COMMENTS ON THE PAD

Pursuant to 18 C.F.R. § 5.6(b)(1), PG&E must prepare a PAD, which provides the Commission, the Conservation Groups, and other interested parties with:

> Existing information relevant to the project proposal that is in the potential applicant's possession or that the potential applicant can obtain with the exercise of due diligence. This existing, relevant, and reasonably available information is distributed to these entities to enable them to identify issues and related information needs, develop study requests and study plans, and prepare documents analyzing any license application that may be filed. It is also a precursor to the environmental analysis section of the Preliminary Licensing Proposal or draft license application provided for in § 5.16, Exhibit E of the final license application, and the Commission's scoping document(s) and environmental impact statement or environmental assessment under the National Environmental Policy Act (NEPA).

Based on our review of the PAD, additional information is needed to refine the proper scope of the EIS and to complete study requests. We begin with general comments, followed by specific comments on identified sections of the PAD. For ease of reference, we organize our specific comments according to the headings provided in the PAD.

I. General Comments

The last relicensing for the Eel River dams and diversion (the "Potter Valley Project," PVP, or the Project) took place against a backdrop of rising concern about the decline of salmon and steelhead in the Eel River and across the West Coast. FERC issued the last license in 1983, but did not finalize a proposed minimum flow regime protective of Eel River fisheries until 2000. However, chinook and coho salmon and steelhead were listed under the federal ESA in 1999, and 2000, respectively.[28]

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[28] *See* note 3, *supra*.

On review of the PVP license, NMFS determined in 2002 that continued operation of the PVP under those revised rules would jeopardize the existence of listed species. The RPA rules under which the Project has operated since 2003 were put in place to protect listed salmonids.

However, it is our opinion that the RPA measures have not been sufficient to provide for fisheries recovery in the Project area. Specifically, the RPA measures have not been maintained during drought years, and there has been a steady decline in salmonid abundance in the Eel River. Thus, greater provisions for fisheries will probably need to be made in future than have been made to date. Meanwhile, the system is steadily losing, not gaining, flexibility to meet such needs in future years.

Additionally, there are a number of concerns about the safety and reliability of the Eel River dams, particularly with respect to seismic and geotechnical stability generally, and with conditions around the left abutment of Scott Dam.[29] Those questions raise additional substantial issues with respect to the potential costs, risks, and benefits associated with the Eel River dams and Potter Valley diversion.

The following are our specific comments on the PAD. For ease of reference, we organize our specific comments according to the headings provided in the PAD.

II. Specific Comments on PAD Sections

3.3.1 Eel River Watershed

State and National Wild and Scenic status of the Eel River.

The PAD fails to identify the Eel River as a State designated Wild and Scenic River which affords protection under the California Wild and Scenic Rivers Act:

> It is the policy of the State of California that certain rivers which possess extraordinary scenic, recreational, fishery, or wildlife values shall be preserved in their free-flowing state, together with their immediate environments, for the

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[29] See Melosh, G., *Geologic Risks at the Potter Valley Project* **(**July 20, 2017), available at https://drive.google.com/file/d/0B8LzWutg0vukcWpsbEJycFlLbTg/view?usp=sharing

benefit and enjoyment of the people of the state. The Legislature declares that such use of these rivers is the highest and most beneficial use and is a reasonable and beneficial use of water within the meaning of Section 2 of Article X of the California Constitution.[30]

The State designated sections of the Eel River include the main stem from 100 yards below Van Arsdale Dam to the Pacific Ocean; the South Fork of the Eel River from the mouth of Section Four Creek near Branscomb to the river mouth below Weott; Middle Fork of the Eel River from the intersection of the river with the southern boundary of the Middle Eel River - Yolla Bolly Wilderness Area to the river mouth at Dos Rios; North Fork of the Eel River from the Old Gilman Ranch downstream to the river mouth near Ramsey; Van Duzen River from Dinsmores Bridge downstream to the river mouth near Fortuna.[31]

The National Wild and Scenic Rivers Act, Section 7(a) outlines that the managing agency must determine whether the project either invades or unreasonably diminishes the scenic, recreational, fish or wildlife values present at the date of designation. Additionally, in an integrated licensing process a preliminary Section 7 determination will need to be submitted by the river-administering agency.[32] Thus, the PAD needs to include a more detailed description of the National Wild and Scenic components within the watershed identifying classifications, the Outstanding Remarkable Values (ORV) for each section of river, and administering agencies.

While the PAD breaks down the percentage of each Wild and Scenic classification type within the watershed, the description does not pinpoint the location of either wild, scenic or recreational sections on the potentially affected Eel River from Cape Horn Dam to the confluence of the Middle Fork Eel River. These Wild & Scenic classification locations are as

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[30] California Public Resources Code Division 5 Parks and Monuments Chapter 1.4 California Wild and Scenic Rivers Act [5093.50 – 5093.70]

[31] *Ibid*.

[32] Interagency Wild and Scenic Rivers Coordinating Council. Wild & Scenic Rivers Act: Section 7 (Internet). Portland, Oregon (USA). U.S. Forest Service; October 2004 [cited 2017 April 12]. 38 p. Available from: https://www.rivers.gov/documents/section-7.pdf

follows:[33]

- 100 Yards below Van Arsdale Dam to Confluence with Tomki Creek – Recreational
- Confluence with Tomki Creek to Middle of Section 22 T19N R12W – Scenic
- Middle of Section 22 T19N R12W to Boundary between Sections 7 and 8 T19N R12W - Recreational
- Boundary between Sections 7 and 8 T19N R12W to Outlet Creek – Wild
- Outlet Creek to Confluence with the Middle Fork Eel River - Recreational

In this same vein, the PAD details that fish are the Outstanding Remarkable Value (ORV) for each of these river sections. Finally, the administering agencies are identified as the State of California, USFS, Bureau of Land Management, Round Valley Indian Reservation and the National Park Service. [34] [35]

4.4 Project History and Overview

The original purposes of the PVP were hydroelectric generation and water diversion. The "Eel Power and Irrigation Company" built the Cape Horn dam, which was absorbed into the "Snow Mountain Water and Power Company."

As the original names of the owners and operators of the PVP suggests, one of the principal purposes of the PVP is to divert water for irrigation interests. To properly consider relicensing for the next 30-50 years or alternatives for the PVP, FERC must fully analyze the water diversion data available through this process.

- The PAD states at page 4-2: "Cape Horn Dam has fish passage facilities, enabling salmon, steelhead, and lamprey to access the Eel River and tributary streams between

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[33] https://www.rivers.gov/rivers/eel.php

[34] River Mileage Classifications for Components of the National Wild and Scenic Rivers System (Internet). December 2016 [cited 2017 July 18]. Page 8. Available from: https://www.rivers.gov/documents/rivers-table.pdf.

[35] Memorandum of Understanding Between the National Park Service Pacific West Region, Bureau of Land Management, California State Office and the U.S. Forest Service Pacific Southwest Region.

Cape Horn and Scott Dams."

  - While this statement is true, it should be qualified. Cape Horn's fish ladder allows salmon and steelhead to pass upstream and downstream, but does limit some migration. The respective levels of success in fish passage are of great concern to the Conservation Groups.

- The PAD also states: "Releases made at Scott and Cape Horn Dams support salmon and steelhead populations in the Upper Eel River Watershed."
  - Salmonid populations have been declining in the Eel River since records were kept since the construction of the PVP. While there is evidence those populations benefit from cold-water releases from Scott Dam, there is also evidence that pikeminnow predation and retarded outmigration significantly diminish, and may outweigh, any benefits to fisheries of Project operations.
- The PAD states: "The Potter Valley Powerhouse is located in the Upper Russian River Watershed, and releases from the powerhouse are a significant source of water in the East Branch Russian River and for local water users."
  - We request additional information as to whether PVP powerhouse operations and diversions are necessary for PG&E to generate power as compared with alternative sources of power such as solar, wind, co-gen, and service area efficiencies and conservation. Additionally, we request that FERC analyze what proportion of available water in the East Branch Russian River PVP diversions constitute during the year, what alternative sources of water may be available, and at what cost.
- The PAD states: "The East Branch Russian River flows south from the Potter Valley Powerhouse (approximately 11 miles) and is impounded by the U.S. Army Corps of Engineers' (USACE) Coyote Dam to form Lake Mendocino. ... Water from Lake Mendocino is used in Mendocino and Sonoma Counties for irrigation, municipal and domestic water supply, recreation, and support of salmon and steelhead populations in the Russian River."

- We request documentation of the data PG&E used to find that the Eel River diversions are needed for "Mendocino and Sonoma Counties for irrigation, municipal and domestic water supply, recreation, and support of salmon and steelhead populations in the Russian River," as the PAD intimates.
- One of the key questions the EIS must analyze is the extent to which Eel River diversions have been, are, or are needed in the "Water from Lake Mendocino ... used in Mendocino and Sonoma."
- This should include current and potential future compliance with SWRCB Frost Water Irrigation requirements, and actual accounting for water rights, permits and licenses, losses to connected groundwater, as well as accounting for currently unknown, illegal, unpermitted and other losses to the Russian River watershed. Demands for Russian River water diversions (including PVID) must also account for current irrigation methods and other water use that is not meeting BMPs for efficiency, conservation and reuse. The Russian River is currently designated as 'over-appropriated' by SWRCB; those demands must be reduced.
  - Downstream users have asserted that 600,000 people are dependent on Eel River diversions. There is no data or evidence in the public record to substantiate the validity or extent of this claim. The description of existing conditions for the EIS and the relicensing process must address the ability of the Sonoma County Water Agency to fulfill municipal water demands through its storage and releases of water in Lake Sonoma, wells and groundwater supplies, combined with local municipal supplies. Further, managers' ability to meet minimum instream flows in the Russian River below its confluence with Dry Creek must be addressed.
- Note that the final license amendment for the Project requires readjustment to accommodate D.1610 changes. (Article 58 – see Table 4-5, page 4-42).

4.5.1.1 Scott Dam

- The PAD states: "Scott Dam is a concrete, gravity-type, ogee-shaped structure having a maximum height of 130 feet and a total length of 805 feet. The ogee crest, which is at an elevation of 1,818.3 feet, is surmounted by five radial gates, each 32 feet wide by 10 feet high, and 26 steel slide gates, each 10 feet high and varying in width from 7.5 feet to 10.08 feet. The gates are manually operated with the exception of Gate 13 which is automated."

  - We request a determination of the potential effects of the failure of the Gate 13's automated operation as well as the differences in operational effectiveness between automated and manual gate use. The Conservation Groups are concerned that failure of Gate 13, or its control mechanisms, could lead to Scott Dam being overtopped.
    - Additionally, we request information regarding the emergency response to gate failure specifically on backup and remotely controlled power supply, the ability to free gates or the needle valve and the grizzly intake structure if jammed with debris, sediments, or other malfunctions, and duplicative remote sensing.

4.5.1.2 Cape Horn Dam

- The PAD states: "There is a 5-foot-diameter outlet through the spillway structure which was abandoned in place in 1987 due to an accumulation of sediment preventing its operation, and the construction of a weir associated with fish ladder improvements that flooded the downstream side of the outlet."
    - We request additional information on the effectiveness of outlet as a downstream fish passage.

4.5.2.1 Lake Pillsbury Reservoir

Current storage capacity is described as 76,876 af, but "normal usable storage" is 66,876 af. We request additional information on the implications of reducing "normal usable storage" to 66,876 af, with an explanation as to why this storage potential is not used to fulfill the RPA requirements. At the conclusion of the 2016 Potter Valley Drought Working group, PG&E staff committed to providing new modeling, surveys and proposals to determine absolute minimum storage levels in Lake Pillsbury commensurate with any safety or operational concerns, particularly in context of providing late season releases for fish during extended drought. We request this review be completed and released for timely review.

The licensee or FERC should also describe sediment accumulation (or decreases, as currently surveyed) and evaluate the potential for collapse of the sediment banks behind the dam, which could increase risks to stability.

The EIS should state what the storage capacity of the reservoir was when constructed, and provide specific data as available documenting the reduction in storage capacity over time, , both in the past and over the next 30, 50 and 100 years.

The EIS should explain the history of the construction of Scott Dam in detail, including the utility of the Project as it was understood at the time.

- The PAD states: "Verification of the minimum storage level necessary to protect project infrastructure and downstream resources is part of on-going analysis."
  - We request that the licensee or FERC explain what analyses are being considered in this ongoing verification process and how the minimum necessary storage level is likely to change over 30, 50, and 100 years. Additionally, we request that licensee or FERC evaluate and describe in a detailed and specific manner the potential consequences of damage to the needle valve, especially during the dry season or periods of low flows, be released and analyzed in the EIS.

4.5.2.2 Van Arsdale Reservoir

- The PAD states: "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 (PG&E 2015; PG&E 2006)."
  - We request that the EIS analyze the historical record, which reports that the Van Arsdale reservoir filled with sediment during a relatively short period of time, which helped drive the construction of Scott Dam.

4.5.3.1 Van Arsdale Intake

- The PAD, in describing the fish screens, states on page 4-32: "The results of the tests indicated that the screens met the majority of the acceptance criteria (SEC 1996). Issues that were identified as needing attention to fully meet the acceptance criteria were later addressed."
    - We request that the licensee or FERC describe which of the acceptance criteria were not satisfied by the fish screens and what measures were taken in order to address this problem. Additionally, we request that the licensee or FERC describe the effectiveness of the present fish screens in the PVP and the degree to which the rest of the bypass structures meet NMFS and CDFW's current standards and BMPs for fish screens, intakes and ladders for salmonids and lamprey.
- The PAD also states: "The fish screens and fish return system remain in continuous operation from October through July, except during periods of storm runoff when flows are 7,000 cfs or greater, at which time diversion is ceased to avoid damage to the screens."
    - We request that the licensee or FERC describe and analyze the implications of this limited season of operation for water diversions, power production, and fish migration. Additionally, we request analysis of the frequency of flows in excess of the 7,000 cfs threshold and the likely implications to cohort survival. More specifically we request analysis of the likely consequences of the reported 51-day period in the winter of 2017 in which the screens and the fish ladder were offline. Multi-year daily data should be provided to understand the frequency of such operational interruptions.

4.5.5.1 Potter Valley Powerhouse

We request additional information on why power generation was reduced disproportionately to the amount of water diverted to the Russian River and if the pre-RPA flow regime was constructed to maximize power production, irrigation volumes, or both.

Additionally, we request additional information and analysis on why power production and diverted flows through PVP are not direct correlations. This information is necessary to understand what power production might reasonably be expected from the existing infrastructure under various flow scenarios.

4.5.7 Gages, Weirs, and Piezometers

- The PAD states: "PG&E maintains leakage weirs and piezometers at Cape Horn Dam and Scott Dam."
    - We request additional information on why FERC has required their placement, and we request that the licensee describe the monitoring and disclose the data it has retrieved. *See* Exhibit 2 (Miller Pacific Report).

4.6 Existing Project Operations

- The PAD states: "The Project is operated in compliance with existing regulatory requirements, agreements, and water rights to generate power and deliver consumptive water to local water users."
    - We request documentation of the suggestion that continued operation of the PVP under the terms of the current license is fully consistent with all relevant provisions of law, including but not limited to the Endangered Species Act, Clean Water Act, California Fish and Game Code 5937, and the public trust resources in the Eel and Russian Rivers.

4.6.1 Water Management

The RPA flows represent a clear improvement over the historic flow regime. However, there is no substitute for maintaining natural conditions in the river.

NMFS' 2002 Biological Opinion found that the 2000 amendment to the 1983 license (PVID alternative chosen by FERC) would have jeopardized the survival and recovery of listed salmon and steelhead in the Eel River. (PAD at p. 4-44). That jeopardy finding meant that FERC had no choice but to adopt the RPA flow regime in the 2004 license amendments.

However, we do not believe that the RPA flow regime has adequately provided for the recovery of Eel River fish under current conditions. The PAD states that the RPA "remains the currently required flow regime." However, PG&E has not fully implemented the RPA. We request that FERC evaluate other alternatives to the RPA.

The PAD states that "NMFS continues to closely evaluate flows in the Eel and Russian Rivers, seeking to balance the benefits to salmon and steelhead in both rivers while considering other beneficial uses." We do not believe that the fisheries resources in the Eel and the Russian Rivers are equitably balanced in the current operation of the Project. The EIS should identify "other beneficial uses" by type, extent, location and success, and the extent to which Eel River diversions are a component of such uses over the course of a water year.

The Eel River offers wild, and federally and state listed, salmonids, and the Russian River, although important, primarily contains hatchery salmonids. The EIS should accurately reflect the conservation status and relative significance of Eel River and Russian River fisheries, and of the impacts of the Project and its operations on those fisheries.

To the extent any listed fish in the Russian River basin actually benefit from Eel River diversions, it is chinook in the Russian below Coyote Dam. The licensee and FERC should evaluate management options available to provide Russian River chinook the flows they need without any Eel River diversions.

The licensee, FERC and Russian River water purveyors should evaluate the degree to which diversions within the Russian River are appreciably reducible through efficiency;, conservation; reuse; increases in local storage for frost, growing season and heat irrigation; better management of connected groundwater; cultivation of crops more appropriate to water availability, and enforcement against illegal, unpermitted, unlicensed and other non-beneficial uses. Water purveyors in the Russian River watershed should review growth projections for Russian River municipal and agricultural water demands and adjust them based on actual water sustainably available from within the Russian River watershed, in order to avoid "paper water" justifications for development approvals in Urban Water Management Plans, General Plans and other planning and regulatory tools.

- The PAD states: "Salmon and steelhead habitat was substantially enhanced through implementation of the current flow schedule."
    - A more accurate statement would be: "harms to habitat by construction and operation of the dams and diversion were partially mitigated by implementation of the current flow schedule."

4.6.2 Regulatory Requirements

- The PAD states: "The Project is further limited by PG&E's existing water rights and water supply agreement with PVID."
    - We request that the licensee, FERC and PVID provide additional information on how the PVP is limited by PG&E's contractual arrangements with PVID. We request that FERC provide a full accounting of water actually diverted, stored or rediverted under PG&E's water rights, since 1972, along with projections for such diversions, storage and rediversions for the next 50 years. Similar data should also be made available for PVID under their water rights and contracts, both retroactive to 1972 and prospective to 2072.

4.6.2.1 FERC License

In Article 58 of the current PVP license, "FERC reserves authority to require modifications to the Project license as may be necessitated by modification by the California State Water Resources Control Board of its Decision 1610."

The revisions to D-1610 proposed by SCWA in its pending petitions before the SWRCB, as analyzed in its the Fish Habitat Flows and Water Rights Project DEIR [36] (Fish Flow Project), found that Eel River diversions are not necessary to meet Russian River water demands during

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[36] The Fish Flows DEIR can be found at http://www.scwa.ca.gov/files/Fish%20Flow%20DEIR%20Full%20Document.pdf; the Errata at http://www.scwa.ca.gov/files/FishFlow_DEIR_Errata_012617_FINAL_Remediated.pdf.

most years, with existing management, diversions, demands and projected demands. Based on our review of SCWA's Fish Flow DEIR and FOER's comments thereon,[37] there is insufficient evidence to support the hypothesis that diversions from the Eel River through the PVP are necessary for the protection of aquatic species or recreational resources on the Russian River.

Once salmon and steelhead were actually listed under the federal ESA, NMFS found that the flows provided in the modified 2000 license would jeopardize the existence of Eel River chinook and steelhead, but not Russian River salmonids.

- The PAD states: "During ESA Section 7 consultation, NMFS evaluated the preferred action of the FERC proceeding in regards to its potential effects on listed salmonids in both the Eel River and Russian River (Table 4-6). On November 26, 2002, NMFS issued its Biological Opinion for the proposed FERC license amendment and concluded that the proposed action would likely jeopardize the continued existence of Southern Oregon/Northern California Coho Salmon, California Coastal Chinook Salmon, and Northern California Steelhead (NMFS 2002). The RPA significantly reduced power generation output from the Project and the amount of water diverted to the East Branch Russian River that technically becomes abandoned (from a water right perspective), but is beneficial to downstream purposes, including contributions to storage in Lake Mendocino."
    - We request a quantitative analysis of reduced power generation and its relationship to reduced diversion flows.
- The PAD states: "PG&E's initial implementation of the RPA in 2004 followed operational parameters that were later determined inconsistent with NMFS' interpretation of the RPA conditions."
- "In 2006, PG&E adjusted operations to comply with NMFS' interpretation, which has

[37] FOER's comments on the Fish Flows DEIR are available at https://eelriver.org/wp-content/uploads/2017/04/FishHabitatFlowsDEIR-FOER_Comments-0309017.pdf

incrementally reduced diversions to the East Branch Russian River, including diversion of available water during periods of spill at Lake Pillsbury."

- "Recent winter droughts combined with the RPA requirements have resulted in challenging license compliance issues for PG&E, resulting in the need for flow variances from FERC to avoid license compliance violations."
    - These passages show that the licensee has not always been able to comply with the RPA. The EIS should describe periods and incidents of noncompliance, analyze the impacts to aquatic resources, and address the evident inadequacy of the RPA and of current compliance and mitigation measures.

4.6.2.2 Water Rights

- The PAD states: "This abandoned water from powerhouse operations adds significant inflow to Lake Mendocino and benefits downstream users."
    - We request additional information of the contributions of abandoned Eel River diversions to Lake Mendocino.
- The PAD states: "PG&E has three licensed water rights for the Project diversions and two pre-1914 water rights (Table 4-7). License 1424, with a priority date of March 12, 1920, allows PG&E to divert and store up to 102,366 acre-feet per annum (afa) at Lake Pillsbury for the beneficial uses of hydropower generation and incidental Fish and Wildlife Protection and Enhancement. License 1199, with a priority date of August 15, 1927, allows PG&E to divert and store up to 4,500 afa at Lake Pillsbury for irrigation purposes within the PVID service area. License 5545, with a priority date of March 11, 1930, allows PG&E to divert to storage up to 4,908 afa of water at Lake Pillsbury and to directly divert up to 40 cfs from the Eel River for irrigation purposes within the PVID service area in the Russian River Watershed. PG&E claims a pre-1914 water right to directly divert up to 340 cfs from the Eel River, as specified in Statement of Water Diversion and Use (SWDU) 1010, for power generation and irrigation use. PG&E also claims a pre-1914 water right to store up to 1,457 afa in

Van Arsdale Reservoir, as specified in SWDU 4704, for power, irrigation and domestic use. PG&E has three licensed water rights for the Project diversions and two pre-1914 water rights (Table 4-7). License 1424, with a priority date of March 12, 1920, allows PG&E to divert and store up to 102,366 acre-feet per annum (afa) at Lake Pillsbury for the beneficial uses of hydropower generation and incidental Fish and Wildlife Protection and Enhancement. License 1199, with a priority date of August 15, 1927, allows PG&E to divert and store up to 4,500 afa at Lake Pillsbury for irrigation purposes within the PVID service area. License 5545, with a priority date of March 11, 1930, allows PG&E to divert to storage up to 4,908 afa of water at Lake Pillsbury and to directly divert up to 40 cfs from the Eel River for irrigation purposes within the PVID service area in the Russian River Watershed. PG&E claims a pre-1914 water right to directly divert up to 340 cfs from the Eel River, as specified in Statement of Water Diversion and Use (SWDU) 1010, for power generation and irrigation use. PG&E also claims a pre-1914 water right to store up to 1,457 afa in Van Arsdale Reservoir, as specified in SWDU 4704, for power, irrigation and domestic use."

- These claimed water rights will require careful scrutiny. The licensee and PVID should be prepared to support these general claims of water rights with evidence of actual, beneficial use of water so that the Commission and relicensing participants can assess and evaluate water rights to Eel River waters.
- We also request additional information regarding how the water rights held by PVID and PG&E line up with the storage amounts in Lake Pillsbury and Lake Mendocino.
- The EIS should also consider and explain the extent to which storage may be available or may feasibly be made available on the Russian River side of the Project. This might include making additional storage available in the Lake Mendocino reservoir, in groundwater reserves, or in alternative small scale

surface storage. Information about the practicability and cost/ benefit ratio of such storage solutions would be critical to evaluating the feasibility of potential reconfigurations of Project flows.

4.6.2.3 Water Supply Agreement

- The PAD states: "PG&E has a contract to sell and deliver water to PVID at the tailrace of the Potter Valley Powerhouse. PG&E's obligation under the current contract is to deliver up to 19,000 ac-ft of water to PVID at a rate not to exceed 50 cfs, provided the water is available and permitted per PG&E's applicable water rights."
    - Please see the comments above on Water Rights

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4.7 Project Facility Maintenance

4.7.1 Inspections

The PAD states: "Scott Dam and Cape Horn Dam are inspected by an independent consultant under contract with PG&E every 5 years in compliance with CFR Title 18, Part 12, Subpart D. The Part 12D safety inspections are intended to identify any actual or potential deficiencies of Project facilities or adequacy of Project maintenance, surveillance, or methods of operation that might endanger public safety."

FERC comes to the question of relicensing the Eel River dams in the immediate aftermath of a near-disaster at Oroville Dam and a series of revelations that raise significant questions about the adequacy of dam safety review by both FERC and the California Division of Safety of Dams (DSOD). PG&E and FERC must ensure that critical dam safety and stability information and data from the public and from peer-review under CEII restrictions are made available for review.

In the aftermath of the Oroville crisis, catastrophic risk assessment expert Robert Bea (at the Center for Catastrophic Risk Management, UC Berkeley) called the near-disaster "a regulated failure."[38] Bea told KQED that the Division of Water Resources "and other oversight bodies, such as the Federal Energy Regulatory Commission, are using standards that don't account for the deterioration of infrastructure over time or outdated technology."

Prof. Bea wrote "it is likely that the wrong standards and guidelines are being used to re-qualify many critical infrastructure systems for continued service. The majority of these standards and guidelines were originally intended for design, not re-qualification or re-assessment of existing aged infrastructure systems that have experienced 'aging,' 'technological obsolesce,' and increased risk (likelihoods and consequences of major failures) effects. Inappropriate standards and guidelines are being used to re-qualify these infrastructure systems for continued service."[39]

In the aftermath of the Oroville events and Prof. Bea's assessment of the adequacy of regulatory standards and guidelines used to determine and assure dam safety, it is incumbent on FERC to reassess those standards and to assure that it is applying the appropriate level of scrutiny to the questions surrounding the safety of the present Project.

4.8 Project Generation and Outflow Records

Our assessment of PVP's power production is that power generation declines disproportionately to reductions in diversions. But even above-average flows in 2012 (65Kaf) appear to have produced about half the average power (20K MWh). (See p 4-56).
We request additional power generation data at a scale sufficient to evaluate the relationships between Project flows and power production.

4.10.3 Temporary Variance

- The PAD states: "Over the term of the current license, PG&E requested and received approval to temporarily modify minimum flow requirements, typically due to the

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[38] See https://ww2.kqed.org/news/2017/04/18/report-design-building-and-upkeep-flaws-led-to-oroville-spillway-failure/.
[39] See *Preliminary Root Causes Analysis of Failures of the Oroville Dam Gated Spillway* R. G. Bea Center for Catastrophic Risk Management University of California Berkeley April 17, 2017.

following circumstances: temporary modifications to flow in order to conduct maintenance and/or testing of Project facilities; and temporary variance of minimum flow requirements due to dry water year conditions or low storage at Lake Pillsbury."

- We request additional information on the number of variances granted, and the circumstances under which they were sought. Such variances may represent a failure of the utility to abide by the terms of the RPA.
- We further request additional information as to where the variances were granted and to what degree flows were reduced on the Eel and Russian Rivers.
- We ask that the EIS analyze and disclose all violations and variances to discern whether additional protective measures, flow levels, storage requirements, or other mitigation measures should be required to meet the intent of the RPA. Temporal losses to habitat or fisheries due to the variances must be identified, along with proposed mitigation measures to address those losses, both cumulatively and individually.
- As demonstrated by PVID's voluntary reductions of their diversions (reportedly allowing several thousand acre feet to remain in L. Pillsbury) within the Temporary Variances and work of the PVDWG 2015, 1016, we believe that the diversions allotted to PVID measured at E-16 could be substantially reduced, both keeping storage levels at Lake Pillsbury higher through the first rains of the water year, and providing more storage for water releases and blockwater utility to support incoming salmonid migration in the fall. We request that the EIS evaluate this alternative operation.

4.11 Proposed License Modifications

As noted above and throughout, FERC must require any new license issued for the Project to be modified in order to comply with federal and state law and regulation. In light of the license application, we ask that FERC ensure that the following are analyzed: 1) impacts on ESA-listed fisheries; 2) fish passage; 3) allowance for climate change related impacts; 4) inability to meet conditions of the RPA; 5) inability to meet Basin Plan objectives and water quality standards; 6) mercury contamination in the Lake Pillsbury reservoir; 7) balance between power production and public trust resource protection required under the Federal Power Act.

The EIS must consider a comprehensive suite of potential license modifications sufficient to fully address each and all of these deficiencies.

5.0 Description of Existing Environment

5.1 Water Use and Hydrology

The EIS must describe water use in the kind of detail necessary to assess the environmental impacts of the proposed relicensing of Project operations. The EIS must provide a detailed and quantified accounting of water demand and identify the sources of consumptive water for Russian River users, providing actual water needs, and actual water uses within a working model demonstrating the validity and accuracy of the claims.

We request that the EIS provide a full and detailed accounting of existing, perfected water rights that may be relevant to Project operations, and a clear explanation of unaccounted-for losses. In addition, the EIS should outline what crops are being grown, in which locations, over what acreage, using what irrigation methods and water quantities during the respective growing seasons. This information and data must also include lands serviced by the Potter Valley Irrigation District.

We request that the EIS provide a summary of power production by the Project which is as granular as possible – daily or hourly production.

The change in Project operations occasioned by the “reinterpretation” of the RPA resulted in a much sharper reduction in power production than in net water diversions. It appears that, before PG&E was corrected by the resource agencies, the operator was continuing to send any flows it considered ‘excess’ to the Russian River side. We request a cataloging of the delta in diversions before and after the “reinterpretation.”

5.1.3.2 Climate and Precipitation

The PAD describes the climate and precipitation in the Project area without noting documented changes in precipitation, hydrology, and temperatures across the region over the last century.[40] These trends appear consistent with the shifts predicted to accompany warming global temperatures.[41] Similarly, while the PAD states that "Rainfall in the Upper Eel River drainage is variable," it does not reflect on the paleogeologic record, which provides evidence that the Eel River region has seen both more severe droughts and far greater floods in the last couple of millennia than during the historic period of record.[42]

Our climate is much more variable than we have thought over the last century. This means that climate disruption, projected to increase that range of variability, makes such extremes more likely over time. But the extremes also are likely to be still more extreme: deeper, hotter droughts; but also atmospheric rivers even larger than those recorded in the beds of sediment off the Eel's mouth.

We request that the EIS analyze a meaningful suite of scenarios, reflecting the best available scientific data and analyses, which project potential changes in precipitation,

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[40] See Asarian, J.E. and J. Walker. 2016. Long-Term Trends in Streamflow and Precipitation in Northwest California and Southwest Oregon, 1953-2012. Journal of the American Water Resources Association (JAWRA) 52: 241-261. DOI: 10.1111/1752-1688.12381; Asarian, J.E. 2015. Long-Term Streamflow and Precipitation Trends in the Eel River Basin. Prepared by Riverbend Sciences for Friends of the Eel River, Arcata, CA. 30p. + appendices. https://eelriver.org/wp-content/uploads/2016/08/Streamflow-and-Precipitation-Trends.pdf; Asarian, E. 2015. Assessment of altered hydrologic function, dams, and diversions within the Southern Oregon/Northern California Coast evolutionarily significant unit of coho salmon, Version 2. Prepared for NOAA Fisheries, Arcata, CA. 73 p. + appendices. https://archive.org/details/soncc_hydrologic_report_20151002_revised.

[41] See, e.g., Luce, C., B. Staab, M. Kramer, S. Wenger, D. Isaak, and C. McConnell. 2014. Sensitivity of Summer Stream Temperatures to Climate Variability in the Pacific Northwest. Water Resources Research 50:3428–3443. doi: 10.1002/2013WR014329, and Null, S.E., J.H. Viers, M.L. Deas, S.K. Tanaka, and J.F. Mount. 2013. Stream Temperature Sensitivity to Climate Warming in California's Sierra Nevada: Impacts to Coldwater Habitat. Climatic Change 116:149–170. doi: 10.1007/s10584-012-0459-8.

[42] See, e.g., Ingram, B.L., and F. Malamud-Roam. 2013. The West Without Water: What Past Floods, Droughts, and Other Climatic Clues Tell us About Tomorrow. University of California Press.

temperature, and climate across the region in order to provide a meaningful analysis of potential effects on Project operations. This should include power production and water diversions, as well as the contributions of Project operations and the Project environment to cumulative effects which may be powerfully shaped by changes in precipitation, air and water temperatures, hydrology, and climate patterns.

5.1.3.3 Runoff

- The PAD states: "Total annual unimpaired inflow at Cape Horn Dam for the period 1925–2016 averaged approximately 478,000 ac-ft and ranged from approximately 26,000 ac-ft to more than 1,303,000 ac-ft."
    - We request further information and analysis of these numbers of the period between 1925 and 2016. The seasonality and variability of flows are factors which affect hydrology and biology, as well as Project operations and potential license changes.
    - We have learned from the recent drought that the RPA flows could not be met at the very time when fisheries most needed them. We request further information and analysis of what the level of decline in precipitation, or change in variability, would render the Project impossible or uneconomic to operate.
    - The EIS and relicensing process must propose and analyze possible mitigations for decreased precipitation, increased air and water temperatures, and changes in the timing of runoff over the coming decades. The best available science appears to demonstrate that we cannot assume stationarity for hydrologic conditions in the upper mainstem Eel River; rather, there are clear trends, likely to become clearer over time.[43]

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[43] See Asarian, J.E. and J. Walker. 2016. Long-Term Trends in Streamflow and Precipitation in Northwest California and Southwest Oregon, 1953-2012. Journal of the American Water Resources Association (JAWRA) 52: 241-261. DOI: 10.1111/1752-1688.12381, and Rheinheimer, D.E., Null, S.E., and J.H. Viers. 2016. Climate-Adaptive Water Year Typing for

(footnote continued)

5.1.3.4 Air Temperature

The PAD reports air temperature data from Scott Dam from 2009 to present. We request that the EIS consider available data for the region across the longest possible record. The EIS should consider, disclose, and analyze air temperature data with respect to the trends noted above, which appear to reflect increasing temperatures associated with climate change. Air temperatures affect water temperatures, a critical limit on salmonid biology, but also evaporation rates from the Project reservoirs.

Further, we request that the EIS's consideration of climate change scenarios include an appropriate air temperature component.

5.1.4 Existing and Proposed Uses of Project Water

- The PAD states: "Existing uses of water passing through the Project area include hydroelectric power production; agricultural, domestic, municipal, and industrial water supply; aquatic and wildlife habitats; and recreation. PG&E does not propose to modify the existing uses of Project water. Regulatory flow requirements in the FERC license (FERC 1983 and 2004) and National Marine Fisheries Services' (NMFS) Reasonable and Prudent Alternative (RPA) (NMFS 2002) constrain Project operations and resulting uses of Project waters."
    - As noted, storage in the requirements of the RPA have not been met; the existing license does not comply with current requirements including fish passage and water quality; and the D.1610 DEIS indicates that Eel River diversions are not necessary to Russian River fisheries. Thus, PG&E should be proposing to modify existing uses of Project water, at least as to flow levels and storage requirements. We request that FERC's EIS and alternatives reflect these facts.

5.1.4.2 Agricultural, Domestic, Municipal, and Industrial Water Supply Uses

- The PAD states: "Some water exiting the Potter Valley Powerhouse Tailrace is

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Instream Flow Requirements in California's Sierra Nevada. Journal of Water Resources Planning Management, 142(11): 0406049.

diverted to the Potter Valley Irrigation District (PVID), consistent with existing contractual obligations and regulatory flow requirements of the FERC Project license. PG&E has consumptive water rights associated with the Potter Valley Project to serve irrigation demands within the PVID place of use (Section 4.0). Water downstream of Lake Mendocino is used for agriculture, domestic, municipal and industrial purposes."

- The EIS must provide detailed information identifying the actual historic volumes, times and rates delivered to PVID diversions from the E. Branch Russian River at the PG&E tailrace since 1983.
- PG&E and PVID should identify any additional water diversions from E. Branch Russian River below the East and West Canals (water "deemed abandoned" from PG&E's tailrace), under what water rights held by PVID or others, as well as groundwater extractions within the land area served by PVID.
- PG&E and PVID should supply information regarded reported "return flows" to E. Branch Russian River from lands served by the District, with gaging data where available to support reported data.
- In the interest of supporting the efficient and beneficial uses of water diverted by PVID, the licensee should provide a full accounting of uses by all recipients of PVID water, identifying domestic use and demands, or, for agricultural use, the types and acreage of crops, volumes of water used and at what rates per type of crop accounted for on a weekly basis, and the type of irrigation (flood, spray, drip, etc) used by crop type, acreage and seasonality, along with analysis to support the efficiency of each type of irrigation or alternative methods of irrigation.
- PG&E and PVID should provide an accounting of losses through PVID's unlined irrigation canals and ditches, due to seepage, leakage or drainage to groundwater or other storage, as well as losses to evaporation.

- The EIS should also provide an accounting and water balance for water diversions and other losses to describe and model the hydrology of the East Branch Russian River between Potter Valley and Lake Mendocino. Contributions (flows, volumes) over the water year of water diverted from the Eel River should be accounted for. The Kamman Report (Exhibit 1) and modeling for SCWA's Low Flow Project DEIR describe substantial unidentified and unaccounted-for stream-flow losses in the mainstem Russian River – almost 38,000 af/year:
- "Non-permitted water rights and diversions may be contributing to significant stream flow losses, which if curtailed, could allow for increased flows in the Eel River." (Exhibit 1, at p. 3)
- "Many of these losses are attributable to unpermitted diversions and, if eliminated, would leave more water in the [Russian] river and result in higher flows at minimum flow compliance points/gauges. In turn, this would reduce the volume of releases needed from Lake Mendocino to meet the downstream minimum instream flow needs." (Exhibit 1, at p. 6)

The EIS should identify the sources of these losses between Lake Mendocino and Dry Creek, their legal status, and whether or not any or all illegal and unpermitted diversions can be eliminated or significantly curtailed, without adjudication of the Russian River.

FERC should also consider the findings and recommendations of the Russian River Independent Science Review Panel Report (ISRP).[44] The statement of purpose includes:

- "to develop a conceptual model of the hydrologic and geohydrologic system for a portion of the Russian River Watershed. The conceptual model will synthesize data from existing monitoring activities and studies into a comprehensive analysis of the mechanisms and processes that control the distribution and occurrence of

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[44] See www.russianriverisrp.org

water in the study area." … "ISRP can potentially play a significant role in increasing the level of scientific understanding of the river system, providing a stronger basis for water management decisions and policies in the future…". Sept. 9, 2016

5.1.4.3 Aquatic and Wildlife Habitats

- The PAD states: "The Potter Valley Project supports a variety of aquatic and wildlife resources and habitats. Aquatic habitat in the vicinity of the Project includes coldwater stream habitat in the Eel River benefiting Chinook salmon, steelhead, and other native and introduced aquatic species, and in the East Branch Russian River benefiting resident rainbow trout and other native and introduced aquatic species. Releases from storage in Lake Mendocino support anadromous salmonids (Chinook salmon, Coho salmon, and steelhead) and other aquatic species in the Russian River."
  - We request that the EIS analyze the extent to which the "coldwater stream habitat in the Eel River*"* actually results in net benefits to "Chinook salmon, steelhead, and other native and introduced aquatic species*."* This is especially important given that 1) the Project blocks fish passage to the upper basin and restricts passage into and out of the interdam reach; 2) salmonid and other native fish reproduction in the interdam reach is affected by pikeminnow predation and delays in downstream migration.
    - We request that the EIS detail and offer additional information on the releases from Lake Mendocino to support native Russian River fisheries. We specifically ask for information on the extent to which diversions from the Eel River are necessary to support those releases under current practices, and consider how adjustments in Lake Mendocino management and/or increases in Lake Mendocino storage could replace such demands to the extent they do exist.

5.1.4.5 Regulatory Flow Requirements

Eel River

- The PAD states: "Releases near the bottom of Lake Pillsbury provide cold water in the 12-mile-long reach between the Project dams from late spring through fall, which help sustain high-quality rearing habitat for juvenile Chinook salmon and steelhead. However, the cold water releases can delay juvenile outmigration, exposing migrating fish to inhospitable water temperatures in the Lower Eel River. PG&E, CDFW, and NMFS have experimented with required 'block water' flow release strategies to encourage timely juvenile outmigration."
    - We request additional information on the actual use by salmonids of this "high-quality rearing habitat for juvenile Chinook salmon and steelhead."
    - One important constraint on the effectiveness of blockwater releases in promoting downstream migration has been the availability of warmer water from the top of the Lake Pillsbury reservoir in the spring. We request additional information and analysis on which modifications to Project infrastructure would provide warm-water flows on demand during times when young salmon and steelhead need to be heading downstream.
    - Another constraint on the effectiveness of blockwater has been quantity. We request that the EIS consider whether additional blockwater would be helpful, and to what extent, in mitigating the harms to fisheries associated with the Project.
    - Experimental blockwater releases intended to promote downstream migration of salmonids led to unexpected upstream migration of lamprey. The EIS must document, consider, and analyze what flow regime (as well as what physical structures) would be optimal to promote lamprey passage up and downstream through the Project area, as well as what flows may be necessary simply to prevent continuing harm to lamprey passage and reproduction.
- The PAD states: "It should be noted that following issuance of the Amended FERC

License in January 2004, PG&E initially diverted more water during the spring period than was technically allowed by the rule curve exceptions clause in Section E.5 of the RPA. PG&E made diversions from 2004 through 2006 based on protocols agreed to by Department of Interior (DOI) and FERC (Oak Ridge National Laboratory) hydrologic modelers during the license amendment process. These protocols allowed diversions exceeding minimum releases to the East Branch Russian River plus PVID's allotment, when Lake Pillsbury storage was below the Target Storage Curve, as long as minimum flow requirements (including block flow releases) were being met in the Eel River below Cape Horn Dam and additional water was available at the diversion due to spillage from Lake Pillsbury and/or accretion between the two dams. During the license amendment process, all modeling of impacts on water supply and aquatic resources for each proposed flow schedule evaluated and incorporated this flexibility. However, the literal wording of the Section E.5 exception clause of the final RPA failed to reflect this flexibility. After this issue was identified by the resource agencies, PG&E began operating the Project per literal interpretation of Section E.5 beginning in 2007."

    - We request additional information regarding the resource agencies declining to allow the diversion of additional flows out of the Eel in the spring.

5.1.5 Water rights

- The PAD states: "PG&E has three licensed water rights for the Project diversions and two pre-1914 water rights (Table 4-7), as described in Section 4.6.2.2. PG&E holds water rights for both power and consumptive uses (SWRCB 2016). Water is diverted from the Eel River for generation at Potter Valley Powerhouse in the East Branch Russian River Watershed. After passing through the Potter Valley Powerhouse, a portion of the powerhouse outflow is diverted via canals to PVID for consumptive use. The remaining outflow is abandoned to the East Branch Russian River. This abandoned water from powerhouse operations provides inflow to Lake Mendocino and benefits many downstream users."

- We request that a thorough technical analysis and justification for the flows released to the East Branch Russian River (as measured at gage E-16, diversions to the tunnel), demonstrating that no adverse biological impacts would occur by lowering the flows during normal, dry and critical dry year types.
- As demonstrated by PVID's voluntary reductions of their diversions (reportedly allowing several thousand acre feet to remain in L. Pillsbury) within the Temporary Variances and work of the PVDWG 2015, 1016, we believe that the diversions allotted to PVID measured at E-16 could be substantially reduced, both keeping storage levels at L. Pillsbury higher through the first rains of the water year, and providing more storage for water releases and Block Water utility to support incoming salmonid migration in the Fall.
- We request that the a full accounting and modeling of water use, diversions, storage and return flows within PVID customers. Allowing increased releases at E-2 below Scott Dam and at E-11 below Cape Horn Dam would also increase juvenile steel rearing habitat (per Available Habitat Area calculations. See, Critical Request for 2015 Flow Variance Due to Limited Water Availability, PG&E, May 13, 2015 filed with FERC, pg. 4)

5.1.6 Hydrology

We request that the EIS includes a full analysis of the potential and probable impacts of climate change on future conditions in the Project area especially in regards to an analysis of future fish habitat conditions.

Eel River Diversion Compared to Unimpaired Eel River Flow

- The PAD states: "Annual Project diversions out of the Eel River constituted approximately 33% of the unimpaired flow in the Eel River at Cape Horn Dam on average over the historic period (1925–1978). During the transition period (1979–2006), annual Project diversions were approximately 26% of the unimpaired flow in the Eel River at Cape Horn Dam. After the RPA reinterpretation (2007–2015), the Project diversions have been 21% of the unimpaired flow at Cape Horn Dam, on average."

  - We request additional information and analysis on the yearly changes in unimpaired flow throughout this time period.

Powerhouse Releases Compared to Total East Branch Russian River Flow

- The PAD states: "Powerhouse releases significantly supplement natural flows in the East Branch Russian River, but the contribution has been declining in recent years with changes in license requirements. Annual powerhouse releases constituted approximately 59% of the total flow in the East Branch Russian River above Lake Mendocino (USGS stream gage #11461500, Russian River near Calpella, California) on average over the historic period (1973–1978). During the transition period (1979–2006), annual powerhouse releases were approximately 58% of the total flow in the East Branch Russian River. After the RPA reinterpretation (2007–2015), the powerhouse releases have been 47% of the total flow on average."
  - We request that the EIS provide greater detail here in order to describe the impacts of Project operations and potential modifications to the license.

5.1.6.4 Powerhouse Flows: Summary of Generation and Dependable Capacity

- The PAD states: "Power generation and outflow data for the Project were separated into the same time periods as the hydrologic analysis (Section 5.1.6.2) to reflect changes in Project operations. Available generation data spans 1972 through 2016 (PG&E 2016). Figure 5.1-8 depicts average monthly generation from 1972 through 2016. Average annual generation at the Potter Valley Powerhouse was approximately 53,600 megawatt hours (MWh) during historic operations (1972–1978), 49,700 MWh during transition operations (1979–2006), and 19,900 MWh for current operations (2007–2016)."
- "Average annual and monthly energy production for current operations (2007–2016) is summarized on Table 5.1-7 and Figure 5.1-9. As identified on Table 5.1-7, Project generation from 2013 to 2016 was affected by implementation of major multi-month

construction outages and drought flow variances. Therefore, the year that most accurately reflects the dependable generating capacity of the Project is 2012 (a dry year) when annual generation was 20,155 MWh."

- "Per FERC requirements, a summary of Project generation and outflow records for operations (annually and by quarter) for the five years preceding filing of the PAD (2012–2016) is included in Table 5.1-8. This summary presents the last complete five years of available records for Project operation. During this period, annual generation ranged from 8,562.3 MWh (2015) to 20,155.1 MWh (2012), and diversion flows ranged from 31,200 ac-ft (2015) to 65,200 ac-ft (2012)."
    - We request additional information regarding the relative utility of the Project's power production and its related economic value to the utility and to its customers. We request that the EIS analyze PVP's power production in terms that illuminate its actual dollar value as well as its importance to the operation of the regional grid, its utility in meeting peaking demands, and any other relevant ways in which Project power production is particularly useful – or to which it is actually surplus to consumer demand, or could be replaced at lower cost, or with lower impacts, or both.
    - We request additional information to determine if there is a minimum flow regime beyond which the project does not make economic sense.
    - The EIS should identify current and future capital or significant maintenance projects for the PVP that would have to be accomplished within the proposed license period of 50 years, along with cost estimates, and potentials for recovery through CPUC rate adjustments.

5.1.6.5 Reservoir Storage Lake Pillsbury

- The PAD states: "Lake Pillsbury has a gross storage capacity of 76,876 ac-ft at the top of the gates (elevation 1,828.3 ft) based on bathymetric data collected in 2015-2016 (PG&E 2017). Reservoir storage and surface area profiles are shown in Table 5.1-9 and Figure 5.1-10. The volume of water storage is approximately 20% of the average annual runoff in the watershed above Scott Dam. Lake Pillsbury generally reaches its peak storage in April or May, and is drawn down throughout the late spring and summer, reaching a low point somewhere between November and January, depending on hydrologic conditions. Lake Pillsbury is generally drawn down to between 15,000 and 25,000 ac-ft of storage, with some dry years drawn down as low as approximately 10,000 ac-ft. Lake Pillsbury is not drawn down further than 10,000 ac-ft due to concerns of bank instability in the reservoir and the potential for sloughing material to block the outlet needle valve or be released downstream creating high turbidity and streambed sedimentation. Verification of the minimum storage level necessary to protect project infrastructure and downstream resources is part of on-going analysis and discussions with resource agencies."

- The Lake Pillsbury reservoir storage rule curve is currently mandated by DSOD. They do not allow early gate closure in late Winter or early Spring to maintain maximum storage going into the dry season, but must release sufficient water to allow for future storm inflows, whether or not they actually occur, until a defined date.
- We request that the proposed revisions to the storage rule curve account for incoming weather patterns, including "atmospheric river" predictions. SCWA has been developing such Forecast Informed Reservoir Operations (FIRO) over the past few years for a proposed storage and release management strategy and reoperation of Lake Mendocino to maximize usable storage in the water supply pool.
- We request additional information and an analysis of the implications of increased seasonal variation and reduced storage in Lake Pillsbury's storage for Project operations, fisheries flows and other mitigations.
- We request additional information on whether water quality conditions are significantly affected by variations in Lake Pillsbury storage.

5.2 Water Quality

5.2.3 State Water Quality Standards

Mercury and Methylmercury

Please note the State Water Board has recently promulgated additional protective standards for mercury which must be reflected in the EIS and in any license FERC may approve for the Project. As the SWB website notes:

> "Mercury is negatively impacting the beneficial uses of many waters of the state by making fish unsafe for human and wildlife consumption. Although mercury occurs naturally in the environment, concentrations of mercury exceed background levels because of human activities. Gold and mercury mines and atmospheric deposition are the predominant sources of mercury, with minor contributions from industrial and municipal wastewater discharges and urban run-off."
>
> "On May 2, 2016, the State Water Resources Control Board adopted Resolution 2017-0027, which approved "Part 2 of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California—Tribal and Subsistence Fishing Beneficial Uses and Mercury Provisions." Resolution 2017-0027 provides a consistent regulatory approach throughout the state by setting mercury limits to protect the beneficial uses associated with the consumption of fish by both people and wildlife. Additionally, the State Water Board established three new beneficial use definitions for use the State and Regional Water Boards in designating Tribal Traditional Culture (CUL), Tribal Subsistence Fishing (T-SUB), and Subsistence Fishing (SUB) beneficial uses to inland surface waters, enclosed bays, or estuaries in the state. The State Water Board approved one new narrative and four new numeric mercury objectives to apply to those inland surface waters, enclosed bays, and estuaries of the state that have any of the following beneficial use definitions: COMM, CUL, T-SUB, WILD, MAR, RARE, WARM, COLD, EST, or SAL, with the exception of waterbodies or waterbody segments

with site-specific mercury objectives."[45]

The Lake Pillsbury reservoir is listed under §303(d) of the Clean Water Act for mercury, and the rest of the Eel Watershed is listed under the Clean Water Act for temperature and sediment concerns. Under the Basin Plan established for the Eel River by the State Water Resources Control Board, the Eel River in the Project Area and reaches below is subject to the following beneficial uses which would trigger the new standards referenced above: COMM, WILD, RARE, WARM, and COLD.[46] It is our understanding that at least some portions of the Eel are or should be recognized as having CUL, T-SUB, and SUB beneficial uses as well, given the importance of fisheries to tribal nations resident along the Eel.

Mercury is present in Project area geologic formations, and is deposited from atmospheric sources. However, the elemental form of mercury is less dangerous than the methylated form, which can be more easily absorbed by life forms, tends to bioaccumulate up food chains, and has been linked to a range of harms in many different life forms. The Lake Pillsbury reservoir, which like many lakes becomes eutrophic as its upper layer warms and its lower layer becomes anoxic, provides the setting in which anaerobic bacteria methylate mercury in reservoir sediments and become the means by which that methylated mercury begins to accumulate in the food chain. Mercury poses clear risks for birds, wildlife and humans which eat fish that contain mercury.[47]

We request additional information and an analysis of the implications other sources of mercury observed in the Project area. Specifically, we request additional information on the

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[45] See http://www.waterboards.ca.gov/water_issues/programs/mercury/

[46] See Basin Plan, 3/05, p 2-9.00, available at http://www.waterboards.ca.gov/northcoast/water_issues/programs/basin_plan/083105-bp/03_bu.pdf

[47] See Chan, H.M., Scheuhammer, A.M., Ferran, A., Loupelle, C., Holloway, J., and S. Weech. 2003. Impacts of Mercury on Freshwater Fish-Eating Wildlife and Humans. Human and Ecological Risk Assessment: Vol. 9, No. 4, pp. 867-883.

level of threat to biota and humans, the potential implications of this level of mercury contamination for fisheries recovery and wildlife in the Project area, and the proportion of the mercury and methylmercury load can be attributed to the existence and operations of the Project.

We request that the EIS fully assess the level of mercury contamination in the Project area, including above the Lake Pillsbury reservoir and below Cape Horn dam. The EIS should describe the nature, extent, and concentrations of mercury contamination in sufficient detail to perform at least a preliminary assessment of potential mitigations, including dam decommissioning and sediment removal. We request additional information and an analysis of whether it is possible, feasible, or even desirable to treat the contaminated sediments and what is the optimal outcome for biological systems and human health.

Additionally, we request an analysis of how much more mercury can be expected to accumulate and to methylate if the Project is operated for an additional 30, 50, or 100 years. The EIS should also assess the potential for mercury to move into the rest of the Eel River under various dam failure scenarios.

Temperature

Although there is an extensive record of stream temperatures in the immediate Project area, we lack adequate data for downstream flow and temperature.

We request additional information and an analysis of projections of likely and potential future conditions in the Project area, especially in comparison to known temperature thresholds which affect the survival and reproduction of steelhead and salmon. The EIS should consider, analyze, and disclose reasonable projections of the likely future range of conditions in the Project area, including how changes in precipitation and air temperatures are likely to affect stream temperatures.

Sediment

In addition to the points noted above regarding mercury contamination, we request additional information regarding sediment, particularly in the Lake Pillsbury reservoir. We request additional information on other contaminants in addition to mercury that should be considered, how quickly the sediment accumulation in the reservoir is displacing remaining storage volume, and to what extent does that reduction substantially alter operator's ability to manage flows within the parameters of the RPA.

We request additional information and an analysis of sediment removal in the event of dam removal.

5.3 Fish and Aquatic Resources

- The PAD states: "Releases from the bottom of the reservoir provide cold water during the late spring through summer months for salmonid rearing in the Eel River downstream of the reservoir."
    - We request that the EIS evaluate the net effect of the Project and its operations on Eel River salmonids and other aquatic resources. Chinook salmon generally are downstream on their way to the ocean in the late spring of their first year. Steelhead generally require a year in freshwater. However, steelhead in the Project area appear to suffer a double blow from pikeminnow predation and migration timing delayed by the very cold water the PAD here presents as a singular benefit.
- The PAD states: "Water from Lake Mendocino is used in Mendocino and Sonoma Counties for irrigation, municipal and domestic water supply, recreation, and support of salmon and steelhead populations in the Russian River."
    - We request additional information and an analysis of these claims in detail.
- The PAD states: "As a result of Project storage and diversions, hydrologic characteristics (magnitude and timing of flows) in the Eel River are modified below Cape Horn Dam, and flows in the East Branch Russian River are augmented."
    - We request additional information and an analysis of the consequences for Eel River fisheries of those modifications, and what mitigations are required to reduce them to a level consistent with law, regulation, fisheries recovery and sustainability.
- The PAD states: "Water temperatures in the Eel River below Lake Pillsbury are colder during the late spring and summer than under unimpaired conditions. The cold water during summer provides highly suitable rearing habitat for juvenile steelhead. This, along with nutrients released from the reservoir, promotes rapid fish growth. However, cold water

temperature in spring can delay the outmigration of juvenile salmonids until a time when downstream temperatures are inhospitable. Pulse flow releases have been used to encourage timely outmigration."

- We request additional information and an analysis in the EIS to evaluate and disclose the actual effectiveness of such pulse flow releases. Our understanding is that the record of such releases is quite limited, and that there is little evidence of their biological effectiveness in practice. Further, it is our understanding that both the limited amount of stored water available for correctly timed pulse flow releases, as well as the physical constraints imposed by Project infrastructure, sharply limit the potential utility of such releases.
- The EIS should consider whether additional blockwater storage, including blockwater volumes reserved for both fall and spring use, could enhance fishery reproductive and migratory success.

- The PAD states: "Fish passage (upstream and downstream) for migratory fish species has existed at Cape Horn Dam (Van Arsdale pool-and-weir ladder) since 1909, with modifications of the ladder to improve fish passage in 1915, 1962, 1987, and, most recently, experimental improvements for Pacific lamprey passage (2014- 16)".
  - This record strongly suggests that fish passage over Cape Horn Dam has been suboptimal. It is not clear that the fish ladder, fish screens, as improved as they appear to be from previous installations, are in fact capable of or likely to allow fish passage sufficient to support recovery of Eel River salmonids and other native fishes. The evidence appears to indicate that lower flows than required under the RPA will result in a failure of chinook migration up the ladder; it also appears to indicate that high flows keep the fish screens from properly functioning to divert fish into the ladder going downstream.
  - We request additional information and an analysis in the EIS to explain the effectiveness of fish passage at Cape Horn Dam.
- The PAD states: "Migratory Pacific lamprey are common in the vicinity of the Project

Substantial Chinook salmon and steelhead spawning habitat also exists in two large tributaries to the Eel River within the study area (Tomki Creek and Outlet Creek), and steelhead spawning habitat exists in numerous smaller tributaries to the Eel River that are unaffected by the Project."

  - We request additional information and an analysis in the EIS to address the apparent collapse of salmon production in Tomki Creek, and to what extent the apparent success of RPA flows in facilitating chinook passage over Cape Horn during most years provides an explanation for the failure of chinook to exploit Tomki's available habitat.

- The PAD states: *This screen was replaced with a pair of inclined plane screens in 1995 to better protect downstream migrant fish and improve operational reliability*.
  - We request additional information and an analysis in the EIS to explain how effective the screens are, especially in their present condition, and whether improved screens might provide better performance.
- The PAD states: "the Eel River provides suitable summer rearing habitat in most years only as far downstream as Thomas Creek, 8 miles below the reservoir."
  - We request additional information and an analysis as to what habitat young steelhead might expect to be able to use in the Project area, and in areas now inaccessible because of the Project, if the Project were not in place. Again, the evidence strongly suggests that most of the best potential rearing habitat in the upper Eel River lies behind Scott Dam.
- The PAD states: "Since the introduction of Sacramento pikeminnow to the Eel River watershed (presumably in Lake Pillsbury) around 1979, this species has spread throughout most of the watershed and has established large populations. Their proliferation and the resulting competition with, and predation on, native fish species has greatly affected overall fish population levels and is viewed as a major obstacle to the recovery of anadromous salmonids in the Eel River Watershed."
  - We note that the RPA required measures to address pikeminnow predation, but those

measures have proved difficult or impossible to implement. We request additional information and an analysis in the EIS to consider and explain what measures might realistically be taken to reduce the impact of pikeminnow on Eel River fisheries, particularly young salmon and steelhead. Because the pikeminnow population in the Eel River appears to be a consequence of the Project and its operations, mitigating its presence should be a requirement of any license which may be issued in the future.

Fish Passage Barriers

Scott Dam

- The PAD states: "Construction of Scott Dam created a 130-foot-high upstream migration barrier to fish passage. No upstream fish passage facilities exist at the dam. The amount of riverine habitat upstream of Scott Dam inaccessible to anadromous salmonids (spawning and rearing) and the estimated potential numbers of returning fish in this area differ significantly based on various reports."
    - We request additional information and an analysis that explains how fish passage could be constructed in order to make this structure passable for salmonids.

Cape Horn Dam

- The PAD states: "CDFW personnel have noted that when ladder flow drops below 9.8 cfs, a migration barrier is created at the submerged orifice of the uppermost ladder pool. Maintaining ladder flows above 9.8 cfs or installing restrictor baffles at each orifice alleviates this problem. Flows in excess of 10.5 cfs can create overflow problems in the fish house at the entrance to the ladder, especially when debris loads are high."
    - It appears that there may be only a fairly narrow window of flows in which the Van Arsdale fish ladder operates properly. We request additional information and an analysis in the EIS to clarify how such flows are to be maintained.
    - The EIS should also explain what impacts on fisheries may result from high debris loads which impair operation of the fish screens. This question does not appear to be addressed in the PAD, but such impacts could contribute to the cumulative impacts on fisheries and aquatic ecosystems which the EIS must address.

- The PAD states: “The current RPA minimum flows are intended to allow for adequate passage flows at the critical riffle above Garcia Creek. During the December to March period, the minimum RPA flow from Cape Horn Dam has a floor of 100 cfs and a cap of 140 cfs; however, the floor can drop to 25 cfs when there are exceptionally low inflows to Lake Pillsbury (NMFS 2002).”
    - When flows were reduced in December 2012, chinook upmigration at Cape Horn essentially ceased (one more fish came up the fish ladder). We request additional information and an analysis in the EIS to consider the impacts, including cumulative impacts, on fisheries reproduction associated with flows which dramatically reduce effective fish passage.

Instream Flow

- The PAD states: “Instream flows include minimum flows and block water (block water is a volume of water used by fisheries agencies adaptively to enhance aquatic habitat).”
    - We want to highlight the importance of the Endangered Species Act in protecting against flows too inconsequential to support salmonids in the Eel River. The flows outlined in the RPA have been insufficient to slow the decline of salmonids in the Eel River, and we request additional information and an analysis on how flows will be governed under the new license in order to protect salmonids.

Block Water

- The PAD states: “Block water for release at the discretion of CDFW to directly benefit salmon and steelhead was originally made available through the 1983 FERC Project license. Such releases were made on 17 occasions between 1985 and 1996.”
    - In the 11 years between 1985 and 1996, there were 17 blockwater releases. We request additional information and an analysis in the EIS to document the timing, magnitude, and circumstances of those releases.
- The PAD states: “In 2004, NMFS and CDFW developed block water release procedures to expedite responses and implementation of releases. As specified by these procedures, any stakeholder (including NMFS and CDFW) can contact either NMFS or CDFW to

request the release of block water. NMFS and CDFW jointly make the final decision regarding block water releases and then contact PG&E to order such releases. In 2012, NMFS and CDFW developed block water guidelines intended to help determine when block water releases would benefit salmon and steelhead in the Eel River. The first "block water" release under the 2002 RPA occurred in May 2012."

- We request additional information and an analysis in the EIS that thoroughly documents and assesses the use, disuse, and effectiveness of blockwater releases as an element of the license's mitigation strategies and techniques.
- Further, we request additional information and an analysis of the method of decision making on blockwater release timing and effectiveness. We also request additional information on benefits to PGE and downstream consumptive users from the unused blockwater; what the consequences may have been of reducing blockwater volumes from 5000 af under the previous license to 2500 af under the RPA amendment, and whether 2500 af is an adequate reserve of blockwater.
- We request additional information and an analysis of how PVP infrastructure constrains the timing, composition, and effectiveness of blockwater releases.

The PAD describes a May 2012 blockwater release. It notes that, per Butler 2012, that while the "(r)elease encouraged Chinook salmon emigration, (it) did not encourage movement of young-of-year steelhead." We request additional information and an analysis on how might the blockwater releases or flow schedule or Project operations in general be better managed to effectively encourage the downstream movement of young of the year steelhead.

The PAD also notes that "the release encouraged adult lamprey to migrate upstream." Elsewhere, the PAD suggests that lamprey migrate throughout the year and are common in the Project area. At the time, however, the surge of lamprey up the Van Arsdale fish ladder was an unforeseen event.

The EIS should provide as much detailed information as is available about the relationships, if any, between downstream flows at Cape Horn Dam, through the Van Arsdale fish ladder, and lamprey migration. The EIS should consider whether additional releases should be scheduled and maintained to maximize lamprey migration above Cape Horn Dam.

The PAD describes the attempted blockwater release in 2013, which failed because there wasn't enough water in Lake Pillsbury. The EIS should document the circumstances, both operational and hydrologic, which made it impossible to use either 2500 af of blockwater or maintain reduced flows from the surface of Lake Pillsbury.

- The PAD describes the 2014 release: "In the spring of 2014, NMFS and CDFW again requested the release of warmer surface waters from Lake Pillsbury to stimulate the timely downstream migration of juvenile Chinook salmon. From April 30 to May 29, PG&E incorporated surface releases into the total release at Scott Dam at varying percentages to achieve target temperatures of about 15°C. A significant increase in emigration of juvenile Chinook salmon and steelhead was achieved during these releases."
    - We request additional information and an analysis in the EIS in order to consider how such releases could be conducted as a matter of routine. It should assess whether such results or better ones could be achieved, by what means, and at what cost. It should clarify what "significant increase" means here, and particularly whether the actual emigration achieved would be sufficient to support recovery of both steelhead and chinook populations. It should also consider what measures might be taken but have not yet been.
    - The PAD suggests what is apparent, that there is always some tension in decisions about use of the limited amount of blockwater available. When blockwater releases are made in the late summer and fall, as they were in 2014, that means that water was not used to promote emigration in the preceding spring. The EIS should consider whether the current blockwater rules make sense in view of the apparent need for supplemental flows during both seasons, especially in the low-water years when fish are already suffering severe cumulative impacts.

The PAD does not note, however, that the 2014 fall releases also had effects far beyond the Project area. When that pulse reached the mouth of the Eel, the reach which had disconnected in late August finally reconnected. This fact alone strongly suggests that the effects of Project operations can and do affect the entire Eel to its mouth.

The EIS should also discuss 2015 and 2016 blockwater releases, as well as any additional releases which may occur prior to the release of the DEIS.

During low reservoir levels at Lake Pillsbury, the only releases through Scott Dam facilities are through the needle valve, located in the cold water strata of the Lake Pillsbury reservoir. There is currently no means or methods for PGE to release warmer water from the Lake Pillsbury reservoir.

During 2016 conversations in the Potter Valley Drought Working Group with staff and participants, PG&E staff acknowledged that there are no on-site pumps, no generators, no plans and no means to discharge any water from Lake Pillsbury other than through the needle valve.

If the needle valve is stuck, clogged or otherwise inoperable, there is no way to comply with RPA mandated minimum flows to E-2, E-11 or E-16, for Fall in-migration "Pulse Flow" releases, for Block Water releases, or for releases to the generating facilities or to PVID or anything in the EBRR.

PGE staff has proposed "studying the issues and coming back within 2 years with a plan to address the issues." We request additional information and an analysis of the proposed plan.

5.3.4.2 Riverine Aquatic Community

Algae

We request additional information and an analysis in the EIS to consider whether Project removal or reconfiguration would reduce the current and future frequency and severity of cyanobacteria blooms in the Eel.

Benthic Macroinvertebrates

- The PAD states: "Benthic macroinvertebrate (BMI) sampling has not been historically conducted in the Eel River between Scott Dam and the confluence with the Middle Fork Eel River."

- Alison O'Dowd of Humboldt State University has conducted BMI sampling in the mainstem Eel near Hearst.[48]
- We request additional information and an analysis in the EIS on Project related effects on BMI communities in the Eel River. It should provide some accounting of BMI community structure above, between, and below the dams and reservoirs, and compare conditions in the Upper Eel River below the dams to unimpaired similar reaches of the river. It should provide an analysis of relationships between flows and BMI productivity and health. It should also sample BMIs for key toxins, especially mercury.

Aquatic Mollusks

- The PAD states: "The Eel River in the vicinity of the Project is within the historic range of the Western pearlshell mussel, Margaritifera falcata, and the California Floater, Anodonta californiensis (Howard et al. 2015a). Both species are believed to be extant in the greater Eel Watershed (Howard et al. 2015a), but focused surveys for native mussels have not been conducted in the Project vicinity."
  - We request that the EIS analyze and disclose, and incorporate into relevant analyses, samples of mollusks in the project area for mercury and other pollutants.
  - The EIS must also analyze the risk of impacts associated with nonnative mollusks. It should detail current and potential measures for mitigating those harms by preventing the introduction and/or reproduction and dispersal of nonnative mollusks.

Fish Community

- The PAD states: "Nine native and six non-native fish species are present or potentially present in the Eel River within the Study Area. Table 5.3-2 lists the fish species that have

[48] See O'Dowd, A., and W. Trush, 2016, FOER Blockwater Investigation Final Memo, p 25 and following, available at https://drive.google.com/open?id=0B8LzWutg0vukUW1CVkU2NHA4SVU.

been reported as potentially occurring in these river sections."

- Table 5.3-2 does not list any fish above Scott Dam or Lake Pillsbury. We request that the EIS must include analysis of fish populations above Lake Pillsbury.
- Rainbow trout above Scott Dam may be very important to protection of the public trust resource in viable native salmonid species, in that the upriver population of rainbow trout may retain the premature migration gene which is the essential difference between winter steelhead (which still survive in low numbers in the upper Eel) and summer steelhead (which have been extirpated from the upper Eel, but still survive in small populations in the Middle Fork Eel and Van Duzen River tributaries of the Eel River). Additionally, rainbow trout serve as effective proxies for the habitat needs of their sea-run steelhead brethren.

Steelhead

The PAD mentions summer steelhead at p 5-44, but fails to present any information about summer steelhead, their apparent extirpation from the Project area, or their habitat requirements in this section.

The best available science now strongly indicates that summer steelhead in the Eel River, like spring chinook where they survive, should be considered and protected as distinct genetic entities under the federal Endangered Species Act. (Miller, in press 2017).

The last license issued for the Project had to be amended at considerable expense and trouble, and with substantial consequences for Project operations, power production and consumptive water use, after it was approved without adequate protections for species which shortly thereafter were listed under the ESA. FERC should seek to avoid such an outcome here by preparing, in the EIS, the level of analysis of summer steelhead and mitigation measures appropriate to the recovery of a critically endangered species.

The EIS should consider whether native rainbow trout above Lake Pillsbury, which are landlocked *O. mykiss*, include individuals with the vital premature migration gene. Because the rainbows have not migrated to the ocean for a century, the premature migration gene that determines the summer steelhead migration strategy and body type will not have been selected out, as appears may have happened to steelhead below the Project.

- The PAD states: *Key information related to steelhead in the Study Area include the following: Adult steelhead numbers have declined since the 1960s.*
  - The PAD here is referring to steelhead counts at Cape Horn dam. We request additional information and an analysis in the EIS as to these numbers compare with other available data about steelhead populations in the Eel and across the region.
- The PAD states: "Spawning and rearing (e.g., over summer) exists both in the Eel River and tributaries downstream of Lake Pillsbury."
  - The question at hand is not so much what habitat exists now, but what its quality and overall utility is – ultimately, whether it is adequate to provide for recovery of the species (again, both summer and winter steelhead). We request additional information and an analysis of more than just the immediate Project area, as it will not be possible to support a recovered Eel River steelhead population in the Project area alone.
- The PAD states: "The density of rearing steelhead in the Eel River decreases with increasing distance and associated warm water temperatures downstream of Van Arsdale Reservoir."
  - We request additional information and an analysis in the EIS of whether rearing steelhead actually survive to make it to the ocean, in what condition, and how many of them survive to return as adults. As noted previously, the EIS should analyze the net utility of Project operations for Eel River fisheries, and consider whether decommissioning would not result in considerably more, and more effective habitat, becoming available than under the most comprehensive possible suite of Project mitigations.
- The PAD states: "Introduced Sacramento pikeminnow densities have been high since the 1980s and are highest in the river below Van Arsdale Reservoir, where water temperatures are more suitable for this species. However, they occur in and above Van

Arsdale Reservoir, at population levels that may interfere with salmonid production. Their proliferation and competition with, and predation on, native fish species is viewed as a major obstacle to the recovery of anadromous salmonids in the Eel River Watershed."

- We request additional information and an analysis in the EIS to consider what, if any, potential measures might effectively reduce pikeminnow impacts on salmonids and other aquatic life in the Eel River.

- The PAD states: "Annual adult steelhead counts at VAFS since 1922 were frequently above 3,000 to 4,000 fish prior to approximately 1960 (Figure 5.3-9 and Table 5.3-3). Since 1960, steelhead counts have typically been less than 1,000 to 2,000 fish and, in many years, less than 500 fish."
  - We request additional information and an analysis in the EIS of what the depensation level would be for this population, given the observed impacts of pikeminnow predation and delayed outmigration. This would help determine if there are other thresholds of concern as the population declines in size which the EIS should address.
- The PAD states: "Many factors have no doubt contributed to the observed declines in fish numbers at VAFS and elsewhere in the watershed, including logging, road construction, livestock grazing, agriculture (both legal and illegal), introduction of invasive species, natural flood events, and poor ocean conditions."
  - We request additional information and an analysis in the EIS which reflects the best available information regarding the complex of limiting factors relevant to salmonid reproduction and recovery in the Eel River.
- The PAD states: "In the late 1990s, a spike in numbers occurred, with counts in 3 successive years ranging from approximately 2,400 to 7,700 fish; however, the spike was heavily influenced by hatchery fish. Since 2008, steelhead counts have ranged from 166 to 935 fish, with only one hatchery fish present in the counts."
  - The literature indicates that domestication effects can take place within even a

single generation of hatchery fish. We request additional information and an analysis in the EIS that reflects any available information about the continued influence, if any, of hatchery operations on Eel River steelhead.

- The PAD states: "The 'collapse' of the steelhead (and Chinook salmon) returns beginning in 1989 (during the ten-year monitoring study) was related to poor ocean conditions that affected salmonids on the West Coast (SEC 1998). Other high and low cycles in the data set are, in part, a product of cycles in ocean productivity."
    - Both good and poor ocean conditions have occurred in the historical record; salmonid numbers did not collapse in previous periods of poor ocean conditions to near-extinction. We request additional information and an analysis in the EIS on the consequences for Eel River steelhead when ocean conditions become poor again.
    - There is evidence that the Pacific Ocean's patterns and chemistry have been changing in ways that suggest deleterious consequences for West Coast salmonids now and in the future. The evidence also suggests that climate change can create additional challenges for Eel River salmonids, bringing both drought to their freshwater habitat and poor feeding conditions to their ocean habitat. Warming temperatures, and especially a persistent pool of anomalously warm water termed "the Blob" in the NE Pacific, appear linked to the intense drought patterns that affected California and the Southwest over the 2012-2015 period.
    - We request additional information and an analysis in the EIS as to the level of impairment in ocean productivity that would make it impossible to restore Eel River salmonids to viable population numbers.
- The PAD states: "A decline in juvenile steelhead beginning in the early 1980s and a rapid increase in Sacramento pikeminnow from the early 1980s to apparently quasi-steady numbers in recent years is indicated in the historical sampling data ... Recent juvenile steelhead sampling data from 2005 to present at seven quantitative sampling sites below Cape Horn Dam (Table 5.3-7) and three qualitative sampling sites above Cape Horn Dam

(Figure 5.3-12) show that summer rearing occurs in the Eel River from Scott Dam to several miles downstream of Van Arsdale Reservoir, with numbers decreasing with increasing distance downstream of the reservoir. The Thomas Creek site, located 8 miles below Van Arsdale Reservoir, is the farthest downstream monitoring site on the Eel River with consistent steelhead presence each year. Pikeminnow numbers (Table 5.3-7) are high at all of the sites downstream of Cape Horn Dam."

- We request additional information and an analysis in the EIS of pikeminnow predation.

- The PAD states: "The decreasing density of juvenile steelhead with distance downstream of Cape Horn Dam is consistent with the pattern of increasing water temperature (see Section 5.2 –Water Quality, Figure 5.2-1). Kubicek (1977) classified the Eel River between Cape Horn Dam and Tomki Creek as thermally marginal and the lower river as thermally lethal. At the farthest downstream sites, in spite of the very high temperatures, low numbers of juvenile steelhead are present in some years. Small localized areas with suitable temperatures can persist in the Eel River at the downstream sites due to cool water thermal refugia created by bank seeps, hyporheic flow upwelling, cold water inflows, and stratified pools in the vicinity of cool water inflows (e.g., Kubicek 1977; Beak 1986)."
  - We request additional information and an analysis in the EIS on the extent to which such refugia might be usable by summer steelhead moving up to the upper basin.
- The PAD states: "*Downstream migration of juvenile steelhead past Cape Horn Dam varies widely within and between years.*"
  - We request additional information and an analysis in the EIS should analyze available data to discover what the optimal migration patterns may be, and consider mitigation measures which may better assist steelhead to achieve those patterns.

Chinook Salmon

We request additional information and an analysis in the EIS as to what accounts for the continued collapse of Tomki Creek chinook populations. This is crucial to determining the extent to which the Project can or should be modified, operated, or decommissioned in order to insure the survival and recovery of Eel River salmonids.

The EIS should attempt to account for the relative improvement in chinook numbers noted previous to the recent drought. Similarly, it should provide an up-to-date accounting of how chinook populations in the upper mainstem Eel have responded to the very significant impacts related to the drought, and compare those impacts to chinook in the South Fork Eel and other watersheds populated by the California Coastal Chinook ESU.

Non-Salmonid Native Species

Green sturgeon are unlikely to have existed in the Project area, but they certainly would have benefitted from larger populations of spawning salmon and lamprey. Recent surveys by the Wiyot Tribe should be reflected in the EIS. The EIS should treat green sturgeon as a species likely to become listed in the near future.

Pacific lamprey are a keystone species in steep decline across the Pacific coast. They have also been the subject of a petition under the Endangered Species Act, at the same time as the green sturgeon petition noted above. While UFSWS declined to list lamprey at that time, the best available scientific information suggests that the species continues to decline and is likely to be listed if current trends continue. Thus, the EIS should also treat lamprey as a species likely to be listed in the near future, and certainly within any license period.

We request additional information and an analysis in the EIS as to how the presence and operation of the Project result in impacts to lamprey and modifications to the license, reflecting what mitigation measures, might be most effective in providing for lamprey recovery. A key question is whether the Eel River is now a source or a sink for lamprey production.

5.3.5.4 Fish Stocking

We request additional information and an analysis in the EIS of introduced stocked rainbow interbreeding with native rainbow above Lake Pillsbury. The EIS should document whether triploid rainbow trout are now exclusively stocked in Lake Pillsbury, and if so, how long this practice has been in effect. If there is significant potential for the stocked rainbow to reduce the potential genetic fitness of native rainbows, the EIS must consider eliminating the stocking program.

5.3.8.1 Steelhead

- The PAD states: "Steelhead in the upper Eel River are considered part of the Northern California Coast (NC) Distinct Population Segment (DPS) and are listed as Threatened under the ESA (NMFS 2016). Steelhead in the Study Area are considered part of the Lower Interior Diversity Stratum, which includes populations spawning in tributaries between Dos Rios and Scott Dam. Upstream of Scott Dam, steelhead are part of the North Mountain Interior Diversity Stratum, which includes the Upper Mainstem Eel River population (NMFS 2016). The Eel River downstream of Cape Horn Dam, including the large tributaries in the Project Area, Tomki Creek and Outlet Creek, are designated as Critical Habitat for NC DPS steelhead (Federal Register, Sept. 2, 2005 [70 FR 52488 – 52627])."
    - As previously noted, the best available scientific information now indicates that summer and winter steelhead should be listed as distinct entities under the federal Endangered Species Act (ESA).[49] While the two are lumped together now, and listed as an ESU with Threatened status, there is little question that when summer steelhead are recognized as a distinct species for the purposes of the law, the Eel River population must be considered Endangered.
    - A recent assessment of California salmonids by Moyle et al, and CalTrout recognizes Northern California summer steelhead as distinct from winter steelhead

[49] See Prince, et al. 2017.

in the same streams.[50] The assessment states that "(r)ecent studies found that NC winter and summer steelhead are distinct from one another. NC summer steelhead are more closely related to NC winter steelhead than they are to summer steelhead from other regions in California. NC summer steelhead have a genetic variation similar to spring-run Chinook salmon that influences run-timing to fresh water, which allows them to access higher elevation and smaller tributaries for spawning."[51]

- The assessment notes that "(t)he Eel River, which once supported the largest run of NC summer steelhead, has had decreasing adult returns over the last fifty years." It describes the "level of concern" for North Coast summer steelhead as "critical," and cites "major dams" as the first of the three greatest anthropogenic threats to the species. It also notes that these fish are "critically susceptible to climate change." By contrast, winter steelhead in Northern California are assessed as having only a moderate level of concern, although major dams are still listed first among anthropogenic threats.[52]
- Current expert opinion strongly suggests that the upper mainstem Eel River above Lake Pillsbury would provide spawning and rearing habitat critically needed by summer steelhead to re-establish a third viable population in the Eel River watershed. The CalTrout report notes that "Scott Dam on the upper mainstem Eel River blocks access to an estimated 463 km (285 mi.) of potential spawning, migration, and nursery habitat" for summer steelhead.[53]
- Thus, the EIS should carefully consider not only Project-related impacts on

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[50] Moyle, P., Lusardi, R., Samuel, P., and J. Katz. 2017. *State of the Salmonids: Status of California's Emblematic Fishes, 2017. 555pp. San Francisco, CA.*

[51] Id.

[52] Id.

[53] See Emily Cooper, *An Estimation of Potential Salmonid Habitat Capacity in the Upper Mainstem Eel River, California*. Masters thesis, Humboldt State University, May 2017.

steelhead, but specifically how all impacts, including cumulative impacts, may weigh on the survival and recovery of summer steelhead.

5.5 Wildlife Resources

Wildlife, including mammals and birds as well as arthropods, may be affected by mercury contamination originating from the Lake Pillsbury reservoir. The propensity of methylmercury to bioaccumulate means that biologically significant amounts may be ingested both by creatures which prey directly on fish affected by mercury accumulation, and by those which don't necessarily appear linked to mercury sources in the environment. For example, high levels of mercury have been found in birds which prey on spiders that bioaccumulate mercury from their prey.

The severe and lasting effects of mercury on reproduction, development, and survival of wildlife and birds are well-documented.[54]

Because the Project and its operations appear to be at a minimum an important source of methylated mercury in the Project areas, the potential impacts of mercury burdens in wildlife, including birds, should be considered among the Project's indirect and cumulative impacts. We request additional information and an analysis in the EIS of the potential impacts of mercury accumulation on listed and sensitive species and it should also assess the potential for mercury to be passed on to human consumers of game species in the Project vicinity. In order to understand the distribution of mercury in the food web, we need information about burdens at various trophic levels, but especially at the highest levels.

Thus, the EIS should consider, analyze, and disclose the mercury burden in representative samples of wildlife, including arthropods and birds, as well as fish, including ammocoetes, mollusks, and benthic macroinvertebrates in the project area. Thus, study AQ-3, found at 6.2.1.3 in the PAD, should be modified to include additional aquatic components, and additional studies

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[54] See Wolfe, M.F., Schwarzbach, S., and R.A. Sulaiman, 1998. Effects of Mercury on Wildlife: A Comprehensive Review. Environmental Toxicology and Chemistry, Vol. 17, No. 2, pp 146-160.

should be undertaken to provide useful estimates of mercury impacts on wildlife. Live trapping of arthropods, rodents and smaller birds in the immediate Project vicinity might be complemented by obtaining hair samples from larger animals, and feathers and scat from larger birds.[55]

5.9 Recreation Resources

Existing On-Site Amenities

Although Table 5.9-2 provides a list of all Potter Valley Project Recreation Facilities, there is no clear picture of what kind of amenities are available at each of these sites. The PAD does not provide an amenities inventory for each recreational facility that details the following:

- Number of tent campsites
- Number of full RV hook-up campsites
- Number of partial RV hook-up campsites
- Existence of Boat Launch Facility
- Existence of Individual and Group Picnic Areas
- Number of Restrooms and Showers
- Number of auto parking spaces
- Number of auto & trailer parking spaces
- Identify all concessionaire located on facility (i.e. full-service marina, houseboat dock, camp store or snack shack)

Missing Whitewater Boating Resources on the Eel River

California Creeks Whitewater Boating Web Guide (Tuthill et al. 2016) is an excellent resource that the Conservation Groups would recommend. However, it does not detail all the available runs potentially impacted by the project. Below is a list of 3 runs not included in Table 5.9-1. This information was found in *The New School Guide to Northern California Whitewater*

[55] See Duffy, L.K., Duffy, R.S., Finstad, G., and C. Gerlach. 2005. A note on mercury levels in the hair of Alaskan reindeer. Science of the Total Environment 339, p 273-276.

by Dan Menten, *The Best Whitewater in California the Guide to 180 Runs* by Lars Holbeck and Chuck Stanley and the *National River Database* maintained by American Whitewater.

Run Name	Put In	Take Out(s)	Gradient	Approx Length (miles)	Duration (days)	Overalll Rating	Boatable Flow Range
Eel River above Pilsbury Reservoir (Upper Main Eel)	Mt Road Bridge	Sunset Campground	82 average	15 (+6 miles on lake)	1	IV 600 to 1200, V 1200+	500 - 1500 kayaks
Van Arsdale to Hearst	Van Arsdale	Hearst	40 fpm	11.4 miles	2 to 3	II 600-2000, II-III 2000+	600 - 7000 cfs
Hearst	Hearst	Highway 162 bridge over the Eel	19 average	19 miles	2 to 3	II 600-2000, II-III 2000+	500 - 8000 cfs

State and National Wild & Scenic Designation

See our comments for Section 3.3.1.

6.2.5 Recreation Resources

The Conservation Groups provide comment on recreation resources studies below. Actual study requests will be made in the Study Proposal section of this document.

An economic analysis included in the AQ1 Hydrology and Project Operations Modeling study would augment and inform recreational resource studies.

Though PG&E proposed no potential studies of Hydrology and Project Operations Modeling, the Conservation Groups recommend an operations model that would be able to compute power generation at the Potter Valley Powerhouse resulting from Project operations. The model should include the capability of reflecting operations to shape power generation to meet energy demands. If needed, post-processing of daily model output could be developed to simulate hourly operations of the powerhouse to simulate inter-day variations in releases from the powerhouse. This post-processor would need to be able to produce outputs in revenue as well as generation. Revenue projections should be based on the most current pricing data available. The outputs need to include standard generation, as well as any ancillary services provided by the project.

Note that the water balance/operations model runs on a daily time step and cannot directly simulate shorter time period power operations. So, to simulate the range, rate of change and occurrence of flows within a day, post-processing of the water balance/operations model output can be accomplished using Excel spreadsheets to apply hourly or 15 minute patterns to the daily flows for a representative period of interest.

Overall, PG&E should collaborate with Relicensing Participants on the more variable, discretionary elements of project operations, model output and additional post-processing needs for refined analysis and information.

6.2.5.1 Study REC 1 – Recreation Facility Assessment & 6.2.5.2 Study REC 2 – Reservoir Recreation Opportunities.

Combine a study for Recreation Facility Assessment & Reservoir Recreation Opportunities

Conservation Groups believe the proposed analyses for facilities and the existing information on reservoir recreation falls short of capturing current user experience specific to each project facility. We therefore propose a combined study that will inventory existing amenities and conditions at each facility (see 5.9 comments) and require a user survey to be administered during the height of the recreation seasons for each facility.

FERC regulations require that the licensee include a description of the existing recreation measures or facilities to be continued and maintained during the term of the new license, propose new measures or facilities, as appropriate, to enhancing recreational opportunities at the Project, and identify public safety in the use of Project lands and waters. In addition, recreation is a recognized project purpose at FERC-licensed projects under Section 10(a) of the Federal Power Act.

6.2.5.3 Study REC 3 – Whitewater Boating Flow Assessment

Conservation Groups disagree with the PAD assessment that existing information is sufficient to close the information gap regarding whitewater boating. We request additional information and an analysis in the EIS of potential effects of relicensing on whitewater boating on the Eel and Russian Rivers.

Existing descriptions of whitewater resources do not capture current user experience on river runs potentially affected by the Project.

While available whitewater descriptions can identify ideal times, flow and access points, they cannot measure project impacts to the whitewater boating experience. A whitewater boating study that includes a stakeholder survey and focus group would provide recreational user preferences and evaluation of existing facilities, available flows and access points under current project operations.

***Average daily flow data does not provide accurate information on historic recreational flows and are not sufficient to properly assess boating flow opportunities*.**

Existing gauging data from USGS E2 11470500 downstream of Scot's Dam and E11 11471500 downstream of Cape Horn Dam is reported in daily averages. However, whitewater boating is reliant on real-time information either in 15 minute increments or hourly data. For instance, on the Class III-IV Pillsbury Run below Scott Dam the minimum flow required for a raft is 500 cfs. (See PAD Table 5.9-1) At any lower flows, paddlers in a raft could either find themselves stranded on the river or without the flows needed to safely navigate the rapids. Yet in the table example below, flows during the day from 11 am to 5 pm could drop out of rafting range and still report out a daily average of 625 cfs. This would give the false impression that a boating opportunity was available during daylight hours.

Example Flows on Pilsbury

1:00 AM	800	
2:00 AM	800	
3:00 AM	800	
4:00 AM	800	
5:00 AM	800	
6:00 AM	800	
7:00 AM	800	
8:00 AM	800	
9:00 AM	800	
10:00 AM	800	
11:00 AM	200	Out of Boating Range for Rafts
12:00 PM	200	
1:00 PM	200	
2:00 PM	200	
3:00 PM	200	
4:00 PM	200	
5:00 PM	200	
6:00 PM	800	
7:00 PM	800	
8:00 PM	800	
9:00 PM	800	
10:00 PM	800	
11:00 PM	800	
12:00 AM	800	
Daily Average	625	

Based on this scenario, we request additional information and an analysis in the EIS of real-time data to properly identify project impacts to whitewater boating on the Eel River.

A Hydrographic Analysis of Spills could identify recreational flow opportunities within a natural hydrograph that are mutually beneficial to Species of Concern and Native Aquatic Species.

Since the management of naturally occurring spills within a natural hydrograph regime could provide opportunity for whitewater recreational flows and benefit species of concern as well as native aquatic species, the Conservation Groups recommend a Hydrographic Analysis of Spills that incorporates the following components:

- Historic 15-minute or hourly gauge information from PG&E loading the data to DSSVue for visualization and analysis using the US Army Corps of Engineers DSSVue software.
- Corresponding daily flow data for USGS records in DSSVue format.

- Characterize historic spill characteristics for spills more than 1000 cfs from 15-minute or hourly hydrological data including plots, identification of magnitude, timing, duration, recession rate, and possible multiple peak flows by year and water year-type
- Characterize Pillsbury lake levels, inflows into Pillsbury Lake, the Van Arsdale Diversion Intake and Potter Valley Powerhouse.
- Summarize PG&E's contractual agreements for flows for Potter Valley Irrigation District.
- Summarize existing infrastructure capabilities for controlling spills.
- Prepare a report that includes methods and findings with annual plot illustrating showing multiple spills by water year; tabulations and plots of spill recessions, as well as inflows to and outflows from Pillsbury Lake during spills. The memo should identify the constraints to operation, capacity and the ability to control spills.

Overall, spill cessation has been or is currently being addressed on other FERC hydroelectric projects including the Upper Drum-Spaulding Project 2310, the Yuba-Bear Project 2266 and the Big Creek 4 Project 2017. This analysis can either be addressed in AQ 10 – Special Status Amphibians and Aquatic Reptiles or within a proposed Whitewater Boating Study to be detailed in the study proposal section.