and businesses proximate to the reservoirs would likely experience aesthetic, recreation, noise, vibration, and potential dust impacts during construction activities that could adversely impact community way of life (see Section 2.2.4.10, Recreation Resources; Section 2.2.4.11, Aesthetic Resources; Section 2.2.4.15, Air Quality; Section 2.2.4.16, Noise; and Section 2.2.4.17, Traffic, for further descriptions of these types of impacts). Construction activities are anticipated to last approximately 2 years at Scott Dam and approximately 1 to 1.5 years at Cape Horn Dam. According to the Lake Pillsbury Alliance, the Lake Pillsbury reservoir basin includes about 450 homeowners and ranches (Lake Pillsbury Alliance n.d.). There are approximately 3,500 people residing in the entire census tract surrounding Lake Pillsbury reservoir, which also includes towns such as Lakeport, Soda Bay, and Clearlake. The community way of life of these people, particularly those living or recreating near Lake Pillsbury reservoir, may be adversely affected during construction from aesthetic, recreation, noise, vibration, and potential dust impacts, resulting in adverse effects to socioeconomic resources.

Cape Horn Dam Area

Residents, visitors, or businesses in the Cape Horn Dam Area would experience similar disruptions and impacts during construction as those described above for the Scott Dam Area. However, as there are few residences near Van Arsdale Reservoir, the effects of these types of disruptions on community quality of life in this census tract are expected to be negligible.

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Eel River Watershed

Similar to the Cape Horn Dam Area, communities in the Eel River Watershed could experience temporary effects related to transportation networks. However, measures enacted to address these issues would reduce such effects, with negligible impacts on community way of life.

Russian River Watershed

Project effects on community way of life in the Russian River Watershed would be negligible since there are no direct construction activities in the watershed and all other socioeconomic indicators discussed above would be negligible due to the implementation of the East Branch Russian River Diversion Plan, which could provide diversions to the East Branch Russian River during construction.

Local Government Stability and Fiscal Conditions

Local government revenues fund public services such as highways and streets, public safety, economic development, health and welfare, culture and recreation, and education. Local economic activity in the Analysis Area, and associated sales and lodging taxes, support local governmental stability and fiscal conditions. Additionally, property values and associated property taxes support local government stability and fiscal conditions. See Section 2.2.3.13, Socioeconomic Resources, Table 2.2.3.13-6 for details on county revenue sources.

Scott Dam Area

As described above, recreation and tourism spending associated with reservoir-based recreation and tourism at Lake Pillsbury reservoir would be expected to decline during construction, with potential short-term adverse effects on Lake County local government revenue sources such as sales tax and lodging tax. However, there would potentially be two effects that may offset these adverse effects. First, if construction workers are from Lake County or relocate to Lake County and/or the Proposed Action sources materials and equipment from Lake County, the net short-term effect on Lake County local government revenues associated with economic activity levels may be negligible to beneficial. Second, if recreationists and tourists shift their spending from the region around Lake Pillsbury reservoir to other locations within Lake County (or shift spending to river-based recreation in the Project area) and do not decrease total spending in Lake County, there would be no adverse effects at the county level associated with reduced tourism spending.

The Proposed Action could result in temporary increased demand for local and county emergency services in support of safety during construction activities, but these would be reduced with adherence to the public safety plan and could be similar to other large construction projects in the region. The Proposed Action could also result in increased costs and time required to obtain water for aerial firefighting units (including tankers and helicopters) and for requiring alternative sources instead of drafting water downstream of Scott Dam[3] for local fire suppression (since Lake Pillsbury reservoir is a source of water for fire suppression) or increased road or other infrastructure maintenance costs to local governments (Thompson 2023). However, a Post-construction Road Restoration Plan would be

[3] USFS is responsible for fighting wildfires in the MNF and has consistently used water sources from Lake Pillsbury reservoir to fight wildfire in the area and drafts water downstream of Scott Dam; this source would be less available following implementation of the Proposed Action.

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implemented post-construction, with measures to assess road conditions and actions to remediate damage. All roadways within the FERC Project boundary would be restored to existing conditions as part of PG&E construction to facilitate continued safe access to the construction areas. The use of roadways outside of the FERC Project boundary may require transportation permits from Caltrans (e.g., oversized/overweight or variance permit) and potentially USFS and county permits. Required permits contain measures designed to minimize damage to existing roadways and would include restoration requirements where damage is incurred. Therefore, road damage and costs associated with repairs to local governments resulting from construction vehicle use is considered negligible. Potential long-term effects on property values and associated tax revenues are discussed below under Phase 2: Post-facility Removal Effects.

Cape Horn Dam Area

While construction activity would occur at Cape Horn Dam, there is little to no expected change in economic activity at local businesses in the area, so there are no changes in local government tax revenues associated with the Proposed Action in this area.

However, as with the Scott Dam Area, the Proposed Action could result in increased demand for local and county emergency services in support of safety during construction activities, but these would be reduced with adherence to the public safety plan and could be similar to other large construction projects in the region. Further, the Proposed Action could result in increased road or other infrastructure maintenance costs to local governments. A Post-construction Road Restoration Plan would be implemented that would assess road conditions and take actions to remediate damage. All roadways within the FERC Project boundary would be restored to existing condition as part of PG&E construction to facilitate continued safe access to the construction areas. The use of roadways outside of the FERC Project boundary may require transportation permits from Caltrans (e.g., oversized/overweight or variance permit) and potentially USFS and county permits. These permits would contain measures designed to minimize damage to existing roadways and would include restoration requirements where damage is incurred. Therefore, costs to local governments of road damage and associated repairs resulting from construction vehicle use are considered negligible.

Eel River Watershed

Flows and water quality in the Eel River are expected to change during the construction period (see Section 2.2.4.2, Water Use and Hydrology, and Section 2.2.4.3, Water Quality), which may affect aesthetics and recreation. As these are short-term effects during construction, there would likely be a negligible effect on property values and associated effects on property tax revenues to local governments during the construction period.

Russian River Watershed

As described above, economic activity (and associated local government tax receipts) in the Russian River is affected by the reliability and cost of water. The East Branch Russian River Diversion Plan could include temporary pumping to the diversion tunnel, if needed, to provide diversions to the East Branch Russian River during construction. Under this plan, inter-basin transfers from the Eel River Watershed to the Russian River Watershed would occur during

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construction, if needed, so there are negligible expected effects on local government stability and fiscal conditions in the Russian River Watershed during construction.

Habitat and Species-related Cultural and Economic Values

As described in Section 2.2.4.4, Fish and Aquatic Resources, effects on habitat and species in the Project area under the Proposed Action compared to the No-Action Alternative would likely be adverse during construction. Potentially affected species with Tribal cultural value and socioeconomic value to other communities include Pacific lamprey, Chinook salmon, coho salmon, steelhead, green sturgeon, northwestern pond turtle, and freshwater mussels. Potential adverse effects to these fish and wildlife species would be particularly experienced by conservationists, Tribal members, and others who value species and habitat conservation. People may value aquatic habitat and species conservation due to cultural values, personal beliefs and moral ethics (i.e., believing protecting a species and its habitat is the right thing to do), altruism (i.e., believing a resource should be protected so that others can use it or benefit from it), and/or a desire to bequeath the resource (i.e., believing a resource should be protected for future generations). Measures to reduce effects to aquatic species and habitats include an East Branch Russian River Diversion Plan, an Aquatic Species Management and Monitoring Plan, and a Construction Water Quality and Water Temperature Monitoring Plan (see Section 2.2.4.3, Water Quality, and Section 2.2.4.4, Fish and Aquatic Resources). These plans would be developed to mitigate the effects of the Proposed Action on fish and aquatic resources in the Eel River and East Branch Russian River, resulting in expected minor adverse effects to socioeconomic values.

While the economic cost of the Proposed Action on aquatic species and their habitats cannot be quantified, it would likely be adverse.

2.2.4.14.2 Phase 2: Post-facility Removal Effects

Post-facility removal effects to socioeconomic values and conditions resulting from physical changes may occur following removals of the dams and recreation facilities/ancillary facilities (Phase 2) compared to the No-Action Alternative (existing condition). Effects on the same set of socioeconomic values evaluated for construction (Phase 1) are evaluated for the post-facility removal period.

Water Reliability and Cost

The Proposed Action may affect the quality and quantity of water available, which may affect the reliability and cost of water for economic uses in the Analysis Area.

Scott Dam Area

There are no expected effects on water reliability or cost in the Scott Dam Area as there are no known surface water diversions that would be affected by the Proposed Action. Water from Lake Pillsbury reservoir is currently used for fire suppression; see Section 2.2.4.9, Land Use, for further information on fire suppression.

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Cape Horn Dam Area

There are no expected effects on water reliability or cost in the Cape Horn Dam Area as there are no known surface water diversions that would be affected by the Proposed Action.

Eel River Watershed

Currently, a very limited portion of Eel River flows are diverted and used for water supply. After the construction period and flushing of sediment through the river system, water quality effects in the Eel River are expected to subside. With natural flows restored in the Eel River, over the long term, there may be a beneficial effect on water quality in the Eel River Watershed. Over the long term, there would be negligible effects on water reliability or cost to downstream surface water users. One objective of the proposed Sediment/Channel Monitoring and Response Plan is to identify diversions that could be affected by the Proposed Action and address potential sediment issues at these water intakes. Additional information about water diversions in the East Branch Russian River is provided in Section 2.2.3.1, Water Use and Hydrology, and in Section 2.2.4.8, Geomorphology.

Russian River Watershed

Post-construction, there would be no Project inter-basin transfers of water, so there would be an adverse effect on agricultural water reliability and cost in the Russian River Watershed, particularly in PVID and downstream agricultural areas. Figure 2.2.4.2-3 in Section 2.2.4.2, Water Use and Hydrology, shows modeled flow releases into the East Branch Russian River with average and maximum PVID diversions. Depending on how water management would shift with cessation of Project inter-basin transfers, there may also be an adverse effect on municipal and industrial water reliability and/or cost in the upper Russian River Watershed. Water supply scenarios developed by Highland Economics to inform a 2020 economic analysis of the Project indicated that without Project inter-basin transfers, agricultural water supply would be reduced in all reaches from the Potter Valley Powerhouse outlet down to Healdsburg (Highland Economics 2020). This same analysis found that unless minimum instream flows and reservoir levels were modified, municipal and industrial water supply would also be reduced by 20 percent on average, with greater reductions in dry water years (Highland Economics 2020). Based on the Highland Economics (2020) study, these reductions can result in numerous costs for water users, including increased cost to procure alternate sources and costs of curtailment. However, if inter-basin transfers of water occur (see Section 2.2.4.2, Water Use and Hydrology) and/or if alternative water supplies can be obtained, this effect could be negligible. One objective of the proposed Sediment/Channel Monitoring and Response Plan is to identify diversions that could be affected by the Proposed Action and address potential sediment issues at these water intakes. Additional information about water diversions in the East Branch Russian River is provided in Section 2.2.3.1, Water Use and Hydrology, and in Section 2.2.4.8, Geomorphology. In addition, as described in Section 2.2.5, Cumulative Effects, operation of the NERF would divert water to the East Branch Russian River for use by ERPA. Once completed, operation of the NERF will result in the long-term diversion of water from the Eel River into the East Branch Russian River.

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Energy Reliability and Cost

The Proposed Action may affect hydropower generation in the Analysis Area, which may affect the reliability and cost of energy in the Analysis Area. Generation at the Potter Valley Powerhouse was discontinued in 2021.

Scott Dam and Cape Horn Dam Areas

There is currently no energy produced from Project facilities, so there is no direct expected effect on local energy production or associated reliability or cost in the Scott Dam or Cape Horn Dam areas.

Eel River Watershed

There are no hydropower facilities in the Eel River Watershed that would be affected by the Proposed Action, so there are no effects on energy reliability or costs in this area.

Russian River Watershed

Under the Proposed Action, post-construction, inter-basin transfers of water from the Eel River to the Russian River would cease. Depending on future water management strategies, flows in the Russian River may decrease. If flows through hydropower facilities on the Russian River decrease, then energy production by these facilities may also decrease, depending on the water management strategies in use at these facilities. There may, therefore, be localized adverse effects on the cost of energy to hydropower plant owners in the Russian River Watershed, which may be passed on to consumers. However, the relatively small capacity of these hydropower facilities relative to total energy demand in the region and the relatively small volume of inter-basin transfers relative to total Russian River flows limit hydropower effects. Therefore, the potential effects on energy reliability and costs throughout the Russian River Watershed would be negligible (although effects on energy costs to hydropower entities may be adverse unless inter-basin transfers of water occur; see Section 2.2.4.2, Water Use and Hydrology).

Economic Opportunity (Income and Employment)

Project operations directly support little economic activity, and Proposed Action construction economic activity would cease following dam removal, so in the long term there would be few jobs directly affected by the Proposed Action. However, there would be effects on economic activity due to the change from a lacustrine to riverine environment and the return to unimpaired hydrology in the Eel River and East Branch Russian River. Water resources are used for out-of-stream consumptive uses such as agriculture, residential, and municipal uses, as well as for instream recreation/aesthetic/habitat conditions important to the recreation and tourism industries and the commercial fishing industries, with consequent effects on employment and income.

Scott Dam

As discussed above, the aesthetics and recreation opportunities at Lake Pillsbury reservoir attract recreationists and tourists who spend money at the few businesses located at the reservoir, supporting the local economy. Further, recreation opportunities and aesthetics attract and retain residents, further supporting the local economy. Removal of Scott Dam and restoration of a natural flowing river would alter the recreational activities and aesthetics of the local area. While reservoir-based

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recreation would no longer be feasible at the Project site, restoration of the river would increase the availability of river-based recreation. The net effect on visitation, total visitor spending, and the limited associated jobs and income supported in the area would likely be adverse at first during the early stages of restoration and as people adjust to new recreation opportunities. However, in the longer term, river-based recreation may provide similar economic opportunity such that effects may be negligible or even possibly beneficial. In sum, effects on economic opportunity at Scott Dam may be adverse particularly in the short term (with potential magnitude of adverse effects similar to the effects described above under the construction phase) but could potentially be negligible or even beneficial due to river-based recreation opportunities and amenities.

Cape Horn Dam

There is currently limited economic activity in the Cape Horn Dam Area. While there is some recreation at Van Arsdale Reservoir, there is little recreation spending or associated employment and income due to the paucity of businesses in the area. Therefore, Cape Horn Dam removal is expected to have a negligible effect on economic opportunity in the Cape Horn Dam Area.

Eel River Watershed

The Eel River historically supported an active fishery, but this fishery has been adversely affected by dwindling stocks. If fish abundance in the Eel River were to improve in response to the Proposed Action and return to natural conditions, then economic opportunity associated with commercial and recreational fishing could also increase. The magnitude of this economic benefit would depend on fish abundance, the level of fish harvest, and the length of the recreational fishing season allowed by pertinent regulations.

Additionally, a return to natural flows would affect river-based recreation and aesthetics in the Eel River. As noted in Section 3.4.1.10, Recreation Resources, removal of Scott Dam and Lake Pillsbury reservoir may extend the Eel River Run by about 4.8 mi. and would likely have a beneficial effect on recreation. This may be associated with increased recreation expenditures in the region, which would enhance recreation-related employment and income in the watershed.

Russian River Watershed

Post-construction, there would be no inter-basin diversions of water from the Eel River to the East Branch Russian River. This would affect availability of water in the Russian River basin, including to agricultural users in the PVID, in downstream reaches of the Russian River, and possibly to municipal and industrial water users in the Russian River basin. The effect on Russian River basin water users would depend on how management of Russian River water supplies adjusts to a lack of inter-basin transfers, including whether minimum instream flows and reservoir levels are adjusted.

Regarding agriculture, water abandoned by the Project that is diverted by the PVID in Mendocino County is used to grow pasture, hay, grains, pears, wine grapes, and other specialty crops (National Agricultural Statistics Service 2023). Farther downstream, the Russian River provides water supplies for additional cropland, primarily planted to high-value orchards and vineyards in Mendocino and Sonoma counties. Reductions in irrigation water supply in these agricultural areas may result in reduced agricultural production value and less economic opportunity.

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Two recent economic analyses by Highland Economics (2020) and Economic Forensics and Analytics, Inc. (2023) studied the potential impact of cessation of Project inter-basin water diversion on Sonoma and Mendocino counties' economies. The Highland Economics analysis estimated that reductions in agricultural productivity due to reduced water supply[4] could result in approximately 100 fewer jobs being supported in Sonoma and Mendocino counties, with roughly half of the impact in each county (Highland Economics 2020). Similarly, the Economic Forensics and Analytics, Inc. analysis focused on the Sonoma County economy estimated that a 10 percent water reduction supply (which the analysis indicated could be similar to the effects of cessation of Project inter-basin transfer of water) could result in 50 fewer agricultural jobs and a decrease of approximately $6.0 million in annual income in Sonoma County (Economic Forensics and Analytics, Inc. 2023). The Economic Forensics and Analytics, Inc (2023) study also estimated that cessation of inter-basin transfers could result in a 30 percent water supply reduction to agriculture, with three times the effect on jobs and income.

The effect of ceasing Project inter-basin transfers on Russian River basin municipal, commercial, and industrial water users is highly dependent on how water supply management would change with cessation of Project inter-basin transfers and also on hydrologic water year. Based on the Highland Economics study, if instream flows and reservoir levels were reduced in order to continue to meet water user demands in the face of lower supply, it is possible that there would be little to no effect on these users (Highland Economics 2020). However, if water supplies to municipal and industrial users are reduced, water shortages or curtailments would impose costs on household, commercial, and industrial water users. The Highland Economics (2020) study identified that these costs could span such diverse categories as inconvenience, aesthetics (for example, brown lawns and unwashed cars), damaged or lost landscape plants, increased costs of alternative production practices or technology, or reduced economic activity by commercial and industrial users. Highland Economics and Economic Forensics and Analytics, Inc. estimated the economic cost to Sonoma County of reduced municipal, commercial, and industrial water supplies may range from approximately $300 to $3,000 per ac-ft, depending on the user and the severity of water shortage (Economic Forensics and Analytics, Inc. 2023; Highland Economics 2020).[5] For commercial users, the key economic sectors in Mendocino and Sonoma counties that are particularly reliant on water include utilities; manufacturing industries such as lumber/sawmills, wineries, and food processing; and tourism industries such as lodging and food service establishments (Highland Economics 2020). If elimination of Project inter-basin transfers resulted in a 10 percent reduction in municipal, commercial, and residential water supply in Sonoma

[4] This study analyzed two water supply management alternatives to cessation of Project inter-basin transfers. Most results are presented for a scenario that included reductions in both water supply and instream flows. The scenario assumed there would be: (1) a reduction in minimum instream flows (compared to baseline conditions); (2) a new Hydrologic Index based on Lake Mendocino inflow with modified thresholds compared to baseline conditions; and (3) annually varying reductions in water supply to municipal and agricultural water users.

[5] The study estimated that eliminating Project inter-basin transfers would reduce income to commercial, municipal, and industrial users by approximately $58.9 million. Inter-basin transfers are approximately 62,500 ac-ft annually, of which the study estimated that 34.2 percent or approximately 21,375 ac-ft is used by commercial, municipal, and industrial users. Dividing $58.69 million by 21,375 provides an estimated $2,750 of income generated per ac-ft.

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County, then the cost could be approximately 250 jobs and $60 million in reduced income across all sectors (Economic Forensics and Analytics, Inc. 2023).

Similarly, the Highland Economics (2020) study determined that water-based recreation and tourism-related economic activity in the Russian River basin may be affected by cessation of Project water transfers. Reduced flows and reservoir levels may adversely affect recreation quality and opportunity for boaters in the Russian River and for recreationists at Lake Mendocino (if Lake Mendocino management is modified). The effects on employment and income of these changes to recreation availability in the Russian River basin may be relatively low, or less than 20 jobs (Highland Economics 2020).

In summary, the Proposed Action (including the cessation of Project inter-basin transfer of water) would have an adverse effect on economic opportunity in the Russian River Watershed. However, if inter-basin transfers of water occur (e.g., see Section 2.2.4.2, Water Use and Hydrology) and/or if alternative water strategies can be achieved, this effect would be negligible.

Population and Housing Effects

Post-dam removal, there would be negligible direct effects on housing or population as there are only a few PG&E employees operating and maintaining Project facilities. However, there may be indirect effects on housing and population in some parts of the Analysis Area due to changes in economic opportunity, aesthetics, and recreation resources.

Scott Dam Area

In the Scott Dam Area, changes in recreation and aesthetics from dam removal may affect the attractiveness of the area for homeowners and recreationists, which may affect both population and housing demand.

There may be potential effects on property values in the Scott Dam Area due to dam removal. The Proposed Action would affect different aspects of the community around Scott Dam and Lake Pillsbury reservoir, such as recreation, aesthetics, water quality, and community identity, which can, in turn, affect property values. For property owners, Lake Pillsbury reservoir is an amenity with a positive economic value. Economic studies of the effects of reservoir recreation and views on nearby housing prices indicate that effects vary substantially based on location, water body characteristics, and other factors. Some studies have found that up to approximately 20 percent of lakefront property value may be related to the aesthetic and recreation amenity of the lake (see for example, Dickes and Crouch 2015; Lansford and Jones 1995; Loomis and Feldman 2003). However, the area is remote with few properties with unobstructed views of Lake Pillsbury reservoir.

Regarding the potential effects on these few properties, several studies have also analyzed the effects of dam removal on property value. For example, one study reviewed the effect of 75 dam removal projects in the New England region and found no statistical effect on property value (Guilfoos and Walsh 2023). Other studies have reported an increase in value following dam removal and restoration (i.e., Bohlen and Lewis 2009; Born et al. 1998; Kruse and Scholz 2006). Increases in value were generally related to improvements in water quality, removal of dam structures, and enhancement of the natural riparian environment. However, many of the dams in

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these studies created small impoundments, not large reservoirs such as Lake Pillsbury reservoir, so Proposed Action effects may be different from effects in the studies noted above.

One study that modeled the effects of the Klamath River dam removals (Kruse and Ahmann 2009) found that adjacency to Klamath Project reservoirs increased residential property values, all else equal. As noted in a review of potential property value effects of the Klamath Dam removals, there are several factors that make it challenging to predict the impacts of dam removal on property values, including local real estate market conditions and varying priorities and values held by current and prospective homeowners (such as for lakefront property versus proximity to a free-flowing river) (Snyder et al. 2012).

Another pertinent study at Almanor Lake in California found that increased exposure of shoreline, which would result from dam removal, lowers house prices between 0.2 percent and 1 percent for every additional foot of exposed shoreline (Loomis and Feldman 2003). However, proximity to rivers also tends to increase property values (Nicholls and Crompton 2017). Following dam removal and restoration actions, natural flows of the Eel River would be reestablished within the reservoir bed and downstream of the former Scott Dam site. Some property owners or potential property owners may prefer a natural flowing river over a reservoir, potentially limiting the effect on property values or even enhancing property values of some homes. The properties surrounding the reservoir would be more distant from the river than they are from the reservoir, and due to this distance and potential riparian vegetation restoration, the few properties that currently have reservoir views may not have a view of the river. For these reasons, the property value benefit of the restored river may be less than the property value benefit of the reservoir. In summary, some local property owners near Lake Pillsbury reservoir may experience a change in property values due to the change in aesthetics and recreation; this effect in the long term may be adverse, negligible, or beneficial.

In sum, current residents and recreationists are drawn to the region for the recreational opportunities provided by Lake Pillsbury reservoir. In the initial years following dam removal, the net effect on population and housing values is likely to be adverse. Over the long term, residents and recreationists may be drawn to the region for the amenities provided by a free-flowing river. The net effect on population and housing values may be adverse or it may be beneficial. The effects of the Proposed Action are more likely to be less adverse or even possibly beneficial following restoration of the Lake Pillsbury reservoir lands.

Cape Horn Dam Area

In the Cape Horn Dam Area, only a few PG&E employees operate and maintain Project facilities. After dam removal, these employees would no longer be required to conduct work in the area. As such, effects on population and housing are expected to be negligible and not expected to affect economic opportunity (see above discussion) or other socioeconomic conditions at the level that would be required to cause population to change.

Eel River Watershed

In the Eel River Watershed, effects on population and housing are expected to be negligible as the Proposed Action is not expected to affect economic opportunity (see above discussion) or other socioeconomic conditions at the level that would be required to cause population to change.

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Russian River Watershed

Population and associated housing demand in areas that are economically reliant on inter-basin transfers of water from the Project, such as within the PVID, could be affected due to reductions in economic opportunity and changes in community way of life.

In particular, economic opportunity and community way of life may be affected in the PVID, which uses Project inter-basin transfers of water. The population within the PVID is estimated at approximately 1,000 people (see Section 2.2.3.13, Socioeconomic Resources, Table 2.2.3.13-2). The lifestyle and economic opportunity of many of these residents may be affected by reductions in water availability, which could reduce population and housing demand in the area. However, people who reside in the PVID area have likely chosen that location not just because of access to irrigation water but also for many other reasons, such as enjoying a rural lifestyle, scenic views, and access to recreational amenities. In addition, alternative water management strategies may be put into place to address the reduction in water from the current diversion. As such, the effect on population and housing may be negligible to minor and adverse.

Due to the complexity of factors affecting population change, while it is possible that there could be localized adverse effects on population and housing (particularly in the PVID), the Proposed Action would likely have a negligible effect on population and housing throughout the Russian River Watershed.

Recreation Value

Changes in water management would affect value associated with water-based recreation opportunity to recreationists throughout the Analysis Area.

Scott Dam and Cape Horn Dam Areas

Currently, the reservoirs are attractions to recreationists visiting recreation sites at Lake Pillsbury reservoir and Van Arsdale Reservoir, as presented above. Removal of Scott Dam and restoration of a natural flowing river would alter the type and quality of recreational activities and aesthetics of the region. However, with restoration to a natural flowing river, river-based amenities and recreation may replace reservoir-based recreation as an attraction.

The effects on long-term recreation value to residents and visitors depends on several factors, including preferences and priorities, restoration and use of lands formerly inundated by the reservoirs, and the level of investments in river-based recreation facilities and opportunities. The type and nature of water-based activities would change, particularly boating activities. However, with restoration and investment in river-based recreation infrastructure, many land-based recreation activities would still be available but would potentially attract different people. As such, recreation value for some residents and visitors would likely decrease while recreation value would likely increase for others. Depending on the land management and future recreation infrastructure investments in the Project area, land-based recreation such as camping, picnicking, and hiking may continue, albeit with different scenic amenities. For recreationists who prefer lake-based activities, there are numerous other lakes, reservoirs, and camping areas in the region that can provide substitute recreation opportunities; for example, there are 24 other campgrounds in the MNF

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(USFS 2022). Lake Mendocino is approximately 25 mi. from Lake Pillsbury reservoir, and Clear Lake is approximately 40 mi. from Lake Pillsbury reservoir.

Immediately following construction, the effect of the Proposed Action on visitation and recreation value would likely be adverse as restoration would be in its early stages and as people would need to adjust to new recreation opportunities. Over the long term, river-based recreation and alternative reservoir and camping areas would provide value to recreationists in the area, particularly if there are investments in river-based recreation infrastructure and amenities. Potential adverse effects can be offset with restoration of vegetation and site aesthetics (see the Restoration Plan) and with investment in river-based recreation infrastructure by local businesses. In sum, due to the substantial change in recreation opportunity, the net effect on recreation value in the long term may be adverse, negligible, or beneficial following restoration.

Eel River Watershed

A new, natural flow regime along the Eel River may impact recreational opportunities. There may be a higher potential for flooding in wet seasons with no water control option afforded by the removed dam, but also potential for greater recreation value due to an extended boating season. One analysis estimated that decommissioning of the Project would extend the rafting and kayak season on the Eel River by approximately 6 weeks (Center for Environmental Economic Development 2002).

In addition, if the Proposed Action results in increased abundance of fish in the Eel River Watershed, then recreational fishing value would also be enhanced. Greater abundance of fish tends to enhance the quality of fishing and associated recreational value to anglers. Recreational value increases for each fishing trip taken, and more trips are typically taken to locations with high-quality fishing opportunities. For example, a study of angling after dam removal on the lower Kennebec River in Maine found that anglers were spending more to visit the fishery and were willing to pay for increased angling opportunities on the river (Robbins and Lewis 2008). While the magnitude of the benefit cannot be quantified, over the long term, the Proposed Action is expected to have a beneficial effect on recreational value to anglers in the Eel River Watershed.

In summary, the Proposed Action is expected to have a beneficial effect on recreational value to recreationists in the Eel River Watershed.

Russian River Watershed

Without the transfer of water from the Project, there may be reduced water levels at Lake Mendocino, a USACE facility, and reduced flows in the upper Russian River (from Coyote Valley Dam to Asti) during drier periods. Lower water levels can adversely affect recreation if facilities are no longer accessible, if flows are not adequate for boating, and/or if visual aesthetic quality (or other aspect of recreational quality) is reduced.

Canoeing and kayaking are popular recreational activities along the Russian River below Lake Mendocino, with commercially guided trips available (Sonoma Water 2016). Swimming and sunbathing are also popular recreational activities along the upper Russian River. Many of the pools in the Russian River below Lake Mendocino are relatively deep and are influenced by

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summer impoundments, so access to swimming and sunbathing would not be substantially altered or inhibited by changes in stream flows.

The upper Russian River section from Coyote Valley Dam to Asti receives less boat traffic than downstream sections of the Russian River (Sonoma Water 2016). Based on interviews with river guides and other sources in the region, the 2020 Highland Economics analysis of effects of Project inter-basin transfers estimated that there may be approximately 19,000 to 95,000 paddle days on the upper Russian River, of which approximately 75 percent could be adversely affected if changes in management resulted in reduction in upper Russian River flows below 70 cfs during the boating season (Highland Economics 2020). Highland Economics modeled potential impacts to recreation based on the percent of the summer recreation season (June through September) in which low water levels would adversely affect boating recreation access, defined as flows below 70 cfs as established in the *Draft Environmental Impact Report for Fish Habitat Flows and Water Rights Project* (Sonoma Water 2016). Reduced visitation (compared to current conditions flow levels with the Project in the summer months) was estimated in Highland Economics 2020 analysis at between 400 and 47,000 reduced boating trips annually, depending on water year type, management of Lake Mendocino in response to cessation of Project inter-basin transfers, and other factors (Highland Economics 2020). Using a conservative value of $30 per day for these reduced boating trips equates to reduced recreation value of $12,000 to $1.4 million annually. This reduction in recreation value associated with boating on the Russian River if flows decreased below the boating threshold could be partially offset by the expected increase in boating recreational value in the Eel River (i.e., reduced recreation value may be mitigated if recreationists can shift to the Eel River during times when there are lower flows in the Russian River).

Recreation value at Lake Mendocino in the Russian River Watershed may also be affected by the Proposed Action. Lake Mendocino is located approximately 5 mi. northeast of Ukiah on the East Fork of the Russian River in Mendocino County (USACE 2024). It was created in 1958 by the construction of the Coyote Valley Dam for flood control. Lake Mendocino recreational facilities include 18 mi. of trails, picnic areas, campgrounds, boat launches, swimming areas, and playgrounds across 14 recreation areas (USACE 2023). These facilities provide opportunities for boating, swimming, water skiing, fishing, camping, mountain biking, horseback riding, hiking, and sightseeing. Lake Mendocino recreation facilities are open year-round, but the summer months of June through August are the most popular months for boating activities on the reservoir (USACE 2018). Boating access is particularly affected by changes in water levels. There are two public boat ramps: one at the northern end of Lake Mendocino (North Boat Ramp) and one at the southern end of Lake Mendocino near Coyote Valley Dam (South Boat Ramp).

Data on visitation at Lake Mendocino for the years 2019, 2022, and 2023 are provided in Table 2.2.4.14-4. Data for 2020 and 2021 were not included as the visitation data were much lower than typical, likely due to the COVID-19 pandemic. On average over the three recent years, there were approximately 493,000 recreation visits (person-days), of which nearly 108,000 visitor days on average included boating (thus making it likely to be most affected by reduced water availability and possible boat ramp closures).

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Table 2.2.4.14-4. Lake Mendocino annual recreation visitation: 2019, 2022, 2023.

Visitation	2019	2022	2023	Average	% of Visitors[1]
Total	480,535	427,468	571,477	493,160	100%
Boaters	73,261	107,990	141,993	107,748	22%
Swimmers	72,825	83,968	147,966	101,586	21%
Anglers	71,900	86,070	101,276	86,415	18%

Source: USACE 2019, 2022, 2023

[1] Visitors can participate in more than one activity, so boaters may also be swimmers and/or anglers. As such, water-based visitation is less than the sum of boating, swimming, and angling participation.

The 2020 Highland Economics analysis of effects on recreation value at Lake Mendocino resulting from cessation of Project inter-basin transfers estimated that approximately 75 percent of Lake Mendocino recreation visitors could be adversely affected by reduced water levels (specifically water levels below 722 ft. msl with all boat ramps closed or below 728 ft. msl with one boat ramp closed) and that the total number of visits to Lake Mendocino could drop by 7 percent to 25 percent, depending on the water year, changes in management of the reservoir in response to cessation of Project inter-basin transfers, and other factors (Highland Economics 2020). Based on 493,000 average annual visitors, this level of reduced visitation would equate to approximately 35,000 to 121,000 fewer visitors annually. Using a value of $30 per visitor day, this would equate to approximately $1.0 to $3.6 million in reduced recreation value from reduced visitation. Additionally, there could also be reduced visitation value to those who continue recreating at Lake Mendocino resulting from the reduced quality of recreation when there are reduced water levels.

In sum, the Proposed Action would likely be an adverse effect on recreation quality and quantity, with a consequent adverse effect on recreation value, at Lake Mendocino and in the Russian River Watershed due to reduced availability of water to maintain instream flows and reservoir levels important for recreation. The effects on value depend on the water year and the management of Lake Mendocino in response to cessation of inter-basin Project transfers (which in turn affects water levels) and how recreationists are affected by these changes. The magnitude of the effect would vary depending on management of Lake Mendocino and release of water for instream flows and water supply by USACE, water year (the drier the water year, the larger the adverse effect), and recreationist response to reduced water levels. However, based on prior analyses conducted by Highland Economics, a conservative estimate of the magnitude of reduced value to recreationists may be in the range of approximately $1 million to $5 million annually (Highland Economics 2020). If, on the other hand, inter-basin transfers of water occur (see Section 2.2.4.2, Water Use and Hydrology) and/or if alternative water strategies can be achieved, this effect would be negligible.

Community Way of Life

The change from a lacustrine to riverine environment and return to unimpaired flows in the Eel River and East Branch Russian River could affect a community's way of life in diverse ways. The Proposed Action could most greatly affect community character and way of life through changes in recreation, aesthetics, agricultural land use, and economic opportunity. These types of effects differ throughout the Analysis Area, as described below.

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Scott Dam Area

Lake Pillsbury reservoir is valued by many local residents as a recreational and environmental amenity of their community (Lake Pillsbury Alliance n.d.), and its removal would change the community's way of life and the sense of place for residents. The environmental shift from a reservoir to a free-flowing river would shift economic activities, aesthetics, and recreation activities. In response to this shift, there may be closure of long-standing local businesses, as well as a shift in the local population. Current residents and visitors may choose to live and recreate in other areas, and new, different residents and recreationists may be attracted to the area. The community may thus also experience changes in demography and in community relationships. For many current residents and visitors, these types of shifts will likely be adverse, while for others the changes in way of life may be beneficial.

Cape Horn Dam Area

As there are few businesses or residences in the Cape Horn Dam Area, there are negligible effects of the Proposed Action expected on community way of life in this area.

Eel River Watershed

As described above, the Proposed Action would likely have beneficial effects on river-based recreation, aesthetics, and economic opportunity in the Eel River Watershed. As a result, community way of life and sense of place may be enhanced in the Eel River, particularly for residents who value water-based recreation opportunity and aquatic habitat and fisheries restoration.

Russian River Watershed

Way of life and community character may be adversely affected, particularly in the PVID, if ranches and farms are no longer viable or if farms have to significantly change operations, which could change the rural character of the area and the way of life of local ranchers and farmers. Reduced water supplies may result in changes in farm ownership, increased farm consolidation (small farms purchased by larger farms), or potential long-term fallowing of lands. Reduced agricultural production may result in reduced agricultural employment opportunities, which would adversely affect farmworkers and communities dependent on agricultural work. Elsewhere in the Russian River Watershed, community way of life and sense of place could be adversely affected by reduced recreation opportunity, reduced economic opportunity, and changes in residential water supply availability. In sum, the Proposed Action may have an adverse effect on quality of life in the Russian River Watershed. However, if inter-basin transfers of water occur (see Section 2.2.4.2, Water Use and Hydrology) and/or if alternative water strategies can be achieved, this effect would be negligible.

Local Government Stability and Fiscal Conditions

In the long term, Proposed Action effects on local government stability and fiscal conditions depend on how property values, economic activity, and government expenditures are expected to change. This varies throughout the Analysis Area.

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Scott Dam Area

As described above, the Proposed Action would affect different aspects of the community around Scott Dam and Lake Pillsbury reservoir such as recreation, aesthetics, and community identity that can, in turn, affect property value and recreation economic activity.

In terms of the magnitude of the potential effect on local government revenues from changes in property values, there are approximately 300 recreational homes and cabins in four communities (Rice Fork Residence Tract, Lake Pillsbury Homesite Tract, Lake Pillsbury Ranch, and Westshore) surrounding Lake Pillsbury reservoir (USFS 2011). Many of these homes, particularly in the Lake Pillsbury Ranch, are not immediately adjacent to the reservoir, and their value may be less impacted by the Proposed Action. However, to approximately estimate the assessed value of all of these homes in the basin, the average assessed property value per housing unit in the county was calculated. Across Lake County, the total assessed value of all property in fiscal year 2022–2023 was $8.711 billion. Dividing by the estimated 34,385 housing units in the county (U.S. Census Bureau 2023) translates to approximately $253,000 in assessed value per housing unit across the entire county.[6] This value includes land and housing improvements; the taxable value of much of the housing at Lake Pillsbury reservoir is just for the housing improvement as most of the land is owned by USFS and is not taxable. The property tax rate in Lake County varies from 1.0 to 1.112 percent (Herrington 2023) or up to approximately $285 annually per home. This indicates that county property taxes paid by the 300 homes in Lake County may be at most approximately $85,000 annually, or less than 0.1 percent of property tax collections (totaling over $101.3 million) in Lake County in fiscal year 2022–2023. Removal of Project infrastructure would also reduce property tax revenues associated with improvements located on Project lands. In fiscal year 2022–2023, the property tax for the Project was $202,536. Given that the total value of property taxes paid by homes in the Scott Dam Area and by the Project is a low portion of total tax revenues in Lake County, and that residential property taxes would still be paid with the Proposed Action (although tax revenues may be lower if property values decline), there is expected to be negligible effect on overall local government stability and fiscal conditions in Lake County.

Changes in recreation economic activity could also affect county lodging taxes and sales taxes in Lake County if tourism spending in the Project area and/or elsewhere in the county were affected. In recent years, the transient occupancy tax collected at the campgrounds operated by PG&E in the Project area has averaged approximately $4,300 annually (PG&E 2024).[7] There are additional occupancy and sales tax receipts collected by the two local businesses at Lake Pillsbury reservoir, and there may be additional tax receipts from reservoir visitor spending at other Lake County businesses serving travelers if non-local recreationists purchased goods or services in Lake County enroute to the reservoir. However, the effect on county sales and lodging tax receipts is expected to be relatively minor (compared to the receipts for the county as a whole) as the change in total expenditures by tourists in the county is expected to be limited. This is because there are few

[6] This value matches well with the market value of summer homes near Lake Pillsbury reservoir as viewed on several real estate websites. Since market value typically exceeds assessed value, and since the taxable value of many of these homes is just on the structure value and not the land value, using this average assessed value likely overestimates property taxes supported by homes near Lake Pillsbury reservoir.

[7] This is the average transient occupancy tax collected at the campgrounds in 2022, 2023, and 2024.

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businesses located at Lake Pillsbury reservoir that provide opportunity for tourist spending, and there is limited drive time between the reservoir and other locations in the county (which would tend to limit the proportion of out-of-county travelers to the reservoir overnighting or having significant expenditures elsewhere in the county enroute to the reservoir that would result in sales tax or occupancy tax generation).If local flood damages to public infrastructure were to increase due to decreased channel capacity from sediment deposition within the channel under the Proposed Action (see Section 2.2.4.2, Water Use and Hydrology), then expenses to local governments could increase compared to the No-Action Alternative. With implementation of the measures identified in the land use analysis (see Section 2.2.4.9, Land Use), these types of potential impacts would be negligible; therefore, effects of the Proposed Action on government expenditures are expected to be negligible.

Cape Horn Dam Area

There are negligible expected effects to local government stability and fiscal conditions in this area. There are little to no property value effects expected around Cape Horn Dam as there is little private property adjacent to the dam and Van Arsdale Reservoir. Further, there would be little to no change in economic activity in the area.

However, if local flood damages to public infrastructure were to increase due to decreased channel capacity from sediment deposition within the channel under the Proposed Action (see Section 2.2.4.2, Water Use and Hydrology), then expenses to local governments could increase compared to the No-Action Alternative. With implementation of the measures identified in the land use analysis, including the Sediment/Channel Monitoring and Response Plan and Flood Monitoring Plan (see Section 2.2.4.9, Land Use), these types of potential impacts would be negligible, so effects of the Proposed Action on government expenditures are expected to be negligible.

Eel River Watershed

Effects of the Proposed Action on local government fiscal conditions in the Eel River Watershed are expected to be generally beneficial. As discussed above, increased flows in the Eel River Watershed and enhanced fish habitat and recreation conditions may all enhance property values and economic activity, which would tend to increase local government tax receipts.

However, if local flood damages to public infrastructure were to increase due to decreased channel capacity from sediment deposition within the channel under the Proposed Action (see Section 2.2.4.2, Water Use and Hydrology), then expenses to local governments could increase compared to the No-Action Alternative. With implementation of the measures identified in the land use analysis (see Section 2.2.4.9, Land Use), these types of potential impacts would be negligible; therefore, effects of the Proposed Action on government expenditures are expected to be negligible.

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Russian River Watershed

With cessation of Project inter-basin transfer of water in the Proposed Action, economic activity in the Russian River basin is expected to decline, particularly in economic sectors that involve high water users. This would then lead to declines in local government tax revenues from sales tax, property tax, and other taxes. For example, a 2023 study by Economic Forensics and Analytics, Inc. of the potential effects of reduced Russian River flows on the Sonoma County economy estimated that the effects of reduced economic activity on all sources of local tax revenues could vary from approximately $2.5 million to $7.4 million, depending on the level of water loss (10 percent to 30 percent was analyzed in the study). Most of these tax impacts are from potential changes in economic activity in the commercial sector. These tax impacts would be much lower if commercial businesses adjust to changes in water supply (through water efficiency measures, new technology, or procurement of alternative water supplies) and thereby minimize the reduction in their output that would result from water shortages.

Property taxes are a particularly important source of income for local tax districts and county government. Property taxes may be affected by reduced water availability that leads to a decline in property values. Compared to the No-Action Alternative, local property values could decline throughout the upper Russian River Watershed, particularly in the PVID where water supplies would be most affected by cessation of Project inter-basin transfers.

The assessed value of agricultural land is based on soil class and irrigation availability, so property value (and associated property tax) can decline with reduced irrigation supplies. However, the effects of changes in farmland value on property taxes are mitigated due to the California Land Conservation Act of 1965 (usually referred to as the Williamson Act). This act enables local governments and private landowners to enter into agreements that restrict land to agricultural or open space use in return for a lower property tax assessment, with an average discount in Mendocino County of 10 percent to 95 percent (Mendocino County Board of Supervisors n.d.). Data from the California Department of Conservation indicate that much of the irrigated agricultural lands in the PVID and the upper reaches of the Russian River in Mendocino County are under Williamson Act contracts (California Department of Conservation 2022). Property taxes in Mendocino County average approximately 1 percent of assessed value.[8] Data on the average assessed value of farmland and how that value may change were not available to estimate the value of property tax reductions that could occur in Mendocino County. For Sonoma County, a 2023 economic analysis of reduced water availability to agriculture estimated that a 10 percent to 30 percent reduction (used by the report to represent conditions without Project inter-basin transfers) could result in reduced county tax revenues of $33,000 to $100,000 annually; most of this tax revenue reduction is likely due to reduced property taxes. This provides an indication of the magnitude of property value effects on agricultural lands that may be experienced in Mendocino County.

[8] Assessed value in the county in 2023 was $13.49 billion and total collected taxes were $117.3 million, according to the 2023 County of Mendocino Annual Comprehensive Financial Report (Office of the Auditor-Controller/Treasurer-Tax Collector 2024).

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In sum, compared to the No-Action Alternative, if the Proposed Action results in cessation of inter-basin transfers of water, then there is an expected adverse effect on local government revenues in the Russian River Watershed. However, if inter-basin transfers of water occur (Section 2.2.4.2, Water Use and Hydrology) and/or if alternative water strategies can be achieved, this effect would be negligible.

Habitat and Species-related Cultural and Economic Values

As described in Section 2.2.4.4, Fish and Aquatic Resources, effects on habitat and aquatic species in the Analysis Area under the Proposed Action compared to the No-Action Alternative may be adverse in some areas and beneficial in others. The types of potential effects on socioeconomic values and the affected populations are the same as those described above for the construction phase. However, the magnitude of effects is different in both the Eel and Russian River watersheds in the long term, and the direction of effects is also different in the Eel River Watershed.

Scott Dam and Cape Horn Dam Areas

The types of potential effects on habitat and species-related cultural and economic values are the same as those described above for the construction phase.

Eel River Watershed

Long term, following restoration, the Proposed Action is expected to have beneficial effects on habitat and species and associated cultural and socioeconomic values to Tribes and other communities. Specifically, the Proposed Action is expected to have beneficial effects to habitat conditions for Pacific lamprey, salmon, steelhead, and tidewater goby, other native fish species, and freshwater mussels (see Section 2.2.4.4., Fish and Aquatic Resources). Many of these species are valued by Tribes and other communities in the region, resulting in a beneficial effect on cultural and other socioeconomic values associated with these resources.

Russian River Watershed

Long term, the Proposed Action is expected to have some adverse effects on cultural value to Tribes and socioeconomic value to other communities that value conservation of Russian River habitat and aquatic species. Specifically, reduced inter-basin flows are expected to have adverse effects on some important fish species (see Section 2.2.4.4, Fish and Aquatic Resources) valued by Tribes and other communities in the region for cultural, recreational, subsistence, commercial, and passive use. The importance and socioeconomic value of conserving and restoring these aquatic habitats and species for current and future generations can be quite high.

If inter-basin transfers cease, flows in the East Branch Russian River would be reduced, which would also have an adverse effect on existing aquatic habitat for special-status aquatic species, BMI, other common game and non-game fish species, and the stocked rainbow trout fishery (see Section 2.2.4.4, Fish and Aquatic Resources).

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2.2.4.14.3 Construction and Environmental Measures

To avoid or reduce effects to socioeconomic resources during construction, PG&E will obtain, prepare, and/or implement the following measures. A complete list of construction measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Construction Site Water Diversion, Dewatering, and Drawdown Plan;
- Aquatic Species Management and Monitoring Plan;
- Water Quality and Water Temperature Monitoring Plan;
- Stormwater Pollution Prevention Plan;
- Construction Erosion Prevention Plan;
- Post-construction Road Restoration Plan;
- Hazardous Materials Measures and BMPs;
- Spill Prevention, Control, and Countermeasures; and
- East Branch Russian River Diversion Plan.

To reduce potential effects to socioeconomic resources during the initial condition and preliminary restoration (Phase 2a) and resulting condition and restoration (Phase 2b), PG&E will implement the following environmental measures. A complete list of environmental measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Flood Monitoring Plan;
- Sediment/Channel Monitoring and Response Plan;
- Restoration Plan; and
- Post-construction Road Restoration Plan.

2.2.4.14.4 Unavoidable Adverse Effects

With implementation of expected mitigation plans, there are no unavoidable adverse impacts on socioeconomic resources and values anticipated at Cape Horn Dam or in the Eel River Watershed. The removal of Scott Dam would result in a change from a lacustrine to riverine environment at Lake Pillsbury reservoir and a return to unimpaired Eel River flows that may result in changes in and could have unavoidable effects on recreation value, community way of life, and population and housing in the Scott Dam Area. These effects may be offset by restoration.

In the Russian River Watershed, if inter-basin water transfers cease, then there would potentially be unavoidable adverse impacts on water reliability and cost, economic opportunity (particularly farming and ranching), recreation value in the Russian River Watershed, and community way of life. If actions can be taken to allow for water diversions (see Section 2.2.5, Cumulative Effects Analysis) or if alternative water sources can be found, there would likely be no unavoidable

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adverse effects to socioeconomic resources. However, if no such alternative water supply strategies were implemented, there would be unavoidable adverse effects to economic opportunity, recreation, and community way of life in the Russian River Watershed.

2.2.4.14.5 References

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2.2.4.15 Air Quality

This section describes the potential effects to air quality that could occur because of the Proposed Action described in PG&E's Surrender Application for the Potter Valley Hydroelectric Project (Project) (see Section 2.1.2, Applicant's Proposal). Section 2.1.2 includes a description of decommissioning Project facilities and restoration goals to be met as part of the Proposed Action.

Potential effects are separated into construction effects (Phase 1) and post-facility removal effects (Phase 2). Refer to Section 2.2.4.1, Analytical Approach, for a description of each phase.

The effects are determined by analyzing the changes in the air quality environment that may result from activities to be implemented under the Proposed Action compared to the No-Action Alternative (existing condition) (see Section 2.1.1, No Action Alternative).

Final effects determinations consider measures (i.e., construction measures and post-facility removal measures) included to avoid or mitigate impacts associated with implementation of the Proposed Action (refer to Section 2.1.2.2, Proposed Environmental Measures). Unavoidable adverse effects are discussed at the end of this section.

2.2.4.15.1 Phase 1: Short-term Construction Effects

The following potential effects to air quality resulting from the Project were evaluated:

- Potential air quality impacts caused by operation of off-road construction equipment (e.g., tractors, excavators, and cranes), including detonation of the adit plug and on-road vehicles;
- Potential health risks due to toxic air contaminant (TAC) emissions from off-road equipment and on-road vehicles; and
- Potential greenhouse gas (GHG) impacts caused by operation of off-road construction equipment and on-road vehicles.

The following section describes the approach used to determine air quality impacts associated with emissions from construction activities.

Approach to Analysis

Annual emissions in units of tons per year (TPY) were estimated for the following criteria pollutants:

- NO_x
- O_3[1]
- SO_2

[1] It is noted that the construction activities would emit O_3 precursor ROG and NO_x. However, the Proposed Action would not directly emit O_3 since O_3 is formed in the atmosphere during the photochemical reaction of O_3 precursors.

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- CO
- $PM_{2.5}$
- PM_{10}

In addition, annual emissions were estimated for GHG emissions in units of metric tons of carbon dioxide equivalent ($MTCO_2e$) per year.

Information regarding construction activities at Scott Dam and Cape Horn Dam, including a finalized construction schedule, anticipated equipment use rates, and staffing numbers, is not available at this time. Therefore, this analysis represents a good-faith effort to evaluate Proposed Action impacts based on the conservative assumptions presented below.

General Conformity and De Minimis *Thresholds*

The 1990 Amendments to the CAA require that federal agency activities conform to the SIP with respect to achieving and maintaining attainment of the NAAQS. The General Conformity Rule requires that a conformity analysis be performed, which demonstrates that a proposed project does not: (1) cause or contribute to violation of any NAAQS in the area; (2) interfere with provisions in the SIP for maintenance or attainment of any NAAQS; (3) increase the frequency or severity of any existing violation of any NAAQS; or (4) delay timely attainment of any NAAQS, any interim emission reduction goals, or other milestones included in the SIP. Provisions in the General Conformity Rule allow for exemptions from performing a conformity determination only if total emissions of individual nonattainment area pollutants resulting from a proposed project fall below the *de minimis* threshold value.

Table 2.2.4.15-1 details the *de minimis* thresholds for all criteria pollutants. A project would conform to the most recent USEPA-approved SIP if annual emissions do not exceed the threshold of 100 tons of NO_x, volatile organic compounds (VOCs) (modeled as ROG for the purposes of this analysis[2]), CO, PM_{10}, and/or $PM_{2.5}$. For the purpose of the analysis, impacts to air quality would be considered significant if emissions from the Project would result in exceedances of the *de minimis* thresholds. If the *de minimis* thresholds are exceeded, then preparation of a General Conformity Analysis, pursuant to CAA Section 176(c)(4), would be required to determine whether the Proposed Action would interfere with attainment of the NAAQS.

[2] Both ROG and VOC refer to a class of reactive/volatile organic compounds. The USEPA uses the term "VOC" in its regulations, and the CARB uses the term "ROG." Differences between USEPA's VOC definition and CARB's ROG definition are generally limited to exempted constituents and do not affect this analysis.

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Table 2.2.4.15-1. Federal *de minimis* thresholds.

Pollutant	Tons per Year
O_3 (ROG)	100
O_3 (NO_x)	100
CO	100
SO_2 (SO_x)	100
PM_{10}	100
$PM_{2.5}$	100
Lead (Pb)	25

Source: USEPA 2024b

Project emissions are also compared to local air district thresholds of significance, as applicable. The Scott Dam Area is located within the LCAQMD, which does not have adopted thresholds of significance because the area is in attainment for all NAAQS and CAAQS. Therefore, emissions that would occur within the LCAQMD (i.e., during decommissioning of Scott Dam) are compared to the federal *de minimis* thresholds only.

The Cape Horn Dam Area is located within the MCAQMD; accordingly, emissions that would occur within the MCAQMD (i.e., during decommissioning of Cape Horn Dam) are compared to the adopted MCAQMD thresholds of significance, as presented in Table 2.2.4.15-2.

Table 2.2.4.15-2. MCAQMD construction thresholds of significance.

Pollutant	Pounds per Day
ROG	54
NO_x	54
PM_{10} (exhaust)	82
$PM_{2.5}$ (exhaust)	54

Source: MCAQMD 2010

In addition, for Proposed Action activities that would occur within the MCAQMD (i.e., during decommissioning of Cape Horn Dam), which is designated a nonattainment area for the state PM_{10} standard, Proposed Action consistency with the MCAQMD's Particulate Matter Attainment Plan is evaluated to determine whether implementation of the Proposed Action would hinder attainment of the PM_{10} CAAQS. See Section 2.2.3.14, Air Quality, for additional information related to the attainment status of Project regions.

Emissions Estimate Methodology and Assumptions

Emissions associated with decommissioning Scott Dam and associated facilities were estimated using the California Emissions Estimator Model (CalEEMod) Version 2022.1.1.29, which is a statewide land use emissions computer model designed to provide a uniform platform for

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government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions associated with both construction and operations from a variety of projects. CalEEMod was developed for the California Air Pollution Control Officers Association in collaboration with the California Air Districts. Default data (e.g., emission factors, trip lengths, meteorology, source inventory) have been provided by the various California Air Districts to account for local requirements and conditions. The model can be used for a variety of situations whereby an air quality analysis is necessary or desirable, such as preparing National Environmental Policy Act documents, conducting pre-project planning, verifying compliance with local air quality rules and regulations, and so on.

The decommissioning activities for Scott Dam and associated facilities were assumed to occur in three seasons: (1) initial low-flow season (June–October), (2) the first high-flow season after the initial low-flow season (November–May), and (3) the first low-flow season after sediment flushing during the high-flow season (June–October). Construction may not occur for 2 years continuously; for example, the first high-flow season activities will occur during the first wet season following the initial low-flow season, which may not occur immediately after the initial low-flow season. Recreation facility and features removal is planned to occur simultaneously with the dam removal activities. This is a conservative assumption considering that removal of recreation facilities may occur over multiple seasons concurrent with dam removal actions. Up to 100 workers per day were assumed to be onsite during peak construction.

Table 2.2.4.15-3 presents the construction schedule applied in the emissions modeling. It is expected that construction would begin after the year 2026. However, should construction commence in years later than the modeled schedule, emissions are expected to be the same or fewer due to the increasingly stringent equipment and vehicle emissions standards.

Table 2.2.4.15-3. Decommissioning of Scott Dam—modeled construction schedule.

Construction Activity	Start Date[1]	End Date[1]	Days per Week	Workdays per Construction Activity
Initial Low-Flow Season Activities	06/01/2026	10/30/2026	5	110
First High-Flow Season Activities	11/01/2026	05/29/2027	5	150
First Low-Flow Season after Sediment Flushing	06/01/2027	10/30/2027	5	109
Recreation Facility Removal	6/01/2026	10/30/2027	5	151

Notes:
[1] Emissions modeling requires a year to estimate the appropriate emission factors, so 2026 was used as a conservative year since emissions tend to be reduced over time.

Off-road Emissions

Decommissioning would involve the use of heavy-duty off-road equipment such as tractors, excavators, and cranes. Off-road equipment types and the number of pieces of equipment were estimated based on similar dam removal projects and CalEEMod default values for demolition activities. The hours of use per day were conservatively set to 10 hours per day and assumed 5 days of work per week. Equipment horsepower and load factors were automatically populated

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with the default average values from CARB's OFFROAD2007 and OFFROAD2011 databases. Calendar year average emission factors for diesel, gasoline, and compressed natural gas off-road equipment are derived from CARB's OFFROAD2017 – ORION (v1.0.1) (California Air Pollution Control Officers Association 2022). See Table 2.2.4.15-4 for the assumptions for off-road equipment use.

Table 2.2.4.15-4. Decommissioning of Scott Dam—off-road equipment assumptions.

Construction Activity	Equipment Type	Fuel Type	Number per Day	Hours per Day	Horsepower	Load Factor
Initial Low-Flow Season Activities	Tractors/Loaders/Backhoes	Diesel	2	10	84	0.37
	Rubber-Tired Dozers	Diesel	2	10	367	0.4
	Concrete/Industrial Saws	Diesel	4	10	33	0.73
	Cranes	Diesel	4	10	367	0.29
	Other Construction Equipment	Diesel	4	10	82	0.42
First High-Flow Season Activities	Tractors/Loaders/Backhoes	Diesel	2	10	84	0.37
	Rubber-Tired Dozers	Diesel	2	10	367	0.4
	Concrete/Industrial Saws	Diesel	4	10	33	0.73
	Bore/Drill Rigs	Diesel	4	10	83	0.5
First Low-Flow Season after Sediment Flushing	Tractors/Loaders/Backhoes	Diesel	2	10	84	0.37
	Rubber-Tired Dozers	Diesel	2	10	367	0.4
	Concrete/Industrial Saws	Diesel	4	10	33	0.73
	Excavators	Diesel	2	10	36	0.38
	Bore/Drill Rigs	Diesel	2	10	83	0.5
	Cranes	Diesel	2	10	367	0.29
	Other Construction Equipment	Diesel	4	10	82	0.42
Recreation Facility Removal	Tractors/Loaders/Backhoes	Diesel	2	10	84	0.37
	Rubber-Tired Dozers	Diesel	2	10	367	0.4
	Concrete/Industrial Saws	Diesel	4	10	33	0.73

On-road Emissions

On-road emissions include those associated with automobile use. This includes worker commutes and heavy truck trips to and from the Project area. Vendor trip rates were left as CalEEMod default values for each construction season activity, and worker trip rates were scaled up to be conservative. During seasons that require substantial material export, the haul truck trip rates were calculated based on the assumption that each haul load can accommodate 16 cy of material. During the initial low-flow season, 16,000 cy of material[3] was estimated to be exported from the site. During the first low-

[3] See Section 2.1.2.1.1, Decommissioning Plan.

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flow season after sediment flushing, an additional 92,000 cy of material[4] was estimated to be exported. The trip distances were updated based on the assumption that all vehicles would travel to and from the city of Ukiah, which is approximately 35 mi. away from the disturbance area. In addition, it was assumed that all exposed surfaces would be watered twice per day to reduce fugitive dust emissions. See Table 2.2.4.15-5 for the assumptions for automobile use.

Table 2.2.4.15-5. Decommissioning of Scott Dam—on-road vehicle assumptions.

Construction Activity	Trip Type	One-way Trips per Day[1]	Miles per Trip	Vehicle Mi. Traveled per Construction Activity	Vehicle Mix
Initial Low-Flow Season Activities	Worker	200	35	2,800.0	LDA, LDT1, LDT2
	Hauling	18	35	1,272.7	HHDT
First High-Flow Season Activities	Worker	60	35	2,100.0	LDA, LDT1, LDT2
	Hauling	5	35	350.0	HHDT
First Low-Flow Season after Sediment Flushing	Worker	45	35	3,150.0	LDA, LDT1, LDT2
	Hauling	105	35	7,318.2	HHDT
Recreation Facility Removal	Worker	40	35	1,400.0	LDA, LDT1, LDT2
	Hauling	5	35	350.0	HHDT

[1] Values are rounded up to the nearest full number.

Key: HHDT = heavy-heavy duty trucks in weight class 33,001–60,000 pounds
LDA = passenger cars
LDT1 = light-duty trucks in weight class 0–3,750 pounds
LDT2 = light duty trucks in weight class 3,751–5,750 pounds

Helicopter Emissions

Helicopters may be used to transport equipment and materials to and from the Project sites. It was assumed that a medium-lift utility helicopter powered by a double-turboshaft engine represents the type of aircraft that may be used. Emission factors for the aircraft per (1) landing and take-off cycle and (2) 1 hour of flight were derived from the *Guidance on the Determination of Helicopter Emissions* (Swiss Confederation 2015). Please see Appendix 2.2.4.15-A for additional details. The one-way helicopter trip distance was assumed to be 35 mi., and it was assumed that 2 flights would occur per day for every day of construction, excluding recreation facility removal (369 days).

Criteria Pollutant and Fugitive Dust Emissions

Construction activities have the potential to temporarily affect air quality through emissions of criteria pollutants, including fugitive dust emissions. Impacts to air quality would result from engine exhaust and fugitive dust emissions caused by operation of off-road construction equipment, on-road vehicles, and helicopter use. As described previously, criteria air pollutants include O_3, CO, NO_2, SO_2, $PM_{2.5}$, PM_{10}, and Pb. Common sources of Pb emissions are lead-based

[4] See Section 2.1.2.1.1, Decommissioning Plan.

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paint and leaded gasoline. Pb is not expected to be emitted during construction activities and, therefore, was not considered in this analysis. PM_{10} refers to all particulate matter less than 10 microns in diameter; thus, PM_{10} includes fugitive dust emissions.

Scott Dam Area

The Scott Dam Area is located in northern Lake County, which is within the jurisdiction of the LCAQMD. Lake County is in attainment for all NAAQS and CAAQS and, as a result, has not adopted an Air Quality Management Plan (LCAQMD 2024).

Emissions modeling for the decommissioning of Scott Dam was conducted using the assumptions described above. Table 2.2.4.15-6 summarizes the estimated construction emissions of criteria pollutants as compared to the corresponding federal thresholds.

Table 2.2.4.15-6. Decommissioning of Scott Dam—annual criteria pollutant and GHG emissions.

Construction Activity Season	Emissions (TPY)						
	ROG	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2e**
Year 1: Initial Low-Flow Season Activities	0.43	3.46	4.94	0.01	32.14	3.50	977.00
Year 1: First High-Flow Season Activities	0.10	0.85	1.16	0.00	3.76	0.40	188.92
Year 1: Recreational Facility Removal	0.29	2.48	2.91	0.00	9.16	1.00	492.81
Year 1: Helicopter Use	-	0.00	0.00	-	0.00	0.00	492.15
Year 1 Total	*0.82*	*6.80*	*9.01*	*0.01*	*45.07*	*4.91*	*2,150.88*
Year 2: First High-Flow Season Activities	0.23	1.99	2.77	0.00	9.19	0.98	459.38
Year 2: First Low-Flow Season After Sediment Flushing	0.33	3.86	3.61	0.01	22.14	2.49	1,258.82
Year 2: Recreational Facility Removal	0.39	3.38	4.01	0.01	12.97	1.41	694.86
Year 2: Helicopter Use	-	0.00	0.00	-	0.01	0.01	718.32
Year 2 Total	*0.95*	*9.23*	*10.39*	*0.02*	*44.31*	*4.89*	*3,131.37*
Project Total	--	--	--	--	--	--	*5,282.26*
Federal *De Minimis* Threshold (TPY)	100	100	100	100	100	100	N/A
Exceeds Thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**

As shown in the table, annual emissions during Proposed Action activities are well below the applicable thresholds for criteria pollutants.

Blasting would be used at Scott Dam during first high-flow season activities to remove the adit plug. Demolition blasting could result in the deposition of dust on surfaces and local elevated PM_{10} concentrations. Per the Institute of Air Quality Management's *Guidance on the Assessment of Dust from Demolition and Construction*, a detailed dust assessment should be conducted when receptors are located within 350 m (approximately 1,150 ft.) of the demolition site (Institute of Air Quality Management 2014). When receptors are located over 350 m from the demolition site, it

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can reasonably be concluded that dust-related impacts would not occur. Given that the nearest receptor is more than 350 m from the adit (1,400 ft. or 426 m), dust deposition and PM emissions from blasting at Scott Dam are not anticipated to affect nearby receptors. Furthermore, implementation of PG&E's proposed General Construction Measures, which include fugitive dust reduction measures, would further minimize potential effects to receptors.

Immediately following the removal of Scott Dam, the water level at Lake Pillsbury reservoir would drop and expose silty soils, which would then dry out. While the soils in the Lake Pillsbury reservoir bed dry and prior to revegetation efforts, there is a potential for windblown dust to affect surrounding areas. The prevailing wind direction in the Project area is most often from the northwest (Iowa State University 2024); as a result, dust from the reservoir bed is expected to primarily blow toward the southeast of Lake Pillsbury reservoir, which is sparsely populated. Other areas around Lake Pillsbury reservoir support scattered, rural residences. Fugitive dust from the drying reservoir bed is not expected to travel long distances due to the presence of dense vegetation surrounding the reservoir. These temporary windblown dust emissions would cease when vegetation establishes on the exposed reservoir bed and stabilizes the soils. Additional evaluation of potential impacts after removal of Scott Dam and restoration is provided below, and details about the proposed Restoration Plan are available in Section 2.1.2, Applicant's Proposal.

Overall, construction emissions would be temporary and intermittent and would cease upon completion of work. Emissions from equipment and vehicles would also be dispersed over a large area that is sparsely populated. PG&E will comply with all applicable LCAQMD rules and regulations regarding construction emissions including, but not limited to, Regulation 2 Rule 2, Particulate Matter Emissions, which establishes limits on the amount of PM allowed to be discharged from combustion (LCAQMD 2006). In addition, standard construction air quality control measures would be implemented during construction, including fugitive dust reduction measures and diesel emission reduction measures (see Section 2.1.2.2, Proposed Environmental Measures). Therefore, the environmental effects on air quality associated with construction activities implemented under the Proposed Action in the Scott Dam Area are considered negligible.

Cape Horn Dam Area

The Cape Horn Dam Area is located within Mendocino County, which is within the jurisdiction of the MCAQMD. This area is in attainment or unclassified for all NAAQS but is in nonattainment for the state PM_{10} standard. The MCAQMD has adopted a Particulate Matter Attainment Plan to achieve attainment of the PM_{10} CAAQS (MCAQMD 2005).

Similar to decommissioning of Scott Dam, information regarding the construction activities at Cape Horn Dam is not available at this time. A conservative approach was taken for evaluating potential emissions during construction at Cape Horn Dam by comparing potential emissions calculated for decommissioning Scott Dam to the MCAQMD criteria. It was assumed that emissions associated with the decommissioning of Cape Horn Dam would be less than those calculated for Scott Dam. Cape Horn Dam decommissioning would occur during the first low-flow season and the first high-flow season. No decommissioning activities are anticipated following the first high-flow season, and so emissions associated with the first low-flow season after sediment flushing were omitted. Decommissioning of Scott Dam would require a higher

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volume of material export, resulting in more haul truck trips, and a longer construction period than decommissioning of Cape Horn Dam due to its larger size. Therefore, air quality emissions associated with the removal of Cape Horn Dam would be fewer than those associated with the removal of Scott Dam.

Emissions associated with decommissioning Cape Horn Dam would be fewer than those presented in Table 2.2.4.15-6. As shown in the table, all criteria pollutant emissions would be below the federal *de minimis* levels that are applied as the thresholds of significance for this analysis. In addition, Table 2.2.4.15-7 below presents the estimated daily emissions from decommissioning of Scott Dam in comparison to the MCAQMD's thresholds of significance.

Table 2.2.4.15-7. Decommissioning of Cape Horn Dam[1]—daily criteria pollutant emissions.

Year	Emissions (pounds/day)			
	ROG	**NO_x**	**PM_{10} (exhaust)**	**$PM_{2.5}$ (exhaust)**
Year 1: Initial Low-Flow Season Activities	2.37	18.98	0.73	0.67
Year 1: First High-Flow Season Activities	0.53	4.63	0.16	0.15
Year 1: Recreation Facility Removal	1.58	13.61	0.50	0.46
Year 1: Helicopter Use	0.00	0.04	0.06	0.06
Year 1 Max[2]	*4.48*	*37.27*	*1.45*	*1.34*
Year 2: First High-Flow Season Activities	1.24	10.88	0.36	0.33
Year 2: Recreation Facility Removal	2.15	18.53	0.66	0.61
Year 2: Helicopter Use	0.00	0.03	0.06	0.06
Year 2 Max[2]	*3.40*	*29.44*	*1.08*	*1.00*
MCAQMD Threshold of Significance	54	54	82	54
Exceeds Threshold?	**No**	**No**	**No**	**No**

[1] Calculations presented in this table are for Scott Dam. Air quality emissions associated with the removal of Cape Horn Dam would be fewer than those associated with the removal of Scott Dam.

[2] The MCAQMD thresholds of significance are in units of pounds per day and, therefore, this analysis sums emissions that may overlap. Year 1 maximum daily emissions are the sum of emissions from Initial Low-Flow Season Activities, Recreation Facility Removal, and Helicopter Use. Year 2 maximum daily emissions are the sum of emissions from First High-Flow Season Activities, Recreation Facility Removal, and Helicopter Use.

Because Mendocino County is designated a nonattainment area for PM_{10}, the Cape Horn Dam analysis also considers Proposed Action consistency with the MCAQMD's Particulate Matter Attainment Plan. The MCAQMD's Particulate Matter Attainment Plan notes that the primary sources of PM emissions in the county are wildfire, residential wood burning, unpaved roads, and construction activities. The Particulate Matter Attainment Plan includes several recommended control measures to reduce PM emissions, such as limiting the installation of wood stoves in new construction and supporting projects to pave existing unpaved roadways. As part of the Proposed Action, standard construction air quality control measures would be implemented during construction, including fugitive dust reduction measures and general emission reduction measures

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(see Section 2.1.2.2, Proposed Environmental Measures). Given the compliance with standard construction air quality control measures, the Proposed Action would be consistent with all the applicable control measures, including prioritizing paved roadways for vehicle travel when feasible and compliance with grading regulations. Furthermore, it is noted that blasting, which can be a notable source of PM_{10} emissions, would not be required at Cape Horn Dam. Therefore, the proposed activities in the Cape Horn Dam Area would not hinder or delay attainment of the PM_{10} CAAQS.

Based on the discussion above and with implementation of the standard construction air quality control measures (see Section 2.1.2.2, Proposed Environmental Measures), the environmental effects on air quality associated with construction activities implemented under the Proposed Action in the Cape Horn Dam Area are considered negligible.

Eel River Watershed and Russian River Watershed

Off-road equipment would only be used within the Scott Dam and Cape Horn Dam areas and, therefore, would not generate emissions in the greater Eel River Watershed and Russian River Watershed.

The truck haul route is assumed to generally transport materials from Scott Dam along Forest Route 20N past the Cape Horn Dam Area, along Eel River Road, through the community of Potter Valley along Potter Valley Road, westbound along State Route 20, and southbound on US 101, terminating in the city of Ukiah. It is acknowledged that other truck routes may be taken. The increase in haul truck traffic would result in emissions distributed along the haul route. Similarly, the use of helicopters may result in emissions along the flight path. However, the incremental increase in emissions due to haul truck traffic and helicopter use would not substantially affect air quality in the air districts located within the Eel River Watershed and Russian River Watershed. Furthermore, the hauling period and/or use of helicopters would be limited to Project decommissioning. Overall, the environmental effects on air quality associated with construction activities implemented under the Proposed Action in the Eel River Watershed and Russian River Watershed are considered negligible.

Potential Health Effects

TACs are air pollutants that may cause or contribute to an increase in mortality or serious illness or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air, but due to their high toxicity, they may pose a threat to public health even at very low concentrations. The primary TAC that construction activities may emit is DPM, which was identified as a TAC by CARB in August 1998. DPM is typically composed of carbon particles and numerous organic compounds, including more than 40 known cancer-causing organic substances. Diesel exhaust also contains gaseous pollutants, including ROG and NO_x.

Another pollutant of concern addressed in this discussion is asbestos. Asbestos is the name given to a number of naturally occurring fibrous silicate minerals with useful properties such as thermal insulation, chemical and thermal stability, and high tensile strength. Exposure to asbestos fibers may result in health issues such as lung cancer, mesothelioma (a rare cancer of the thin membranes lining the lungs, chest, and abdominal cavity), and asbestosis (a non-cancerous lung disease that

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causes scarring of the lungs). Exposure to naturally occurring asbestos can occur during soil-disturbing activities in areas with deposits present (USEPA 2025).

Some land uses are considered to accommodate populations that are more sensitive to air pollution than others. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardiovascular diseases. Examples of sensitive receptor locations include hospitals, residences, convalescent facilities, and schools.

Scott Dam Area, Cape Horn Dam Area, Eel River Watershed, and Russian River Watershed

In the Scott Dam Area, the nearest residence to the demolition area is located approximately 1,400 ft. southwest of Scott Dam. In the Cape Horn Dam Area, the nearest residence to the demolition area is located approximately 1,000 ft. east of Cape Horn Dam. According to CARB, the concentration of DPM declines dramatically after 500 ft. of separation from the source (CARB 2005). Off-road equipment use associated with decommissioning activities would not occur within 500 ft. of receptors, and therefore, receptors would not be exposed to substantial diesel emission exhaust or other TACs associated with the use of off-road equipment.

Diesel-fueled haul trucks would operate on area roadways and emit DPM in closer proximity to receptors along the haul routes. However, given the transient nature of passing haul trucks and that vehicles currently use these roadways, construction emissions are not expected to adversely affect sensitive receptors.

Exposure to naturally occurring asbestos can occur during soil-disturbing activities in areas with deposits present. Serpentine rock, particularly ultramafic rocks, can contain naturally occurring asbestos. Construction and demolition activities associated with the Proposed Action in areas of rock formations that contain naturally occurring asbestos could release asbestos to the air and pose a health hazard. As noted in Section 2.2.3.6, Geology and Soils, serpentine rocks have been mapped in the vicinity of the north end of Scott Dam and could also be present in the vicinity of Cape Horn Dam. However, sediment collected from Lake Pillsbury reservoir was tested and asbestos was not detected in any of the samples. The absence of asbestos in the sediment collected from Lake Pillsbury reservoir suggests that asbestos is not present in the rock formations that surround the reservoir. Nevertheless, construction work would occur within the jurisdiction of the LCAQMD and would be subject to LCAQMD Regulation 2, Prohibitions and Standards, Rule 4.467, Asbestos Emissions Control Measure (LCAQMD 2006). Compliance with the LCAQMD Rule 4.467 also ensures compliance with the National Emission Standards for Hazardous Air Pollutants. Compliance with existing rules and regulations would ensure that implementation of the Proposed Action does not result in adverse effects to sensitive receptors related to asbestos.

Based on the above, the emissions generated from construction activities would not result in increased adverse health impacts.

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Greenhouse Gas Emissions

Scott Dam Area, Cape Horn Dam Area, Eel River Watershed, and Russian River Watershed

GHG emissions would be generated during construction activities from the combustion of petroleum fuels to power on-road vehicles, off-road equipment, and helicopters. As summarized in Table 2.2.4.15-6, the decommissioning of Scott Dam would generate a total of 5,282.26 $MTCO_2e$. The decommissioning of Cape Horn Dam is expected to result in fewer emissions due to the smaller volume of required material export and shorter construction period. Nevertheless, under the conservative assumption that both components emit an equivalent volume of GHG emissions, the Proposed Action would generate a total of 10,564.52 $MTCO_2e$.

The federal government requires mandatory reporting of GHG emissions when projects may emit more than 25,000 $MTCO_2e$ in a year. The Proposed Action emissions would be well below this metric. A quantitative threshold for determining a project's significance has not been established at the state or federal level. Nevertheless, consistent with other recent FERC environmental analyses[5] and to provide context, this analysis discloses the GHG emissions associated with the Proposed Action in comparison to state and national GHG emission inventories. In 2021, GHG emissions in California totaled 381.3 million $MTCO_2e$ (CARB 2023). In that same year, net GHG emissions in the United States totaled 5,586 million $MTCO_2e$ (USEPA 2024a). In comparison to the state and national GHG emission inventories, total GHG emissions from the Proposed Action would constitute a maximum of 0.0028 and 0.0002 percent of total inventoried emissions, respectively. As another way to provide context, USEPA estimates than an average passenger vehicle emits roughly 4.6 $MTCO_2e$/year (USEPA 2024c). As a result, total GHG emissions from the Proposed Action would be the equivalent of 2,297 passenger cars driven for one year. While GHG emissions and global climate change are inherently cumulative impacts, the incremental contribution of Project construction emissions in the context of statewide and national emissions is negligible.

2.2.4.15.2 Phase 2: Post-facility Removal Effects

The following initial temporary condition and preliminary restoration (Phase 2a) and resulting physical conditions and restoration (Phase 2b) potential effect to air quality resulting from physical changes that may occur following removal of the dams and recreation facilities/ancillary facilities (Phase 2) compared to the No-Action Alternative (existing condition) was evaluated:

- Potential effects of restoration and resulting effects on air quality.

To evaluate the long-term, post-facility removal effects, activities were qualitatively evaluated to determine whether there would be more, less, or no change in expected air quality and GHG emissions under the Proposed Action as compared to the No-Action Alternative.

[5] See Section 3.3.11, Air Quality and Climate Change, of the Final Environmental Impact Statements for Hydropower License for the Goldendale Energy Storage Project – FERC Project No. 14861-002. Available at: https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20240208-3036. Accessed October 2024.

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Criteria Pollutant, Fugitive Dust, and Greenhouse Gas Emissions

Scott Dam Area, Cape Horn Dam Area, Eel River Watershed, and Russian River Watershed

Under existing conditions, regular maintenance as well as flow gage checks and vegetation management occur in the Scott Dam and Cape Horn Dam areas. Following facility removal, emissions may be generated from employee commutes to the sites until license termination. Heavy equipment may be used in the implementation of measures in the Restoration and Sediment/Channel Monitoring and Response plans, such as for grading and slope stabilization. Therefore, any emissions associated with post-facility removal would be substantially fewer than those that would occur during construction and are presented in Tables 2.2.4.15-6 and 2.2.4.15-7, both of which are under all applicable thresholds of significance. Therefore, following the proposed removal of Scott Dam and Cape Horn Dam and associated facilities, air quality effects and GHG emissions associated with restoration activities and the resulting effects would be minimal. After PG&E has met the requirements in the Surrender Order and the license is terminated, there will be no emissions resulting from operation and maintenance of the Project. As a result, negligible effects related to air quality would occur from the decommissioning, and environmental measures are not proposed.

2.2.4.15.3 Construction and Environmental Measures

To avoid or reduce effects to air quality during construction and restoration activities, PG&E would obtain, prepare, and/or implement the following. A complete list of construction measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- General Construction Measures, including implementation of emission reduction measures and fugitive dust reduction measures

2.2.4.15.4 Unavoidable Adverse Effects

There are no unavoidable adverse air quality effects from the Proposed Action.

2.2.4.15.5 References

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Appendix 2.2.4.16-A Noise and Vibration Calculations

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2.2.4.16 Noise

This section describes the potential effects related to noise that could occur because of the Proposed Action described in PG&E's Application for Surrender of License and Decommissioning Plan for the Potter Valley Hydroelectric Project (Project), which is described in Section 2.1.2, Applicant's Proposal. Section 2.1.2 includes a description of decommissioning Project facilities and restoration goals to be met as part of the Proposed Action.

Potential effects are separated into construction effects (Phase 1) and post-facility removal effects (Phase 2). Refer to Section 2.2.41, Analytical Approach, for a description of each phase.

The effects are determined by analyzing the changes in the noise environment that may result from activities to be implemented under the Proposed Action compared to the No-action Alternative (existing condition) (Section 2.1.1, No-Action Alternative).

Final effects determinations consider measures (i.e., construction measures and post-facility removal measures) included to avoid or mitigate impacts associated with implementation of the Proposed Action (refer to Section 2.1.2.2, Proposed Environmental Measures). Unavoidable adverse effects are discussed at the end of this section.

2.2.4.16.1 Phase 1: Short-term Construction Effects

The following potential effects related to noise resulting from the Project were evaluated:

- Temporary noise and vibration from ground-operated off-road equipment;
- Temporary noise from truck hauling of materials and equipment; and
- Temporary noise from helicopter use for movement of equipment and material.

Approach to Analysis

This analysis was based on the noise and vibration levels known to occur from typical construction equipment, including the use of blasting for removal of the adit plug. The anticipated noise and vibration levels at sensitive receptor locations were then compared to the existing ambient environment. The potential increase in noise was considered in comparison to the following standards: 1 dBA increase is imperceptible, 3 dBA increase is barely perceptible, 5 dBA increase is clearly noticeable, and 10 dBA increase is subjectively perceived as approximately twice as loud (Caltrans 2013). The potential increase in groundborne vibration was considered in comparison to the effects of vibration on people and buildings, as presented in Table 2.2.3.15-3 in Section 2.2.3.15, Noise.

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Off-Road Equipment

Construction and demolition activities associated with the Project would require the use of numerous pieces of noise- and vibration-generating equipment, such as backhoes, bulldozers, excavators, scrapers, and more. Table 2.2.3.15-2 in Section 2.2.3.15, Noise, presents the typical maximum noise levels for equipment commonly used in general construction projects at full-power operation at a distance of 50 ft. As shown in the table, construction equipment typically generates 74 to 89 dBA of noise at 50 ft. away. In addition, this analysis considers blasting for removal of the adit plug under this category. As presented in Table 2.2.3.15-2, blasting results in approximately 94 dBA at 50 ft. away. The noise level from Project activities at sensitive receptor locations was estimated based on the principle that sound from a point source generally attenuates at a rate of 6 dB per doubling distance. Therefore, the reference noise level was adjusted in 6-dB increments based on how many times the 50-ft distance was doubled between the construction area and the nearest receptor.

Table 2.2.3.15-4 in Section 2.2.3.15, Noise, presents the typical vibration levels for equipment commonly used in demolition projects at a distance of 25 ft. As shown in the table, off-road equipment typically generates 0.003 to 0.644 peak particle velocity (PPV) inches per second (in/sec) at 25 ft. away. The level of vibration experiences at sensitive receptor locations was estimated using Equation 7-2 from the FTA Transit Noise and Vibration Impact Assessment Manual (FTA 2018).

$$PPV_{equip} = PPV_{ref} \times (\frac{25}{D})^{1.5} \qquad \textbf{Eq. 7-2}$$

where:

PPV_{equip} = the peak particle velocity of the equipment adjusted for distance, in/sec

PPV_{ref} = the source reference vibration level at 25 ft, in/sec

D = distance from the equipment to the receiver, ft

All off-road equipment noise and vibration calculations are included as Appendix 2.2.4.16-A.

Haul Trucks

The regular use of heavy-duty haul trucks on area roadways would contribute to the noise environment. The noise level from Project haul trucks was estimated at receptor locations using the United States (U.S.) Department of Housing and Urban Development (HUD) Exchange Day/Night Noise Level (DNL) Calculator. The assumptions for truck traffic volumes are presented in each analysis section.

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Helicopter Use

Helicopters may be used to transport materials or large pieces of equipment, and receptor locations would be exposed to brief and intermittent helicopter noise. It is assumed that helicopters would land at the Gravelly Valley Airport, located immediately north of Lake Pillsbury reservoir, and the helipad located at the Potter Valley Powerhouse site. Potential noise effects from the use of helicopters are discussed qualitatively in this analysis.

Scott Dam Area

The decommissioning activities for Scott Dam and associated facilities were assumed to occur in three seasons: (1) the initial low-flow season (June–October), (2) the first high-flow season after the initial low-flow season (November–May), and (3) the first low-flow season after sediment flushing during the high-flow season (June–October). Construction phase timing is dependent on flow conditions; for example, Phase 2, the first high-flow season activities, will occur during the next wet season, which may not occur immediately after Phase 1.

Project activities would temporarily generate noise from the use of off-road equipment and truck hauling. In addition, helicopters may be used to facilitate material transport during the Project. Off-road equipment use, truck hauling, and helicopter use would cause temporary increases to ambient noise levels during construction activities. The following subsections provide more detail on the noise exposure associated with each of the three categories of construction noise: construction equipment, truck hauling, and helicopter use.

Off-Road Equipment

The nearest residence to the demolition area is located approximately 1,400 ft. southwest of Scott Dam (see Section 2.2.3.15, Noise, Map 2.2.3.15-1), and the ambient noise environment was estimated to be roughly 40 dBA. Because construction and demolition activities are not expected to occur within 500 ft. of receptors, Lake County General Plan Policy N-1.7 would not be applicable. Lake County does not have an adopted noise ordinance.

The estimated noise from off-road equipment experienced at the nearest sensitive receptor would range from 47 to 62 dB. The estimated noise from blasting at the nearest receptor would be approximately 67 dB. As a result, the use of off-road equipment associated with the Project could result in a temporary increase in noise up to 27 dB. However, construction and demolition activities would be temporary and would only occur during daytime hours. In addition, blasting of the adit plug would be a one-time occurrence. Implementation of the General Construction Measures, which include noise reduction measures, would reduce noise impacts to the maximum extent feasible. A complete list of construction measures is included in Section 2.1.2.2, Proposed Environmental Measures. Even with the implementation of the proposed noise reduction measures, the increase in noise from the use of off-road equipment may still exceed the ambient noise environment by more than 5 dBA, which is considered “clearly noticeable.” Therefore, during construction activities, receptors within the Scott Dam Area may be exposed to a significant adverse effect related to noise from off-road equipment.

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Should impact pile drivers be used during demolition of Scott Dam, the estimated maximum groundborne vibration level from off-road equipment experience at the nearest sensitive receptor would be 0.0015 in/sec PPV. This is well below the threshold for damage to buildings and the threshold of human perception. No impacts are expected to occur related to vibration.

Haul Trucks

Several roads, including County Road 301, Kapranos Road, Elk Mountain Road, Rice Fork Road, Gravel Cutoff Road, Logging Road (M8), Gage E2 Access Road, Scott Dam Road, Upper Scott Dam Access Road, and roads associated with the resort and residences, are located in the Scott Dam Area Study Region (see Section 2.2.3.16, Traffic, Map 2.2.3.16-1). It is assumed that haul trucks would transport material along Scott Dam Road and southward along County Road 301. The receptors closest to the assumed haul route within the Scott Dam Area are located approximately 2,000 ft. south of Scott Dam Road. Based on the Scott Dam removal timeline and the anticipated volume of material to be exported, it was assumed that a maximum of 105 haul truck trips per day would be required during peak construction. At an effective distance of 2,000 ft. away, 105 daily truck trips traveling at an assumed speed of 25 miles per hour (mph) would generate a DNL of 40 dB (HUD 2024). The DNL is the average noise level over a 24-hour period. The expected noise from haul truck trips experienced at receptors would not exceed the existing ambient noise level, and, as a result, the impact would not be significant. Furthermore, implementation of the Construction Noise Measures, which prohibit the use of engine braking (i.e., jake brakes), would ensure that potential noise would be reduced to the maximum extent feasible. Therefore, the use of haul trucks during construction activities under the Proposed Action would have a negligible effect on receptors in the Scott Dam Area.

Helicopter Use

Under existing conditions, aircraft flyovers associated with the Gravelly Valley Airport, north of Lake Pillsbury reservoir, contribute to intermittent increases in ambient noise in the Scott Dam Area. The Gravelly Valley Airport serves an average of 83 takeoffs and landings per month (AirNav 2024), or an average of 2.7 flyover events per day. If helicopters are used for Project activities, the number of aircraft flyover events would increase and intermittent noise impacts may occur. The Gravelly Valley Airport is located in an unpopulated, forested area; as a result, an increase in landing/takeoff cycles would not be expected to adversely affect residents. However, flyover events may increase noise for receptors. The required Construction Noise Measures, which would ensure that helicopters operate during daytime hours only, would reduce potential noise impacts to the maximum extent feasible. Nevertheless, even with the implementation of the proposed noise reduction measures, the increase in noise from helicopter flyovers may still be considered significant. Therefore, a significant temporary adverse effect during construction activities may occur related to noise from helicopters on receptors in the Scott Dam Area.

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Cape Horn Dam Area

Removal of Cape Horn Dam would be completed intermittently over the course of roughly 12 to 18 months. As with the activities proposed in the Scott Dam Area, noise would be generated in the Cape Horn Dam Area from the use of off-road construction and demolition equipment, heavy-duty truck trips for material hauling, and helicopter use. The following subsections evaluate potential impacts associated with each of the three categories of construction noise.

Off-Road Equipment

The nearest residence to the demolition area is located approximately 1,000 ft. east of Cape Horn Dam (see Section 2.2.3.15, Noise, Map 2.2.3.15-2), and the ambient noise environment is estimated to be roughly 45 dBA. Mendocino County does not have an adopted noise ordinance.

The estimated noise from off-road equipment experienced at the nearest sensitive receptor would range from 50 to 65 dB. The estimated noise from blasting at the nearest receptor would be approximately 67 dB. As a result, the use of off-road equipment associated with the Project could result in a temporary increase in noise up to 22 dB. This is a significant increase in noise level compared to the existing conditions. However, construction and demolition activities would be temporary and will only occur during daytime hours. In addition, blasting would be a one-time occurrence. Implementation of the Construction Noise Measures would reduce noise impacts to the maximum extent feasible. Even with the implementation of the proposed noise reduction measures, the increase in noise from the use of off-road equipment may still exceed the ambient noise environment by more than 5 dBA, which is considered "clearly noticeable." Therefore, a significant temporary adverse effect may occur during construction activities related to noise from off-road equipment on receptors in the Cape Horn Dam Area.

Should impact pile drivers be used during demolition of Cape Horn Dam, the estimated maximum groundborne vibration level from off-road equipment experience at the nearest sensitive receptor would be 0.0025 in/sec PPV. This is well below the threshold for damage to buildings and the threshold of human perception. No impacts are expected to occur related to vibration.

Haul Trucks

Several roads are located in the Cape Horn Dam Area Study Region, including roads associated with the residences; Ridgeway Highway; Logging Road (M8); Van Arsdale Road; Eel River Road; Cutoff Road; Cape Horn Dam East Access Road; Intake Access Road; Penstock, Pipeline, and Butterfly Valve House Access Road; and Powerhouse Main Access Road (see Section 2.2.3.16, Traffic, Map 2.2.3.16-2). It is assumed that haul trucks would transport material along Ridgeway Highway and southward along Eel River Road. The receptors closest to the assumed haul route within the Cape Horn Dam Area are located approximately 100 ft. east of Ridgeway Highway. Based on the Cape Horn Dam removal timeline and the anticipated volume of material to be exported, it was assumed that a maximum of 20 haul truck trips per day would be required during the peak construction period. At an effective distance of 100 ft. away, 20 daily truck trips traveling at an assumed speed of 25 mph would generate a DNL of 53 dB (HUD 2024). The expected noise from haul truck trips experienced at receptors would exceed the existing ambient noise level.

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However, implementation of the Construction Noise Measures, which prohibit the use of engine braking, would ensure that potential noise would be reduced to the maximum extent feasible. Overall, the use of haul trucks during construction activities under the Proposed Action would have a negligible effect on receptors in the Cape Horn Dam Area.

Helicopter Flights

If helicopters are used during Project activities in the Cape Horn Dam Area, intermittent noise impacts to receptors may occur. Helicopters associated with work at the Cape Horn Dam Area are assumed to use the landing pad located at the Potter Valley Powerhouse site, which is not currently used as an active landing site. Therefore, any increase in helicopter activity (i.e., landing/takeoff cycles and aircraft flyover events) may be considered significant in comparison to the existing conditions. The required Construction Noise Measures, which would ensure that helicopters operate during daytime hours only, would reduce potential noise impacts to the maximum extent feasible. Even with the implementation of the proposed noise reduction measures, the increase in noise from helicopter use may still be considered significant. Therefore, a significant temporary adverse effect may occur during construction activities related to noise from helicopters on receptors in the Cape Horn Dam Area.

Eel River Watershed and Russian River Watershed

The Southern Eel River Watershed Study Region and Northern Russian River Watershed Study Region are both heavily forested and rural in nature. The ambient noise environment is primarily defined by vehicle traffic on area roadways, with higher ambient noise levels in more developed regions, such as the community of Potter Valley. Off-road equipment noise is localized to the general construction area. Impacts related to off-road equipment use were evaluated for the receptors located nearest to the construction areas in the discussion above.

It was assumed that the haul route would generally transport materials from Scott Dam along Forest Route 20N past the Cape Horn Dam Area, along Eel River Road, through the community of Potter Valley along Potter Valley Road, westbound along Highway 20, southbound on Highway 101, and terminating in the city of Ukiah (see Section 2.2.4.17, Traffic, Map 2.2.4.17-1). As of 2022, the segment of Highway 101 through Redwood Valley experiences a maximum of 24,000 average daily vehicle trips, and the segment of Highway 20 immediately east of Redwood Valley experiences a maximum of 11,500 average daily vehicle trips (Caltrans 2024). The addition of up to 105 one-way truck trips per day would represent between a 0.4 and 0.9 percent increase in traffic compared to the existing conditions. The 0.4 to 0.9 percent increase in haul truck traffic along the haul route is expected to result in a negligible increase in noise to receptors along the haul route. Similarly, the use of helicopters may temporarily increase the noise environment for receptors along the flight path. Nevertheless, the hauling period and/or use of helicopters would be limited to a couple of months per Project phase. Additionally, material transport is assumed to occur primarily during daytime hours, which are considered less noise-sensitive. Finally, implementation of the Construction Noise Measures would ensure that haul trucks do not use engine braking. Overall, the noise impacts during construction activities under the Proposed Action would have a negligible effect on receptors located in the Eel River and Russian River watersheds.

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2.2.4.16.2 Phase 2: Post-facility Removal Effects

The following potential post-facility removal effects to noise resulting from physical changes that occur following dam and recreation facility/ancillary facility removal, including restoration, were evaluated:

- Potential noise effects of restoration and resulting effects.

Scott Dam Area, Cape Horn Dam Area, Eel River Watershed, and Russian River Watershed

Following the proposed removal of Scott Dam and Cape Horn Dam and associated facilities, noise associated with restoration activities and the resulting effects would be minimal. Noise may be generated from employee commutes to the sites during restoration activities; however, this level of noise is expected to be less than what occurs under existing conditions. As a result, no effects related to noise would occur and environmental measures are not proposed.

2.2.4.16.3 Construction and Environmental Measures

To avoid or reduce effects related to noise during construction, PG&E will obtain, prepare, and/or implement the following measures. A complete list of construction measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- General Construction Measures, including implementation of noise reduction measures

2.2.4.16.4 Unavoidable Adverse Effects

The Proposed Action would result in temporary and brief unavoidable adverse noise effects at noise-sensitive areas associated with the use of off-road construction equipment and helicopters.

There are no unavoidable adverse noise effects from physical changes that occur following dam and recreation facility/ancillary facility removal, including restoration, under the Proposed Action.

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2.2.4.17 Traffic

This section describes the potential effects related to traffic that could occur because of the Proposed Action described in Pacific Gas and Electric Company's (PG&E's) Application for Surrender of License and Decommissioning Plan for the Potter Valley Hydroelectric Project (Project), which is described in Section 2.1.2, Applicant's Proposal. Section 2.1.2 includes a description of decommissioning Project facilities and restoration goals to be met as part of the Proposed Action.

Potential effects are separated into construction effects (Phase 1) and post-facility removal effects (Phase 2). Refer to Section 2.2.4, Environmental Effects, for a description of each phase.

The effects are determined by analyzing the changes in the transportation environment that may result from activities to be implemented under the Proposed Action compared to the No-Action Alternative (existing condition) (Section 2.1, Proposed Action and Alternatives).

Final effects determinations consider measures (i.e., construction measures and post-facility removal measures) included to avoid or mitigate impacts associated with implementation of the Proposed Action (refer to Section 2.1.2.2, Proposed Environmental Measures). Unavoidable adverse effects are discussed at the end of this section.

2.2.4.17.1 Phase 1: Short-term Construction Effects

The following potential effects to the transportation network resulting from Project facility modifications were evaluated:

- Increased traffic on roads in the Transportation Analysis Area resulting from truck trips during construction;
- Increased traffic on roads in the Transportation Analysis Area resulting from worker transportation during construction; and
- Potential impacts related to emergency access.

During construction, vehicle miles traveled (VMT) would be generated from heavy trucks hauling materials to and from the Project area and from worker commutes to and from the Project area. An increase in VMT on area roadways can increase congestion and cause delays by reducing intersection and roadway segment level of service (LOS), particularly in more developed regions that already experience traffic congestion. Detailed haul routes and construction worker numbers are not available at this time, and as a result, quantifying changes in VMT associated with Project construction activities cannot be determined. This analysis relies on best estimates of trip generation and qualitatively evaluates potential impacts related to traffic.

The access roadways to Project facilities include gravel roadways and paved roadways with uneven surfaces, potholes, and areas of erosion. It is noted that the use of heavy construction vehicles, including haulers and large trucks, may accelerate the wear of roadways, including potholes, cracks, and uneven surfaces, and could lead to repairs being needed sooner than under

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the No-Action Alternative. Impacts related to roadway wear and maintenance are addressed in Section 2.2.4.9, Land Use. As described in further detail therein, implementation of the Construction Transportation Management Plan will reduce impacts related to potential roadway damage. The plan may include an evaluation of pre-construction roadway conditions, pre-construction improvements to ensure safe haul truck access, and post-construction roadway condition evaluation and repairs along haul truck routes. In addition, it is noted that certain roads that access Project facilities and features will be removed following decommissioning activities (see Section 2.1.2.1.1, Decommissioning Plan, Tables 2-8 and 2-10).

Scott Dam Area

The decommissioning activities for Scott Dam and associated facilities were assumed to occur in three seasons: (1) the initial low-flow season (June–October), (2) the first high-flow season (November–May) after the initial low-flow season, and (3) the first low-flow season after sediment flushing (June–October). Construction may not occur for 2 years continuously; for example, the first high-flow season activities will occur during the first wet season following the initial low-flow season, which may not occur immediately after the initial low-flow season. Recreation facility and features removal is planned to occur simultaneously with the dam removal activities.

The roadways and trails that provide access to the Scott Dam Area are presented on Map 2.2.3.16-1. Bicycle trails and public transit stops do not extend into the Project area. The Gravelly Valley Airport, north of Lake Pillsbury reservoir, provides access to the Scott Dam Area by air.

During the decommissioning of Scott Dam, public access to area roadways and trails may be limited during active construction activities.

Traffic from Truck Trips

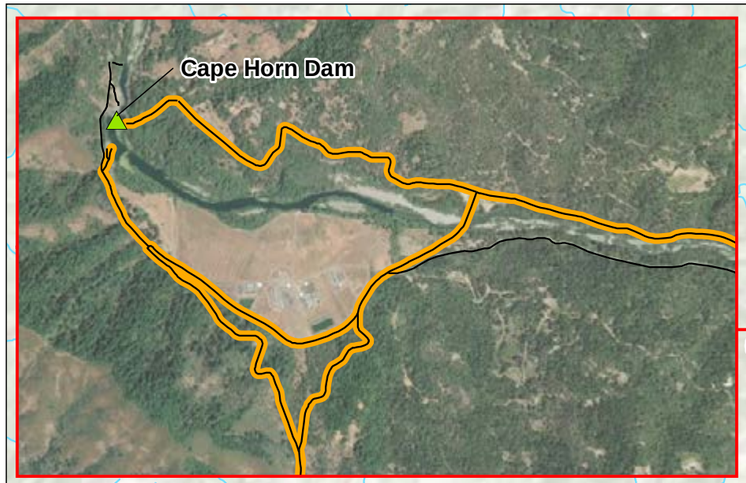
During the removal of Scott Dam, haul truck activity would occur during the initial low-flow season (approximately 5 months) and the first low-flow season after sediment flushing (approximately 5 months). Under the Proposed Action, PG&E would initiate removal of Scott Dam and Cape Horn Dam during the same low-flow season. Removal of the adit plug and the first high-flow season activities will occur during the first wet season following the initial low-flow season, which may not occur immediately after the initial low-flow season.

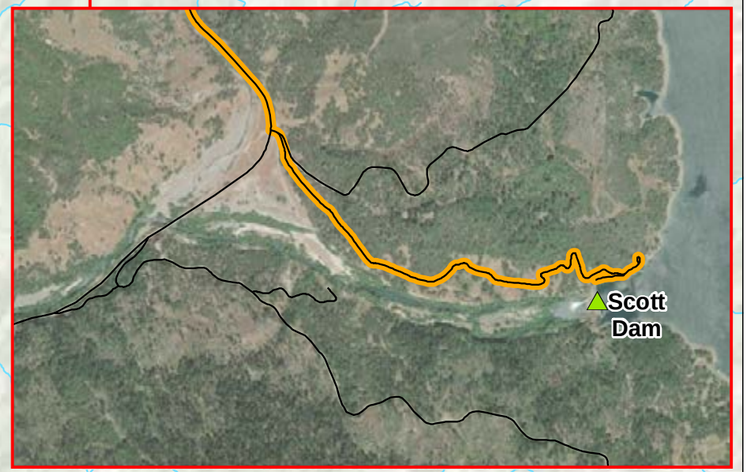
During the initial low-flow season, 16,000 cubic yards[1] (cy) of material from the removal of the dam was estimated to be exported from the site. Assuming that each haul truck can accommodate a load volume of 16 cy, roughly 18 haul truck trips[2] would occur each day over the 5-month season.

[1] See Section 2.1.2.1, Surrender of License.

[2] This is equal to 9 trips back and forth from the Project site, as haul trucks arrive empty and leave fully loaded.

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Cape Horn Dam

Van Arsdale Reservoir

Lake Pillsbury reservoir

Scott Dam

Potter Valley

Redwood Valley

Calpella

Lake Mendocino

Ukiah

Ukiah Municipal Airport

Upper Lake

Nice

Clear Lake

Lucerne

20

20

29

101

PG&E Project Facilities

- Dam
- Powerhouse
- FERC Project Boundary
- Potential Haul Route

Other Features

- Freeway / Highway
- Local Roadway
- City / Town

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PG&E Potter Valley Project
FERC Project No. 77

Map 2.2.4.17-1

Potential haul route.

0 0.5 1 2 3 Miles

Date: 7/7/2025

Projection: UTM Zone 10 N
Datum: NAD 83

C:\Users\kgabel\OneDrive - Stantec\gisnt\185706343\map\Noise Traffic Air Quality\Map 2.2.4.17-1_PotentialHaulRoute_11i17i_12.mxd

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The most intensive haul truck activity would occur during the first low-flow season after sediment flushing, when up to 92,000 cy of material[3] would be exported from the site resulting in a maximum of 106 one-way truck trips[4] per day during this phase. Additional haul truck trips would occur during decommissioning of recreation facilities. It is noted that haul trucks would also be used throughout the construction period to transport construction equipment, tools, water, and other ancillary materials to the site, as well as material removed associated with the decommissioning of the Project recreation facilities. These truck trips would be less frequent than the truck trips associated with a large volume of material export and would not result in a substantial impact. The following discussion considers conservative estimates to identify maximum potential effects.

In general, it is anticipated that haul truck traffic associated with the removal of Scott Dam and associated facilities would carry exported material along Upper Scott Dam Access Road, Scott Dam Road, Eel River Road/Elk Mountain Road, north of the Eel River towards Cape Horn Dam, and Highway 20 to Highway 101, southbound toward Ukiah, although other routes may be used. See Map 2.2.4.17-1 for the potential haul route evaluated in this discussion. As depicted therein, haul trucks would primarily use either private access roads or large collector roadways, and travel along public local streets would be limited to a short stretch along USFS Route M6 prior to reaching Gage E2 Access Road (roughly 0.5 mile). Elk Mountain Road provides access to the residences cited along Rice Fork Road. Upper Scott Dam Access Road and Scott Dam Road are exclusively used by PG&E to access Project facilities and features, and access is limited by security gates. As a result, additional use of these roadways from truck trips during decommissioning of Scott Dam would not result in impacts to the public. However, Eel River Road/Elk Mountain Road is a public road, operations of which may be affected by the Proposed Action.

Under the Proposed Action, PG&E would implement General Construction Measures to minimize potential effects to the transportation network from truck trips. These measures include limiting construction activities to begin after sunrise (but no earlier than 7:00 a.m.) and end before sunset (but no later than 7:00 p.m.), limiting the speed of any vehicles and equipment traveling across unpaved areas to no more than 15 miles per hour, and ensuring that work occurs within identified staging areas. In addition, PG&E's proposed Construction Transportation Management Plan will include measures to provide public notifications regarding planned road use by haul trucks and workers including the dates and times of construction, routes to be used by haul trucks, ensure that workers commute during off-peak hours, plans for any street or lane closures, and preservation of emergency vehicle access at all times, among other requirements.

Overall, with implementation of the General Construction Measures and Construction Transportation Management Plan (refer to Section 2.1.2.2, Proposed Environmental Measures), effects on traffic resulting from increased truck trips during construction are considered negligible. In addition, many of the roads used by trucks hauling material to and from the site would use either

[3] See Section 2.1.2.1, Surrender of License.

[4] This is equal to 53 trips back and forth from the Project site, as haul trucks arrive empty and leave fully loaded.

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private, PG&E-owned access roads where the general public would not be affected, or highways where the addition of Project traffic would not be noticeable compared to existing traffic levels.

Traffic from Worker Trips

During construction, workers would commute to and from the Project area each day. The majority of the worker traffic would occur during the initial low-flow season (approximately 5 months) and the first low-flow season after sediment flushing (approximately 5 months).

Some worker traffic would also occur at the beginning of the first high-flow season (November–May) after the initial low-flow season for the detonation of the adit plug. As discussed above, PG&E would implement General Construction Measures to minimize potential effects to the transportation network. PG&E's proposed Construction Transportation Management Plan will also include several measures to minimize potential effects from increased traffic by workers arriving and leaving the construction site. For example, the plan may include requirements for workers to commute outside of peak hours and to adhere to specified travel routes. Alternatively, a rideshare system may be implemented wherein construction staff meet and park at a location outside of the project facilities and take shuttles to the site to limit the number of vehicles on access roadways. The Construction Transportation Management Plan will be finalized prior to the initiation of construction activities.

The total number of daily worker vehicle trips as a result of Project facility modifications is not anticipated to impact traffic in the Transportation Analysis Area since these workers would likely commute to and from the site during off-peak hours, as ensured by the Construction Transportation Management Plan. With implementation of the General Construction Measures and Construction Transportation Management Plan, impacts to traffic resulting from worker transportation during construction are considered negligible.

Emergency Access

This discussion considers potential effects of access to the Scott Dam Area by first responders as well as access to evacuation routes by residents of the greater Project area. Map 2.2.3.16-4 identifies the primary access routes to the Scott Dam Area. Construction materials and equipment would be staged in areas that would not block emergency access or evacuation routes. The proposed Construction Transportation Management Plan would include a traffic control plan and a staging and haul route plan that would identify the primary emergency access routes, and ensure that the routes remain open throughout the entire construction period. Therefore, with implementation of the General Construction Measures and Construction Transportation Management Plan (refer to Section 2.1.2.2, Proposed Environmental Measures), effects to emergency access to the Scott Dam Area and access to evacuation routes by residents of the greater Project area would be negligible.

Cape Horn Dam Area

Cape Horn Dam decommissioning would occur during the first low-flow season (approximately 5 months) and at the beginning of the first high-flow season (November–May) after the initial low-

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flow season for the removal of the cofferdams. No decommissioning activities are anticipated following first high-flow season.

The roadways and trails that provide access to the Cape Horn Dam Area are presented on Map 2.2.3.16-2. Bicycle trails and public transit stops do not extend into the Project area. The Potter Valley Powerhouse Helicopter Landing Site is located adjacent to the Potter Valley Powerhouse.

Traffic from Truck Trips

See Map 2.2.4.17-1 for the potential haul route evaluated in this discussion. Haul truck travel along local streets would be limited to Powerhouse Road, which is also used to access rural residences in Potter Valley. However, trips along Powerhouse Road would be generated from travel to and from the Potter Valley Powerhouse, which would not include a substantial number of heavy duty truck trips due to the limited volume of material export associated with decommissioning the powerhouse.

The overall number of haul truck trips associated with decommissioning Cape Horn Dam would be less than those required for the removal of Scott Dam because the removal of Cape Horn Dam would entail less material export and would occur over a shorter construction season. While there would be an increase in truck trips during implementation of the Project, these trips would not noticeably increase traffic along the highway.

Haul trucks would also be used throughout the construction period to transport construction equipment, tools, water, and other ancillary materials. These truck trips are expected to be less frequent than the trips associated with material export and would not result in a substantial impact.

As discussed above, PG&E would implement General Construction Measures and the Construction Transportation Management Plan to minimize potential effects to the transportation network from truck trips. Overall, with implementation of these measures and the Construction Transportation Management Plan (refer to Section 2.1.2.2, Proposed Environmental Measures), effects on traffic resulting from increased truck trips during construction are considered negligible.

Traffic from Worker Trips

As noted above, during construction, workers would commute to and from the Project area each day. The majority of the worker traffic would occur during the initial low-flow season. Some worker traffic would also occur at the beginning of the first high-flow season for the removal of the cofferdams. The total number of daily worker vehicle trips as a result of Project facility modifications would not be anticipated to create any noticeable impacts to traffic due to the relatively small number of workers (fewer than 23 staff per day) and use of roads during off-peak hours. With implementation of the General Construction Measures and Construction Transportation Management Plan, impacts to traffic resulting from worker transportation during construction at Cape Horn Dam are considered negligible.

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Emergency Access

This discussion considers potential effects of access to the Cape Horn Dam Area by first responders as well as access to evacuation routes by residents of the greater Project area. As discussed above, the Construction Transportation Management Plan will include measures to ensure that construction materials and equipment would be staged in areas that do not block emergency access or evacuation routes and the primary emergency access route (identified on Map 2.2.3.16-4) would remain open throughout the entire construction period. Therefore, with implementation of the General Construction Measures and Construction Transportation Management Plan (refer to Section 2.1.2.2, Proposed Environmental Measures), effects to emergency access to the Cape Horn Area and access to evacuation routes by residents of the greater Project area would be negligible.

Eel River Watershed

The most significant roadway in the area is Highway 101. As of 2022, the segment of Highway 101 through the city of Willits experiences a maximum of 7,900 average daily vehicle trips (Caltrans 2024). The majority of traffic associated with the Proposed Action would occur south of the dams and would not affect the Eel River Watershed region.

Potential effects to bridges, road crossings, and roads in low-lying areas adjacent to the Eel River from reduced channel capacity due to sediment deposition following the removals of the dams are evaluated in Sections 2.2.4.8, Geomorphology, and 2.2.4.9, Land Use.

Russian River Watershed

Haul truck traffic and worker commutes are expected to primarily come from the south and, as a result, would affect roadways within the Russian River Watershed, including Highway 101. As of 2022, the segment of Highway 101 through Redwood Valley experiences a maximum of 24,000 average daily vehicle trips and the segment of Highway 20 immediately east of Redwood Valley experiences a maximum of 11,500 average daily vehicle trips (Caltrans 2024). Therefore, the addition of up to 106 one-way truck trips per day would represent between a 0.4 and 0.9 percent increase in traffic compared to existing conditions. This minor increase in daily traffic volume would not noticeably affect roadway LOS. Lake County has established a minimum standard of LOS C for county-maintained roadways. It is not expected that Project haul truck traffic would degrade operations of roadways in Lake County to below LOS C.

2.2.4.17.2 Phase 2: Post-facility Removal Effects

Phase 2 includes the immediate effects after removal of the dams (i.e., increase in sediment transport in the Eel River downstream of the dams) and restoration activities in the Project area, including the Lake Pillsbury reservoir and Van Arsdale reservoir beds. Potential effects to traffic during Phase 2 compared to the No-Action Alternative (existing condition) were evaluated:

- Potential effects on the transportation network.

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When a dam is removed, sediment that has accumulated in the reservoir over time is released downstream, which is deposited on the riverbed and surrounding areas. This deposition can reduce the capacity of the river and floodways to transport water during periods of high rainfall, which can potentially cause localized flooding in areas that were previously unaffected. As a result, during Phase 2a, the potential exists for flooding to occur that may affect the transportation network. Potential increases in the 100-year flood elevation and inundation extents are evaluated in Section 2.2.4.8, Geomorphology. To address and reduce the potential impacts to infrastructure, PG&E would develop and implement the Sediment/Channel Monitoring and Response Plan. The plan would include measures for monitoring potential sediment deposition and reductions in flow conveyance at the bridge locations that may occur during drawdown and notching of the dam. PG&E would also develop and implement the Flood Monitoring Plan, which will establish monitoring of water levels and flood risks, define measures to protect downstream infrastructure and surrounding areas, and define a process for addressing any potential issues. With implementation of these measures, and given the available freeboard at the bridges, potential effects to infrastructure from sand deposition during construction are considered negligible.

During Phase 2b, following facility removal, employee commutes to the sites may continue with implementation of the management plans until license termination; however, the trips would be fewer than would occur during Phase 1 construction and that which currently occurs under the No-Action Alternative for Project operation and maintenance.

Following construction activities, certain roads that access Project facilities and features will be removed (see Section 2.1.2.1.1, Decommissioning Plan, Tables 2-8 and 2-10). Scott Dam Road and Upper Scott Dam Access Road will be left in place. None of the access roads and trails in the Cape Horn Dam area are proposed for removal. Overall, removal of certain roads that access Project facilities and features will have no impact on public emergency evacuation.

2.2.4.17.3 Construction and Environmental Measures

To avoid or reduce effects to the transportation network during construction, PG&E will obtain, prepare, and/or implement the following measures and plan. A complete list of construction measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- General Construction Measures
- Construction Transportation Management Plan
- Sediment/Channel Monitoring and Response Plan
- Flood Monitoring Plan

2.2.4.17.4 Unavoidable Adverse Effects

Unavoidable adverse impacts to the transportation network would not occur with implementation of the Proposed Action.

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2.2.4.17.5 References

Caltrans (California Department of Transportation). 2024. Traffic Census Program, 2022 AADT. Available at: https://dot.ca.gov/programs/traffic-operations/census. Accessed April 2024.

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2.2.4.18 Marine Resources

This section describes the potential effects to marine resources that could occur because of the Proposed Action described in Pacific Gas and Electric Company's (PG&E's) Application for Surrender of License and Decommissioning Plan for the Potter Valley Hydroelectric Project (Project) (see Section 2.1.2, Applicant's Proposal). Section 2.1.2 includes a description of decommissioning Project facility modifications, including restoration activities, to be implemented under the Proposed Action.

Potential effects are separated into construction effects (Phase 1) and post-facility removal effects (Phase 2). Post-facility removal effects are split into phases: Phase 2a – Initial Conditions and Preliminary Restoration and Phase 2b – Resulting Conditions and Restoration. Refer to Section 2.2.4.1, Analytical Approach, for a description of each phase.

The effects are determined by analyzing the potential changes to marine resources that may result from activities to be implemented under the Proposed Action compared to the No-Action Alternative (existing condition) (Section 2.1.1, No-Action Alternative). Analysis of the Proposed Action considers removal of Scott Dam and removal of Cape Horn Dam within the same construction season, as described in Section 2.1.2, Applicant's Proposal.

Final effects determinations consider construction measures and post-facility removal measures included to avoid, minimize, or mitigate impacts associated with the Proposed Action (see Section 2.1.2.2, Proposed Environmental Measures). Unavoidable adverse effects are discussed at the end of this section.

2.2.4.18.1 Phase 1: Short-term Construction Effects

The following potential effects to marine resources resulting from short-term construction-related activities were evaluated:

- Potential effects of increased turbidity and suspended sediment during construction;
- Potential effects of pollutant spills of oil, fuel, or other toxic materials; and
- Potential effects of water contamination from stormwater or nutrient and bacterial runoff.

For the purposes of this section, the Analysis Area for marine resources is intertidal, tidal, and oceanic habitats between the mouth of the Eel River estuary and the nearshore region, limited to distance from shore and as illustrated in Section 2.2.3.17, Marine Resources, Map 2.2.3.17-1.

Potential Effects of Increased Turbidity or Suspended Sediment on Marine Resources

Construction activities at Scott Dam and Cape Horn Dam have the potential to temporarily impact water quality in the Eel River downstream of the dams. In addition, certain Project recreation facilities (i.e., campgrounds and day-use areas) will be removed and the site will be restored (see Section 2.1.2.1, Surrender of License, Table 2-8 for the Project recreation facilities and associated roads that will remain). Because the recreational facilities that will be removed are near Lake

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Pillsbury reservoir, there is a potential for water quality in the reservoir and downstream Eel River to be affected. As discussed in Section 2.2.4.3, Water Quality, these construction activities have the potential to cause a temporary increase in turbidity and suspended sediment in the Eel River downstream of the construction sites due to ground disturbance. Construction activities would disturb soils and make them susceptible to erosion. As a result, water quality may be potentially temporarily affected, reducing the quality of EFH.

PG&E would implement water quality and erosion control measures to address and reduce the potential for increased suspended sediment loads and turbidity during construction activities. Construction measures include a Construction Site Water Diversion, Dewatering, and Drawdown Plan; a Construction Water Quality and Water Temperature Monitoring Plan; BMPs; a Construction Erosion Prevention Plan; an Aquatic Species Management and Monitoring Plan; and an Estuary Protection Plan. The Construction Site Water Diversion, Dewatering, and Drawdown Plan would describe the timing and sequencing of drawdown. In addition, PG&E would obtain applicable resource agency and construction permits. With these measures, the potential for an increase in turbidity and suspended sediment and related water quality effects on marine species and habitat in the Eel River estuary, nearshore, and ocean are considered negligible.

Potential Effects of Pollutant Spills on Marine Resources

Construction activities include the use of a variety of chemicals such as fuels, lubricants, paints, solvents, and construction materials. Improper handling, storage, or accidental spills of these chemicals could result in pollutants entering soil or surface water if not managed correctly. Activities associated with construction could increase the potential for accidental spills and pollutants to be introduced into the Eel River. This reduction in water quality could affect marine species and EFH by reducing habitat quality in the Eel River estuary, nearshore, and ocean.

To address and reduce the potential for pollutant spills, PG&E would implement construction-related BMPs to control spills; have emergency cleanup equipment readily available onsite; implement a Spill Prevention, Control, and Countermeasures (SPCC) Plan with protocols for preventing spills and managing incidents should they occur; and an Estuary Protection Plan. In addition, PG&E would obtain applicable resource agency and construction permits. With adherence to the above measures, potential effects to marine species and habitat in the Eel River estuary and nearshore region from pollutant spill contamination related to construction are reduced to a negligible level.

Potential Effects of Contamination from Stormwater or Nutrient and Bacterial Runoff on Marine Resources

Construction activities could temporarily alter natural drainage patterns. Without proper stormwater management practices such as silt fencing, straw/hay bales, or vegetative buffers, runoff from rainfall events could also transport pollutants from the construction site into the Eel River. Excess nutrients or bacteria (i.e., contaminants) could enter the Eel River if weather events coincide with the construction activity. This reduction in water quality could directly affect marine species and EFH by reducing habitat quality in the Eel River estuary, and nearshore region.

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PG&E would implement water quality and erosion control measures at the construction activity locations described above. Construction measures include a Stormwater Pollution Prevention Plan (SWPPP) and an Erosion Prevention Plan. Additionally, an Estuary Protection Plan would be implemented. PG&E would also obtain applicable resource agency and construction permits. With these measures, the potential for contamination from stormwater and nutrient/bacterial runoff and related water quality impacts to marine species and habitat in the Eel River estuary, nearshore, and ocean are considered negligible.

2.2.4.18.2 Phase 2: Post-facility Removal Effects

Phase 2 includes the initial, temporary physical conditions immediately following removal of the dams (Phase 2a) and Phase 2b that generally encompass the recovery phase of the decommissioning effort. Phase 2a conditions include those that may occur with the initial release of stored water and sediment following removal of the adit plug at Scott Dam and complete removal of Scott Dam and Cape Horn Dam (including cofferdam removal). During Phase 2b, Scott Dam and Cape Horn Dam will have been removed, Lake Pillsbury reservoir will have been dewatered, and restoration activities at these areas will have been initiated. The removal of the fish passage barrier (Scott Dam), improved fish passage at Cape Horn Dam, and reestablishment of unimpaired hydrology and natural sediment transport would result in an overall benefit to marine resources.

The following potential effects to marine resources associated with Project facility modifications from Phase 2a were evaluated and are described below:

- Direct effects from the short-term increased sediment load in the Eel River estuary and nearshore area immediately following dam removal;
- Direct effects through the short-term degradation of water quality, including toxins, nutrients, suspended solids, and pathogens, within the estuary and nearshore area that may be increased during the initial pulse release when the adit plug in Scott Dam is removed; and
- Indirect effects through the short-term degradation of water quality including algal blooms (increased chlorophyll α) and increased suspended solids, resulting in eutrophication and a reduction in DO, pH and alkalinity, and water temperature within the Eel River estuary, nearshore, and ocean.

The following direct and indirect effects to marine resources (including listed species) from Phase 2b resulting conditions and restoration beneficial effects include the following:

- Unimpaired hydrology would support the Eel River system connectivity from its source to the Eel River estuary, nearshore, and ocean.
- Unimpaired water quality and sediment processes would support Endangered Species Act–listed salmonid species' expanded habitat extent and their EFH within the Eel River estuary, nearshore, and ocean.

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Direct Effects of Increased Sedimentation, Turbidity, and Suspended Solids

The Eel River estuary and nearshore area include habitat for species listed and EFH listed in Section 2.2.3.3, Fish and Aquatic Resources, Tables 2.2.3.3-3 and Table 2.2.3.3-22. These species include finfish, all life stages of coastal pelagic species, Pacific Coast groundfish, highly migratory species, coho (*Oncorhynchus kisutch*) and Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*Oncorhynchus mykiss*), anadromous and marine fish species, sea turtles, and marine mammals such as whales and sea lions (see Section 2.2.3.17, Table 2.2.3.17-2 through Table 2.2.3.17-8. These species may be affected by changes to water quality parameters caused by Phase 2a actions, as outlined in Table 2.2.4.18-1 below.

Both direct and indirect effects can contribute to the reduction of quality or quantity of EFH and as such would be considered an adverse effect. "Adverse effect means any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH" (NOAA Fisheries 2004). Per NOAA Fisheries' preceding definition, any potential changes directly and indirectly to water quality from toxins, DO, turbidity (chemical), or biomagnification from toxins (biological alteration), pH and alkalinity, and water temperature would qualify as adverse effects to EFH and require conservation measures as a result.

Table 2.2.4.18-1. Water quality parameters in the Eel River estuary and/or in nearshore areas potentially affected by the Proposed Action and with the potential to affect marine resources.

Water Quality Parameter	Description
Chlorophyll α	Measurements are used as proxy for primary productivity from phytoplankton presence, which forms the base of the food web, and directly estimate the amount of biomass, which helps to understand ecosystem health.
DO	Reduced levels of DO are often related to eutrophication and can cause die-offs of marine organisms.
Nutrients	Nitrogen and phosphorus are primary nutrients that affect the aquatic food web; nutrient enrichment (high nutrient levels) can trigger algal blooms.
Pathogens	Of concern are *Escherichia coli* and enterococci, both of which cause health risks to humans and fish that are common in coastal waters, and when levels become elevated, this can result in beach closures and fishing restrictions.
pH and alkalinity	pH measures the concentration of hydrogen ions in solution that indicates how basic or acidic it is, while alkalinity measures the concentration of bicarbonate in solution, illustrating how resistant a solution is to a change in pH.
Suspended solids	Sediment particles or algae suspended in the water column can reduce light penetration. Deposition of solids can cover benthic habitat and change natural bathymetry.

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Water Quality Parameter	Description
Toxins	Stormwater runoff may input heavy metals and pesticides that can be harmful to aquatic organisms.
Turbidity	Reduced water clarity can reduce light penetration, leading to reduced primary productivity, and contribute to reduced DO. Reduced water clarity can also reduce predators' ability to find prey.

Direct effects from Phase 2a in the Eel River estuary, nearshore, and ocean areas include the potential for increased levels of sedimentation, turbidity, and suspended solids, toxins, pathogens, and nutrients, which could directly affect estuarine and marine species and decrease the quality of EFH. The fate of the initial pulse of sediment into the estuary, nearshore, and ocean would depend on riverine flows and tidal conditions at the time of dam removal. In addition, there is the potential that sediment from the dam removals could be deposited at the estuary mouth, reducing connectivity with the ocean.

Refer to Section 2.2.4.8, Geomorphology, for a detailed evaluation of the potential Phase 2a effects to sediment conditions and Section 2.2.4.3, Water Quality, for a detailed evaluation of the potential Phase 2a effects to water quality downstream of the dams.

Eel River Estuary

Rapid dam removal would result in the flushing of a large volume of sediment downstream (approximately 21 million cubic yards of sediment [primarily silt and clay]) into the Eel River downstream of Scott Dam in a single high-flow season. The removal of the Scott Dam adit plug during dam removal would create a release flow of approximately 7,000 cubic feet per second (cfs) from Scott Dam. At Scott Dam, this is equivalent to approximately a 2-year event (impaired flow) (see Section 2.2.3.1, Water Use and Hydrology). A 5-year event at Scott Dam is 16,500 cfs. At Scotia, the 2-year and 5-year events are 118,651 cfs and 205,066 cfs, respectively. Van Arsdale Reservoir is relatively small (originally 1,140 acre-feet) but contains approximately 1.7 million cubic yards of sediment (primarily coarser sediment) that could potentially be mobilized downstream of Cape Horn Dam following removal of cofferdams following dam removal. The coarser material would remain in the channel near / downstream of Cape Horn Dam. PG&E would schedule the adit blast at Scott Dam and the removal of the Cape Horn cofferdams during a period of high flows, which would minimize the duration of elevated suspended sediment to the extent possible. A large flush of fine sediments would travel down the Eel River from Scott Dam as washload (minimal deposition) along the entire Eel River to the ocean. A much smaller contribution to suspended sediments will be made by Cape Horn deconstruction.

Existing sediment modeling results indicate that most of the sand and coarse sediment that would be mobilized would be deposited upstream of the Middle Fork Eel River confluence, more than 120 miles (mi.) upstream of the mouth of the Eel River.

Sediment concentration measurements upstream of the estuary are available from 1959 to 1980 at U.S. Geological Survey (USGS) gage 1477000 Eel River at Scotia, approximately 150 mi. downstream from Scott Dam and approximately 7 mi. upstream of the confluence with the Van

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Duzen River. Typical daily sediment concentration in the winter months ranged from 2,500 to 8,000 milligrams per liter (mg/L) during this time period, with peaks greater than 10,000 mg/L during wetter years (USGS 2024b). Under existing conditions, the Upper Eel River subbasin contributes approximately 6 percent of the annual sediment load to the estuary, while the Middle Fork subbasin contributes 13 percent. The majority of sediment (68 percent) is derived from the mainstem of the Eel River between the South Fork Eel River and Middle Fork Eel River (Brown and Ritter 1971).

Suspended sediment concentrations would be elevated in the Eel River, including the estuary, and nearshore region to a lesser extent due to dam removal. As discussed in Section 2.2.4.3, Water Quality, modeling results indicate that initial maximum sediment concentrations immediately below Scott Dam with the draining of Lake Pillsbury reservoir would be significantly higher for 1 to 8 days following dam removal depending on the flow rates at the time of removal (see Section 2.2.4.3, Water Quality, Table 2.2.4.3-1 for further discussion of potential effects to water quality). The concentrations from the dam removals would be expected to be diluted with downstream distance from the dams by the downstream inflows from large tributary streams, including from Tomki Creek, Outlet Creek, Middle Fork Eel River, North Fork Eel River, South Fork Eel River, and Van Duzen Rivers. As discussed in Section 2.2.4.4, Fish and Aquatic Resources, modeled suspended sediment concentration at the estuary could still be extremely high (potentially 40,000 mg/L or higher at a 5,000 cfs release at the dam and assuming 12 million cubic yards of sediment is released) (see Section 2.2.4.4, Fish and Aquatic Resources, Figure 2.2.4.4-1), and would result in mortality and impaired function of salmonids and non-salmonids in the estuary (see Section 2.2.4.4, Fish and Aquatic Resources, Table 2.2.4.4-2).

As the highly turbid water travels down the Eel River to the mouth of the Eel River estuary, some suspended sediments could potentially settle out in the estuary. Deposited sediments would be remobilized with subsequent high-flow events, possibly over the course of several years, until they make their way out of the system. PG&E would implement the Estuary Protection Plan that would include water quality monitoring in the estuary prior to, during, and after the dam removals and monitor for potential sedimentation in the estuary that may occur from removal of the dams, as well as define a process for developing additional measures, if needed. In addition, the timing of the removal of the dams would be designed to minimize related potential impacts to sensitive species to the extent feasible.

In addition to modeling, sedimentation concentrations resulting from similar dam removal projects were reviewed to evaluate potential effects from the removal of Scott and Cape Horn dams (also see Section 2.2.4.8, Geomorphology). The Klamath River dam removals are an example of a rapid dam removal approach, similar to the approach for Scott Dam in which water levels from the reservoirs were quickly drained through opening low-level gates or blasting tunnels near the base of the dams. During the Klamath River dam removal project, the sediment concentration at Iron Gate Dam (USGS gage 11516530), the most downstream of the four dams that were removed, peaked at approximately 7,300 mg/L (USGS 2024a). This peak concentration was reduced by about 80 percent to approximately 1,600 mg/L by the river mouth (USGS gage 11530500) located about 122 mi. downstream and was within the range of sediment concentration experienced during historic high-river-flow events. Similar to the Klamath River dam removals, sediment

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concentrations from the removal of Scott and Cape Horn dams would be anticipated to be substantially reduced upstream of the estuary by tributary inputs and deposition.

Removing Scott Dam and Cape Horn Dam would have a short-term unavoidable adverse effect on suspended sediment and turbidity in the Eel River for a period of several days up to potentially several months, for which no mitigation is possible. This effect would extend along the entire length of the Eel River and Eel River estuary and into the nearshore region. PG&E would comply with a California Eelgrass Mitigation Policy (CEMP) (NOAA Fisheries 2014) by implementing an Estuary Protection Plan that would include pre-construction and post-construction survey mapping of eelgrass beds and their spatial extent in areas that may be affected by the Project and define a process for developing additional measures, if needed. In the long term, suspended sediment and turbidity would return to unimpaired conditions, with high-flow events transporting watershed-derived suspended sediment out into the ocean. PG&E would implement the Estuary Protection Plan that would include water quality monitoring in the estuary prior to, during, and after the dam removals and monitor for potential sedimentation in the estuary that may occur from removal of the dams, as well as define a process for developing additional measures, if needed. In addition, the timing of the removal of the dams would be designed to minimize related potential impacts to sensitive species to the extent feasible.

Nearshore Areas

As discussed above, when the adit plug is removed and following dam removal, high flows would be expected to transport suspended fine sediment beyond the estuary and into the nearshore area. The direction of plume travel would be dependent on incoming wave direction. During the winter/early-spring season (first high-flow season following the initial low-flow season) when adit plug removal is scheduled to occur, coastal storms tend to originate from the south to produce northernly currents, and thus, the sediment plume may travel north toward Humboldt Bay. Studies have shown that sediment plumes tend to stay within the 130-foot depth contour and that 40 to 75 percent of the sediment discharged by the Eel River settles out of the plume before reaching the entrance to Humboldt Bay (Geyer et al. 2000; Hill et al. 2000), indicating that the majority of the sediment will not enter Humboldt Bay. The area between the Eel River mouth and the headwall of Eel River Canyon just beyond the nearshore area has historically received a high concentration of sediment that has shaped this geologic feature. The extent and direction of the sediment plume would likely be similar to what occurs during high-flow events that have been documented in the recent past (Geyer et al. 2000; Guerra et al. 2006), with the potential for higher-than-typical flows during the initial pulse after dam removal.

Marine Mammals and Sea Turtles. There is low potential for impacts due to increased turbidity for marine mammals listed in Table 2.2.3.17-8 and ESA-listed marine mammal species within the nearshore (see Section 2.2.3.17, Marine Resources, Map 2.2.3.17-1) (e.g., humpback whale [Central America and Mexico DPS], killer whale [Southern resident DPS], and Steller sea lion). Direct effects on any marine mammals from turbidity may present as changes in movement patterns, including avoidance; reduced visibility, which may affect their foraging; and increased stress (NOAA Fisheries 2018). Designated critical habitat for marine species (see Section 2.2.3.17, Marine Resources, Table 2.2.3.17-1) could also be potentially be exposed to sediment plumes and increased turbidity following removal of the dams. Sea turtle species

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transiting the nearshore area, including ESA-listed species in Table 2.2.3.17-7, are unlikely to be affected by turbidity. Sea turtles would respond to increased turbidity in a way similar to marine mammals. Behavioral effects may include increased stress, impaired foraging capabilities due to poor visibility, increased foraging effort, and disrupted migration (NOAA Fisheries 2018).

Marine Fish and Salmonids. Marine fish species within the nearshore area (see Section 2.2.3.17, Marine Resources, Table 2.2.3.17-2 through 2.2.3.17-6) may be affected by increased turbidity from the removal of the dams. In controlled experiments by Redding et al. (1987, as reported in Robertson et al. 2006), ESA-listed salmon, including coho and steelhead, were found to have reduced feeding rates at higher suspended sediment concentrations. The same study showed that Chinook salmon preferred feeding in moderately turbid waters but feeding rates diminished in highly turbid waters.

Short-term changes to fish community structure and reproductive success may also occur, as was observed following dam removal on the Elwha River. The estuarine fish community changed in the former estuary, favoring freshwater adapted species, while still functioning as a nursery for juvenile salmon (Rubin et al. 2017). Results from a decade of monitoring have shown that the productivity of adult Chinook salmon in the Elwha River has not yet reached target levels (NOAA Fisheries 2024b).

However, fisheries scientists widely acknowledge that the long-term benefits to marine fish species, particularly salmon, from dam removal outweigh short-term impacts caused by increased turbidity (California Water Boards 2024; Foley et al. 2017; NOAA Fisheries 2021, 2024a, 2024b; Rubin et al. 2017; San Francisco Chronicle 2024). For example, environmental analyses predicted short-term, sediment-related impacts to salmonids following removal of the Klamath River dam but concluded that the long-term benefits of the dam removals to Klamath River water quality, salmon populations, and overall river system health far outweigh the short-term impacts (California Water Boards 2024). Salmon would primarily benefit from access to previously inaccessible reaches of rivers in which this species has historically spawned (NOAA Fisheries 2024c). Following removal of the Elwha Dam in 2011 through 2014, researchers found that dam removal led to increased adult salmon numbers, expanded habitat use, and a resurgence of naturally produced juvenile salmon (NOAA Fisheries 2024b). As the Elwha River delta expanded seaward, new estuarine habitat was created and used by salmon, shorebirds, and their invertebrate prey (Foley et al. 2017). Klamath River Chinook salmon are predicted to increase by as much as 80 percent in the next three decades (New York Times 2024). As a result, though increased turbidity may have a short-term impact to marine fish, the long-term benefits are expected to far outweigh them.

Marine Invertebrates and Eelgrass. Marine invertebrate species and eelgrass within the nearshore area may be affected by increased sediment loads by inadvertent burial, which reduces their oxygen availability. Depending upon marine invertebrate motility, some species may be unable to leave a highly turbid area (NOAA Fisheries 2018). Bivalves may be less affected by increased turbidity because they can reduce their net pumping rates and expel added sediments quickly enough to prevent mortality (Wilber and Clarke 2001). Following dam removal on the Elwha River in California, invertebrate density rapidly rebounded as turbidity levels returned to normal, but invertebrate diversity initially remained low with fewer types of taxa (NOAA Fisheries 2025).

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PG&E would comply with a CEMP with a goal of no net loss with the implementation of the Estuary Protection Plan that would include pre-construction and post-construction survey mapping of eelgrass beds and their spatial extent in areas that may be affected by the Project and define a process for developing additional measures, if needed.

Increases in suspended sediment in the nearshore region related to dam removal would be greater than the historic range of high-flow events. The duration of the event, however, would be relatively short, on the order a few days (see Section 2.2.4.4, Fish and Aquatic Resources). As a result, increased sediment loads may temporarily affect certain species in nearshore areas. The Estuary Protection Plan would include monitoring to determine if sediments are deposited in the Humboldt Bay and potential actions, if feasible, to address such an accumulation of sediment. In the long term, suspended sediment and turbidity would return to unimpaired conditions, with high-flow events transporting watershed-derived suspended sediment out to the ocean.

Direct Effects of Increased Levels of Toxins, Nutrients, and Pathogens

Direct effects from Phase 2a in the Eel River estuary, nearshore, and ocean include the potential for increased levels of toxins, nutrients, and pathogens that could become suspended and reintroduced into the Eel River estuary and nearshore region as once-buried sediments in the reservoirs are exposed during dam removal (see Section 2.2.4.3, Water Quality), which could directly affect estuarine and marine species and decrease the quality of EFH.

Toxin, nutrient, and pathogen inputs could potentially occur as a result of stormwater runoff if agricultural land adjacent to the Eel River (e.g., in Scotia or Ferndale) were to become inundated from a storm event that occurred concurrent with the removal of the Scott Dam adit plug. As described above and in Section 2.2.4.8, Geomorphology, the removal of the Scott Dam adit plug would result in a flow release that would be within the historic range for this watershed. Analyses by Stillwater Sciences (2021) "concluded that the long-term and short-term coarse sediment deposition due to dam removal would not adversely increase the flood risk associated with the 100-year flood event." Therefore, it is unlikely that adjacent agricultural land would become inundated when the adit plug is removed, and become a source of nutrients, toxins, or pathogens in the river.

There is the potential for the reintroduction of toxins, nutrients, and pathogens in suspension from the reservoir sediments into the river system. As discussed in Section 2.2.3.6, Geology and Soils, results of a sediment characterization investigation for Lake Pillsbury reservoir and Van Arsdale Reservoir indicated that the sediments in these reservoirs are generally not contaminated and represent background conditions for remote reservoirs (Geosyntec 2019; 2020). Therefore, reintroduction of toxins, pathogens, and nutrients from reservoir sediments with removal of the dams would be unlikely to expose or directly affect marine and estuarine species.

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Indirect Effects

Removal of Scott Dam and Cape Horn Dam and the associated releases of trapped sediment from behind the dams have the potential to affect water quality parameters such as DO, nutrients, chlorophyll α, algal toxins, pH and alkalinity, and water temperature in the Eel River estuary, nearshore, and ocean.

Dissolved Oxygen

High suspended sediment concentrations are likely to result in impacts to DO downstream during Scott Dam removal while Lake Pillsbury reservoir is draining. The sediment is anoxic (lacking oxygen) and contains demands from both oxidation and biological consumption that would result in a period of low DO that could extend many miles downstream in the Eel River, likely down to the confluence with the Middle Fork Eel River (see Section 2.2.4.3, Water Quality).

Additionally, the upstream and downstream cofferdam removal at Cape Horn Dam would further decrease DO levels downstream in the Eel River, but this would be of shorter duration and smaller magnitude in comparison to the DO levels that would occur following dam removal. While specifics regarding the magnitude, extent, and duration are not known, water quality data from the Klamath River dam removal project and the sediment composition from Van Arsdale Reservoir basin can inform the potential effects of the removal of the cofferdam on downstream water quality conditions (see Section 2.2.4.3, Water Quality). As discussed in Section 2.2.4.3, the likely impact to DO from the release of sediments from behind the cofferdams would be moderate and would not pose a significant effect to fish or other aquatic organisms downstream.

As discussed above, DO would be expected to decrease downstream to the confluence of the Middle Fork Eel River and effects to DO following cofferdam removal would be less than would occur with the removal of the dams; therefore, effects are expected to be negligible on the Eel River estuary, nearshore, and ocean.

Nutrients, Chlorophyll α, and Algal Toxins

Addition of nutrients into the Eel River may result from sediment released from dam and cofferdam removal. The input of once-buried nutrients into the riverine and estuarine systems could trigger eutrophication as a secondary effect following dam removal. Nixon has defined eutrophication as "an increase in the rate of supply of organic matter to an ecosystem" (1995). Initially, nutrient enrichment can cause algal blooms, which result in increased turbidity, decreased light penetration, and increased water temperatures because suspended particles like algae absorb heat more readily than the surrounding water. Subsequently, decomposition of the algal bloom releases carbon dioxide, followed by reduced concentrations of DO.

Several toxic algal blooms have been observed in the Eel River Watershed (see Section 2.2.3.2, Water Quality) that result from an excessive growth of algae (chlorophyll α). Recent measurements (Geosyntec 2020) indicated relatively high average concentrations of both total Kjeldahl nitrogen and total phosphorus in Lake Pillsbury reservoir sediments, which were typical of a eutrophic system with high nutrient concentrations (Marx et al. 1999). Van Arsdale Reservoir

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sediments had moderate total Kjeldahl nitrogen and total phosphorus concentrations but were significantly lower than those measured in Lake Pillsbury reservoir (Geosyntec 2020).

PG&E would schedule the removal of Scott Dam during a time of high flows and low water temperature to minimize the potential short-term effects of increased nutrient loads in the Eel River to the extent possible. Algal blooms caused by high nutrient loads generally require warm, slow-moving water and therefore would be unlikely to occur during high-winter-flow periods, as most excess nutrients resulting from these releases would be flushed to the ocean before favorable conditions for algal blooms in the river could occur.

The removal of Scott Dam would have a negligible short-term effect on water quality in the Eel River estuary due to high nutrient levels, chlorophyll α, and algal toxins. It is possible that some sediment settling would occur along the Eel River that could potentially result in an increase in algal production in warm and low-flow conditions. As the nearshore region would ultimately receive these additional nutrients, chlorophyll α, and algal toxins, there is the potential for this short-term input to have a temporary effect from the delivery of nutrients and chlorophyll α adding to the upwelling processes and existing seasonal conditions with high nutrients.

pH and Alkalinity

Changes in both pH and alkalinity are possible due to the deconstruction of both Scott and Cape Horn dams. Data from the Klamath River dam removals indicate that potential impacts to pH would be expected to be relatively minor and of short duration downstream of the dams. Similarly, alkalinity would also be expected to drop due to the release of large amounts of sediment from the reservoir, which can temporarily bind with available alkaline particles in the water, although these impacts are not expected to be of long duration.

As a result, the removal of Scott Dam and Cape Horn Dam is expected to have a negligible effect on pH and alkalinity in the Eel River estuary, nearshore, and ocean.

Water Temperature

The removal of Scott and Cape Horn dams would return the Eel River to unimpaired flows that would have a direct effect on water temperature in the river. It is estimated that temperatures in the Eel River at the E2 gage, about 0.5 mi. downstream of Scott Dam, could increase up to 8.5 degrees Celsius (ºC) from approximately May through the end of August compared to existing conditions under the No-Action Alternative and based on 2020–2023 data. Water temperatures at this location from September through January would be significantly cooler (up to 5°C) when compared to existing conditions. This would be a beneficial impact on water temperature compared to the No-Action Alternative within the Eel River but would negatively impact existing cold-water conditions during the spring and summer immediately below the dam (see discussion in Section 2.2.4.3, Water Quality). This change in water temperatures would only occur from Scott Dam downstream to approximately Cape Horn Dam (12 miles) and would not affect the estuary, nearshore, and ocean.

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Direct and Indirect Effects on Listed Species

Direct and indirect effects on water quality can be particularly severe for species already experiencing population stressors, such as listed species and species that have designated critical habitat within the estuary, nearshore, and offshore areas, also including EFH within the estuary and nearshore areas. For this Project, these include coho, eulachon/smelt (*Thaleichthys pacificus*), green sturgeon (*Acipenser medirostris*), white sturgeon (*Acipenser transmontanus*), Chinook salmon, steelhead, humpback whale (*Megaptera novaeangliae*), blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), North Pacific right whale (*Eubalaena japonica*), sei whale (*Balaenoptera borealis*), southern resident killer whale (*Orcinus orca*), Guadalupe fur seal (*Arctocephalus townsendi*), Steller sea lion (*Eumetopias jubatus*), southern sea otter (*Enhydra lutris nereis*), green sea turtle (*Chelonia mydas*), leatherback sea turtle (*Dermochelys coriacea*), olive ridley sea turtle (*Lepidochelys olivacea*), and tidewater goby (*Eucyclogobius newberryi*). Additional species only listed under the California Endangered Species Act include the threatened longfin smelt (*Spirinchus thaleichthys*) (CNDDB 2024). Direct effects from turbidity on species that may occur or transit in the nearshore area are addressed in the *Direct Effects of Increased Sedimentation, Turbidity, and Suspended Solids* subsection "Nearshore Areas" above.

Species such as green and white sturgeon, sea otter, and octopus all feed on benthic molluscs, which may have a higher potential for exposure to toxins because their prey tends to accumulate toxins in higher concentrations than other macroinvertebrates. In addition, Chinook salmon, and other predatory species at the top of the trophic pyramid such as southern resident killer whale (and non-listed gray whale [*Eschrichtius robustus*]), are more likely to suffer from the effects of biomagnification, or the process by which toxins gradually accumulate in their bodies in levels higher than those found in the environment (Gray 2002). Toxin accumulation can lead to neurologic and physiological problems, reduced fecundity and low reproductive success, increased susceptibility to illness or injury, and reduced ability to navigate and find prey. Listed species may also be more vulnerable to introduced pathogens due to low genetic diversity or prior exposure to toxins.

Any indirect effects on water quality that change the primary productivity of estuarine and marine environments, such as reduced light, insufficient DO, or increased turbidity, could affect all organisms that rely on lower trophic levels. Listed species, such as southern resident killer whale, are particularly sensitive to reductions in prey availability stemming from decreased water quality, as they rely on salmon as their preferred primary prey. Hanson et al. (2021) discussed the well-documented summer diet of southern resident killer whale, primarily made of salmon, yet there are limited data on the three endangered southern resident killer whale pods' diet while they are in the outer coastal waters where they are likely to consume non-salmonid prey, such as halibut (*Hippoglossus stenolepis*) and lingcod (*Ophiodon elongatus*), during winter and in drought years, or southern resident killer whale may potentially utilize other feeding areas within their range. As discussed in Section 2.2.4.4, Fish and Aquatic Resources, the initial release of sediment and reduction of DO concentrations downstream of the reservoir would result in unavoidable, short-term adverse effects to salmonids and other fish and aquatic organisms, which could include mortality and impaired function. Salmon may be able to return relatively quickly to the Eel River. On the Klamath River, a single fall-run Chinook salmon was documented in a tributary upstream of J.C. Boyle Dam approximately two months after the dam was removed (Oregon Department of

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Fish and Wildlife 2024), illustrating the potential of how quickly salmon could return upstream of the removed dams.

To minimize the potential adverse effects of short-term increases in suspended sediment on anadromous fish and other aquatic organisms, PG&E proposes to implement several measures, including a Sediment/Channel Monitoring and Response Plan and an Aquatic Species Management and Monitoring Plan. PG&E's Aquatic Species Management and Monitoring Plan would include surveys and a rescue and relocation plan to reduce the effects of the Proposed Action on individual fish. PG&E also proposes to implement several measures during and after dam removal to address and reduce potential effects to aquatic habitat, sediment processes, and water quality, including the Sediment/Channel Monitoring and Response Plan, Estuary Protection Plan, and Restoration Plan, which will be beneficial to migratory fish in the Eel River, which are a food source for southern resident killer whale.

The potential effect from sediment loads on water quality in the estuary and nearshore areas would be anticipated to be temporary and limited to the period immediately following the flow release and restoration activities (Phase 2a) and, with implementation of the measures discussed above, would not rise to the level of adverse effects. Modeling results suggested that the majority of the fine sediment would be transported as washload without re-deposition once entrained by the flow and that the majority of the coarse sediment would be deposited upstream of the estuary (see Section 2.2.4.8, Geomorphology). Water quality parameter effects including toxins, nutrients, suspended solids, and pathogens may occur; these effects are expected to be minor and temporary. Phase 2a will result in a large sediment pulse that would be attenuated with tributary inputs and is considered negligible.

Phase 2b of the Proposed Action includes post-dam removal restoration and the resulting restored hydrologic and geomorphic conditions in the watershed. The effects of Phase 2b are expected to be permanent and significantly beneficial to fish and aquatic resources in the Eel River Watershed, including the estuary and nearshore environments, in comparison to the No-Action Alternative.

2.2.4.18.3 Construction and Environmental Measures

To avoid, or minimize, the Proposed Action affecting marine species and EFH in the Eel River estuary, nearshore, and ocean during construction, PG&E would obtain, prepare, and/or implement the following measures and plans. These measures and plans would be applied during implementation of the Proposed Action. A complete list of construction measures is included in Section 2.1.2.2, Proposed Environmental Measures.

- Construction Site Water Diversion, Dewatering, and Drawdown Plan
- Water Quality and Water Temperature Monitoring Plan
- Aquatic Species Management and Monitoring Plan
- BMPs
- Construction Erosion Prevention Plan

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- Estuary Protection Plan
- SWPPP
- Hazardous Materials Handling Measures
  - SPCC Plan
  - Construction-related BMPs
  - Required compliance with applicable local, state, and federal standards associated with handling and disposal of hazardous materials

Construction also would include obtaining and implementing resource agency and construction permits; following water quality BMPs; and complying with local, state, and federal laws (e.g., Basin Plan water quality requirements):

- USACE Section 404 CWA Permit
- SWRCB Section 401 CWA Water Quality Certification
- SWRCB Construction General Permit/SWPPP
- NMFS EFH consultation and CEMP

To avoid or reduce effects related to marine resources during Phase 2, PG&E will obtain, prepare, and/or implement the following measures and plans. A complete list of measures is included in Section 2.1.2.2., Proposed Environmental Measures.

- Aquatic Species Management and Monitoring Plan
- Estuary Protection Plan
- Restoration Plan
- Sediment/Channel Monitoring and Response Plan

2.2.4.18.4 Unavoidable Adverse Effects

There are short-term, temporary unavoidable adverse effects to water quality as a result of Project facility modifications to be implemented under the Proposed Action due to elevated suspended sediment concentrations that would extend along the entire length of the Eel River and Eel River estuary and into the ocean that may affect marine resources. The initial release of sediment and reduction of DO concentrations downstream of the reservoir could result in unavoidable, short-term adverse effects to salmonids and other fish and aquatic organisms in the estuary, which could include mortality and impaired function. In the long term, suspended sediment and turbidity would return to unimpaired conditions, with high-flow events transporting watershed-derived suspended sediment out to the ocean.

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2.2.4.18.5 References

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2.2.5 Cumulative Effects

A cumulative effect is defined in this document to be the effect on the environment that results from the incremental effect of the Proposed Action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor but collectively significant actions taking place over time, including land and water development activities.

The section evaluates cumulative effects of PG&E's proposed decommissioning of the Potter Valley Hydroelectric Project (Project) and implementation of the Restoration Plan. The cumulative effects associated with the authorization of the NPUPL Proposed Action, including construction of the NERF, are evaluated in Section 3.2.15, Cumulative Effects.

2.2.5.1 Cumulatively Affected Resources

The resources considered for the cumulative effects analysis of the Proposed Action were identified based on information contained in this Surrender Application and a review of technical information developed in support of this document.

Resources that may be cumulatively affected by the incremental actions of the Proposed Action in combination with past, present, and reasonably foreseeable future actions include water use and hydrology, water quality, fish and aquatic resources, botanical resources, wildlife resources, geology and soils, geomorphology, land use, recreation resources, cultural resources, Tribal resources, socioeconomic resources, noise, and marine resources. These are resources for which potential unavoidable effects from the Proposed Action under the Surrender Application were identified.

Additional information on these resources can be found in Section 2.2.3, Affected Environment, Section 2.2.4, Environmental Analysis, and the sections below.

2.2.5.2 Geographic Scope

The geographic scope of the cumulative effects analysis defines the physical limits or boundaries of the Proposed Action's effects on resources when considering effects from other projects. These boundaries are defined to include the Proposed Action's effects on the resources. The geographic scope includes the Eel River upstream of Lake Pillsbury reservoir to the ocean and the East Branch Russian River between the Potter Valley Powerhouse and Lake Mendocino.

2.2.5.3 Temporal Scope

The temporal scope of the cumulative effects analysis includes past, present, and reasonably foreseeable future actions and their possible cumulative effect on each resource listed above. The temporal scope for the cumulative effects analysis would be the time necessary for removal of the dams and restoration activities before FERC issues the license termination.

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2.2.5.4 Past, Present, and Reasonably Foreseeable Actions

The action under consideration is PG&E's proposed decommissioning and restoration plans. Other actions considered in this cumulative effects section include the following:

- **Construction and operation of the NERF.** Construction will be completed by ERPA[1] (see Section 3.1 for a description of the NPUPL Proposed Action). Operation of the NERF, by ERPA, will allow for long-term diversions from the Eel River to the East Branch Russian River. The proposed long-term operation of the NERF, based on the Two Basin Diversion Rules memorandum dated February 7, 2025 (CDFW et al. 2025) (NERF Diversion Rules), is described in Appendix 2.2.5-A and summarized below:
  - The total diversion to the East Branch Russian River would be up to 300 cfs, limited to a seasonally varying percentage of unimpaired flow in the Eel River.[2] Annual diversions to the East Branch Russian River would range from approximately 8,000 ac-ft to 108,000 ac-ft (50,377 ac-ft on average from 1911 to 2017), depending on hydrologic availability.
  - Up to 50 cfs would be diverted to PVID, with an annual limit on diversions of 8,000 ac-ft per year. Diversions would occur throughout the year when flow is available and are not limited to the diversion season.
  - Daily releases to the Eel River below the NERF would range from 70 percent to 100 percent of unimpaired flow. This is consistent with the concept for the previous RPA minimum instream flow requirement for the Eel River below Cape Horn Dam, which generally required a release to the Eel River of 70 percent of unimpaired flow. Annual release volumes to the Eel River would range from 79 percent to 94 percent of unimpaired flow depending on the flow scenario.
- **Improved water reliability in Potter Valley**. Sonoma Water is evaluating potential management strategies in the Potter Valley groundwater basin to offset the reduction to water diversions resulting from PG&E's decommissioning of Scott and Cape Horn dams and operations of the NERF (Jacobs 2025). These activities may include pursuing and integrating a water supply strategy, accelerating efforts to reduce water demand in Potter Valley, developing new in-valley pond storage, developing new groundwater supply in Potter Valley, and incentivizing storage and well development throughout Potter Valley. In addition, USACE, with local sponsors Mendocino County Inland Water and Power Commission and the Lytton Tribe, is evaluating the potential of increasing storage in Lake Mendocino by raising Coyote Valley Dam (USACE 2025).

[1] These actions are contingent upon FERC's authorization of the non-Project use of Project lands to allow for the modification of existing Project works and construction of the NERF by ERPA on land within the FERC Project boundary.

[2] The Draft Diversion Rules (2.7.2025) define unimpaired flow as the "Eel River streamflow immediately upstream of the NERF prior to any diversion by the NERF."

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- **Implementation of fisheries restoration activities identified in the Eel River Restoration and Conservation Plan** (Cal Trout et al. 2024). Phase 1 of the Eel River Restoration and Conservation Plan was finalized in June 2024. The overarching goal of the plan is to build on existing restoration actions in the watershed, including the removal of Scott and Cape Horn dams. Specifically, the objective of the plan is to accomplish the following:

  > *Guide substantial, collaborative, and long-term restoration and conservation actions to revitalize the Eel River and restore its fisheries. In addition, the Plan has been prepared to expand and coordinate efforts among those who are working on restoration and conservation efforts in the basin to have the greatest effect toward recovery of native anadromous fish populations. The Plan proposes a holistic approach to restoring and conserving the Eel River Watershed, with a particular focus on the river corridor.*

  The restoration and conservation program is intended to protect federally protected fish species in the watershed and aid in their recovery with a focus on fall-run California Coastal Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), Northern California Coastal steelhead (summer and winter run; *O. mykiss*), Pacific lamprey (*Entosphenus tridentatus*), and green sturgeon (*Acipenser medirostris*) (Cal Trout et al. 2024). Phase 1 was focused on developing the program's vision, goals, and objectives; compiling existing data; selecting focal species; and developing a prioritization framework. Phase 2 of the plan will include developing an organizational structure, hiring staff, and implementing the prioritization process to determine actions needed to effectively and efficiently restore and conserve Eel River fish and aquatic resources. Phase 3 encompasses the implementation of restoration and conservation actions and a monitoring program to assess program effectiveness. Activities envisioned by the plan include but are not limited to restoring aquatic habitat connectivity, riverine habitat restoration, estuary habitat restoration, instream flow protection, water quality and water temperature improvement, riparian and wetland habitat restoration, invasive species management, and sediment control (Cal Trout et al. 2024).

- **Development and implementation of TMDLs in the watershed** (USEPA 2004, 2005, 2007)**.** As described in Section 2.2.3.2, Water Quality, water bodies in the Project area listed as impaired by the USEPA under Section 303(d) of the CWA include the following:
  - Upper Eel River (temperature, sedimentation/siltation, and aluminum);
  - Lake Pillsbury reservoir (mercury);
  - Middle and lower main Eel River (temperature, sedimentation/siltation, and aluminum);
  - The Russian River Watershed, including the East Branch Russian River (sediment and temperature); and
  - Lake Mendocino (mercury).

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USEPA has developed water temperature and sediment TMDLs throughout the Eel River (USEPA 2004, 2005, 2007). The primary purpose of the TMDLs is so the SWRCB can ensure that beneficial uses of freshwater habitat (e.g., salmonid habitat) are protected from elevated levels of sediment and temperature and to address the declines of salmon and steelhead populations in the watershed (USEPA 2007). These TMDLs set the maximum levels of pollutants that the water body can receive without exceeding water quality standards for the Eel River basin. The TMDLs identify the following specific actions for limiting heat and sediment input into the Eel River (USEPA 2007):

> *For the temperature TMDLs, [US]EPA recommends that protection or restoration of shade be evaluated in timber harvest permits on private lands to assure compliance with the TMDL shade allocations, and thus water quality standards. The State should also assure that the THP [Timber Harvest Plan] process is protecting natural shade.*
>
> *For the sediment TMDL, EPA specifically recommends that more instream information be gathered in tributaries throughout the basin. Collecting this information, using a random sampling approach, would assist the Regional Board in determining if the reduced human-related sediment loading seen in the recent past is confirmed by instream conditions. Specific data collection recommendations include annual cross-sectional analyses in the lower Eel River main stem and Salt River, road assessment, and monitoring of restoration activities. Other sediment-associated implementation activities that would be helpful to watershed restoration include removal of sediment from the Salt River to restore flow, limit flooding, and restore fisheries; wetlands restoration; upgrading of deficient roads; and modification to restoration activities based on monitoring results.*

- **Implementation of recovery actions for federally protected California Coastal Chinook salmon and the Northern California steelhead DPS pursuant to the Coastal Multispecies Recovery Plan** (NOAA 2016). NOAA Fisheries finalized the Coastal Multispecies Recovery Plan in 2016 for California Coastal Chinook salmon and the Northern California steelhead DPS.[3] The recovery plan is intended to provide a framework for the conservation and survival of these species that focuses on and prioritizes threat abatement and restoration actions. NOAA Fisheries estimated recovery of the California Coastal Chinook salmon and the Northern California steelhead DPS may take 50 to 100 years (NOAA 2016). The goal of the recovery plan is to restore these species to sustainable levels so that they can be delisted and to restore freshwater and estuarine habitats to support self-sustaining, well-distributed, and naturally spawning populations (NOAA 2016).
  - Recovery objectives include the following:
    - Reducing the present or threatened destruction, modification, or curtailment of habitat or range;

[3] The recovery plan also focused on the Central California Coast steelhead DPS, which does not occur in the Eel River.

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  - Ameliorating utilization for commercial, recreational, scientific, or educational purposes;
  - Abating disease and predation;
  - Establishing the adequacy of existing regulatory mechanisms for protecting the ESU and DPSs now and into the future (i.e., post-delisting);
  - Addressing other natural or anthropogenic factors affecting the continued existence of the ESU and DPSs; and
  - Ensuring the status of the ESU and DPSs are at a low risk of extinction (i.e., viable) based on abundance, growth rate, spatial structure, and diversity.

- **Eel River – Trout Creek and Alder Creek Land Acquisition, Potter Valley Tribe.** The Potter Valley Tribe received a donation of 879 acres of forested lands in the mainstem Eel River Watershed in January 2019. The Tribe negotiated a land conservation proposal with the Stewardship Council, which was formed as part of a PG&E settlement agreement under bankruptcy reorganization in 2003. Among the long-range future plans are "development of recreational facilities, expanding environmental education programs, assisting with restoration of habitat and fishery resources, wildfire and fuels management, and becoming good neighbors with the stakeholders in the area" (Potter Valley Tribe 2025).
- **Continued management actions of MNF as guided by applicable land management planning documents, including its LRMP** (MNF 1995). The LRMP includes goals, objectives, direction, and prescriptions used to guide land management activities within the MNF with respect to desired existing and future conditions. The Scott Dam Area, including Lake Pillsbury reservoir, is within the boundaries of the MNF. The Scott Dam Area lies within Management Area 11 (Lake Pillsbury reservoir). The LRMP contains management direction (see Section 2.2.3.8, Land Use, for additional information), including the following:
  - Manage all bald eagle (*Haliaeetus leucocephalus*) sites as recommended in the Pacific Bald Eagle Recovery Plan and the Lake Pillsbury reservoir Bald Eagle Habitat Management Plan;
  - Analyze and coordinate the development, management, and use of the Lake Pillsbury reservoir basin;
  - Emphasize providing quality water-oriented recreation opportunities in a manner consistent with the protection of bald eagles;
  - Where applicable to NFSL, implement watershed improvements identified by the Lake Pillsbury Basin Sediment Task Force to control sediment inflow to Lake Pillsbury reservoir;
  - Emphasize stabilizing serpentine areas along the reservoir shoreline as well as the banks of the Eel River and the Rice Fork of the Eel River at their inlets to the reservoir to help reduce turbidity in the reservoir;

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- Reduce conflicts between OHV users and other recreationists through trail designation, administrative controls, and revision of the forest OHV plan;
- Concentrate efforts to inform users about resource protection, fire prevention, and campground regulations. Prioritize law enforcement efforts in this area;
- Analyze opportunities for the development of watchable wildlife areas and wildlife habitat interpretation for the public; and
- Maintain the permit for a private resort on the reservoir for boat rentals, fuel, and so on. Continue to permit the summer home tract.

As such, the LRMP is expected to continue to protect and maintain conditions on the lands managed by the MNF.

- **Climate change effects, including potential reductions in snowpack, shifts in precipitation from snow to rain, earlier runoff, more frequent and intense storms, increased occurrence and severity of wildfires, and warming air temperatures.** These changes could alter the historical timing, magnitude, and quality of flows in the Eel River and East Branch Russian River watersheds, increase water temperatures, and reduce vegetation cover in high-burned areas that could result in increased sediment loading into waterways. Increased severity of wildfires due to climate change can also result in the loss of habitat for sensitive species and cultural and Tribal resources.

2.2.5.5 Cumulative Effects Analyses

The Proposed Action is expected to have short-term and resulting condition adverse effects on environmental, cultural, and Tribal resources. These effects are summarized in Volume IA, Section 6.0, Conclusions and Recommendations. However, the Proposed Action along with implementation of other planned recovery activities in the watershed would result in significant, long-term, and beneficial cumulative effects to environmental and cultural resources in the Eel River and East Branch Russian River.

In the following sections, specific existing or foreseeable activities that may cumulatively affect environmental and cultural resources are described, and a summary of the cumulative effects of the Proposed Action along with other existing or foreseeable activities is provided. Only those actions with potential effects for each resource are described.

2.2.5.5.1 Water Use and Hydrology

The removal of Scott Dam would restore unimpaired flows in the Eel River. With removal of Cape Horn Dam, diversions into the East Branch Russian River would cease and hydrology in the East Branch Russian River would become unimpaired. Unimpaired flow includes seasonally high flows when storm events occur, but the flows would be very low during the summer/fall season (e.g., 1 cfs) (see Section 2.2.3.1, Water Use and Hydrology). Storage would be lost at Lake Pillsbury reservoir, and diversions to PVID from the Eel River would cease. The Proposed Action would have a long-term unavoidable adverse effect on PVID water supply and hydrology in the East Branch Russian River.

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Other actions as described above in Section 2.2.5.4 in combination with the Proposed Action would result in an overall cumulative benefit to PVID water supply and hydrology in the East Branch Russian River and have a negligible effect on the Eel River.

NERF Construction and Operations

- ERPA's construction and operation of the NERF would allow diversion of water from the Eel River to the East Branch Russian River. The timing and monthly volume of water diversions would be altered compared to existing conditions (Table 2.2.5-1). NERF diversions would depend on the seasonal water availability of the unimpaired Eel River downstream of the former Scott Dam. Under existing conditions, total diversions are consistent throughout the year; historically, average monthly flows ranged from 31 cfs in January to 64 cfs in May (1911–2017; Table 2.2.5-1). Under the proposed NERF Diversion Rules, total diversions would more closely resemble the pattern of a natural hydrograph in the Eel River compared to existing conditions. Average monthly total NERF diversions in the drier months of July through October would range from 1 cfs to 6 cfs, and in the wetter months of December through April, average monthly diversions would range from 97 cfs to 211 cfs (Table 2.2.5-1). The annual limit of diversions to PVID would be approximately 8,000 ac-ft. This annual limit was met in all but the four driest years in the 107-year period of record (1911–2017; Figure 2.2.5-A-7 in Appendix 2.2.5-A). This is below the current average diversion of approximately 35 cfs from May 15 through September 15 (10,700 ac-ft). In addition, there would be minimal PVID diversions between June and October, based on monthly average flows. The total annual diversions to the East Branch Russian River would range from approximately 8,000 ac-ft to 108,000 ac-ft (50,377 ac-ft on average [1911–2017]), depending on water availability, which is greater than existing conditions.
- In the Eel River downstream of the NERF, the total annual average flow would decrease from approximately 493,955 ac-ft per year under the unimpaired Proposed Action to 435,673 ac-ft per year with the NERF, which is a decrease of about 11.8 percent (see Table 2.2.5-1 and Table 2.2.5-A-1 in Appendix 2.2.5-A). On an average monthly basis, the NERF diversions would reduce unimpaired Eel River flows by 11 percent or less for the months of August through February and 13 percent to 19 percent in the months of March through July (Table 2.2.5-1).
- The NERF diversion would provide water to PVID and the East Branch Russian River while maintaining protective flows in the Eel River below the NERF. Diversion amounts to PVID would be below PVID's current diversions, and summer flows in the East Branch Russian River would still be very low during the late summer and early fall (e.g., 4 cfs or less in August, September, and October). NERF operations in combination with the Proposed Action, however, would cumulatively benefit PVID water supply and long-term hydrology in the East Branch Russian River, and be protective of flows in the Eel River.

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Other Actions

- Implementation of the water supply reliability programs and activities currently being evaluated (e.g., a water supply strategy, water conservation, and development of in-pond storage, wells, and groundwater supply) in Potter Valley and the Russian River would help offset reductions in water supply and diversions resulting from the PG&E's Proposed Action and operations of the NERF especially during times of low water conditions (e.g., dry water years, summer months). Implementation of these programs and activities in combination with the Proposed Action would have a long-term cumulative benefit to water use and hydrology in Potter Valley and be protective of flows in the Eel River.
- The Eel River Restoration and Conservation Plan identifies several potential activities that would be implemented, including those that would benefit Eel River flows, such as riparian and wetland restoration and instream flow protection. Implementation of the Eel River Restoration and Conservation Plan in combination with the Proposed Action would result in a neutral to beneficial cumulative effect on water use and hydrology in the Eel River.
- Implementation of TMDLs in the Eel River and East Branch Russian River watersheds would include some measure of watershed protection/restoration. Implementation of TMDLs and the Proposed Action together would result in a long-term cumulative benefit to hydrology resources in the Eel and East Branch Russian rivers.
- Implementation of the Coastal Multispecies Recovery Plan (NOAA 2016) restoration activities in the watershed may benefit natural hydrology in the Eel River. Therefore, implementation of NOAA Fisheries' Coastal Multispecies Recovery Plan and the Proposed Action cumulatively would have neutral to beneficial effects on hydrology in the Eel River.
- The Potter Valley Tribe's previous Trout Creek and Alder Creek land acquisition and proposed activities (recreational facilities, expanding environmental education programs, assisting with restoration of habitat and fishery resources, wildfire and fuels management) would likely result in neutral to beneficial effects to water use and hydrology in the Eel River. Cumulatively, the land acquisition/activities and the Proposed Action would have a neutral to beneficial effect on hydrology in the Eel River.
- The MNF's forest management and watershed protection actions and limiting of activities within riparian areas to maintain riparian resources and channel conditions and to prevent degradation of riparian corridors and streams, in combination with the Proposed Action, are expected to have a cumulative beneficial effect on hydrology in the Eel River.
- Climate change effects, including potential reductions in snowpack, shifts in precipitation from snow to rain, earlier runoff, more frequent and intense storms, increased occurrence and severity of wildfires, and warming air temperatures, could alter the historical timing, magnitude, and quality of flows in Eel River Watershed. The Proposed Action restores unimpaired flow conditions in the Eel River and East Branch Russian River. The combination of climate change and the Proposed Action would be a cumulative adverse effect on the water supply and hydrology in the East Branch Russian River. With construction of the NERF (discussed above), however, the overall effect to water use and hydrology in the East Branch Russian River would be cumulatively beneficial.

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Table 2.2.5-1. Monthly average flows diverted to the Potter Valley Irrigation District and East Branch Russian River, total flow diversions, and total flow in the Eel River below Cape Horn Dam/the NERF under existing conditions (No-Action), the Proposed Action (i.e., dam removal and no diversions), and the NERF Diversion Rules[1] (1911–2017).

Month	Diversions to Potter Valley Irrigation District (cfs)			Diversions to East Branch Russian River (cfs)			Total Diverted Flows (cfs)			Eel River (cfs)		
	Existing Conditions (No-Action)[2]	Proposed Action	NERF Diversion Rules	Existing Conditions (No-Action)[2]	Proposed Action	NERF Diversion Rules	Existing Conditions (No-Action)[2]	Proposed Action	NERF Diversion Rules	Existing Conditions (No-Action)[2]	Proposed Action	NERF Diversion Rules
Oct	19	0	0	39	0	4	58	0	4	54	60	57
Nov	5	0	0	39	0	33	44	0	33	231	333	300
Dec	5	0	1	39	0	96	44	0	97	976	1,153	1,056
Jan	5	0	35	26	0	136	31	0	171	1,610	1,739	1,568
Feb	5	0	44	33	0	167	38	0	211	1,764	1,907	1,696
Mar	5	0	41	38	0	149	43	0	190	1,368	1,439	1,249
Apr	21	0	11	34	0	139	55	0	150	880	943	793
May	35	0	1	29	0	79	64	0	80	391	438	359
June	35	0	0	25	0	30	60	0	30	105	156	126
July	35	0	0	10	0	6	45	0	6	30	44	38
Aug	35	0	0	10	0	1	45	0	1	24	19	18
Sep	35	0	0	10	0	1	45	0	1	24	20	19
Total (ac-ft)	**14,487**	**0**	**7,907**	**20,087**	**0**	**50,387**	**34,574**	**0**	**58,294**	**446,508**	**494,143**	**435,848**

[1] Based on the Two Basin Diversion Rules memorandum (CDFW et al. 2025).
[2] 1912–2023 period of record (see Section 2.2.3.1, Water Use and Hydrology)

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2.2.5.5.2 Water Quality

The removal of Scott Dam would restore unimpaired flow and sediment conditions in the Eel River. With removal of Cape Horn Dam, diversions into the East Branch Russian River would cease and hydrology in the East Branch Russian River would become unimpaired. The Proposed Action unimpaired flow conditions would result in adverse effects to water quality by increasing spring and summer water temperature in the Eel River from below Scott Dam to below Cape Horn Dam a few miles and increase spring and summer water temperatures in the East Branch Russian River compared to existing conditions. As a result, the Proposed Action would have a long-term unavoidable adverse effect on water temperature in the Eel River and the East Branch Russian River compared to existing conditions.

Other actions described above in Section 2.2.5.4, in combination with the Proposed Action, would result in an overall cumulative benefit to water temperature and water quality in the East Branch Russian River, and the other actions would not cumulatively alter the Proposed Action water quality effects on the Eel River.

NERF Construction and Operations

- As discussed in Section 2.2.5.5.1 above, construction and operation of the NERF would allow for water diversions from the Eel River through the Project's existing water diversion system to the Russian River Watershed following removal of Cape Horn Dam and Lake Pillsbury reservoir storage. The timing and monthly volume of water diverted would be altered compared to existing conditions (Table 2.2.5-1). NERF diversions would depend on seasonal water availability in the unimpaired Eel River and maintain protective flows in the Eel River downstream of the NERF. The proposed NERF diversions would more closely resemble a natural hydrograph compared to existing conditions. Average monthly total NERF diversions in the drier months of July through October would be low, and flows would be greater in the wetter months (December through April; Table 2.2.5-1). The low summer diversions would provide limited direct surface flow to the East Branch Russian River, but it is anticipated that the earlier season flows would help maintain groundwater levels and result in some level of groundwater inflow to the East Branch Russian River in the summer/fall. In combination with the Proposed Action, the NERF diversions would cumulatively benefit water temperature and water quality in the East Branch Russian River and not affect water temperature and water quality in the Eel River.

Other Actions

- Implementation of TMDLs in the Eel River and East Branch Russian River watersheds would involve activities to manage and improve water quality, including water temperature, sediment, and aluminum concentration. Removing Scott Dam and Cape Horn Dam under the Proposed Action would release reservoir sediments downstream. However, in the long term, unimpaired hydrology and natural sediment transport processes would reestablish a natural channel and a new natural suspended sediment and turbidity regime. The release of the reservoir sediment would temporarily adversely impact the objectives of the TMDLs at reducing sediment levels. Currently, Lake Pillsbury reservoir is trapping

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much of the sediment produced in the upper Eel River Watershed. Although the removal of the dams would not increase the long-term volume of sediment delivered from the upper watershed, sediment that is currently being trapped in the reservoirs would be transported down the Eel River. The new (natural) suspended sediment and turbidity regime may increase baseline sediment loads used in the TMDLs developed for the middle and lower main Eel River. The Proposed Action would also result in a new natural water temperature regime in the Eel and East Branch Russian rivers. This water temperature regime would be higher in the summer due to lower (unimpaired) summer flows below Scott Dam and in the East Branch Russian River. The TMDLs in addition to the Proposed Action would cumulatively reduce elevated levels of water temperature and sediment, but the baseline sediment and water temperature conditions would be higher than under current conditions.

- Implementation of the water supply reliability programs and activities currently being evaluated (e.g., a water supply strategy and water conservation) in Potter Valley and the Russian River would help offset reductions in diversions to the East Branch Russian River resulting from the PG&E's Proposed Action and operations of the NERF, especially during times of low water conditions (e.g., dry water years, summer months). Implementation of some of these programs and activities (e.g., well or groundwater development), however, could reduce flows in the East Branch Russian River depending on how they were implemented; overall, however, the water supply reliability programs/activities in combination with the NERF and Proposed Action would have a cumulative beneficial effect on water quality and temperature in the East Branch Russian River and a negligible effect on water quality and temperature in the Eel River.
- Implementation of the fisheries restoration plans and projects identified in the Eel River Restoration and Conservation Plan would include activities to improve water quality and water temperature, restore riverine and estuary habitats, and control sediment entering waterways. Implementation of these plans would result in a neutral to beneficial cumulative effect on water quality compared to the Proposed Action.
- The Potter Valley Tribe acquired approximately 879 acres of forested lands in the Eel River Watershed under the Eel River – Trout Creek and Alder Creek Land Acquisition. Future plans associated with this acquisition include assisting with restoration of habitat and fisheries resources and wildfire and fuels management. Therefore, in combination with the Proposed Action, this previous land acquisition would likely result in neutral to beneficial cumulative effects to water quality in the Eel River.
- The MNF's forest management and watershed protection activities and limiting of activities within riparian areas (to maintain riparian resources, improve channel conditions, and prevent degradation of riparian corridors and streams), in combination with the Proposed Action, are expected to have a cumulative negligible or small benefit to water quality in the Eel River.
- Climate change effects to the Eel River Watershed, including potential reductions in snowpack, shifts in precipitation from snow to rain, earlier runoff, more frequent and intense storms, increased occurrence and severity of wildfires, and warming air temperatures, could alter the historical timing, magnitude, and quality of flows in the Eel

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River Watershed, increase water temperatures, and reduce vegetation cover in high-burned areas that could result in increased sediment loading into waterways. Climate change effects in combination with the Proposed Action are expected to have an unavoidable cumulative adverse effect on water temperature in the Eel River; however, with implementation of the NERF, there would be a cumulative benefit to water temperature in the East Branch Russian River.

2.2.5.5.3 Fish and Aquatic Resources

The removal of Scott Dam under the Proposed Action would remove the existing dam that is a barrier to fish passage for ESA-listed Chinook salmon and steelhead, other special-status species, and native species into the Eel River Watershed headwaters (50+ mi. of spawning and rearing habitat). Removal of Cape Horn Dam would provide anadromous fish unconstrained passage to the mainstem upper Eel River and tributaries. Removal of Cape Horn Dam, however, would cease water diversions into the East Branch Russian River. This would result in long-term direct loss of special-status species (FYLF, northwestern pond turtle, western pearlshell mussels), which would be an unavoidable adverse effect on fish and aquatic resources in the East Branch Russian River (Section 2.2.4.4, Fish and Aquatic Resources).

Most other actions in combination with the Proposed Action would result in an overall cumulative benefit to fish and aquatic resources in the Eel River and East Branch Russian River.

NERF Construction and Operations

- As described above, construction and operation of the NERF would allow diversion of water from the Eel River to the East Branch Russian River following removal of Cape Horn Dam and Lake Pillsbury reservoir storage. The timing and monthly volume of water diverted would be altered compared to existing conditions (Table 2.2.5-1). The NERF diversions would depend on seasonal water availability of the unimpaired Eel River flows and maintaining protection of flow in the Eel River below the NERF. The proposed total NERF diversions would more closely resemble a natural hydrograph compared to the existing condition. As described above in Section 2.2.5.5.1, average monthly diversions to the East Branch Russian River in the drier months of July through October would be low, and flows would be greater in the wetter months of December through April (and greater than occur under existing conditions) (Table 2.2.5-1). The low summer diversion would provide limited direct surface flow to the East Branch Russian River, but it is anticipated that the earlier season flows would help maintain groundwater levels and result in some level of groundwater inflow to the East Branch Russian River in the summer/fall. In combination with the Proposed Action, the NERF diversions would cumulatively benefit hydrology and aquatic habitat in the East Branch Russian River and special-status species (FYLF, northwestern pond turtle, western pearlshell mussels).

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Other Actions

- The overarching goal of the Eel River Restoration Plan is to build on existing restoration actions in the watershed, including the removal of Scott and Cape Horn dams. The restoration and conservation program is intended to protect federally protected fish species in the watershed and aid in their recovery with a focus on fall-run California Coastal Chinook salmon, coho salmon, Northern California Coastal steelhead (summer and winter run), Pacific lamprey, and green sturgeon (Cal Trout et al. 2024). Implementation of the Eel River Restoration and Conservation Plan would result in a beneficial cumulative effect on fish and aquatic resources compared to the Proposed Action.
- Implementation of the water supply reliability programs and activities currently being evaluated (e.g., a water supply strategy, water conservation) in Potter Valley and the Russian River would help offset reductions in diversions to the East Branch Russian River resulting from the PG&E's Proposed Action and operations of the NERF especially during times of low water conditions (e.g., dry water years, summer months). Implementation of some of these programs and activities (e.g., well or groundwater development) could reduce flows in the East Branch Russian River depending on how they were implemented; however, overall, the water supply reliability programs/activities along with the NERF would have a cumulative benefit to surface hydrology that would benefit aquatic habitat, water temperature, and aquatic species in the East Branch Russian River and have a negligible cumulative effect in the Eel River.
- Development and implementation of TMDLs in the watershed, including the upper Eel River (temperature, sedimentation/siltation, and aluminum), middle and lower main Eel River (temperature, sedimentation/siltation, and aluminum), and Russian River Watershed including the East Branch Russian River (sediment and temperature), would improve habitat conditions in the Eel and East Branch Russian rivers. Implementation of the TMDLs in combination with the Proposed Action would result in a beneficial cumulative effect on fish and aquatic resources.
- Recovery actions in the Coastal Multispecies Recovery Plan for federally protected Chinook salmon and steelhead include reducing threats to habitat, abating disease and predation, and addressing regulatory mechanism for protecting the species. The recovery plan is intended to provide a framework for the conservation and survival of these species. Implementation of the Proposed Action and the Coastal Multispecies Recovery Plan in combination with the Proposed Action would result in a beneficial cumulative effect on fish and aquatic resources.
- The Potter Valley Tribe's previous acquisition of approximately 879 acres of forested lands in the Eel River watershed (Trout Creek and Alder Creek Land Acquisition) would include development of recreational facilities, expanding environmental education programs, assisting with restoration of habitat and fishery resources, and wildfire and fuels management. These activities in combination with the Proposed Action would result in beneficial cumulative effects to fish and aquatic resources.

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- The MNF's continued forest management and watershed protection activities, and limiting of activities within riparian areas to maintain riparian resources and channel conditions and to prevent degradation of riparian corridors and streams, in combination with the Proposed Action, would be expected to have a cumulative benefit to fish and aquatic species in the Eel River.
- Climate change could alter the historical timing, magnitude, and quality of flows in the Eel River Watershed, increase water temperatures, and reduce vegetation cover in high-burned areas that could result in increased sediment loading into waterways. The Proposed Action increases access into the headwaters of the Eel River upstream of Lake Pillsbury reservoir and increases passage by removing Cape Horn Dam. These actions would be expected to increase resiliency of the fish populations. The Proposed Action would provide a cumulative benefit to fish and aquatic species related to climate change effects.

2.2.5.5.4 Botanical Resources

The Proposed Action may result in potential temporary short-term adverse effects to eelgrass (*Zostera* spp.) communities in the Eel River estuary from suspended fine sediment loads and alteration of riparian and wetland habitat along the East Branch Russian River (Section 2.2.4.5, Botanical Resources). In the long term, the Proposed Action would remove Scott and Cape Horn dams and restore unimpaired hydrology and sediment supply/transport in the Eel River. Diversions from the Eel River to the East Branch Russian River would cease. Summer flows would be much lower, but high-flow events would still occur seasonally as a result of storm events. The East Branch Russian River channel would adjust in geomorphic form to a condition more similar to its unimpaired, natural condition prior to receiving increased flows from Eel River diversions.

Other actions in combination with the Proposed Action would result in an overall cumulative benefit to botanical resources (botanical, riparian, and wetland resources).

NERF Construction and Operations

- As discussed in the Water Use and Hydrology section above, construction and operation of the NERF would allow for diversions from the Eel River to the East Branch Russian River; average monthly East Branch Russian River diversions in the drier months of July through October would be low, and flows would be greater in the wetter months of December through April (and greater than under existing conditions) (Table 2.2.5-1). In combination with the Proposed Action, operation of the NERF would increase East Branch Russian River diversions for riparian and wetland habitats and aquatic special-status plants along the river. This increase in flows, as compared to the Proposed Action, would cumulatively benefit botanical resources (special-status plants, riparian habitats, and wetlands) in the East Branch Russian River.

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Other Actions

- Implementation of TMDLs in the Eel River and East Branch Russian River watersheds over the long term would reduce elevated levels of sediment and pollutants and result in an overall cumulative benefit to water quality for aquatic special-status plant species and wetland and riparian habitat.
- Implementation of water supply reliability programs and activities (e.g., implementation of a water supply strategy, water conservation, and the development of in-pond storage, wells, and groundwater supply) in Potter Valley and the Russian River would help offset reductions in East Branch Russian River diversions resulting from the Proposed Action especially during times of low water conditions (e.g., dry water years, summer months), which would likely result in a beneficial cumulative effect to botanical resources (e.g., wetland and riparian habitat) along the East Branch Russian River.
- The Potter Valley Tribe previously acquired approximately 879 acres of forested lands in the Eel River Watershed under the Eel River – Trout Creek and Alder Creek Land Acquisition. Long-term plans under this acquisition that could cumulatively affect botanical resources include development of recreation facilities, expanding environmental education programs, restoration of habitat and fishery resources, and wildfire and fuels management. The cumulative impact on botanical resources depends on the exact nature of the activities. Construction of additional recreational facilities could alter habitats for special-status plants. Expanding environmental education programs may help protect sensitive botanical resources and promote conservation activities. Wildfire and fuels management may reduce stand-replacing fire risks, which could benefit special-status plant species that depend on forested habitats. Therefore, in combination with the Proposed Action, this previous land acquisition and proposed activities would likely result in neutral to beneficial cumulative effects to botanical resources.
- Management of threatened, endangered, and sensitive plant resources and riparian and aquatic ecosystems in the MNF would continue to occur under the LRMP (MNF 1995). The LRMP establishes survey and monitoring guidelines and defines management activities to benefit threatened, endangered, and sensitive plant resources. The LRMP also limits management activities within riparian reserves (buffers around different types of aquatic habitats) to maintain riparian resources, channel conditions, and fish passage and to prevent and mitigate degradation of riparian habitat. In combination with the Proposed Action, continued implementation of management activities under the LRMP would benefit botanical resources and riparian and wetland habitats on MNF lands.

2.2.5.5.5 Wildlife Resources

The Proposed Action may result in potential adverse effects to bald eagles, northern spotted owls (*Strix occidentalis caurina*), other raptors including osprey (*Pandion haliaetus*), other special-status birds or game birds, special-status mesocarnivores, and tule elk (*Cervus canadensis nannodes*) and other game mammals (Section 2.2.4.6, Wildlife Resources). In the long term, the Proposed Action would remove Scott and Cape Horn dams and restore unimpaired hydrology and sediment supply/transport in the Eel River. Diversions from the Eel River to the East Branch

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Russian River would cease. Summer flows would be much lower, but high-flow events would still occur seasonally as a result of storm events. The East Branch Russian River channel would adjust in geomorphic form to a condition more similar to its unimpaired, natural condition prior to receiving increased flows from Eel River diversions.

Other actions in combination with the Proposed Action would result in an overall cumulative benefit to wildlife resources (including threatened and endangered species).

NERF Construction and Operations

- As discussed in the Water Use and Hydrology and Botanical Resources sections above, operation of the NERF would allow for water diversions from the Eel River to the East Branch Russian River. As compared to the Proposed Action, operation of the NERF would increase diversions to the East Branch Russian River for riparian and wetland habitats that provide suitable habitat for a variety of wildlife species and to PVID for irrigation of agricultural lands that may also provide habitat for wildlife. In combination with the Proposed Action, increased diversions to the East Branch Russian River and PVID may cumulatively benefit bald eagle, osprey, and other special-status raptor foraging habitat; tricolored blackbird (*Agelaius tricolor*) irrigated agricultural nesting habitats; special-status bat foraging habitat; and tule elk and other game mammal foraging habitat.

Other Actions

- Implementation of TMDLs in the Eel River and East Branch Russian River watersheds would reduce elevated levels of sediment and pollutants and result in an overall cumulative benefit to water quality in the long term for aquatic foraging species such as bald eagle, osprey, and special-status bats.
- Implementation of water supply reliability programs and activities (e.g., implementation of a water supply strategy, water conservation, and development of in-pond storage, wells, and groundwater supply) in Potter Valley and the Russian River would help offset reductions in PVID and East Branch Russian River diversions resulting from the Proposed Action and may cumulatively benefit bald eagle, osprey, and other special-status raptor foraging habitat; tricolored blackbird irrigated agricultural nesting habitats; special-status bat foraging habitat; and tule elk and other game mammal foraging habitat
- Implementation of the fisheries restoration plans and projects identified in the Eel River Restoration and Conservation Plan would protect federally listed fish species within the watershed and aid in the recovery of anadromous fish populations. Additionally, implementation of recovery actions under NOAA Fisheries' Coastal Multispecies Recovery Plan would address current population threats for listed species and restoration of spawning habitats within the Eel River Watershed, with the goal of enhancing self-sustaining and naturally spawning steelhead and salmon populations. The Proposed Action would have short-term and significant adverse effects on fish resources during the construction phase; however, removal of a barrier to fish passage on the Eel River (Scott Dam) and access to habitat in the Eel River Watershed upstream of Lake Pillsbury reservoir would result in long-term benefits to fish populations. Implementation of the Eel River

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Restoration and Conservation Plan, NOAA Fisheries' Coastal Multispecies Recovery Plan, and the Proposed Action would result in beneficial, long-term cumulative effects on fish and aquatic resources. Healthier fish populations, in turn, would benefit foraging habitat for fish-eating wildlife species such as bald eagle and osprey.

- The Potter Valley Tribe previously acquired approximately 879 acres of forested lands in the Eel River Watershed under the Eel River – Trout Creek and Alder Creek Land Acquisition. Long-term plans under this acquisition that could cumulatively affect wildlife resources include development of recreation facilities, expanding environmental education programs, assisting with restoration of habitat and fishery resources, and wildfire and fuels management. The cumulative impact on wildlife depends on the exact nature of the activities. Construction of additional recreational facilities could increase human disturbance pressure or alter wildlife habitats. Expanding environmental education programs may help protect sensitive wildlife resources and promote conservation activities. Restoration of fisheries may enhance foraging opportunities for fish-eating wildlife such as bald eagle and osprey. Wildfire and fuels management may reduce stand-replacing fire risks, which could benefit closed-canopy forest species such as northern spotted owl, fisher (*Pekania pennanti*), and marten (*Martes americana*). Therefore, in combination with the Proposed Action, this previous land acquisition would likely result in neutral to beneficial cumulative effects to wildlife resources.
- Management of wildlife resources (including threatened, endangered, and sensitive species) in the MNF would continue to occur under the LRMP (MNF 1995). The LRMP establishes monitoring guidelines and defines survey guidelines and management directives to benefit wildlife species, including bald eagle, osprey, American peregrine falcon (*Falco peregrinus*), northern spotted owl, northern (American) goshawk (*Astur atricapillus*), special-status bat species, and tule elk. The LRMP also defines management activities within wildlife habitats to promote important habitat elements such as snags, coarse woody debris, and hardwood retention. In combination with the Proposed Action, continued implementation of management activities under the LRMP would cumulatively benefit wildlife habitats on MNF lands.

2.2.5.5.6 Geology and Soils

The Proposed Action, with the dewatering of Lake Pillsbury reservoir, has the potential to adversely affect groundwater (Section 2.2.4.7, Geology and Soils). The connectivity between groundwater and Lake Pillsbury reservoir is currently unknown. Given the absence of information, it is assumed that groundwater in the vicinity of Lake Pillsbury reservoir is charged and supported by water contained in Lake Pillsbury reservoir. Assuming this connectivity, groundwater levels may decline after the removal of Scott Dam, which could adversely affect wells and private property owners who rely on wells for their water supply. Under the Proposed Action, with removal of Cape Horn Dam, diversions into the East Branch Russian River would cease and hydrology in the East Branch Russian River would become unimpaired. Any reduction of diversion water from the Eel River to the East Branch Russian River could create a greater demand on groundwater resources in Potter Valley. A greater demand could lower the water table and adversely affect at least some groundwater wells in Potter Valley.

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There is also the potential for slope instability during the dewatering of Lake Pillsbury reservoir. Large-scale slope failures would not be expected, but small-scale slope failures could occur, leading to increased sedimentation in the Eel River and its tributaries upstream of Scott Dam; however, the amount of sediment contributed from slope failures would not be expected to be significant compared to the amount of sediment already in Lake Pillsbury reservoir. The potential for slope failure would be reduced as the once-saturated soils dry and new vegetative growth takes root.

Implementation of the water supply reliability programs and activities currently being evaluated (e.g., a water supply strategy, water conservation, and development of in-pond storage, wells, and groundwater supply) in Potter Valley and the Russian River would help offset reductions in water supply and diversions resulting from the Proposed Action that may adversely affect private property owners who rely on wells for their water supply. Therefore, in combination with the Proposed Action, implementation of these programs and activities may result in a beneficial cumulative effect to groundwater use in Potter Valley.

The LRMP includes goals, objectives, direction, and prescriptions used to guide land management activities within the MNF with respect to desired existing and future conditions. The Scott Dam Area, including Lake Pillsbury reservoir, is within the boundaries of the MNF. Continued management of actions of the MNF as guided by applicable land management planning documents such as the LRMP (MNF 1995), including goals associated with forest management and watershed protection, is not expected to contribute to adverse cumulative effects to slope instability or groundwater levels. Therefore, the Proposed Action's incremental contribution to cumulative effects associated with groundwater levels adversely affecting wells would be cumulatively significant.

The Proposed Action would also complement some of the continued sediment management actions of the MNF, as guided by its LRMP (MNF 1995). This would aid the MNF objective of stabilizing serpentine areas along the reservoir shoreline as well as the banks of the Eel River and the Rice Fork of the Eel River at their inlets to the reservoir, which will help reduce turbidity in the Eel River downstream. In combination with the Proposed Action, continued implementation of management activities under the LRMP would cumulatively benefit geology and soil resources of the Eel River on MNF lands.

2.2.5.5.7 Geomorphology

The Proposed Action would result in the temporary alteration of the Eel River channel and/or floodplain morphology from sediment deposition after deconstruction of the dams until subsequent high-flow events can resuspend the sediment and transport it farther downstream. The deposited sediment may have an adverse short-term effect on bridge infrastructure, as well as other infrastructure such as water intakes or diversions. In the long term, the Proposed Action would remove Scott and Cape Horn dams and restore unimpaired hydrology and sediment supply/transport in the Eel River. Diversions from the Eel River to the East Branch Russian River would cease. Summer flows would be much lower, but high-flow events would still occur seasonally as a result of storm events. The East Branch Russian River channel would adjust in geomorphic form to a condition more similar to its unimpaired, natural condition prior to receiving increased flows from Eel River diversions.

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In addition to Proposed Action effects, cumulative effects to geomorphology from the other actions listed above in Section 2.2.5.4 are discussed by action below.

NERF Construction and Operations

- In the Eel River downstream of the NERF, the months with the highest average flows and the potential to have the greatest geomorphic impact are December through March, with Proposed Action average monthly flows of approximately 1,100 cfs to 1,900 cfs. The magnitude of the NERF diversions would be relatively small compared to the total Eel River flow during the peak flow months. The NERF diversions would reduce average monthly flows during these months by 5 percent to 13 percent. The maximum NERF diversion is 300 cfs, which is relatively low compared to the peak annual 2-year recurrence interval event on the Eel River at Cape Horn Dam for the computed unimpaired Proposed Action of 12,221 cfs and the 1-year event of 612 cfs (see Table 2.2.3.1-10 in Section 2.2.3.1, Water Use and Hydrology). Typically, however, diversions do not occur during peak flow events due to high suspended sediment concentrations. It is not anticipated that NERF diversions would affect high-flow events in a way that would affect geomorphic processes. Impacts from implementation of the NERF and potential small reduction in flows due to NERF diversions, in combination with the Proposed Action, would be minor and not significant.

  NERF operation would result in the diversion of water from the Eel River into the East Branch Russian River, although with a different diverted flow annual hydrograph since the Proposed Action would eliminate the ability to store water in Lake Pillsbury reservoir and thus impact the amount of flow available for NERF diversions.

  The Proposed Action would result in the reduction in peak flow for the 2-year and higher events of about 6 percent in the East Branch Russian River near Calpella compared to the existing condition (see Table 2.2.3.1-17 in Section 2.2.3.1, Water Use and Hydrology). This flow reduction would cause a small reduction in channel-forming processes but would be unlikely to cause pronounced channel narrowing or other geomorphic changes to occur. The Proposed Action, however, would result in a large reduction (approximately 76 percent) in the 1- to 1.5-year flood event compared to the existing condition in the East Branch Russian River, which may result in less frequent mobilization of sediment that could increase the duration over which fines accumulate in pools before being flushed out by a flood. Similarly, new vegetation could start to become more established on bars and channel margins. These potential effects are considered to have a negligible effect, however, since large flood flows would still occur on the East Branch Russian River under the Proposed Action and changes to geomorphic processes that do occur would cause the river to adjust in geomorphic form to a condition more similar to its unimpaired, natural condition prior to receiving increased flows from Eel River diversions.

  NERF diversions would add a maximum of up to 300 cfs peak flow back into the East Branch Russian River based on tunnel capacity. Peak flows are expected to be similar to existing conditions. An analysis of potential NERF cumulative effects on mean monthly flows shows the NERF diversions would increase average monthly flows on the East Branch Russian River near Calpella from about 373 cfs in January and February under the Proposed Action of no

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diversions from the Eel River (which is shown as "Unimpaired Flow" in Figure 2.2.5-A-5 in Appendix 2.2.5-A) to approximately 524 cfs (average in January and February) with NERF diversions. Thus, NERF diversions would increase average monthly flows in the peak months (i.e., January and February) by about 151 cfs, or 41 percent, compared to the Proposed Action. The NERF average monthly flows in January and February, however, would be less than existing conditions (e.g., 524 cfs versus 585 cfs).

The Proposed Action in combination with NERF diversions would have a long-term cumulative benefit to geomorphology in the East Branch Russian River and a neutral effect on geomorphology in the Eel River.

Other Actions

- The proposed removal of Cape Horn Dam and Scott Dam would restore unimpaired hydrology, sediment supply, sediment transport, and geomorphic processes and create a more dynamic channel formed in a diverse gradation of coarse sediment, exposed gravel and cobble bars, deeper pools with less sand accumulation, and less-dense riparian vegetation. Implementation of the Eel River Restoration and Conservation Plan, NOAA Fisheries' Coastal Multispecies Recovery Plan, and the Potter Valley Tribe's work on the previous Trout Creek and Alder Creek land acquisition would also benefit hydrology, watershed conditions, and geomorphology. These actions, in combination with the Proposed Action, would result in beneficial, long-term cumulative effects on the geomorphology of the Eel River.
- Implementation of TMDLs in the Eel River and East Branch Russian River watersheds would involve activities to manage and improve water quality, including sediment/siltation and aluminum. Removing Scott Dam and Cape Horn Dam under the Proposed Action would result in the flush of a large volume of reservoir sediments downstream, which would have a short-term unavoidable adverse effect on suspended solids, turbidity, and sediment deposition in the Eel River. In the long term, however, the unimpaired hydrology and natural sediment transport processes would reestablish a natural channel and a new natural suspended sediment and turbidity regime. The release of the Lake Pillsbury reservoir and Van Arsdale Reservoir sediment would temporarily adversely impact the objectives of the TMDLs at reducing sediment levels. Currently, Lake Pillsbury reservoir is trapping much of the sediment produced in the upper Eel River Watershed. Although the removal of the dams would not increase the long-term volume of sediment delivered from the upper watershed, it would result in sediment that is currently being trapped in the reservoirs being transported down the Eel River. The new natural suspended sediment and turbidity regime may increase baseline sediment loads used in the TMDLs developed for the middle and lower main Eel River. In the long term, the Proposed Action, in combination with the implementation of the TMDLs, is expected to have neutral to beneficial effects on sediment concentration in the Eel River.
- The Proposed Action would also complement some of the continued sediment management actions of the MNF, as guided by its LRMP (MNF 1995). Removal of Scott Dam will eliminate fluctuating reservoir water levels in Lake Pillsbury reservoir that can contribute to erosion along the shoreline and channel areas. This would aid the MNF objective of

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stabilizing serpentine areas along the reservoir shoreline as well as the banks of the Eel River and the Rice Fork of the Eel River at their inlets to the reservoir, which will help reduce turbidity in the Eel River downstream. In combination with the Proposed Action, continued implementation of management activities under the LRMP would cumulatively benefit the geomorphology of the Eel River on MNF lands.

- Climate change is predicted to lead to more frequent and intense storms that could increase the magnitude but also decrease the duration of peak flows for the flood events that create geomorphic change. Removal of Scott Dam and loss of runoff storage at Lake Pillsbury reservoir will restore unimpaired hydrology. For example, it is predicted that the 2-year recurrence interval event would increase by 38 percent from 7,420 cfs to 10,242 cfs at Scott Dam (see Section 2.2.3.1, Water Use and Hydrology). The differences would be lower for less frequently occurring flood events, and the differences would also be less with increasing distance downstream in the Eel River Watershed as other tributaries contribute flow. The unimpaired hydrology, combined with climate change, could lead to increased frequency at which sediment is mobilized, channel bars and banks deposit or erode, and riparian vegetation is reset. These are natural processes. The cumulative effect of climate change and the Proposed Action is expected to be neutral to natural geomorphic processes.

2.2.5.5.8 Land Use

Construction and dam removal activities associated with the Proposed Action may result in short-term adverse effects on land use in the Eel River (as described in Section 2.2.4.9, Land Use), including to infrastructure such as bridges located downstream of Scott Dam and Cape Horn Dam from sediment deposition and to other infrastructure along the river such as water intakes or diversions, which may be buried or plugged from sediment deposition and become inoperable or require ongoing management. The Proposed Action is expected to have a long-term adverse effect on land use from the loss of Lake Pillsbury reservoir as a source for fire suppression, which may include possible lengthened response times for acquiring water from the river or from other sources of water that are farther from a fire than Lake Pillsbury reservoir.

In addition to impacts from the Proposed Action, the potential for cumulative impacts to land use from other projects/actions listed above in Section 2.2.5.4 are discussed by action below.

- The Potter Valley Tribe received a donation of 879 acres of forested lands in the mainstem Eel River Watershed in January 2019. The Tribe negotiated a land conservation proposal with the Stewardship Council, which was formed as part of a PG&E settlement agreement under bankruptcy reorganization in 2003. Among the long-range future plans are "development of recreational facilities, expanding environmental education programs, assisting with restoration of habitat and fishery resources, wildfire and fuels management, and becoming good neighbors with the stakeholders in the area" (Potter Valley Tribe 2025). Depending on actions taken by the Potter Valley Tribe, there may be additional cumulative impacts to land use, such as beneficial long-term impacts to wildfire and fuels management.

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- Management actions of the MNF as guided by applicable land management planning documents such as its LRMP (MNF 1995), including goals associated with forest management and watershed protection, are not expected to contribute to adverse cumulative effects.

The above-identified projects are not expected to adversely contribute to adverse cumulative effects on land use in the Eel River and East Branch Russian River, and, therefore, cumulative effects from future plans or reasonably anticipated actions along with the Proposed Action are not significantly different than the effects of the Proposed Action alone on land use.

2.2.5.5.9 Recreation Resources

Construction and dam removal activities associated with the Proposed Action may result in short-term adverse effects on recreational resources in the Eel River (as described in Section 2.2.4.10, Recreation Resources), including the loss of reservoir-based recreation opportunities at Lake Pillsbury reservoir from the drawdown of Lake Pillsbury reservoir and restricted recreation use during construction, as well as potential short-term, temporary effects to fishing opportunities and whitewater boating in the Eel River from high suspended sediment load and aquatic biota mortality. The Proposed Action is expected to have the following long-term effects on recreational resources in the Eel River and the East Branch Russian River (as described in Section 2.2.4.10, Recreational Resources):

- Loss of recreation opportunities at Lake Pillsbury reservoir with the removal of some of PG&E's recreation facilities and ancillary features (permanent loss);
- Loss of reservoir-based recreation at Lake Pillsbury reservoir with the transition from a lacustrine to riverine environment;
- Potential reduction in fishing, boating, and swimming opportunities in the East Branch Russian River during low summer flows;
- Improved access for anadromous fish to tributaries upstream of Scott Dam, providing increased opportunity for riverine fishing upstream of Scott Dam; and
- Beneficial cumulative effects to fish and aquatic resources in the Eel River and East Branch Russian River, benefiting recreational fishing.

In addition to impacts from the Proposed Action, cumulative impacts from the actions listed above in Section 2.2.5.4 are discussed by action below.

- Once completed, operation of the NERF would result in the diversion of water from the Eel River into the East Branch Russian River. Diverted water would be used by ERPA to maintain the health of the mainstem Russian River, provide a supply of water for users, and support East Branch Russian River fisheries. In combination with the Proposed Action, implementation of these NERF diversions would provide cumulative benefits to fish and aquatic resources and recreational fishing in the East Branch Russian River.

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- In combination with the Proposed Action, implementation of the following actions would provide cumulative benefits to fish and aquatic resources and recreational fishing in the Eel River:
  - Implementation of fisheries restoration plans and projects identified in the Eel River Restoration and Conservation Plan;
  - Development and implementation of TMDLs in the watershed; and
  - Implementation of recovery actions for federally protected California Coastal Chinook salmon and the Northern California steelhead DPS pursuant to the Coastal Multispecies Recovery Plan.
- Cumulative benefits to recreational resources along the Eel River would also occur from the Potter Valley Tribe's Trout Creek and Alder Creek previous land acquisition. Among the long-range future plans are "development of recreational facilities, expanding environmental education programs, assisting with restoration of habitat and fishery resources, wildfire and fuels management, and becoming good neighbors with the stakeholders in the area" (Potter Valley Tribe 2025).
- The MNF is expected to protect and maintain conditions on the lands it manages. Cumulative benefits to recreational resources may occur to the Lake Pillsbury reservoir basin from the following aspects of continued management of actions of the MNF:
  - Emphasis on providing quality water-oriented recreation opportunities in a manner consistent with the protection of bald eagles;
  - Coordination of the development, management, and use of the Lake Pillsbury reservoir basin;
  - Conflict resolution between OHV users and other recreationists through trail designation, administrative controls, and revision of the forest OHV plan; and
  - Opportunity analysis for the development of watchable wildlife areas and wildlife habitat interpretation for the public.

No cumulative actions or projects have been identified that would further reduce potential impacts to recreation resources. The Proposed Action, along with other planned actions that are expected to occur in the future, would result in some beneficial long-term and cumulative effects on riverine recreational resources in the Eel River and East Branch Russian River, including benefits to fish and aquatic resources in the Eel River with the return to unimpaired hydrology and geomorphic processes, benefiting recreational fishing. The Proposed Action's incremental contribution to cumulative effects on recreation at Lake Pillsbury reservoir due to the loss of reservoir recreational opportunities with the removal of some of PG&E's recreation facilities and ancillary features would be significant; however, with implementation of the proposed Restoration Plan, this could be offset with favorable conditions for river-based recreation in the future.

The Proposed Action, along with other planned actions that are expected to occur in the future, would result in some beneficial long-term and cumulative effects on riverine recreational resources in the Eel River and East Branch Russian River and would also result in some adverse long-term

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effects on reservoir recreational resources (as described below and in Sections 2.2.4.10, Recreation Resources, and 3.2.10, Recreation Resources) at Lake Pillsbury reservoir.

2.2.5.5.10 Cultural Resources

Other actions in combination with the Proposed Action would result in an overall adverse cumulative effect to cultural resources.

Archaeological Sites

Implementation of other actions and the Proposed Action would result in cumulative adverse effects on archaeological sites. Physical damage to known and unknown archaeological sites could occur through construction-related ground disturbance and draining of reservoirs, which would expose and allow increased access to previously inundated archaeological sites, resulting in looting and vandalism. The transfer, lease, or sale of historic property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance could also result in adverse effects to archaeological sites. For PG&E-owned Project lands, all of which are under existing conservation agreements, the removal of FERC jurisdictional boundaries would put those lands fully under the conservation agreement, as their inclusion in the FERC boundary may have entailed some exclusions from the agreements.

Built Environment

Implementation of other actions and the Proposed Action would result in cumulative adverse effects on built-environment resources. No resource-specific studies have been conducted to help identify the specific effects to built-environment resources. However, given the absence of information, it is assumed the deconstruction and removal of the hydroelectric facilities and construction of the NERF would have adverse effects on a hydroelectric facility that may be eligible for listing in the NRHP. In addition, other actions could result in changes to the character, use, or physical setting of built-environment resources that contribute to the resource's historic significance.

2.2.5.5.11 Tribal Resources

The Proposed Action, along with other planned actions that are expected to occur in the future, would result in an overall cumulative benefit to Tribal resources, especially restoration of native fisheries (see Fish and Aquatic Resources section above), other ethnobiological resources (see Botanical and Wildlife Resources sections above), and water quality. Implementation of restoration plans, the fisheries restoration plans, projects identified in the Eel River Restoration and Conservation Plan, and recovery actions listed under NOAA Fisheries' Coastal Multispecies Recovery Plan if developed in coordination with Tribes would result in benefits to water quality, aquatic resources, fisheries, and terrestrial resources used by all Tribes.

Ground disturbance from the Proposed Action coupled with construction of the NERF and other actions that are expected to occur in the future, plus indirect effects from erosion and sedimentation, may cause cumulative adverse effects to parts of known and unknown archaeological sites and other non-renewable Tribal resources including human remains. The cumulative loss of non-renewable Tribal resources could diminish the religious and cultural

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significance of the resource by changing the contributing elements, character, use, or physical and sensory setting of TCPs, TCLs, and other significant Tribal resources.

2.2.5.5.12 Socioeconomics

Construction of the NERF and inter-basin transfers from the Eel River to the East Branch Russian River are expected to offset the adverse socioeconomic effects of the Proposed Action on the Russian River Watershed (under the Proposed Action, diversions to the East Branch Russian River would cease), including effects related to water reliability and cost, energy reliability and cost, economic opportunity, habitat and species values, recreation value, local government fiscal conditions, and community way of life. As such, there are no cumulative adverse effects expected in the Russian River Watershed.

There are negligible effects expected in the Cape Horn Dam Area from the Proposed Action except for potential adverse effects on recreation and habitat- and species-related values. To the extent that climate change exacerbates droughts, reduces water levels, and adversely affects aquatic habitat quality and recreation opportunities, the cumulative effects will be adverse on recreation value and species- and habitat-related values.

Climate change effects of increased occurrence and severity of wildfires and upward trending annual acreage burned in wildfires in California (CARB 2023) may compound potential adverse socioeconomic effects in the Scott Dam Area. The potential adverse effects of the Proposed Action's change from a lacustrine to riverine environment at Lake Pillsbury reservoir and the return to unimpaired Eel River flows on population, housing, recreation value, and economic opportunity could be exacerbated by increased wildfire risk due to climate change. Recreation value can decline due to wildfires due to closure of recreation areas during and following wildfire events and due to changes in the quality of the recreation resulting from changes in vegetation and aesthetics. Property values, property damage, and population decline can also be adversely affected by increased wildfire risk. As such, the cumulative effects from the Proposed Action and climate change on recreation, property values, population, and associated economic opportunity may be adverse in the Scott Dam Area. The removal of the dams and implementation of associated habitat restoration in the Eel River under the Proposed Action would increase watershed resiliency and help to counteract the potential adverse effects of climate change on recreation, habitats, species, and economic opportunity in the Eel River Watershed. There are no adverse effects projected in the Eel River Watershed from the Proposed Action, so there are no cumulative adverse effects anticipated.

2.2.5.5.13 Noise

Phase 1 of the Proposed Action would result in temporary and brief unavoidable adverse noise effects at noise-sensitive areas associated with the use of off-road construction equipment and helicopters. PG&E would implement noise reduction measures, including limiting the time period for noise-generating activities. Implementation of the Construction Noise Measures would reduce noise impacts from the Proposed Action.

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For there to be a cumulative effect, noise-generating activities must occur at the same time and within the same area. Noise-level increases generated during Phase 1 of the Proposed Action would be site-specific to each disturbance area. Implementation of past, present, and reasonably foreseeable actions that may occur in the Project vicinity, listed above in Section 2.2.5.4, is not expected to cumulatively affect noise associated with the Proposed Action. For example, implementation of the Eel River Restoration and Conservation Plan would not include noise-generating activities that would occur within the immediate vicinity and at the same time as PG&E's construction activities. Similarly, development and implementation of the TMDLs in the watershed would not result in noise-generating activities in proximity to the Proposed Action disturbance areas. Continued management actions included as part of the MNF LRMP may occur near the Scott Dam disturbance area; however, given the rural setting and distance to the nearest receptors, adverse cumulative noise impacts are not expected to occur.

Therefore, the Proposed Action's incremental contribution to cumulative effects related to noise would not be significant.

2.2.5.5.14 Marine Resources

The Proposed Action would result in temporary elevated suspended sediment concentrations that would extend along the entire length of the Eel River and Eel River estuary and into the ocean, as well as elevated toxins, nutrients, suspended solids, and pathogens that may result in an avoidable adverse impact to marine resources. The initial release of sediment and reduction of DO concentrations downstream of Scott Dam would result in unavoidable, short-term adverse effects to salmonids and other fish and aquatic organisms, which could include mortality and impaired function. In the long term, hydrology, suspended sediment, and geomorphic processes would return to unimpaired conditions, with high-flow events transporting watershed-derived suspended sediment out to the ocean (Section 2.2.4.18, Marine Resources).

Projects under consideration to be implemented that could make a beneficial contribution to the overall cumulative effects to marine resources include the following:

- Operation of the NERF to divert water from the Eel River to the East Branch Russian River by ERPA;
- Eel River Restoration and Conservation Plan;
- Development and implementation of TMDLs in the watershed (USEPA 2004, 2005, 2007);
- Implementation of recovery actions for federally protected California Coastal Chinook salmon and the Northern California steelhead DPS pursuant to the Coastal Multispecies Recovery Plan (NOAA 2016); and
- Continued management of actions of the MNF as guided by applicable land management planning documents, including its LRMP (MNF 1995).

In addition to impacts from the Proposed Action, cumulative impacts from these projects/actions are discussed by action below.

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NERF Operations

As described in the Water Use and Hydrology section above, operation of the NERF would result in flow diversions to the East Branch Russian River between November and June, with minimal diversions in August through October. In combination with the Proposed Action and removal of the dams, operation of the NERF would result in a more natural hydrograph pattern in the Eel River and smaller flow diversions out of the Eel River during the summer to early fall, which would be an overall benefit to marine resources.

Other Actions

- The projects listed above including the Eel River Restoration and Conservation Plan and the Coastal Multispecies Recovery Plan would support restoration efforts for habitat and multiple listed salmonid species recovery plans. These projects include aquatic habitat connectivity, riverine habitat restoration, estuary habitat restoration, instream flow protection, water quality and water temperature improvement, riparian and wetland habitat restoration, invasive species management, and sediment control. These projects align with recovery goals for California Coastal Chinook salmon and the Northern California steelhead DPS. Implementation of TMDLs in the watershed (USEPA 2004, 2005, 2007) in parallel with ongoing management of the MNF, including its LRMP (MNF 1995), would support an improvement in the management of Eel River resources and, as a result, marine resources. The implementation of these projects would also support the prolonged stewardship of the Eel River.
- The Proposed Action's incremental contribution to adverse effects to marine resources from the short-term, temporary unavoidable adverse effects to water quality resulting from removal of the dams would likely not be reduced by these other projects. Therefore, the Proposed Action's incremental contribution to cumulative effects on marine resources would be significant in the short term but beneficial in the long term with the return to unimpaired hydrology and geomorphic processes. Ultimately, the unimpaired hydrology of the Eel River and restoration of habitat for the two listed species, Chinook salmon and Northern California steelhead DPS, would be an overall improvement of their habitat and respective EFHs and supportive of their respective ESA recovery plans.

2.2.5.6 Cumulative Effects on Climate Change

Global climate change refers to the increase in the average temperature of the Earth's atmosphere and oceans and the projected continuation of this increase. The causes of global climate change have been linked to both natural processes and human actions. According to the Intergovernmental Panel on Climate Change, increasing GHG concentrations resulting from human activity, such as fossil fuel combustion and deforestation without adequate revegetation, have been largely responsible for human-induced global warming (Intergovernmental Panel on Climate Change 2023). Increases in the concentrations of GHGs in the atmosphere decrease the amount of solar radiation reflected back into space, intensifying the natural "greenhouse effect" and resulting in the increase of global average temperatures. The most common GHGs include carbon dioxide and water vapor, although there are several others, such as methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. The potential heat-trapping ability of each of the GHGs

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varies substantially. To account for these differences in warming effect, GHGs are defined by their global warming potential. In this analysis, GHGs are reported as carbon dioxide equivalents (CO_2e) to measure their relative potency.

GHG impacts are inherently cumulative, and all GHG emissions contribute to the significant environmental impacts of global climate change. Although an individual project cannot generate enough GHG emissions to change climatic conditions, the combination of GHG emissions from an individual project in combination with other future projects could contribute to global climate change. This analysis focuses on the potential incremental contribution of the Proposed Action in combination with past and current projects and reasonably foreseeable future projects on GHG emissions within California.

The geographic scope of this cumulative GHG analysis is the state of California because the state is the controlling legal authority on GHG emissions in the Project area. The most recent statewide climate change legislation is Assembly Bill 1279, The California Climate Crisis Act, which establishes the policy of the state to achieve carbon neutrality as soon as possible, but no later than 2045, and maintain net negative GHG emissions thereafter. The following discussion considers how the Proposed Action, in combination with other cumulative projects within the state, may affect achievement of the goals established in Assembly Bill 1279.

The Potter Valley Powerhouse has not generated power since May 2021. Under the No-Action Alternative, the existing conditions would persist and power generation would not occur at the Potter Valley Powerhouse. A transformer has been out of service and has not been replaced due to the license surrender.

As presented in Section 2.2.4.15, Air Quality, using conservative estimates, implementation of the Proposed Action would emit a total of approximately 10,564.52 metric tons of CO_2e. These construction emissions would be temporary and intermittent and would cease upon completion of work. Additionally, compared to total annual GHG emissions within the state of California (381.3 million metric tons of CO_2e [CARB 2023]), GHG emissions from the Proposed Action would constitute a maximum of 0.0028 percent of total inventoried emissions. Therefore, although GHG emissions and global climate change are inherently cumulative impacts, the incremental contribution of Project construction emissions in the context of statewide emissions is negligible.

In conclusion, impacts of the Proposed Action on GHG emissions and the resulting effect on global warming, when considering other projects and actions across the state, are negligible.

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2.2.5.7 References

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