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Water Boards

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SECRETARY FOR
ENVIRONMENTAL PROTECTION

**State Water Resources Control Board**

APR 14 2014

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

Dear Secretary Bose:

COMMENTS ON THE PRE-APPLICATION DOCUMENT AND SCOPING DOCUMENT 1 FOR BUCKS CREEK HYDROELECTRIC PROJECT, FEDERAL ENERGY REGULATORY COMMISSION PROJECT NO. 619; PLUMAS COUNTY

Pacific Gas and Electric Company (PG&E) and the City of Santa Clara (collectively referred to as Licensees[1]) own and operate the Bucks Creek Hydroelectric Project (Project), also known as Federal Energy Regulatory Commission (Commission) Project No. 619. On November 15, 2013, the Licensees filed the Project's Pre-Application Document (PAD) with the Commission. The PAD contains the Licensees' Project proposal for their new Commission license. On January 14, 2014, the Commission issued Scoping Document 1 (SD1) for the Project. State Water Resources Control Board (State Water Board) staff's comments on the Licensees' PAD and the Commission's SD1 are provided in Attachment A. State Water Board staff's study requests are provided in Attachment B.

Items 1 and 3 of the Pre-Application Filing Activities Under the Integrated Licensing Process (ILP) section of the Memorandum of Understanding (MOU) executed between the Commission and State Water Board on November 19, 2013[2] apply to this phase of the ILP process. Based upon the Process Plan and Schedule put forth by the Licensees in their PAD, State Water Board staff provides the following initial estimate of process milestones for water quality certification[3]:

- Application for water quality certification: March 2017
- Issuance of draft water quality certification for public review: July 2018
- Issuance of final water quality certification: December 2018

[1] Licensees also refers to the consultants that represent them.

[2] A copy of the MOU is available online at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/ferc_mou/index.shtml .

[3] These milestones are dependent upon timely completion and compliance with the California Environmental Quality Act, for which State Water Board staff understands the City of Santa Clara will be the Lead Agency and the State Water Board is a responsible agency.

APR 14 2014

As this is the first project to move through these MOU provisions, State Water Board staff will work with Commission staff to refine these process milestones. State Water Board staff requests the ILP Process Plan for this Project so that the water quality certification milestones can be integrated into the Commission's plan. As outlined in Item 3 of the MOU, State Water Board staff will actively participate in study plan development.

If you have questions regarding this letter, please contact me at (916) 445-9989 or by email at Peter.Barnes@waterboards.ca.gov. Written correspondence should be directed to:

State Water Resources Control Board
Division of Water Rights
Water Quality Certification Program
Attn: Peter Barnes
P.O. Box 2000
Sacramento, CA 95812

Sincerely,

Peter Barnes
Engineering Geologist
Water Quality Certification Program
Division of Water Rights

Enclosures: Attachment A – Comments on the Pre-Application Document and Scoping Document 1 for the Bucks Creek Hydroelectric Project
Attachment B – Study Plan Requests for the Bucks Creek Hydroelectric Project

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ATTACHMENT A:
COMMENTS ON THE PRE-APPLICATION DOCUMENT AND
SCOPING DOCUMENT 1 FOR THE BUCKS CREEK HYDROELECTRIC PROJECT

The following comments are provided by State Water Resources Control Board (State Water Board) staff on the Pre-Application Document (PAD) and Scoping Document 1 (SD1) for the Bucks Creek Hydroelectric Project (Project), Federal Energy Regulatory Commission (Commission) Project No. 619. The Project is owned and operated by Pacific Gas and Electric Company and the City of Santa Clara (collectively referred to as Licensees).

## Regulatory Authority

Before the Commission can issue a new license, the Licensees must obtain water quality certification from the State Water Board pursuant to section 401(a)(1) of the federal Clean Water Act (CWA) (33 U.S.C. §1341(a)(1)). Section 401 of the CWA requires any applicant for a federal license or permit, which may result in any discharge to navigable waters, to obtain water quality certification from the State Water Board that the discharge will comply with the applicable provisions of sections 301, 302, 303, 306, and 307 of the CWA.

Under section 303 of the CWA and under the Porter-Cologne Water Quality Control Act, the Central Valley Regional Water Quality Control Board adopted, and the State Water Board and United States Environmental Protection Agency (USEPA) approved, the *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins* (Basin Plan). The Basin Plan designates the beneficial uses of waters to be protected along with the water quality objectives necessary to protect those uses. The Basin Plan does not list beneficial uses for Milk Ranch Creek, Bucks Creek, or Grizzly Creek. However, the beneficial uses of any specifically identified water body general apply to its tributary streams. All three of these streams are tributary to the North Fork Feather River, which is identified in the Basin Plan as having the following beneficial uses: municipal and domestic supply; power; contact recreation; canoeing and rafting recreation; other non-contact recreation; cold freshwater habitat; cold water spawning; and wildlife habitat. These beneficial uses also apply to the tributaries of the three streams.

Bucks Lake, Lower Bucks Lake, Three Lakes, and Grizzly Forebay are also not explicitly listed in the Basin Plan. Therefore, they fall under the surface water bodies referred to as *Other Lakes and Reservoirs in Sacramento River Basin 5A.* The designated beneficial uses for these water bodies are: municipal and domestic supply; irrigation; stock watering; industrial process; power; contact recreation; other non-contact recreation; warm freshwater habitat; cold freshwater habitat; cold water spawning; and wildlife habitat. These beneficial uses are to be protected for all waters that fall under the title of *Other Lakes and Reservoirs in Sacramento River Basin 5A*, except in specific cases where evidence indicates additional or alternative beneficial use designations.

The beneficial uses together with the water quality objectives that are contained in water quality control plans (basin plans) and state and federal anti-degradation requirements constitute California's water quality standards under section 303 of the CWA. The water quality objectives set or describe the water quality limits necessary to achieve and protect the beneficial uses. The State Water Board must evaluate the impacts of the Project on the associated water bodies to determine whether the Project complies with all applicable water quality objectives in the Basin Plan, and protects the designated beneficial uses. Water quality certification also may address a project's effects on public trust resources. In developing a water quality certification the State Water Board looks not only on proposed modifications to Project operations from the existing condition, but also on whether past, existing, or future operations may impair or degrade water quality.

The Licensees must file an application for water quality certification once the Commission issues the Notice of Ready for Environmental Analysis. A complete application for a water quality certification must include a description of any steps that have been, or will be taken to avoid, minimize, or compensate for loss of or significant adverse impacts to beneficial uses of water. (Cal. Code Regs. tit. 23, § 3856, subd. (h)(6).). If the Project does not comply with one or more of the water quality objectives or criteria, then the Licensees must describe the actions that they will take to bring the Project into compliance in order to protect and maintain the beneficial uses of the State's waters. During the licensing process, State Water Board staff will act in an advisory role to inform the Licensees of the information necessary for a complete application for water quality certification. Filing requirements for an application for water quality certification are specified in California Code of Regulations, title 23, section 3856. The State Water Board may request additional information to clarify, amplify, correct, or otherwise supplement the contents of the application (Cal. Code Regs., tit. 23, § 3836.). State Water Board staff cannot prejudge the outcome of any proceeding before the State Water Board on an application for water quality certification.

# Pre-Application Document Comments

### ***General Comments***

The following comments are on the information contained in the PAD developed by the Licensees. However, State Water Board staff request the Commission's consideration of the comments below when developing its preliminary list of issues and alternatives to be addressed in the Environmental Assessment required by the National Environmental Policy Act. Many of the topics raised in these comments are applicable to the Commission's SD1.

### ***Project Affected Area***

The State Water Board recommends that the Licensees work with Relicensing Participants[1] (RPs) to define the appropriate "project affected area" or geographic scope when analyzing impacts to specific resources. When discussing the Project affected area for both water resources and fish and aquatic resources, the Licensees do not include the North Fork Feather River. State Water Board staff understands that the amount to which the Project influence conditions in the North Fork Feather River is dependent on the Project's operation as well as operations of the Upper North Fork Feather River Hydroelectric Project (FERC Project No. 2105) and the Rock Creek-Cresta Hydroelectric Project (FERC Project No. 1962). However, the Project and affected tributaries directly contribute to flows within a section of the North Fork Feather River. State Water Board staff recommends that the "project affected area" be amended to include the North Fork Feather River from its confluence with Milk Ranch Creek downstream to Poe Dam. State Water Board staff also recommends that this be used as the geographic scope for all studies of Project affected environments and impacts to resources.

### ***Section 2.2 – Proposed Communication Protocols***

State Water Board staff has observed significant public interest in the Project, especially from parties which reside around Bucks Lake. In order to facilitate effective communication with the public, State Water Board staff recommends that the Licensees set up a relicensing website.

[1] Relicensing Participants refers to state and federal resource agencies, concerned citizens, stakeholders, and non-governmental organizations that are involved in the relicensing process.

The website should include a description of the Project, a calendar of meetings and deadlines, access to Project related documents, and other information related to the relicensing of the Project. In previous meetings, the Licensees have indicated that they are working on developing a relicensing website and State Water Board staff encourages them to make this a top priority. The use of a website is a common practice in the relicensing process in California. For example, websites were developed for the relicensing of the Don Pedro Hydroelectric Project (FERC Project No. 2299), the Yuba River Development Project (FERC Project No. 2246), and the Middle Fork American River Project (FERC No. 2079).

In addition to providing a relicensing website, State Water Board staff recommends that the Licensees make every effort to provide remote access to meetings. Many of the stakeholders interested in this Project reside in and around the area of Bucks Lake and the town of Quincy. Additionally, many of these stakeholders have jobs or other commitments which restrict their daytime availability and/or ability to travel. As a result, many of these stakeholders may find it difficult to attend relicensing meetings, especially those that are held in Sacramento. State Water Board staff recommends the Licensees provide a conference call-in line for every relicensing meeting and a webinar when appropriate. Such provisions will help ensure effective communication and the maximum level of participation.

***Section 4.0 – Project Location, Facilities, Operations***

The PAD has multiple references to Milk Ranch Conduit and how it diverts water via feeder dams on tributaries that it crosses. State Water Board staff requests that the Licensees provide additional information regarding how this system works. This information should include, but is not limited to: specifically how water is diverted, how much water is diverted, and when it is diverted. These tributaries should also be added to the "project affected area" and included in any relevant studies.

***Section 5.0 – Description of the Existing Environment***

State Water Board staff requests that the Licensees develop the unimpaired hydrology for all Project-affected streams. The unimpaired hydrology can be developed through the synthesis of historical gage and power generation data or through the use of a modeling program. This information will help inform decisions and will help define any potential impacts of the Project on the natural flow regime of Project affected waterbodies. This information is also pertinent to the Indicators of Hydrologic Alteration (IHA) study plan requested by State Water Board staff in Attachment B.

State Water Board staff noted a lack of consistency between Tables 5.3-1, 5.3-2, and 5.3-8. Table 5.3-8 contains multiple amphibians and aquatic reptile species that are not contained in Tables 5.3-1 and 5.3-2. State Water Board staff requests that the information presented in Table 5.3-8 be incorporated into Tables 5.3-1 and 5.3-2 and the resulting list be used when evaluating Project impacts. The Foothill Yellow-legged Frog (FYLF; *Rana boylii*) is of particular interest to State Water Board staff and other RPs that are involved in ongoing efforts to protect known populations on the North Fork Feather River.

In sub-section 5.2.9, *Water Quality Objectives from the Basin Plan*, the Licensees list migration of aquatic organisms (MIGR) as a Basin Plan designated beneficial use for the Project-affected waters. Currently, the Basin Plan does not designate migration of aquatic organisms as a beneficial use for any of the Project-affected waters. Additionally, canoeing and rafting is a

designated beneficial use of Project-affected waters, which is omitted from the Licensees' list. State Water Board staff requests that the Licensees update this list in future documents. The designated beneficial uses of each Project-affected water body are outlined above in the Regulatory Authority section.

The North Fork Feather River is listed under section 303(d) of the Clean Water Act as impaired for temperature. State Water Board staff requests that the Licensees address how the Project-affected tributaries and powerhouse releases affect the temperature of the North Fork Feather River through the study plan process.

## Scoping Document 1 Comments

### *4.1.1 Resources that could be Cumulatively Affected*

Commission staff identifies aquatic resources as having the potential to be cumulatively affected by continued Project operation. State Water Board staff requests that the Commission also include water resources (specifically related to water quality) and terrestrial resources (specifically related to amphibians and aquatic reptiles) as potentially cumulatively affected by Project operations. Both of these resources have been impacted in the North Fork Feather River watershed and it is reasonable to assume that the Project could contribute to that impact.

### *4.1.2 Geographic Scope*

State Water Board staff agrees with and supports the Commission's determination that the geographic scope for cumulative impacts to aquatic resources should extend from the point where the North Fork Feather River enters Lake Almanor to the point downstream where the North Fork Feather River flows into Lake Oroville.

### *6.0 Request for Information and Studies*

State Water Board staff has reviewed the requests from FERC (italics) and provides comments below.

> *Information, quantitative data, or professional opinions that may help define the geographic and temporal scope of the analysis (both site-specific and cumulative effects), and that helps identify significant environmental issues.*

The geographic scope of analyses for potential site-specific impacts varies depending on the resource being evaluated. State Water Board staff recommends that the geographic scope for site-specific impacts be developed in consultation with the RPs. For both site-specific and cumulative impacts, State Water Board staff recommends that the temporal scope also be developed in consultation with the RPs. Ideally the temporal scope would be determined in such a manner that it helps define the Project's impacts on that particular resource.

> *Identification of, and information from, any other EA [Environmental Assessment], EIS [Environmental Impact Statement], or similar environmental study (previous, on-going, or planned) relevant to the proposed relicensing of the project.*

The relicensing efforts for the Poe Hydroelectric Project (FERC Project No. 2107), the Rock Creek – Cresta Hydroelectric Project (FERC Project No. 1962), and the Upper North Fork Feather River Hydroelectric Project (FERC Project No. 2105) have resulted in numerous studies and environmental reports which are relevant to the North Fork Feather River watershed. In addition, post licensing efforts of the Rock Creek – Cresta Hydroelectric Project have generated additional data sets and study reports specific to that project reach. These studies look at items such as sediment transport (Sediment Transport Promotion Test and Sediment Management Monitoring), water quality (Annual Water Quality Monitoring Report), and FYLF populations (Annual FYLF Surveys). These reports and surveys would be valuable in providing information regarding cumulative impacts of the Project-affected streams with the North Fork Feather River, as well as information regarding what is occurring at the confluences of these Project-affected streams with the North Fork Feather River.

PG&E is the licensee for all of these projects and should be able to provide the information that has been developed.

> *Existing information and any data that would help to describe the past and present actions and effects of the project and other developmental activities on environmental and socioeconomic resources.*

At the Scoping Meeting held by the Commission on February 11, 2014, State Water Board staff noticed that there was significant concern from residents around Bucks Lake regarding how Project operations impact water quality and lake accessibility. Residents indicated that these impacts directly affected local businesses and the economy. It is State Water Board staff's intention that information regarding how the operation of the Project will impact water quality, water resources, and aquatic resources will be obtained through the implementation of study plans developed in consultation with RPs. However, State Water Board staff understands that residents and business owners around Bucks Lake may have valuable information regarding how Project operations (lake levels) can affect the local economy. State Water Board staff urges the Commission to consult with these stakeholders when evaluating the socioeconomic impacts of the Project's operation.

> *Information that would help characterize the existing environmental conditions and habitats.*

State Water Board staff believes that this information will be obtained through the implementation of studies developed through the relicensing process.

> *The identification of any federal, state, or local resource plans, and any future project proposals in the affected resource area (e.g., proposals to construct or operate water treatment facilities, recreation areas, water diversions, timber harvest activities, or fish management programs), along with any implementation schedules.*

As previously stated, the Project-affected water bodies fall within the boundaries of the Basin Plan and must meet applicable water quality objectives and be protective of designated beneficial uses. Additionally, the State Water Board is developing statewide mercury water quality objectives (http://www.waterboards.ca.gov/water_issues/programs/mercury/). It is anticipated that the objectives will address the amount of locally caught fish that may be consumed by humans and wildlife. When finalized, these objectives would apply to California's inland surface waters which include the Project-affected water bodies.

State Water Board staff encourages the Commission to review and take into consideration the Plumas County General Plan and any applicable plans developed by the United States Forest Service (USFS) as the Project falls in Plumas County and parts of the Plumas National Forest.

> *Documentation that the proposed project would or would not contribute to cumulative adverse or beneficial effects on any resources. Documentation can include, but need not be limited to, how the project would interact with other projects in the area and other developmental activities; study results; resource management policies; and reports from federal and state agencies, local agencies, Indian tribes, NGOs [nongovernmental organizations], and the public.*

State Water Board staff believes that this information will be developed during the relicensing process.

> *Documentation showing why any resources should be excluded from further study or consideration.*

State Water Board staff does not recommend any resources should be excluded from further study or consideration at this time.

> *Study requests by federal and state agencies, local agencies, Indian tribes, NGOs, and the public that would help provide a framework for collecting pertinent information on the resource areas under consideration necessary for the Commission to prepare the EA/EIS for the project.*

Please refer to Attachment B for the State Water Board's study requests. In addition to the study requests contained in Attachment B, State Water Board staff acknowledges the specialized expertise of relicensing participants such as the California Department of Fish and Wildlife, the United States Fish and Wildlife Service, and USFS. The State Water Board respects the ability of these agencies to rigorously evaluate the Project's impacts both on aquatic and terrestrial biological resources, which are integral components of the beneficial uses designated in the Basin Plan. State Water Board staff supports the study requests and proposals submitted by these resource agencies.

ATTACHMENT B:
STUDY PLAN REQUESTS FOR
BUCKS CREEK HYDROELECTRIC PROJECT
FEDERAL ENERGY REGULATORY COMMISSION PROJECT NO. 619

The information developed through the implementation of study plans will not only be used by the Federal Energy Regulatory Commission (Commission) to develop license conditions and fulfill requirements under the National Environmental Policy Act (NEPA), but also by other agencies that must take permitting actions during the proceeding. This information will assist the State Water Resources Control Board (State Water Board) in developing water quality certification conditions to ensure compliance with the Clean Water Act and other appropriate requirements of state law. Both the City of Santa Clara and the State Water Board will use these studies to fulfill the requirements of the California Environmental Quality Act (CEQA). It is the State Water Board's understanding that the City of Santa Clara will act as lead agency for CEQA and the State Water Board will be a responsible agency.

As a mandatory conditioning agency under the Commission's relicensing process and as a responsible agency under CEQA, the State Water Board will act in an advisory role to inform the Pacific Gas and Electric Company and the City of Santa Clara (collectively Licensees) of the information that it believes is necessary to fulfill the requirements of CEQA and federal and state water quality laws, and to develop a complete application for water quality certification.

In this advisory role, State Water Board staff will participate in the Study Plan Development process and submit study plan requests and comments in accordance with the Commission's Integrated Licensing Process (ILP). If the study plans approved by the Commission do not cover those requested by State Water Board staff, and are determined to be insufficient in providing the information needed in connection with the issuance of the water quality certification, the State Water Board may choose to request such information under the Porter-Cologne Water Quality Control Act (Cal. Wat. Code, § 13000 et seq.), Water Code section 13383, or other applicable authority.

State Water Board staff supports the Licensees proactive development of Draft Proposed Study Plans for the Project. In general State Water Board staff supports the draft plans and looks forward to working with the Licensees to continue to refine these study plans to ensure they adequately analyze potential Project impacts and meet the regulatory needs of all resource agencies. State Water Board staff provides specific feedback on a couple of the draft study plans below. State Water Board staff appreciates the effort put forth by the Licensees to provide draft study plans in advance of the ILP.

The following is a list of nine (9) studies requested by State Water Board staff:

## 1. Water Balance / Operations Model

**Study Goal and Objective**
The primary goal of the study is to develop a water balance and operations model that can be used to simulate current and potential future operations of the Bucks Creek Hydroelectric Project (Project). The model should be developed over a period that covers the range of hydrologic conditions (e.g., range of dry to wet conditions).

The objectives for the model are that it will: (1) inform decisions made for Project operations; (2) accurately reproduce observed reservoir levels, reservoir releases, and hydropower generation, within acceptable calibration standards over a range of hydrologic conditions; (3) provide output

to inform other studies, analyses, and models; and (4) allow simulation of changes in Project operations to determine effects on reservoir levels, reservoir releases and hydropower generation.

**Relevant Resource Management Goals**
Prior to issuing a water quality certification, the State Water Board must ensure that the prescribed operation of the Project is protective of state and federal water quality objectives as well as the waterbodies' designated beneficial uses. Additionally, the State Water Board must also ensure that the Project for which the water quality certification is issued has been properly evaluated in accordance with CEQA. It is important for State Water Board staff to understand how Project operations can influence instream flows and reservoir levels as such information is crucial when balancing designated beneficial uses.

**Relevant Public Interest Considerations**
State Water Board is a resource agency with mandatory conditioning authority.

**Existing Information**
A water balance/operations model is currently unavailable to Relicensing Participants (RPs). The Licensees have years of instream flow and Project operation data that could be used to develop such a model.

**Nexus Between Project and Resource to be Studied**
A water balance/operations model that can simulate effects of different stream flow regimes will be an important tool in development of protection, mitigation, and enhancement measures for multiple resources. Without such a model, an assessment of the effects of potential changes in Project operations on hydropower generation, water supply, recreation, and stream flows cannot be determined.

**Methodology and Consistency with Generally Accepted Scientific Practice**
State Water Board staff does not have a preference regarding the type of model developed. However, the specific type of model for this Project should be determined through consultation with the RPs and incorporate data over an agreed upon period of the record for historical hydrology and Project operations. Water balance/operations models are commonly developed during hydropower relicensings.

**Level of Effort and Cost**
The model required for the Project would likely be less complex than those developed for other project relicensing efforts. The potential cost of this model is estimated to be in the range of $50,000 to $75,000.

## 2. Water Temperature Model

**Study Goal and Objective**
The primary goal of the study is to develop a water temperature model that can be used by the State Water Board and RPs to simulate current and potential future water temperature conditions.

The objectives for the model are that it is able to: (1) simulate reservoir and stream water temperatures resulting from Project operations; (2) accurately reproduce observed reservoir and stream water temperatures, within acceptable calibration standards over a range of hydrologic conditions; and (3) demonstrate sensitivity to both stream flow and meteorological conditions. The model should be designed to include all Project streams as well as the North Fork Feather River from its confluence with Milk Ranch Creek to Poe Dam.

**Relevant Resource Management Goals**
Prior to issuing a water quality certification, the State Water Board must ensure that the prescribed operation of the Project is protective of state and federal water quality objectives as well as the waterbodies' designated beneficial uses. Water temperature affects both water quality objectives and designated beneficial uses. It is necessary for State Water Board staff to understand how water temperature is influenced by Project operations.

**Relevant Public Interest Considerations**
State Water Board is a resource agency with mandatory conditioning authority.

**Existing Information**
Empirical data on water temperature exists for the larger Project streams (Milk Ranch Creek, Bucks Creek, and Grizzly Creek) and are summarized in Section 5.2.10 of the Pre-Application Document (PAD). Additionally, there is existing information on the water temperature for the reaches of the North Fork Feather River that are affected by Project operations (confluence of the North Fork Feather River with Milk Ranch Creek down to Poe Dam).

**Nexus Between Project and Resource to be Studied**
Table 5.2-9 of the PAD presents maximum daily average temperature data for three major Project affected streams during multiple water year types before and after the 2006 flow amendment[1]. Following implementation of the 2006 flow amendment, in July each stream showed decreased maximum daily average temperatures. Based on these existing data, it appears Project operations directly affect water temperatures. A water temperature model that can simulate water temperatures resulting from different stream flow regimes will be an important tool in development of protection, mitigation, and enhancement measures for aquatic resources and protection of beneficial uses.

**Methodology and Consistency with Generally Accepted Scientific Practice**
State Water Board staff understands that temperature data may not be currently available for all affected stream reaches and that additional data collection may be necessary. To ensure meaningful data collection, State Water Board staff recommends that the locations and timing of additional data collection be developed in consultation with the RPs.

State Water Board staff does not have a preference to the type of model developed. The specific type of model for this Project should be determined through consultation with the RPs. The study would develop a water temperature model for Project-affected streams which would involve compiling data from an agreed upon period of the record for water temperature,

[1] Article 13 of the current Commission license was amended on January 11, 2006 to require minimum flow releases from Lower Bucks Lake to Bucks Creek and Grizzly Forebay to Grizzly Creek. The amendment also required the Licensees to develop a channel maintenance flow plan, a fish survey plan, and specify the type of stream flow gage to be installed in Bucks Creek below Lower Bucks Lake Dam.

meteorology, and hydrology. The model would also illustrate how the Project affects temperature in the North Fork Feather River through discharges from both Project related powerhouses and Project affected streams. Water temperature models are commonly developed during hydropower relicensings. Most recent relicensing efforts in California have included a water temperature model.

**Level of Effort and Cost**
The model required for the Project would likely be less complex than those developed for other project relicensing efforts. The potential cost of this model is estimated to be in the range of $100,000 to $150,000.

## 3. Indicators of Hydrologic Alteration

**Study Goal and Objective**
The goal of this study is to characterize various metrics of hydrologic alteration due to Project operations and maintenance using the Indicators of Hydrologic Alteration (IHA, The Nature Conservancy 2009) methodology and other appropriate techniques. This study would also include potential future climate change effects.

Conducting this study will require development of historical hydrology and unimpaired hydrology datasets for Project affected reaches, including, but not limited to: Bucks Creek, Grizzly Creek, and Three Lakes Creek.

**Relevant Resource Management Goals**
The State Water Board is responsible for issuing a water quality certification that ensures the Project comply with water quality standards. In order to properly evaluate impacts to water quality and designated beneficial uses it is important to characterize the amount of hydrologic alteration that has occurred, and could occur, due to Project operations. Understanding how the Project alters the hydrology of a stream can help identify sources of impairment and help inform mitigation measures.

**Relevant Public Interest Considerations**
State Water Board is a resource agency with mandatory conditioning authority.

**Existing Information**
The PAD provides limited information on current flow releases into Project-affected stream reaches. The PAD also lacks information on pre-Project unimpaired stream flows in the Project stream reaches.

**Nexus Between Project and Resource to be Studied**
The Project substantially alters the natural hydrology of the Project affected streams. The Project related dams store water for release at later dates, altering the natural hydrograph of the streams and watershed. Additionally, water is removed from one stream and discharged into another. IHA quantifies these changes and can be extremely helpful for understanding Project-related effects and impacts.

**Methodology and Consistency with Generally Accepted Scientific Practice**
IHA is a widely used hydrologic assessment tools and is endorsed by several state and federal resource agencies. The Licensees should consult with RPs to determine the most appropriate manner for developing an unimpaired hydrology dataset based on available information.

**Level of Effort and Cost**
The IHA model is free. The level of effort and cost will heavily depend on the status of existing hydrologic data (e.g., the period of record of hydrology data available to the Licensees). If these data are readily available, then this is primarily a desktop modeling exercise. Based on other recent relicensing projects, State Water Board staff estimates the cost of this study to be $30,000.

References:
The Nature Conservancy. 2009. Indicators of Hydrologic Alteration – Version 7.1 User's Manual. Totten Software Design and Smythe Scientific Software.
Available online at:
https://www.conservationgateway.org/ConservationPractices/Freshwater/EnvironmentalFlows/MethodsandTools/IndicatorsofHydrologicAlteration/Pages/IHA-Software-Download.aspx

## 4. Fish Populations (Streams)

**Study Goal and Objective**
The goal of this study is to document the status of fish populations within all Project-affected stream reaches. The specific objectives are to determine and quantitatively describe: (1) fish species composition and spatial distribution; (2) total or relative abundance of fish, by species; (3) fish population size and age-class distributions; (4) fish condition; and (5) fry emergence timing. When available, historical information on fish populations should be included in the study.

**Relevant Resource Management Goals**
Cold freshwater habitat and cold water spawning are designated beneficial uses for all Project-affected water bodies. In order to ensure that future Project operations are protective of these beneficial uses, State Water Board staff must understand the fish that are present and using each stream's habitat. This, along with other requested studies, will allow State Water Board staff to determine how current and future Project operations affect those beneficial uses.

**Relevant Public Interest Considerations**
State Water Board is a resource agency with mandatory conditioning authority.

**Existing Information**
Recent fish surveys (2002 - 2013) have included three sites in the Project area: two on Bucks Creek; and one on Grizzly Creek. These three survey locations are limited in geographic scope and do not include Milk Ranch Creek or any of the smaller tributary streams intersected by and diverted into the Milk Ranch Conduit.

**Nexus Between Project and Resource to be Studied**
The continued operation and maintenance of the existing Project has a potential to affect stream fish populations. State Water Board staff needs information for all Project-affected stream reaches to develop measures to protect beneficial uses and associated resources.

**Methodology and Consistency with Generally Accepted Scientific Practice**
This study would be a combination of compiling recent fish survey data and conducting additional surveys using electrofishing, snorkel surveys, or comparable methods in Project-affected streams (or portions thereof) that have not been surveyed ever or recently. Fish population studies are commonly done during hydropower relicensings. Most recent relicensing efforts in California have included fairly extensive stream fish surveys.

**Level of Effort and Cost**
Data collection would occur over a minimum of two years. Similar stream fish population studies have been conducted for the relicensing of other hydroelectric projects in California. The work required for the Project would occur primarily on creeks and smaller tributary streams and should require less effort. Thus, State Water Board staff estimates the potential cost to be in the range of $65,000 to $85,000.

## 5. Fish Populations (Reservoirs)

State Water Board staff supports the Reservoir Fish Species Composition Study Plan (Study Plan FA-S1) submitted by the Licensees with the following adjustments:

- Add Bucks Lake to the list of sampling sites;
- Assess lake surface level effects on fish passage from reservoirs into upstream tributaries for Bucks Lake and other Project reservoirs if data indicates it is necessary;
- Sample at least twice in a calendar year to account for spatial and temporal distribution of fish species;
- Sample at high and low reservoir pool volumes; and
- Consult the California Department of Fish and Wildlife (CDFW) to determine appropriate sampling and reporting methods, as there is concern that the proposed gill net sampling has the potential to result in high mortality rates and biased results.

**Existing Information**
State Water Board staff understands that there are CDFW records for the stocking of Bucks Lake. However, little information exists for the other reservoirs and, to State Water Board staff's knowledge, fish surveys have not been conducted in any of the Project reservoirs.

**Nexus Between Project and Resource to be Studied**
Project operations determine the volume of water stored in Project reservoirs, which in turn, determines the amount of habitat available to resident fish. The volume of water stored in the reservoirs determines reservoir water levels, which may impact the ability of fish to access upstream tributaries. Cold freshwater habitat and cold freshwater spawning are designated beneficial uses for the reservoirs. It is important to quantify the population of fish present in these reservoirs when determining whether or not beneficial uses are being adequately protected.

**Methodology and Consistency with Generally Accepted Scientific Practice**
This study would be a combination of compiling recent fish stocking data and conducting additional surveys in all Project-affected reservoirs that have not been surveyed ever or recently. The method of sampling will be developed in consultation with CDFW and other RPs to ensure that sampled populations are adequately protected. Fish population studies are commonly done during hydropower relicensings. Most recent relicensing efforts in of California have included fairly extensive reservoir fish surveys.

**Level of Effort and Cost**
The level of effort and cost will vary depending upon the sampling methods used. The level of effort and cost should be similar to what was put forth by the Licensees in Study Plan FA-S1 ($49,000).

## 6. Fish Entrainment Study

State Water Board staff supports the intent of the Fish Entrainment Risk Assessment (Study Plan FA-S2) submitted by the Licensees. However, State Water Board staff requests that the Licensees work with RPs to more fully develop this study plan so it is effective in meeting the informational needs of all resource agencies. This may include the addition of study sites at Milk Ranch Conduit which the Licensees have precluded based off of the results of previous studies conducted as part of the Grizzly Development Amendment to the Project.

Typically under the ILP, a site visit of the Project is held at the same time as the scoping meeting. However, due to the timing of the scoping meeting (i.e., winter), a site visit was not conducted at the same time and is scheduled for to occur sometime in the spring of 2014. RPs, including State Water Board staff, are requesting additional information on the operation of the Milk Ranch Conduit. State Water Board staff believes that it is premature to remove the Milk Ranch Conduit from consideration under this study at this time.

State Water Board staff is aware of additional information and references provided by CDFW and requests that the Licensees incorporate these references in an updated study plan. These references will assist in the development of sustained and burst speeds for fish found within Project-affected waters and the risk of entrainment. See the references provided below:

Beamish, F.W.H. 1978. Swimming capacity. In *Fish Physiology*, vol. 7 eds. W. S. Hoar and D. J. Randall, pp. 101-187. New York: Academic Press Inc.

Keen, J.E. and Farrell, A.P. 1994. Maximum prolonged swimming speed and maximum cardiac performance of rainbow trout, *Oncorhynchus mykiss*, acclimated to two different water temperatures. Comparative Biochemistry and Physiology Part A 108: 287-295.

Webb, P.W. 1978b. Temperature effects on acceleration of rainbow trout *Salmo gairdneri*. Journal of the Fisheries Research Board of Canada 35: 1417-1422.

Ye, X. and Randall, D. J. 1991. The effect of water pH on swimming performance in rainbow trout (*Salmo gairdneri*). Fish Physiology and Biochemistry 9: 15-21.

## 7. Water Quality Assessment

State Water Board staff support the Water Quality Assessment Study Plan (Study Plan WR-S2) submitted by the Licensees with the following adjustments:

- Extend the analysis on the Project's potential effect on water temperature to the North Fork Feather River, specifically at the confluence with each Project-affected tributary and the Project's powerhouse.
- Include documentation of any algae blooms that have occurred in Project affected waterbodies.

It is important that the study assess the Project's potential to cumulatively affect water in the North Fork Feather River, which is listed as temperature impaired under section 303(d) of the Clean Water Act. This impairment not only affects the water quality of the North Fork Feather River, but also has the potential to affect its designated beneficial uses. State Water Board staff are not only interested in how the tributary flows affect temperature in the North Fork Feather River, but also how releases from the Project powerhouses have the ability to influence temperature.

Algae blooms may be indicative of poor water quality and have the potential to impact designated beneficial uses. At the Scoping Meeting held by the Commission on February 11, 2014, residents around Bucks Lake indicated that algae blooms may have occurred in the past. It was their opinion that such blooms were the results of low lake levels. State Water Board staff is requesting that the Licensees provide information on any recorded algae blooms and take note of any which may occur during monitoring efforts.

**Existing Information**
State Water Board staff understands that temperature data are available for the North Fork Feather River. However, staff is unaware of any data being collected at the requested confluences and discharge points. State Water Board staff is unaware of any information regarding the occurrence of algae blooms.

**Nexus Between Project and Resource to be Studied**
The Project affects the flows of tributaries which discharge into the North Fork Feather River. Additionally, water that is diverted from these tributaries is discharged through a powerhouse at a different location on the North Fork Feather River. The storage, transportation, and amount of water discharged into the North Fork Feather River through Project-affected streams and powerhouses have the potential to influence temperature in the North Fork Feather River.

The Project also regulates the amount of water stored in Project reservoirs. Higher water temperatures due to low storage in the later, and warmer, summer months have the potential to cause algae blooms. State Water Board staff is interested in determining if any have ever occurred or occur during the relicensing period. If blooms occurred or occur, State Water Board staff would like information on the size of the bloom and the conditions under which they occurred or occur.

**Methodology and Consistency with Generally Accepted Scientific Practice**
State Water Board staff recommends collecting temperature data using methods similar to those that are used throughout the watershed. It is important that data are collected under different operational and meteorological conditions.

For algae blooms, State Water Board staff requests that the Licensees provide any historical or new information, as available, on algae blooms in Project affected reservoirs and visually monitor for their presence during the implementation of this study.

**Level of Effort and Cost**
State Water Board staff believes that the addition of monitoring locations in the North Fork Feather River would require minimal effort and cost. The Licensees have an extensive monitoring system within the watershed and the additional locations would require little additional effort.

Visual monitoring of algae blooms would occur during other monitoring efforts. The review of data for any information on historical reports or observations of algae blooms in Project-affected reservoirs would require minimal additional effort.

## 8. Instream Flow Habitat and Aquatic Species Passage Barrier Assessment

**Study Goal and Objective**
The goal of the study is to understand and quantify aquatic species habitat in relation to stream flow. A second goal is to assess barriers to fish and amphibian passage on Bucks Creek, Grizzly Creek, and Milk Ranch Creek. Specific objectives include: (1) development of fish species habitat suitability criteria (as needed); (2) development of fish habitat versus stream flow relationships; (3) describe potential barriers to fish and amphibians; and (4) identify flows that may facilitate movement around barriers, especially at tributary confluences with the North Fork Feather River.

**Relevant Resource Management Goals**
Cold freshwater habitat and cold water spawning are designated beneficial uses of all Project-affected water bodies. It is important to State Water Board staff that future Project operations are protective of these beneficial uses. In order to understand how the Project affects these beneficial uses, State Water Board staff must be able to evaluate how Project operations affect habitat and aquatic species passage barriers through manipulation of flow. Different instream flows often provide different levels of habitat and passage. In developing mitigation measures and setting instream flow requirements it is necessary to understand the correlation between instream flows and habitat availability.

**Relevant Public Interest Considerations**
State Water Board is a resource agency with mandatory conditioning authority.

**Existing Information**
An instream flow study was done on Bucks Creek, Milk Ranch Creek, and Grizzly Creek in 1991, prior to Grizzly Development. Large floods and debris flows occurred in 1997 and 1998, which likely changed the morphology and instream habitat composition of Project streams. New information is needed to assess Project effects on instream flow habitat (and potentially other aquatic species) in all Project-affected stream reaches.

**Nexus Between Project and Resource to be Studied**
Continued operation and maintenance of the existing Project has a potential to affect stream habitat for fish and aquatic species in Project-affected stream reaches.

**Methodology and Consistency with Generally Accepted Scientific Practice**
Methodologies for this study may differ depending on stream size. The specific type of methodology should be determined through consultation with the RPs. The instream flow incremental methodology (IFIM) is a comprehensive framework of analytical techniques and approaches and is commonly the starting point for similarly proposed studies. The IFIM will specify different methods which are acceptable for determining needed instream flows.

Physical habitat simulation modeling (PHABSIM) is an IFIM assessment that may be done in larger stream reaches and is common in recent relicensing efforts in California. PHABSIM uses three major components (river hydraulics, species life stage microhabitat suitability, and physical habitat modeling) to develop information on species life stages' microhabitat, in terms of weighted usable area (WUA).

A barrier assessment should also be developed in consultation with RPs. At a minimum, there should be two steps. The first step should involve the mapping and measurement of the jump height and jump pool of all identified barriers. Secondly, any barriers which are identified as impassable at low flows could be further analyzed using simple hydraulic models. The models would allow the development of stage-discharge relationships for the jump pools below each low-flow barrier.

**Level of Effort and Cost**
With controlled stream flow releases below reservoirs and other diversion structures, data collection could be accomplished during a single field season with any required modeling taking another 1-2 months. The work required for the Project study would occur primarily on creeks and smaller tributary streams, and thus State Water Board staff estimates the potential cost to be in the range of $100,000 to $200,000.

## 9. Channel Morphology Assessment

**Study Goal and Objective**
The goal of the study is to quantify and characterize stream form, processes and interaction with the riparian zone in the lower gradient stream reaches affected by the Project. Specifically, this should include Milk Ranch Creek, Bucks Creek, and Grizzly Creek downstream of Project diversions as well as the major streams that flow into the Project reservoirs.

The study objectives should be developed in consultation with RPs, but should at least include developing an understanding of the Project's effect on: substrate mobility; particle size distribution; spawning gravel distribution; floodplain connectivity; erosion; and the sediment budget. This study will allow the Licensees and RPs to evaluate the effects of the 2006 minimum instream flows.

**Relevant Resource Management Goals**
Channel morphology has the ability to affect designated beneficial uses within Project-affected water ways. Therefore, it is important for State Water Board staff to understand how the Project may affect channel morphology through the manipulation of instream flows. This will allow State Water Board staff to determine whether or not additional stream flow, large woody debris, and/or sediment measures are necessary.

**Relevant Public Interest Considerations**
The State Water Board is a resource agency with mandatory conditioning authority.

**Existing Information**
In the PAD, the Licensees indicate that a geomorphic assessment was completed in 2002 by Stillwater Sciences. The study covers Bucks Creek, Grizzly Creek, and Milk Ranch Creek, as well as Project influenced streams above Bucks Lake. State Water Board staff believes that this information is a basis upon which the new study can be built. Additionally, the PAD mentions a fish habitat study which was conducted in 1990 and may provide useful background information for this new proposed study. Information from Study 8 may also be beneficial and should be considered in developing and implementing this study.

**Nexus Between Project and Resource to be Studied**
The continued operation and maintenance of the Project has the potential to affect channel morphology and fluvial processes in Bucks Creek, Grizzly Creek, Milk Ranch Creek, and the North Fork Feather River.

**Methodology and Consistency with Generally Accepted Scientific Practice**
Similar studies are common in the relicensing of hydroelectric projects in California. State Water Board staff recommends that the Licensees work with RPs to develop a methodology that is appropriate for this Project. As indicated above, information developed from previous studies should be used to identify appropriate study sites and inform methodologies so that data can be compared.

**Level of Effort and Cost**
The level of effort and cost will vary depending upon the sampling methods used. The level of effort and cost should be less than that for similar studies recently undertaken in the relicensing of larger hydroelectric projects. State Water Board staff estimates that the collection of data should take a field crew between three and nine days with the evaluation and processing of data into a final report taking two weeks. The total cost is estimated to be between $25,000 and $50,000.