FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, DC 20426
February 15, 2018

OFFICE OF ENERGY PROJECTS

Project No. 77-285--California
Potter Valley Project
Pacific Gas and Electric Company

Debbie Powell, Senior Director
Power Generation – Operations
Pacific Gas and Electric Company
P.O. Box 770000, CN11D-1138
San Francisco, CA 94177-0001

Reference: Study Plan Determination for the Potter Valley Project

Dear Ms. Powell:

Pursuant to 18 C.F.R. § 5.13(c) of the Commission's regulations, this letter contains the study plan determination for the Potter Valley Project. The determination is based on the study criteria set forth in section 5.9(b) of the Commission's regulations, applicable law, Commission policy and practice, and the record of information.

Background

On September 14, 2017, Pacific Gas and Electric Company (PG&E) filed a proposed study plan (PSP) for 21 studies related to hydrology, water quality, geomorphology, fish resources, special status amphibians, aquatic reptiles, mollusks, cultural resources, land resources, recreation resources, botanical resources, and wildlife resources in support of its intent to prepare a re-license application for the Potter Valley Project.

On September 26, 2017, PG&E held an initial study plan meeting to discuss the PSP. Between then and November 30, 2017, PG&E held a series of meetings with resource-specific Technical Working Groups (TWGs) to discuss the PSP and study needs. Stakeholders subsequently filed comments on the PSP, including revisions made in response to the working group meetings. PG&E filed a revised study plan (RSP) on January 16, 2018.

Comments on the RSP were filed by the Potter Valley Irrigation District (PVID), the Mendocino County Inland Water and Power Commission (MCIWPC), the National Park Service (Park Service), the U.S. Forest Service (Forest Service), the Pacific Coast

Federation of Fishermen's Associations and the Institute for Fisheries Resources (Fisheries Groups; jointly filed), the National Marine Fisheries Service (NMFS), California Department of Fish and Wildlife (California DFW), the Wiyot Tribe, and the Round Valley Indian Tribes.

General Comments

A number of the comments received do not address study plan issues. This includes comments related to the development of various resource management plans and other protection, mitigation, or enhancement measures (PM&Es). This determination does not address such comments, but only addresses comments specific to the merits of the proposed studies submitted pursuant to section 5.13 of the Commission's regulations and comments received thereon.

Study Plan Determination

PG&E's RSP is approved, with the staff-recommended modifications discussed in Appendix B. Of the 21 studies proposed in PG&E's RSP, 17 are approved as proposed by PG&E, and 4 are approved with staff-recommended modifications (Appendix A). The specific modifications and basis for modifying PG&E's studies are discussed in Appendix B. Studies for which no issues were raised are not discussed in this determination. Unless otherwise indicated, all components of the approved studies not modified in this determination must be completed as described in PG&E's RSP.

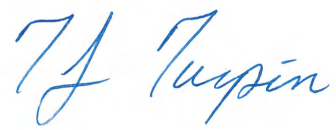
Commission staff considered all study plan criteria in section 5.9 of the Commission's regulations; however, only the specific study criteria that are particularly relevant to the determination are referenced in Appendix B.

Pursuant to section 5.15(c)(1) of the Commission's regulations, the initial study report for all studies in the approved study plan must be filed by February 15, 2019.

Nothing in this study plan determination is intended, in any way, to limit any agency's proper exercise of its independent statutory authority to require additional studies. In addition, PG&E may choose to conduct any study not specifically required herein that it feels would add pertinent information to the record.

If you have any questions, please contact John Mudre at john.mudre@ferc.gov or (202) 502-8902.

Sincerely,



Terry L. Turpin
Director
Office of Energy Projects

Enclosures: Appendix A–Approved and Modified Studies Subject to this Determination
Appendix B–Staff's Recommendations on Proposed and Requested Studies

APPENDIX A

SUMMARY OF DETERMINATIONS ON PROPOSED STUDIES

Study	Approved	Approved with Modifications	Not Required
Study AQ 1 – Hydrology and Project Operations Modeling	**X**		
Study AQ 2 – Water Temperature	**X**		
Study AQ 3 – Water Quality	**X**		
Study AQ 4 – Fluvial Processes and Geomorphology	**X**		
Study AQ 5 – Instream Flow		**X**	
Study AQ 6 – Lake Pillsbury Fish Habitat	**X**		
Study AQ 7 – Fish Passage		**X**	
Study AQ 8 – Fish Entrainment	**X**		
Study AQ 9 – Fish Populations	**X**		
Study AQ 10 – Special-Status Amphibians and Aquatic Reptiles	**X**		
Study AQ 11 – Special-Status and Invasive Aquatic Mollusks	**X**		
Study CUL 1 – Cultural Resources	**X**		
Study CUL 2 – Tribal Resources	**X**		
Study LAND 1 – Roads and Trails Assessment	**X**		
Study LAND 2 – Visual Resource Assessment	**X**		
Study LAND 3 – Hazardous Fuels Reduction Assessment		**X**	
Study REC 1 – Recreation Facility Assessment		**X**	
Study REC 2 – Reservoir Recreation Opportunities	**X**		

Study	Approved	Approved with Modifications	Not Required
Study REC 3 – Whitewater Boating	**X**		
Study TERR 1 – Botanical Resources	**X**		
Study TERR 2 – Wildlife Resources	**X**		

APPENDIX B

STAFF RECOMMENDATIONS ON PROPOSED AND RECOMMENDED STUDY MODIFICATIONS

The following discusses staff's recommendations on studies proposed by PG&E and participants' requests for study modifications.

SECTION 1: GENERAL ISSUES

This section addresses general issues and issues common to multiple studies.

Dam Safety Studies

The Fisheries Groups commented that their previously-requested analysis of dam safety issues at the project and changes to project operation to address dam safety issues at the project are not addressed in the RSP.

As discussed in Scoping Document 2 (SD2), the dam safety program at the Potter Valley Project and other Commission projects is set forth in part 12 of the Commission's regulations and is ongoing regardless of whether the project is in relicensing. Under part 12, the project is inspected annually by D2SI engineers, and a comprehensive analysis of the project, including the adequacy of the inflow design flood, is conducted by independent consultants every 5 years. Information relating to dam safety that is developed during relicensing will be provided to the Division of Dam Safety and Inspections (D2SI) for its review.

Dam Removal/Decommissioning Studies

The Fisheries Groups state that PG&E should include an analysis of expected fish habitat characteristics under various project removal scenarios. PG&E responds that it is not proposing to decommission the project or remove the dams, and that studies related to decommissioning or dam removal are beyond the scope of its relicensing studies.

In SD2, staff note that decommissioning or dam removal may be an end result of this proceeding, and therefore, staff included a placeholder in the EIS outline for a decommissioning alternative. However, prior to conducting a detailed decommissioning analysis with or without dam removal, the Commission waits until a licensee actually proposes to decommission a project, or a participant in a licensing proceeding demonstrates, with supporting evidence, that there are serious resource concerns that cannot be mitigated if the project is relicensed.[1] Here, the licensee has explicitly stated

[1] *See generally Project Decommissioning at Relicensing; Policy Statement*, FERC Stats. & Regs., Regulations Preambles (1991-1996), ¶ 31,011 (1994).

that it is not proposing to decommission the project, and there is no evidence of an unavoidable, serious resource concern that can't be mitigated through relicensing the project. For these reasons, detailed decommissioning-related studies are not needed at this time.

Geographic Scope/Cumulative Effects

Numerous entities commented that the geographic scope of many of PG&E's studies should be enlarged to encompass the geographic scope for the cumulatively-affected resources identified in SD2. In particular, the entities requested that the downstream limit of the geographic scope of studies on the Eel River be extended from its confluence with the Middle Fork Eel River downstream to the ocean.

Generally, the geographic scope of a required study is established based on the anticipated extent of the direct project-related effect. For cumulatively effected resources identified in SD2, the direct project-related effect does not extend downstream to the ocean. In addition, as to the portion of the geographic scope for cumulatively-affected resources downstream of the direct, project-related effects, we typically do not require license applicants to perform studies to assess the effects of other's actions. Instead we use existing information from a variety of sources, to the extent available, to inform our cumulative effects analysis. Therefore, we do not recommend that the geographic scope for the studies be extended downstream to the ocean.

LIDAR Surveys

The Forest Service requests that PG&E conduct LIDAR (Light Detection and Ranging, also Light Imaging, Detection and Ranging) surveys along the Eel River corridor between Scott Dam and its confluence with the Middle Fork Eel River, as well as the main stem Eel River and Rice Fork upstream of Lake Pillsbury for the purpose of providing high quality topographic data that small-scale aerial photography cannot provide. It further states that such LIDAR surveying would be useful in studies *AQ 1 – Hydrology and Project Operations Modeling, AQ 2 – Water Temperature, AQ 4 – Fluvial Processes and Geomorphology,* and *AQ 10 – Special-Status Amphibians and Aquatic Reptiles*.

PG&E states that a LIDAR survey of the whole river corridor is not needed, because sufficient information already exists for portions of the river corridor and this information has been identified in the individual study plans. PG&E further states that if during the course of conducting certain studies, it finds that additional river topographic information is needed, then additional site-specific LIDAR data collection will be done.

PG&E's proposed approach to site-specific use of LIDAR is an efficient and cost-effective way to provide the needed topographic data for the applicable studies. Therefore, we do not recommend that PG&E perform a LIDAR survey of the entire river corridor as requested by the Forest Service.

Working Groups, Focus Groups, Stakeholder Input

PG&E proposes the formation of hydrology and project operations technical modeling group (AQ 1), fish passage (AQ 7), predatory fish (AQ 9), and conceptual life cycle (AQ 9), recreation (REC 3) TWGs. It also proposes a Lake Pillsbury homeowners focus group (REC 2).

Round Valley states that in many studies, PG&E proposes to defer decisions on certain study details until after the Study Plan Determination. Round Valley is concerned that the study plans contain references to the "Technical Workgroups," "Focus Groups," and "Stakeholder Input," without further definition or explanation of their roles in the process of study plan implementation. Round Valley requests that the Commission direct PG&E to immediately develop a detailed description for the Technical Workgroups, the Focus Groups, and Stakeholder Input processes. Forest Service, California Fish and Wildlife, and the Wiyot Tribe, express similar concerns.

While we have seen value in the use of technical working groups in many cases in developing certain details of an approved study, such groups are not a requirement of the Commission's ILP regulations and it seems reasonable to allow an applicant to work through the study process as it sees fit. If a stakeholder does not believe that a study was conducted properly, the study plan modification provisions of the regulations are a means for requesting modifications.

SECTION 2: PROPOSED STUDIES AND MODIFICATIONS

The following section discusses the studies contained in PG&E's RSP, and the comments thereon. Our basis for recommending or not recommending certain modifications to each study plan is discussed below.

Study AQ 1 – Hydrology and Project Operations Modeling

PG&E's Proposal

PG&E proposes to develop a project operations computer model (Operations Model) that can be used to simulate current and potential future operations of the project. The objective of the study is to develop an Operations Model that represents the historical project operation to be used to simulate potential future operations under a variety of operating scenarios.

PG&E would use the U.S. Army Corps of Engineers-Hydrologic Engineering Center Reservoir Simulation model to develop the Operations Model. The model would simulate project operations for water years 1975 through 2016. The proposed period of record (POR) includes both the driest (1977) and wettest (1983) water years since 1922. Using generated daily unimpaired inflow data, the Operations Model would also be able to simulate basic decisions made during project operations including the management of flood control reservation, water supply management, dam releases, reservoir levels, and hydropower generation.

The model output would be mean daily flow out of project facilities (i.e., Eel River below Scott Dam, Eel River below Cape Horn Dam, and East Fork Russian River below Potter Valley Powerhouse) and also daily reservoir elevations (Lake Pillsbury and Van Arsdale Reservoir). Model nodes (data output locations) would occur at each major inflow or outflow location, including reservoirs, diversions, gages, and tributary inflow/accretion locations. The model output data would be summarized in a manner most suitable for use in the project relicensing (e.g., daily time series, monthly averages, water years, water year types).

Other study components include: (1) an Indicators of Hydrological Alterations (IHA) analysis; (2) a flood frequency analysis for the unimpaired hydrology and modeled existing operations hydrology; and (3) a characterization of Lake Pillsbury spills and river ramping rates.

As pertinent to the discussion below, PG&E also proposes to conduct a Lower Eel River Low Flow Hydrology Analysis to characterize project hydrology effects on the lower Eel River at the furthest downstream gage location (USGS 11477000) on the Eel

River at Scotia, California, particularly with respect to the fall low flow season (adult salmon upstream passage) or early spring (juvenile outmigration).

Comments on the Study

NMFS requests that fisheries impacts related to project flow releases, as described in the RSP, include the period of fall and spring salmonid migration when project operations have the greatest influence on Lower Eel River flow and habitat conditions.

Forest Service questions PG&E's approach of using a reservoir mass balance model to back-calculate inflows. Forest Service also expresses concern that PG&E's need to smooth the mass balance calculations to compensate for inaccuracies in gage data suggests significant error would be associated with this method, especially on daily time scales.

Forest Service recommends PG&E make continuous rainfall measurements on the reaches above Lake Pillsbury and use the data to generate a complete, continuous unimpaired daily flow dataset for the Eel and Rice Forks above Lake Pillsbury. In the event these data do not do not show a strong correlation with measured flows above Lake Pillsbury, Forest Service recommends the development of a lumped-parameter, rainfall-runoff model or a statistical approach, to estimate unimpaired flows.

Discussion and Staff Recommendation

Fisheries Impacts

We do not recommend that the study plan be modified to include NMFS' request that fisheries impacts related to project flow releases flows be described in the Lower Eel River Low Flow Analysis component of this study, because such an analysis does not relate to the purposes of the study. The purpose of this study is to characterize project hydrologic effects on the lower Eel River at the furthest downstream gage location, particularly with respect to the fall low flow season and the early spring season. This information will allow an assessment of effects on adult salmon upstream passage and juvenile outmigration, respectively, which will be addressed in other studies, including AQ 4, AQ 5, and AQ 9.

Unimpaired Hydrology

In regard to Forest Service's concern regarding PG&E's proposal to smooth the mass balance calculations to compensate for inaccuracies in gage data, we note that error in developing a daily unimpaired data set would occur with any method, including the rainfall-runoff method or statistical approaches. On a monthly basis, the mass balance

approach works well without much need for adjustment. However, when generating daily unimpaired inflows, the need to smooth the data results from the historical record of hydrologic events includes having missing measurements and is subject to the precision of the parameter being recorded or reported, such as reservoir level. Especially when evaporation is being considered, anomalies such as "negative" inflows, or apparent inconsistencies among daily inflows can and will occur. The intent of PG&E is to "smooth" such anomalies as needed to produce a hydrologic data set without corrupting the integrity of reservoir volumes during monthly periods.

We conclude that the approach that PG&E outlines in the study plan to develop the unimpaired dataset is commonly used and should result in a dataset appropriate for model use [section 5.9(b)(6)]. We do not agree that the precision of the dataset would be improved by installing rainfall gauges on the reaches above Lake Pillsbury as Forest Service recommends [section 5.9(b)(4)]. By participating in the technical group, interested participants can work with PG&E to validate and calibrate the model. Therefore, we recommend that *Study AQ 1 - Hydrology and Project Operations Modeling* be approved as proposed.

Study AQ 2 – Water Temperature

PG&E's Proposal

PG&E's proposed water temperature study addresses project effects on water temperature in four locations: (1) Lake Pillsbury; (2) the Eel River below Scott Dam; (3) the East Fork Russian River; and (4) tributaries upstream of Lake Pillsbury. Information developed in this study would be used to, in combination with other studies, assess project effects on aquatic habitat.

For Lake Pillsbury, PG&E would use the existing reservoir storage, streamflow, water temperature, and meteorological data in combination with a CE-QUAL-W2 model to characterize the relationship between storage in Lake Pillsbury, cold water pool availability, and water temperature releases under existing operations and meteorological conditions. For the Eel River below Scott Dam, PG&E would use the existing water temperature, streamflow, and meteorological data in combination with a multiple regression approach (or physical model, as necessary) to characterize water temperature conditions in the affected river reaches under existing operations and meteorological conditions. For the East Fork Russian River, PG&E would collect seasonal water temperature data on the East Fork Russian River over a range of project operations. For tributaries upstream of Lake Pillsbury, PG&E would synthesize available water temperature data below anadromous fish barriers to characterize potential habitat.

Comments on the Study

Forest Service requests that water temperature data collected by the Mendocino National Forest also be considered in the study, particularly, data from Bucknell Creek. However, it provides no indication of what the data would be used for or any justification for using it.

Forest Service also questions PG&E's assertion that the shorter time series of water temperature is sufficient to provide reference condition information on unimpaired conditions over the complete period of record. Forest Service requests that PG&E confirm this assumption by including statistical analyses of air temperatures and rainfall during this shorter time period relative to values from the full period of record. The range of variability and exceedance probabilities of daily average air temperatures and daily total rainfall values should be computed on a monthly basis for the shorter time series and compared with longer time-series values. Modeled, unimpaired discharge magnitudes and exceedence probabilities above Lake Pillsbury to be computed in the Hydrologic Characterization should also be compared across the shorter and longer time series. Rainfall and temperature data available for 2005-2016 can be tested using nearby reference data, for example; air temperature and rainfall data from nearby Soda Creek Remote Automatic Weather Station (RAWS).

In response to a Forest Service's similar comment on its PSP about the use of a shorter time series and need for a statistical analyses of air temperatures and rainfall, PG&E stated that its Water Temperature in the Eel River Water Temperature Modeling section includes modeling unimpaired water temperature for the period of record when boundary condition data (i.e., measured water temperature data upstream of Lake Pillsbury) are available (i.e., 2005-2016). PG&E further stated that while this is a shorter period of record than exists for hydrology, it is a sufficient period of record to provide reference condition information on unimpaired water temperature.

Discussion and Staff Recommendation

We do not see the need for using water temperature data from Bucknell Creek in this study, and Forest Service provides no justification for its recommended inclusion in the study. Because PG&E's proposed methodology would meet the study objectives, there is no need for modifying the study to require incorporation of the Bucknell Creek temperature data [section 5.9(b)(1) and (b)(4)].

With regard to the additional statistical analyses recommended by the Forest Service, PG&E is proposing to limit its modeling of unimpaired water temperature conditions in the Eel River to a time period for which both hydrology and water temperature data are available. We note that annual unimpaired inflow of the Eel River

at Cape Horn Dam during the 2005 – 2016 varied from about 120,000 to over 950,000 cubic feet per second (cfs) and that this range of flows encompasses the vast majority of annual flows experienced since 1925 (PG&E 2017) and therefore should provide a sufficient for the water temperature analyses. For these reasons, we find there is no need for the additional statistical analyses requested by the Forest Service [section 5.9(b)(6)]..

Study AQ 3 – Water Quality

PG&E's Proposal

PG&E proposes to augment existing water quality data by conducting analyses to: (1) characterize physical, chemical, and bacterial water quality conditions in project reservoirs and affected river reaches through the collection of seasonal water quality data, and compare this data to the objectives of the Basin Plan and other water quality standards; and (2) characterize mercury levels in Lake Pillsbury fish by analyzing tissue from fish collected as part of *Study AQ 9 – Fish Populations* and compare the results to appropriate fish consumption standards for humans and wildlife.

PG&E's proposed study area includes: (1) Lake Pillsbury; (2) the Eel River between Scott Dam and the Middle Fork Eel River confluence (including Van Arsdale Reservoir, which is primarily riverine in character); (3) the East Fork Russian River between the Potter Valley powerhouse and the ordinary high water mark of the downstream Lake Mendocino; and (4) tributaries upstream of Lake Pillsbury.

Study components would include: (1) seasonal *in situ* water quality measurements and collection of water quality samples; (2) monthly Lake Pillsbury water quality sampling; (3) *in situ* river water quality sampling; (4) bacteriological monitoring; (5) sampling of cyanobacteria (a.k.a. blue-green algae) and toxins (collectively harmful algae blooms (HABs); and (6) fish tissue mercury sampling.

As part of its study, PG&E proposes to collect and analyze certain metals, including mercury and methyl mercury on a monthly and seasonal basis in accordance with EPA methods nos. 1630 and 1631. PG&E also proposes to characterize mercury levels in Lake Pillsbury fish and compare the results to appropriate fish consumption standards for humans and wildlife.

The study would incorporate water quality data previously collected by PG&E and would support other studies including *Study AQ 2 – Water Temperature* and *Study AQ 6 – Lake Pillsbury Fish Habitat*. Fish collected during *Study AQ 9 – Fish Populations* would be used for fish tissue mercury analysis in this study and discharge data from *Study AQ 1 – Hydrology and Project Operations Modeling* would be used in this study.

Comments on the Study

Forest Service recommends that PG&E conduct hydrogen sulfide monitoring upstream of the Lake Pillsbury in the upper Eel River and Rice Fork, and at all the Lake Pillsbury sites. Forest Service states that there have been no previous efforts to monitor hydrogen sulfide gas in areas other than in Lake Pillsbury in the immediate proximity of Scott Dam. Forest Service further states that upstream monitoring locations would determine the project influence on hydrogen sulfide in Lake Pillsbury. The Forest Service requests that PG&E use the Acid Volatile Sulfide-Simultaneously Extracted Metals (AVS-SEM, aka SEM-AVS) method in addition to the EPA 1630-1631 mercury methods to address information needs not obtained from these EPA procedures.

PG&E responded to an earlier request to conduct hydrogen sulfide sampling in Lake Pillsbury tributaries by stating that a minimum dissolved oxygen level of 4.0 milligrams per liter (mg/L) is sufficient for complete oxidation of hydrogen sulfide to elemental sulfur and that sulfides are produced by sulfate-reducing bacteria under anaerobic conditions. They state that because the Upper Eel River and the Rice Fork are expected to be well-oxygenated, there is no reason to expect to find sulfides in the river water samples.

Discussion and Staff Recommendation

It is unlikely that hydrogen sulfide is present in the Lake Pillsbury tributaries, which are neither hypoxic nor severely anoxic. Therefore, any hydrogen sulfide present in Lake Pillsbury likely does not originate from the tributaries, but is the result of the natural process of anaerobic decomposition of allochthonous or autochthonous organic material in the lake, which would be expected to occur seasonally in an anaerobic hypolimnion. PG&E's water sampling program will provide information on the dissolved oxygen status of the lake's tributaries, which can be used to confirm our conclusion on the likelihood of hydrogen sulfide presence in the tributaries. Therefore, we do not recommend hydrogen sulfide monitoring in the tributaries.

With respect to the Forest Service's request for AVS-SEM method analyses, which is used to assess the potential for metal ions found in sediment to cause toxic effects to sediment-dwelling organisms, the Forest Service has not explained how this method is consistent with generally accepted practice in the scientific community or why its recommended methodology should supplement PG&E's in regard to meeting the study objectives [section 5.9(b)(6)]. Further, we have no basis for recommending that the Forest Service's recommended methodology replace or supplement the methodology proposed by PG&E. For these reasons, we do not recommend that the AVS-SEM method be required for this study.

Study AQ 5 – Instream Flow

PG&E's Proposal

In order to augment existing information and identify potential project effects related to instream flows, PG&E proposes to: (1) review and update, if appropriate, the current Eel River geomorphic segments and mesohabitat; (2) review existing instream flow hydraulic model to verify modeling approach and calibration; (3) review and update, if appropriate, anadromous species and life stage habitat suitability criteria (HSC), including juvenile steelhead water temperature HSC; (4) re-model habitat versus flow relationships for anadromous species and life stages using updated information, if appropriate; (5) model foothill yellow-legged frog (FYLF) habitat as a function of flow and ramping rates; and (6) conduct observations with stakeholders of East Fork Russian River minimum flows.

The study area includes the following project reservoirs and affected river reaches: (1) the Eel River between Scott Dam and the Middle Fork Eel River confluence (including Van Arsdale Reservoir, which is primarily riverine in character); and (2) the East Fork Russian River between Potter Valley powerhouse and the ordinary high water mark of downstream Lake Mendocino.

The study would assess or include: (1) Eel River geomorphic segments and mesohabitat; (2) selection of target species and/or guilds; (3) species and life stage habitat suitability; (4) instream flow modeling; (5) fish stranding and stage-change / ramping rates; (6) effective spawning habitat; (6) Eel River juvenile out-migration; (7) FYLF habitat modeling; and (8) East Fork Russian River minimum flows

The study would provide hydraulics modeling data that would be used in *Study AQ 4 – Fluvial Processes and Geomorphology* and *Study AQ 10 – Special-Status Amphibians and Aquatic Reptiles*. This study would use data from *Study AQ 1 – Hydrology and Project Operations Modeling*.

Comments on the Study

Forest Service states it is unclear whether updated hydraulic data would be collected at supplemental transects if the evaluation indicates that the river channel has evolved to a new condition (aggraded or degraded) at historical transect locations. Forest Service requests that the plan be modified to state that if historical mapping and flow transect locations are applicable to current conditions, use the historical mapping and historical hydraulic data for instream flow modeling; otherwise, update mesohabitat using

a combination of aerial photography, helicopter flights, and/or ground truthing, and update hydraulic data by collecting measurements at supplemental transect locations that are selected in collaboration with stakeholders.

Forest Service states that in addition to water temperature, water quality, geomorphology, instream flow, fish passage, and entrainment, there are other resources (e.g., recreation, archeology, wildlife, etc.) to consider in a comprehensive integrative report under the Conceptual Life Cycle Model and Analysis Framework for Anadromous Salmonids (in AQ 9). Forest Service requests that a synthesis of all interrelated factors affecting multiple resources be provided in a single report to better understand the tradeoffs associated with various competing needs.

Discussion and Staff Recommendation

It is unclear from the RSP whether or not PG&E is proposing to update hydraulic data by collecting measurements at supplemental transect locations that are selected in collaboration with stakeholders within the context of this study, or possibly study AQ 4. If new transects are established to replace transects for which hydraulic data exists, then any replacement transects should also have hydraulic data, such that all transects have the same suite of data elements. Therefore, we recommend modifying the study to require that if any historical transect having hydraulic data is replaced with a new transect, then the new transect should also have hydraulic data [section 5.9(b)(6)].

With regard to Forest Service's comment about the need for a synthesis of all interrelated factors affecting multiple resources, as noted above, the integrative synthesis is a component of study AQ 9. We will consider the integrative report and comments thereon in our discussion of study AQ 9.

Study AQ 6 – Lake Pillsbury Fish Habitat

PG&E's Proposal

PG&E proposes to characterize the availability of coldwater and warmwater fish habitat in Lake Pillsbury during summer/early fall under existing project operations. The study would utilize information developed through the performance of *Study AQ 1 – Hydrology and Project Operations Modeling*, *Study AQ 2 – Water Temperature*, *Study AQ 3 – Water Quality,* and *Study AQ 9 – Fish Populations*.

More specifically, PG&E would: (1) summarize the current fish species assemblage data (e.g., coldwater and warmwater species) in Lake Pillsbury; (2) characterize the gaged historical daily water surface elevations and pool volumes over the 1975–2016 hydrological POR, using available water surface elevation records; and (3)

characterize existing project operation data (i.e., instream flow requirements, infrastructure, and operations), daily water surface elevations, and pool volumes over the 1975–2016 hydrological POR. PG&E proposes to characterize alternative project operational scenarios as part of PM&E discussions during preparation of its license application.

PG&E would identify specific criteria to be used to define coldwater and warmwater fish habitat in consultation with stakeholders, including criteria for water quality, such as dissolved oxygen and hydrogen sulfide, and successful breeding and rearing. The study would also identify measures to reduce successful breeding and rearing for potential juvenile salmonid predators such as pikeminnow and bass (potential juvenile salmonid predators). It states that the latter has application to improve survival of potential downstream juvenile anadromous migrants through Lake Pillsbury, if passage is provided at Scott Dam.

Finally, PG&E would use the hydrology data (reservoir elevations and pool volumes) combined with water quality information (epilimnion and hypolimnion water temperatures and dissolved oxygen concentrations) during the summer and early fall to provide a time series analysis of the amount of available coldwater and warmwater fish habitat (including littoral zone spawning habitat) in Lake Pillsbury. Available habitat would be analyzed over the 1975–2016 hydrological POR for modeled existing project operation, including the potential effects of climate change on existing operation.

Comments on the Study

NMFS recommends that the study be modified to include a mark-recapture tagging study in combination with a creel census to evaluate the duration of habitat occupancy and survival rates of stocked rainbow trout in Lake Pillsbury. It states that this would provide insight into how well Lake Pillsbury habitat could potentially support steelhead. It further states that this information is critical to developing fish passage and reintroduction strategies above Scott Dam.

Discussion and Staff Recommendation

Habitat suitability for coldwater and warmwater fish is better determined on the basis of the proposed habitat-based methods, rather than by the tagging study and creel surveys recommended by NMFS, because it is unlikely that anglers could provide reliable information concerning the depths at which fish were caught [section 5.9(b)(6)]. In addition, neither a recapture study nor a creel survey would provide reliable information on the survival of stocked trout, because the rate of natural mortality is unknown [section 5.9(b)(6)]. Therefore, we recommend that PG&E's *Study AQ 6 – Lake Pillsbury Fish Habitat* be approved as proposed.

Study AQ 7 – Fish Passage

PG&E's Proposal

PG&E proposes the following elements to augment existing information on fish passage: (1) document the location, nature, and characteristics of potential critical riffle fish barriers in the Eel River between the Middle Fork Eel River and Scott Dam; 2) document tributary confluence access in the Eel River between the Middle Fork Eel River and Scott Dam and in Lake Pillsbury; (3) characterize adult anadromous species upstream passage at Cape Horn Dam; (4) characterize juvenile anadromous species downstream passage at Cape Horn Dam with respect to potential injury; (5) evaluate potential anadromous fish habitat upstream of Scott Dam/Lake Pillsbury; (6) identify and evaluate (conceptual level) means for providing upstream and downstream passage of anadromous fish at Scott Dam/Lake Pillsbury; and (7) monitor adult anadromous salmonid escapement in the Eel River.

PG&E's proposed study area includes: (1) Scott Dam, Lake Pillsbury, and anadromous salmonid habitat upstream of Lake Pillsbury; (2) the Eel River between Scott Dam and the Middle Fork Eel River confluence (including the Cape Horn Dam fish ladder and the Van Arsdale intake facilities). In response to comments on the PSP, the study area was expanded to include selected river reaches upstream of Lake Pillsbury up to existing fish barriers to characterize potential anadromous fish habitat. The study area was also expanded downstream of the Middle Fork Eel River confluence to monitor adult anadromous salmonid escapement.

In the course of the study, PG&E would: (1) establish a fish passage technical working group composed of stakeholders knowledgeable in issues related to fish passage; (2) review and synthesize the extensive critical riffle analyses conducted previously on the Eel River between Cape Horn Dam and Outlet Creek confluence; (3) evaluate tributary confluence fish passage; (4) review and characterize adult anadromous salmonid passage at Cape Horn Dam; (5) review and characterize Pacific Lamprey passage at Cape Horn Dam; (6) assess downstream juvenile anadromous fish passage at Cape Horn Dam; (7) assess downstream passage of adult steelhead kelts (i.e., post-spawned steelhead) at Cape Horn Dam; (8) assess salmon and steelhead escapement in the Eel River; (9) assess anadromous fish habitat upstream of Lake Pillsbury; and (10) identify and, at a conceptual level, evaluate the feasibility of conceptual fish passage options at Scott Dam.

Comments on the Study

NMFS states that while the proposed use of large hatchery triploid rainbow trout may help evaluate potential injury to large steelhead kelts as they descend over Cape Horn Dam, their behavior may not adequately simulate the timing of downstream

migrating kelts or their passage behavior over the dam. It states that the duration of steelhead spawning within the project area in combination with the potential delay in migration while descending over Cape Horn Dam is concerning and may carry significant consequences for the ability of kelts to return as repeat spawners. Therefore, NMFS states that to determine the significance of this potential project impact, installing passive detection arrays (passive integrated transponder (PIT) and/or radio telemetry) within the project area and tagging adult steelhead as they ascend Cape Horn Dam (i.e., trap fish at Van Arsdale Fish Station (VAFS)) would be the most appropriate method for documenting the spawning duration of steelhead within the project area and subsequent migratory behavior of kelts as they descend back down and over Cape Horn Dam.

NMFS states that developing a well-orchestrated tagging (PIT and/or telemetry transmitters) study would inform survival rates and the navigation routes utilized by juvenile salmonids as they descend through the 13-mile project area to Cape Horn Dam. NMFS states that this is important information, because outmigrant studies previously conducted at VAFS indicate the majority of juvenile salmonids descend over Cape Horn Dam and not through the fish ladder. It states that currently, the migration routes past Cape Horn Dam are not understood nor is the level of injury or mortality they sustain. NMFS further states that the degree to which juvenile salmonids are injured or disoriented as they fall over the dam may make them more susceptible to predation by pikeminnow or bass foraging below the dam. While PG&E proposes the use of surrogate juvenile-size hatchery fish to assess injury rates as they pass over the dam, NMFS is concerned their behavior would not inform survival rates through the 13-mile project area, nor simulate the timing and duration spent by juvenile salmonids descending downstream to Cape Horn Dam, which potentially increases their vulnerability to predation. Therefore, NMFS states that the most appropriate way to answer these questions is with a well-designed juvenile salmonid tagging study utilizing PIT tagging and/or telemetric technologies.

NMFS states that it appreciates PG&E's commitment to installing a sonar fish counting station at one location in the Eel River upstream of the South Fork Eel River confluence in a partnership among PG&E and stakeholder groups with significant resources provided by the California DFW. NMFS comments that given the complexities of operating this equipment at this location for the first time, and the variability of salmon and steelhead migrations, it believes it is imperative that a minimum of two adult salmonid migration seasons (fall through spring) are monitored to fully realize the utility of this information. Therefore, NMFS requests that PG&E conduct sonar monitoring from mid-October 2019 through April 2020, (i.e., a minimum of two adult salmonid migration seasons).

Discussion and Staff Recommendation

Kelts

Although NMFS does not object to the use of large hatchery rainbow trout as a surrogate for kelts to study injury resulting from passing over Cape Horn Dam, it questions whether the use of hatchery trout would provide useful information on the timing and behavior related to duration of spawning and migratory behavior of kelts. NMFS's recommendation to trap and PIT tag wild steelhead as they ascend the fish ladder at VAFS could provide this information at a reasonable cost, since pit tag receivers would likely be installed for the juvenile salmon passage component of the study [sections 5.9(b)(6) and (b)(7)]. Using large hatchery trout would not provide any information on the timing of upstream migration or downstream migration following spawning. Therefore, we recommend modifying this study to include PIT tagging steelhead and monitoring the subsequent downstream passage of kelts at Cape Horn Dam.

Juvenile Salmon

A PIT tagging study using wild smolts would provide the desired information concerning migration timing and route of passage, whereas PG&E's proposed use of hatchery smolts would not, because the migratory behavior of hatchery fish may not be representative of wild fish. We note that the same PIT tag receiver array could also be used in the kelt study, as described above [sections 5.9(b)(6) and (b)(7)]. Therefore, we recommend modifying the study to include PIT tagging and monitoring of wild juvenile salmon.

Salmon Escapement

Given the complexities of operating sonar monitoring at the Eel River location for the first time, two season's worth of sampling may be warranted. However, it is possible that the first season's sampling will show that the sonar system is not working to achieve the desired results and that a second season of sampling would be unlikely to as well. A more reasonable approach would be for the technical working group to review the results from the first season and then decide and recommend to the Commission whether the study should be modified to include a second season, as provided for in section 5.15(c) of the Commission's regulations. Therefore, , we recommend approval of the study with the modification that PG&E conduct PIT tagging and passage monitoring of steelhead/kelts and juvenile salmon.

Study AQ 9 – Fish Populations

PG&E's Proposal

To augment existing information on fish populations in the Eel and Russian Rivers, PG&E proposes to conduct the following: (1) use fish population data sets, including results of ongoing monitoring, to characterize fish species composition, distribution, timing, and abundance (including trends over time) in the Eel River between Scott Dam and the Middle Fork Eel River; (2) characterize fish species composition, relative abundance, and size in Lake Pillsbury by use of gillnets, electrofishing, and/or minnow traps; (3) characterize fish populations in the East Fork Russian River between the Potter Valley Powerhouse and downstream Lake Mendocino, using snorkeling or electrofishing; (4) evaluate the distribution and relative abundance of pikeminnow upstream of Lake Pillsbury; and (5) integrate historical fish population data, new fish population data, and other ecological data, analyses, and tools developed as part of the relicensing studies into a conceptual life cycle model and analysis framework to identify limiting factors, formulate and compare alternative operations scenarios, and develop PM&E measures.

The proposed study area would include the following project-affected reaches and reservoirs: (1) the Eel River between Scott Dam and the Middle Fork Eel River confluence (including Van Arsdale Reservoir); (2) the East Fork Russian River between Potter Valley Powerhouse and the ordinary high water mark of Lake Mendocino; and (3) Lake Pillsbury. Based on comments on the PSP, the study area was expanded to include an analysis of predatory fish upstream of Lake Pillsbury below anadromous fish barriers, and available fish data from lower in the Eel River, as applicable to the project.

During this study PG&E would: (1) continue ongoing Potter Valley Project monitoring studies required by the existing license and NMFS' Reasonable and Prudent Alternative (RPA); (2) synthesize Eel River fish species composition, distribution, timing, and abundance data; (3) assess Sacramento pikeminnow (and other predatory fish) suppression and predation hotspots; (4) determine pikeminnow (and other predatory fish) distribution and relative abundance upstream of Lake Pillsbury; (5) determine Lake Pillsbury fish species composition, relative abundance, and size; (6) characterize East Fork Russian River fish populations; and (7) develop a conceptual life cycle model and analysis framework for anadromous salmonids.

Comments on the Study

Forest Service states that it appreciates the addition of an integrative synthesis of anadromous salmonid population data with other ecological data and analyses (hydrology, water temperature, water quality, geomorphology, instream flow, fish

passage, and entrainment). However, it states that there are other resources (e.g., recreation, archeology, wildlife, etc.) to consider in a comprehensive integrative report. Forest Service requests that a synthesis of all interrelated factors affecting multiple resources be provided in a single report to better understand the tradeoffs associated with various competing needs.

Fisheries Groups state that salmon populations used the area above Lake Pillsbury before the project was constructed, but the current population is zero as a result of the Potter Valley Project. They state that excluding this area from AQ 9 would create an incomplete analysis and obscure the extreme difference in historical and current population that exists above Lake Pillsbury. They further state that this study should be further extended with a potential "future population" analysis under various dam removal scenarios created utilizing the carrying capacity generated in AQ 7.

NMFS states that current project fisheries monitoring methodologies conducted by PG&E are inadequate to identify specific life-stage bottlenecks (e.g., survival and predation rates, habitat use, passage routes, and migration behavior and timing, etc.) within the project area. NMFS recommends that the study plan be modified to require PG&E to use more robust and advanced fisheries techniques to further the understanding of project-related impacts on salmonids listed under the Endangered Species Act (ESA).

NMFS states that juvenile PIT tagging studies utilizing strategic placement of PIT tag and/or telemetric detection arrays would provide high-resolution information regarding survival and predation rates on juvenile steelhead, and information related to their summer-rearing tailrace occupancy (e.g., habitat preferences, etc.). It further states that strategic placement of detection arrays would also facilitate studies described in *Study AQ 7 - Fish Passage* to understand adult and juvenile migration routes as they attempt to navigate project facilities (e.g., Cape Horn Dam) and access tributaries for spawning, and help to inform its recommended terms and conditions for licensing the project. NMFS states that it is willing to assist PG&E in further developing a tagging study aimed to answer these specific questions regarding potential project-related impacts.

Discussion and Staff Recommendation

Forest Service's request for a synthesis of all interrelated factors affecting multiple resources to be included in the study report is outside of the scope of this fish populations study, and more within the purview of Commission staff's environmental analysis. As a result, we do not recommend modifying this study to include these additional resources.

Regarding the Fisheries Groups concern that PG&E is excluding areas above Lake Pillsbury, we note that PG&E's Study AQ 9 includes an analysis of predatory fish,

including pikeminnow, upstream of Lake Pillsbury below anadromous fish barriers. Other studies (e.g., *AQ 3 – Water Quality*) also provide information on habitat suitability upstream of Lake Pillsbury. However, any "future population" analysis is premature, given no feasible fish passage options have been identified.

With respect to NMFS' comments on PG&E's ongoing fish monitoring studies, in particular the need for more robust and advanced fisheries techniques, we note that PG&E is already proposing the strategic placement of pit tag detection arrays for Study AQ 7 – Fish Passage, should a pit tagging component of that study be pursued. Further, as discussed under AQ 7, we recommend modifying that study to include PIT tagging of juvenile salmon to address residence time of juveniles between the dams and monitoring their subsequent downstream passage at Cape Horn Dam.

Study CUL 1 – Cultural Resources

PG&E's Proposal

In order to evaluate potential project-related effects on cultural resources and meet the requirements of section 106 of the National Historic Preservation Act (NHPA), PG&E proposes to: (1) establish an Area of Potential Effects (APE) for the project in consultation with the California State Historic Preservation Officer (SHPO), Forest Service, and tribes; (2) identify and map areas within the APE that have been previously surveyed and summarize the associated survey protocols and methods; (3) work with the Forest Service to identify areas within the APE that were not surveyed using current standards; (4) conduct research and consultation to define possible locations of unidentified resources, determine areas of high sensitivity, and establish the historic context; (5) map the locations of all known prehistoric and historic-era cultural resources and historic properties in the APE, including their eligibility status in the National Register of Historic Places (NRHP); (6) coordinate with the California SHPO to complete and supplement existing formal eligibility determination information; (7) visit known cultural resources located within the APE to verify their location, condition, and boundaries, and update the existing site records, if necessary, including condition assessments of each resource; (8) conduct intensive surveys of the APE in previously unsurveyed areas or where surveys occurred more than 10 years ago and in areas where previous surveys do not meet current standards, to identify, map, and record currently unknown cultural resources, and conduct condition assessments of each resource; and (9) complete NRHP evaluations of historic-era built environment resources. Such evaluations would consider the project system as a whole and in terms of a historic district. Older or outdated evaluations that have received consensus determinations may be re-evaluated based on the findings of updated inventory and documentation on an individual basis.

PG&E defines the project's APE as: (1) the area within the FERC project boundary plus a buffer of 200 feet (refer to Map CUL 1-1). The proposed APE would be buffered by a 0.25-mile record search radius that would be used to develop contextual and background information pertaining to provisions 4 and 5 of the proposed study noted above, and to support inventory and evaluation of cultural resources in the APE. The proposed APE would be submitted to the California SHPO for formal consultation as part of implementation of the study plan.

Comments on the Study

Forest Service recommends that PG&E modify the APE to include: the 12-mile river corridor of the Eel River between Scott Dam and Cape Horn Dam; 7.5 miles of County Road 301 between Van Horn Dam and Scott Dam/Lake Pillsbury; and County Road 240 (a.k.a., the M8 or the Logging Road). Forest Service maintains that the 12-mile section of river is required for project operation and maintenance and the specified roads are used by PG&E personnel, adjacent landowners, and the public to access this section of the river.

Forest Service states that project-related river flows in the 12-mile reach have the potential to erode known existing archaeological sites and the year-round access to kayakers and other recreationalists, due to higher flows provided by the project during the summer months that would not otherwise occur, can potentially adversely affect important Native American village sites downstream from Scott Dam due to vandalism and looting, which has occurred in the past. Forest Service notes that the only major cultural surveys done on this 12-mile stretch of river were done in the 1960s and did not account for any Euro-American archaeological sites that may also exist there. They point out that a cursory survey of the 12 mile river corridor, conducted more than 50 years ago, indicates that at least 22 aboriginal archeological sites (many containing deep and substantial cultural deposits) exist along the river between Lake Pillsbury and Van Arsdale Reservoir. Forest Service states that these sites are potentially vulnerable to recreationalists and high water flows.

Forest Service notes that, although PG&E states in the RSP that flow releases dictated by the current license do not negatively affect cultural resources, PG&E has not provided data or documentation to support this claim. Forest Service states that Scott Dam was constructed because the natural flow of the Eel River in this corridor was unable to support the hydroelectric system during summer months. Thus, the Forest Service concludes that the project results in unnaturally sustained high water flows of this segment of river during this period of the year. Forest Service further points out that PG&E themselves note in Section 3.3.3 of the PAD that project operations are considered to affect the 12-mile section of river between Scott Dam and Cape Horn Dam.

In response, PG&E recognizes the potential for archaeological resources to be located along the 11-mile stretch of the Eel River between Scott Dam and Van Arsdale Reservoir; however, they state that flow releases from the project do not negatively affect these resources. In addition, PG&E states that other than maintaining the Trout Creek Campground, which is located at the upper extent of the Van Arsdale Reservoir, they do not conduct any project-related activities in this reach. Finally, PG&E notes that there is no evidence that dispersed recreation use in this reach is project induced and is different and/or greater than it would be if the project did not exist.

The California SHPO states that the study plan should not refer to an APE, as the APE has not yet been defined and will be defined through the implementation of the study plan and consultation with it and the Commission. It further states that, when defined, the APE should adequately encompass any potential direct, indirect, and cumulative effects by the project.

Discussion and Staff Recommendation

PG&E is proposing to include Van Arsdale Reservoir in the APE, as it is within the project boundary. Therefore, although Forest Service requests that the entire 12-mile reach from Scott Dam to Cape Horn Dam be included in the APE, only the 11-mile reach of river between Scott Dam and Van Arsdale Reservoir is discussed below in regards to whether the proposed APE needs to be modified.

It is not in dispute that the 11-mile reach has been shown to have archaeological resources, as demonstrated by a 1960 archaeological study as well as other ethnographic and historic information. Although Forest Service states that the managed flow releases from the project have the ability to erode downstream archaeological sites, it provides no evidence that erosion is an issue in the 11-mile reach or that any erosion that may be occurring is caused by the project. In addition, the Forest Service's assertion that the year-round access to the reach provided to recreationalists as a result of the higher summer flows has led to site vandalism and looting of archaeological sites appears to be unfounded. Although Forest Service cites to a conversation with PG&E archaeologists and planners about the looting of an unrecorded village site below Scott Dam as evidence of the potential project's effects, this example does not provide sufficient support to tie the looting activities to project operations. The put-in just downstream of Scott Dam that recreationalists use to access this reach of river is not a project facility. In addition, no evidence has been provided that supports a correlation between project operations and the number of downstream recreation users or the occurrence and frequency of any looting and vandalizing of archaeological sites. Although the project summer flows may indeed result in a greater number of recreation users in the reach than would otherwise occur during that period, this does not provide a clear nexus between the operation of the

project and the illegal behavior that may be exhibited by those accessing the reach. Therefore, because there is no established connection between the operation of the project and any potential effects on archaeological resources in this reach of the river [section 5.9(b)(5)], we do not recommend that it be included in the APE.

Although County Roads 301 and 240 may be used by recreationalists and others to access the Eel River and Lake Pillsbury, they are public roads that are used for multiple purposes. As such, any effects that may occur along these roads would be considered cumulative effects, and we typically do not require license applicants to perform studies on non-project effects to inform our cumulative effects analysis. Therefore, we do not recommend the inclusion of these roads in the APE.

In regards to the California SHPO's statement regarding the APE, we conclude that the definition of the APE for both the CUL 1 and CUL 2 studies is appropriate as proposed by PG&E and are seeking concurrence from the California SHPO on this definition of the APE by copy of this Study Plan Determination.

Therefore, having reviewed PG&E's *Study CUL1 – Cultural Resources* and the comments thereon, we recommend the study be approved as proposed.

Study CUL 2 – Tribal Resources

PG&E's Proposal

In order to locate and evaluate potential project-related effects on significant tribal resources and meet the requirements of section 106 of the National Historic Preservation Act (NHPA) PG&E proposes to: (1) consult with tribes to identify and map tribal resources within the APE established for the study that could be affected by project operation and/or maintenance activities; and (2) conduct an inventory and tribal/ethnographic study to determine the presence of tribal resources within the established APE, and evaluate those resources to determine if they are eligible for listing in the National Register. The APE for CUL 2 is the same as described above for CUL 1.

Comments on the Study

Comments from Forest Service, California SHPO, and PG&E described above in CUL 1 regarding the APE, also apply to the CUL 2 study.

Discussion and Staff Recommendation

Our discussion and recommendation regarding the project APE is provided above in CUL 1.

Therefore, having reviewed PG&E's *Study CUL 2 – Tribal Resources* and the comments thereon, we recommend the study be approved as proposed.

Study LAND 1 – Roads and Trails Assessment

PG&E's Proposal

There are approximately 6 miles of project roads and trails within the project boundary that are used primarily for routine operation and maintenance of the project. PG&E inspects these roads and trails regularly during the course of day-to-day project activities and conducts maintenance on them as needed. PG&E's road and trail maintenance generally includes, but is not limited to, debris removal, resurfacing/sealing, repair or replacement of erosion control and access control structures, repair of signage, and brush control.

In order to assess existing project road and trail conditions, PG&E proposes to: (1) survey project road and trail conditions in relation to applicable maintenance standards; (2) identify and characterize PG&E's current road and trail use, maintenance practices, and agreements; and (3) identify and characterize user-created roads and trails located adjacent to Lake Pillsbury, within the project boundary. The proposed study area includes existing project facility access roads and trails, recreation facility access roads, a project recreation trail, including a 10-foot wide buffer on either side of the project facility access roads and recreation facility access roads, and a 5-foot buffer on either side of project facility access trails and the project recreation trail. User-created roads and trails within the existing project boundary would also be included in the study area.

Comments on the Study

Forest Service requests that PG&E's study determine: (1) the type of recreation use that originates within the FERC project boundary and extends past the project boundary; and (2) to evaluate demand, use, capacity, recreational opportunities, resource issues, and the condition of all roads and trails, including those outside the project boundary, identified as a result of the study. This would include an assessment of project and recreation roads and trails that originate in the project boundary and extend past the boundary.

Forest Service requests that the study include an assessment of recreational use within, and adjacent to, the project boundary to determine: (1) to what degree the observed use is related to the project; (2) whether and to what extent the effects are caused on/to Forest Service land and resources; and (3) the level of future use and recreational needs. Forest Service recommends that the study be modified to incorporate a use, capacity, opportunity, and resource issue assessment of roads and trails outside of the project boundary to determine levels of use in the area as well as whether more development is needed to adequately protect the recreational opportunities and ecological resources within the Lake Pillsbury Basin.

Forest Service also requests that efforts to assess the condition and use of roads and trails outside of the project boundary be the same as efforts used to assess existing project roads and trails within the project boundary. Additionally, Forest Service requests that recreational trails, including those potentially added to the project, be assessed using the Forest Service Trail Accessibility Guidelines (FSTAG; Forest Service 2013).

Forest Service states off-highway vehicle (OHV) use of roads and trails in the project vicinity is due to camping opportunities at the project, and there is no legal, established route to those roads and trails around the project from the other OHV trail system in the area. Forest Service also states that changes in recreation demands on the northern end of Lake Pillsbury, specifically at the Navy and Oak Flat Campgrounds, would require the study to incorporate an informed "recreation plan, provision of public access, and installation of recreation facilities for any application for a substantial amendment to a license that does not already include such articles," as stated in *Recreation Development at Licensed Hydropower Projects, FERC. Recreation Development at Licensed Hydropower Projects* (Division of Project Compliance and Administration Office of Hydropower Licensing 1996).

PG&E states that there is no documented evidence to show that the project induces recreational use of roads and trails beyond the FERC project boundary, and that there is no evidence to show recreational use of roads and trails outside of the project boundary is related to the project. PG&E also notes that Forest Service has not identified what constitutes project-related use, nor have they identified roads and trails where that use occurs, and therefore a clear nexus between use of lands within the project boundary and recreational use of roads and trails outside of the project boundary does not exist.

Additionally, PG&E argues that the Motor Vehicle Opportunity Guide, referenced in the Forest Service comment letter on the PSP, indicates OHV roads and trails in the vicinity of the campgrounds are part of a large OHV trail system managed by the Forest Service.

Discussion and Staff Recommendation

Several Forest Service comments and requests regarding the study were related to recreation. Those recreation-related comments and requests are addressed in the *Study REC 1 – Recreation Facility Assessment* discussion section below.

Commission staff note that it is clear that roads and trails that are within the project boundary, including those that are user-created, are proposed to be identified and assessed in the RSP. However, it would be very difficult to assess whether the conditions and use of the roads and trails outside the project boundary are project related [section 5.9(b)(5)]. As such, any effects that may occur along these roads would be considered cumulative effects, and we typically do not require license applicants to perform studies on non-project effects to inform our cumulative effects analysis. Therefore, we do recommend that the study be modified to include roads and trails outside of the project boundary.

Regarding the Forest Service assertion that the existence of the project campgrounds is why OHV use occurs at the project, and in the immediate area, as there is no evidence to back up this claim [section 5.9(b)(5)].

For the above reasons, we recommend that PG&E's *Study LAND 1 – Roads and Trails Assessment* be approved without modification.

Study LAND 2 – Visual Resource Assessment

PG&E's Proposal

To identify effects of continued project operation and maintenance on the aesthetic quality of the project area, PG&E proposes to: (1) document the existing visual condition (EVC) of project facilities from key observation points (KOP) located along primary travel corridors, recreation areas, and water bodies; (2) assess the compatibility of project facilities with surrounding landscape conditions and determine whether the project facilities conform to established Forest Service and/or Lake and Mendocino County visual resource management objectives; and (3) document visual conditions at Lake Pillsbury at various water levels from Memorial Day through Labor Day.

Comments on the Study

The National Park Service recommends using the principles found in Flows and Aesthetics: A Guide to Concepts and Method (Whitaker and Shelby 2017), and the results from the instream flow study, to describe anticipated impacts of the proposed

actions and alternatives on instream flows and the related effects on scenic river values (i.e., flows, width, depth, channel inundation or exposure).

Forest Service requests that PG&E include a viewshed analysis that identifies the land area from where the project can be seen. This requested analysis would include areas outside of the primary travel corridors and recreation areas that PG&E has proposed to analyze, and would include, but not be limited to, the Snow Mountain Wilderness and Berryessa Snow Mountain National Monument. Forest Service also requests that data from the REC 1 survey be used to develop landscape character, scenic character descriptions, and design narrative. Forest Service also requests to incorporate into the viewshed analysis the policy direction found in Chapter 2330, Publicly Managed Recreation Opportunities, of the Forest Service Manual 2300 – Recreation, Wilderness, and Related Resource Management, (Forest Service 2018).

Discussion and Staff Recommendation

The six flow-aesthetic principles described in Whitaker and Shelby 2017 that the National Park Service recommends using to describe anticipated effects of the flow alternatives are: (1) aesthetics improve the most at the low end of the flow range; (2) flows that "fill the bottom of the channel" are likely to provide acceptable aesthetics; (3) flows that provide optimum aesthetic ratings are less clear; (4) increases in flows may change the shape, type, or other characteristics of water falls, with substantial effects on aesthetics; (5) very high flows may be rated lower, although some enjoy the novelty and raw power of these sometimes awe inspiring events; and (6) diverse flows may produce multiple aesthetic benefits. As noted by Whitaker and Shelby, these principles can be characterized as concepts, generalizations, or broad hypotheses that deserve attention in future research. While the principles may provide PG&E a framework of ideas to consider when analyzing the results of the instream flow study, modifying the proposed study plan to require the use of them appears to be unnecessary [section 5.9(b)(5)]. However, PG&E may choose to use them to help inform their analyses as they deem appropriate based on the instream flow study results.

Chapter 2330 of the Forest Service Manual includes guidelines for keeping and maintaining records of recreation facilities, planning and designing recreation facilities, and the need for public recreation cabins and permitting requirements associated with them. It is unclear how these policy guidelines relate to the viewshed analysis, as they appear to be requirements for the need, planning, and design of recreational facilities rather than the evaluation of the effect of current facilities on the viewshed [section 5.9(b)(5)]. Therefore, we do not see a need to modify the proposed study plan to require the incorporation of these policies. However, we note that as part of this study, PG&E is

proposing to compile and summarize pertinent Mendocino County, Lake County, and Forest Service management direction and objectives regarding visual resources.

Identifying and documenting areas where the project can be seen outside of the primary travel corridors and recreation areas, as requested by Forest Service, does not appear to be necessary. Identifying and documenting high use areas from which the project can be seen, such as the primary travel corridors and recreation areas proposed by PG&E, would provide sufficient information to evaluate any effects of continued project operation and maintenance on the aesthetic quality of the project area [section 5.9(b)(7)]. Therefore, we do not recommend that the study be modified to include areas where the project can be seen outside of the primary travel corridors and recreation areas.

For the above reasons, we recommend that PG&E's *Study LAND 2 – Visual Resource Assessment* be approved without modification

Study LAND 3 – Hazardous Fuels Reduction Assessment

PG&E's Proposal

To inform the potential development of measures to reduce fire risk, PG&E proposes to conduct a hazardous fuels assessment of PG&E lands within the project boundary in consultation with the Forest Service. The assessment would include: (1) the mapping of fuel conditions; (2) the mapping of existing defense zones (fuel treatment areas); (3) describing fuel reduction measures that PG&E and/or Forest Service implement, including, current vegetation management practices as they pertain to fuel reduction; and (4) identify existing fire prevention measures.

Comments on the Study

Study Area

Forest Service requests that the PG&E lands to be included in the study be defined in detail, and include, all parcels of land owned by PG&E in the Pillsbury Basin and Eel River Corridor. In requesting the expanded scope, Forest Service requests that all PG&E parcels be assessed for hazardous fuels, vegetation communities, fuel and fire-behavior models based on current conditions, and fire-return intervals.

Risk Assessment

Forest Service requests that the study assess how project operations, and/or visitors, are potential, and actual, sources of ignition on PG&E lands, and what risks this poses to Forest Service land and resources.

Discussion and Staff Recommendation

Study Area

Regarding the Forest Service's request to expand the study area to include all PG&E lands in the Pillsbury Basin and Eel River Corridor, the recreational use of this area is so extensive and mixed that it would be very difficult to assess whether and how much of the fuel and fire risk is project related or induced [section 5.9(b)(5)]. Therefore, we do not recommend that the study be modified to include roads and trails outside of the project boundary.

Risk Assessment

Regarding the Forest Service's request that PG&E assess how project operations and visitors to the project could be potential, or actual, sources of ignition of fires, we note that the LAND 3 study plan includes identifying existing fire prevention measures at project facilities and developed project recreational facilities. However, in order to assess current prevention measures, and inform potential new measures, we believe an assessment of the potential for project structures, operation and maintenance procedures, and visitors to be sources of fire ignition would improve the usefulness of the study [section 5.9(b)(5)].

Based on our consideration of the PG&E's proposed *Study LAND 3 – Hazardous Fuels Reduction Assessment* and the comments thereon, we recommend approval of the study with the modification that PG&E conduct an assessment of the potential for project structures, operation and maintenance procedures, and visitors to be sources of fire ignitions within the project boundary to inform the need for additional preventative measures.

Study REC 1 – Recreation Facility Assessment

PG&E's Proposal

In order to evaluate the types of facilities present in the project boundary, and the existing recreational use of, and access to, those facilities, PG&E proposes to: (1) conduct inventories and assessments at developed project recreation facilities to update information on facility capacity, condition, and consistency with applicable accessibility standards; (2) conduct visitor surveys at the project recreation facilities to identify visitor needs, preferences, and perceptions regarding project recreation facilities and opportunities; (3) estimate existing recreation use using available information sources and information developed through vehicle counts; and (4) identify recreation trends, needs, and potential future recreation demand.

The survey instrument and protocols would be developed in consultation with the Forest Service. Surveys would be conducted at all developed recreational facilities, and at the non-project Pine Point Day Use Area. The surveys would be administered on randomly selected weekdays (one day per week), weekend days (one day per week), and all holidays throughout the peak recreation season (Memorial Day through Labor Day), according to a pre-established schedule, and as reservoir water levels decline, so that visitor responses can be correlated to specific water surface elevations. The survey would be administered in English and Spanish, and would also be mailed to recreation groups and associations that frequent the project recreation facilities.

Comments on the Study

Study Area

Forest Service recommends that PG&E focus on project-related effects from developed and undeveloped recreation, and not limit the scope of the study to analyzing effects only within the project boundary.

Study Methodology

Consistent with its comments on *Study LAND 1 – Roads and Trails Assessment*, Forest Service requests that the study include assessments of recreational use within, and adjacent to, the project boundary to determine: (1) to what degree use is related to the project; (2) what effects are caused to Forest Service land and resources; and (3) what future use and needs of the project-related recreational uses will be. Forest Service also requests the survey be designed to identify and evaluate demand, use, capacity, recreational opportunities, and resource issues outside of the project boundary.

Forest Service states that the study should include the policy direction found in Chapter 2330, Publicly Managed Recreation Opportunities, of the Forest Service Manual 2300 - Recreation, Wilderness, and Related Resource Management (Forest Service 2018).

Regarding project recreation trails, Forest Service notes that PG&E stated in the RSP that the project includes one recreation trail. Forest Service states that this is an inaccurate assessment, and that multiple motorized trails exist within the boundary. Forest Service requests that these unidentified trails be inventoried and identified as project facilities.

Discussion and Staff Recommendation

Study Area

Regarding the Forest Service request to not limit the scope of the study to analyzing effects only within the project boundary, recreational use of this area is so extensive and mixed that it would be very difficult to assess whether and how much of the effects of recreation on lands outside of the project boundary are project related or induced. The Forest Service has not identified what constitutes project-related use or project-induced recreation, nor has the Forest Service identified roads and trails where that use occurs, and therefore a clear nexus between use of lands within the project boundary and recreational use of roads and trails outside of the project boundary has not been established [section 5.9(b)(5)]. Therefore, we do not recommend that the study be modified to include project-related effects from developed and undeveloped recreation outside of the project boundary.

Study Methodology

Several Forest Service comments and requests on the LAND 1 study, regarding recreation and recreational use of roads and trails, are more appropriately related to the revised REC 1 study, and mirror some Forest Service REC 1 requests.

We acknowledge that informal user-created recreational sites can have a negative impact on surrounding resources, but note that PG&E is already proposing to assess the use and characteristics of user-created roads and trails within the project boundary as a component of the *LAND 1 – Roads and Trails Assessment*.

In regards to the Forest Service request for the study to include policy direction from Forest Service Manual 2300, it is unclear how these policy guidelines relate to this study as they appear to be requirements for the need, planning, and design of recreational facilities rather than assessment of existing facilities [section 5.9(b)(5)]. Therefore, we do not see a need to modify the proposed study plan to require the incorporation of these policies.

Commission staff notes that Table REC 1-1, Project Recreation Facilities, in the RSP does not include all project recreational facilities that are found within the project boundary. Specifically, recreation facility access roads, and the Sunset Nature Trail, facilities, which are identified in table LAND 1-1 of the RSP, are absent from the project recreation facilities list. PG&E should update the table, to include all project recreation facility access roads, and the Sunset Nature Trail, in order to fully assess all project recreation facilities [section 5.9(b)(6)]. Additionally, PG&E should expand their REC 1

study area to include user-created roads and trails identified as a result of the LAND 1 study [section 5.9(b)(6)].

On the basis of our review of PG&E's *Study REC 1 – Recreation Facility Assessment* and the comments thereon, we recommend that the study be approved with the modification to include assessment of all project recreation facility access roads, the Sunset Nature Trail, and any user-created roads and trails, within the project boundary that are identified by the LAND 1 study.

LITERATURE CITED

Forest Service. 2013. Forest Service Trail Accessibility Guidelines: Scoping Requirements, Technical Provisions, and Appendices. 2013 Update. U.S. Forest Service. 37 pp.

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