



**Federal Energy  
Regulatory  
Commission**

**Office of  
Energy  
Projects  
February 2011**

**FERC/F-0237**

**Final Environmental Impact Statement  
For Hydropower License**



**McCloud-Pit Hydroelectric Project  
FERC Project No. 2106, California**

**Federal Energy Regulatory Commission  
888 First Street, NE  
Washington, DC 20426**



**FINAL ENVIRONMENTAL IMPACT STATEMENT  
FOR HYDROPOWER LICENSE**

McCloud-Pit Hydroelectric Project—FERC Project No. 2106



Federal Energy Regulatory Commission  
Office of Energy Projects  
Division of Hydropower Licensing  
888 First Street, NE  
Washington, DC 20426

February 2011



FEDERAL ENERGY REGULATORY COMMISSION  
WASHINGTON, DC 20426

OFFICE OF ENERGY PROJECTS

To the Agency or Individual Addressed:

**Reference: Final Environmental Impact Statement**

Attached is the final environmental impact statement (final EIS) for the McCloud-Pit Project (Project No. 2106), located on the McCloud and Pit Rivers in Shasta County, California.

This final EIS documents the view of governmental agencies, nongovernmental organizations, affected Indian tribes, the public, the license applicant, and Federal Energy Regulatory Commission (Commission) staff. It contains staff evaluations on the applicant's proposal and alternatives for relicensing the McCloud-Pit Project.

Before the Commission makes a licensing decision, it will take into account all concerns relevant to the public interest. The final EIS will be part of the record from which the Commission will make its decision. The final EIS was sent to the U.S. Environmental Protection Agency and made available to the public on or about February 25, 2011.

Copies of the EIS are available for review in the Commission's Public Reference Branch, Room 2A, located at 888 First Street, N.E., Washington DC 20426. The EIS also may be viewed on the internet at <http://elibrary.ferc.gov>. For assistance, contact FERC Online Support at [FERCOnlineSupport@ferc.gov](mailto:FERCOnlineSupport@ferc.gov) or toll-free at 1-866-208-3676, or for TTY, (202) 502-8659.

Attachment: Final Environmental Impact Statement



## COVER SHEET

- a. Title: Relicensing the McCloud-Pit Hydroelectric Project, FERC Project No. P-2106
- b. Subject: Final Environmental Impact Statement
- c. Lead Agency: Federal Energy Regulatory Commission
- d. Abstract: On July 16, 2009, Pacific Gas and Electric (PG&E) filed an application to relicense its 368-megawatt (MW) McCloud-Pit Hydroelectric Project (P-2106). The McCloud-Pit Project is located on the McCloud and Pit Rivers in Shasta County, California. The project consists of three power developments (James B. Black, Pit 6, and Pit 7) and generates an average of about 1,542.2 gigawatt-hours (GWh) annually.
- The project occupies 1,651.4 acres of federal lands managed by the U.S. Department of Agriculture.
- The staff's recommendation is to relicense the project as proposed, with certain modifications and additional measures recommended by the agencies.
- e. Contact: Emily Carter  
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(202) 502-6512
- f. Transmittal: This Environmental Impact Statement (EIS) prepared by the Commission's staff on the hydroelectric license application filed by PG&E for the existing McCloud-Pit Hydroelectric Project (FERC No. P-2106) is being made available to the public on or about February 25, 2011, as required by the National Environmental Policy Act of 1969.<sup>1</sup>

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<sup>1</sup> National Environmental Policy Act of 1969, amended (Public Law [Pub. L.] 91-190, 42 United States Code [U.S.C.] 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258, §4(b), September 13, 1982).

## FOREWORD

The Federal Energy Regulatory Commission (Commission), pursuant to the Federal Power Act (FPA)<sup>2</sup> and the U.S. Department of Energy Organization Act,<sup>3</sup> is authorized to issue licenses for up to 50 years for the construction and operation of non-federal hydroelectric developments subject to its jurisdiction, on the necessary conditions:

That the project...shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development, for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including irrigation, flood control, water supply, and recreational and other purposes referred to in section 4(e)...<sup>4</sup>

The Commission may require such other conditions not inconsistent with the FPA as may be found necessary to provide for the various public interests to be served by the project.<sup>5</sup> Compliance with such conditions during the licensing period is required. The Commission's Rules of Practice and Procedure allow any person objecting to a licensee's compliance or noncompliance with such conditions to file a complaint noting the basis for such objection for the Commission's consideration.<sup>6</sup>

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<sup>2</sup> 16 U.S.C. §791(a)-825r, as amended by the Electric Consumers Protection Act of 1986, Pub. L. 99-495 (1986) and the Energy Policy Act of 1992, Pub. L. 102-486 (1992), and the Energy Policy Act of 2005, Pub. L. 109-58 (2005).

<sup>3</sup> Pub. L. 95-91, 91 Stat. 556 (1977).

<sup>4</sup> 16 U.S.C. §803(a) (2006).

<sup>5</sup> 16 U.S.C. §803(g) (2006).

<sup>6</sup> 18 Code of Federal Regulations (CFR) §385.206 (2010).

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## ACRONYMS AND ABBREVIATIONS

|                                     |   |
|-------------------------------------|---|
| ABA                                 | Architectural Barriers Act  |
| ADA                                 | Americans with Disabilities Act   |
| Advisory Council                    | Advisory Council on Historic Preservation   |
| APE                                 | area of potential effects   |
| APLIC                               | Avian Power Line Interaction Committee  |
| basin plan                          | <i>Water Quality Control Plan for the Sacramento and San Joaquin River Basins</i> |
| BLM                                 | Bureau of Land Management   |
| BMP                                 | best management practice  |
| °C                                  | degrees Celsius   |
| California Boating                  | California Department of Boating and Waterways                                    |
| California Fish and Game            | California Department of Fish and Game  |
| California Water Board              | California State Water Resources Control Board                                    |
| CDEC                                | California Data Exchange Center   |
| Central Valley Regional Water Board | Central Valley Regional Water Quality Control Board                               |
| CEQA                                | California Environmental Quality Act  |
| CFR                                 | Code of Federal Regulations   |
| cfs                                 | cubic feet per second   |
| Commission                          | Federal Energy Regulatory Commission  |
| CSU                                 | California State University   |
| CWHR                                | California Wildlife-Habitat Relationships   |
| CZMA                                | Coastal Zone Management Act   |
| DO                                  | dissolved oxygen  |
| draft EIS                           | draft environmental impact statement  |
| DWR                                 | California Department of Water Resources  |
| EIR                                 | environmental impact report   |
| EIS                                 | environmental impact statement  |
| EPA                                 | U.S. Environmental Protection Agency  |
| ESA                                 | Endangered Species Act  |
| °F                                  | degrees Fahrenheit  |
| FERC                                | Federal Energy Regulatory Commission  |
| final EIS                           | final environmental impact statement  |
| Forest Service                      | U.S. Department of Agriculture – Forest Service                                   |
| FLA                                 | Final License Application   |
| FPA                                 | Federal Power Act   |
| FR                                  | Forest Road   |
| FSORAG                              | Forest Service Outdoor Recreation Accessibility Guidelines                        |

|                   |   |
|-------------------|---|
| FSTAG             | Forest Service Trail Accessibility Guidelines   |
| FWS               | U.S. Department of the Interior – Fish and Wildlife Service   |
| GIS               | geographic information system   |
| GWh               | gigawatt-hour(s) (equals one million kilowatt-hours)  |
| HCM               | Habitat Criteria Mapping  |
| hp                | horsepower  |
| IBM               | Individual Base Modeling  |
| IFIM              | instream flow incremental methodology   |
| ILP               | Integrated Licensing Process  |
| Interior          | U.S. Department of the Interior   |
| KOP               | key observation point   |
| kV                | kilovolt(s)   |
| kW                | kilowatt(s)   |
| kWh               | kilowatt hour(s)  |
| licensee          | Pacific Gas and Electric  |
| LSR               | Late Successional Reserve   |
| LWD               | large woody debris  |
| msl               | mean sea level  |
| MMI               | multimetric index   |
| MOU               | memorandum of understanding   |
| MVA               | megavolt-ampere   |
| MW                | megawatt  |
| MWh               | megawatt-hours  |
| NA                | not applicable  |
| National Register | National Register of Historic Places  |
| NEPA              | National Environmental Policy Act   |
| NERC              | North American Electric Reliability Council   |
| NFS               | National Forest System  |
| NHPA              | National Historic Preservation Act  |
| NMFS              | U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service |
| NTU               | nephelometric turbidity unit(s)   |
| OCAP BiOp         | NMFS Operations Criteria and Plan Biological Opinion  |
| O&M               | operation and maintenance   |
| OHV               | off-highway vehicle   |
| PA                | Programmatic Agreement  |
| PAOT              | people-at-one-time  |
| Park Service      | National Park Service   |
| PG&E              | Pacific Gas and Electric  |

|                            |   |
|----------------------------|---|
| PHABSIM                    | Physical Habitat Simulation Modeling  |
| project                    | McCloud-Pit Hydroelectric Project   |
| Public Draft Recovery Plan | Public Draft Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and the Distinct Population Segment of Central Valley Steelhead |
| QA/QC                      | quality assurance / quality control   |
| RMO                        | road management objective   |
| RO                         | runoff  |
| ROD                        | Record of Decision on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl                              |
| ROS                        | recreation opportunity spectrum   |
| RPA                        | Reasonable and Prudent Alternative  |
| RV                         | recreational vehicle  |
| SHPO                       | State Historic Preservation Officer   |
| SMS                        | Scenery Management System   |
| TCP                        | Traditional Cultural Property   |
| TMDL                       | total maximum daily load  |
| Tribes                     | Winnemem Wintu Tribe, Pit River Tribe, and Redding Rancheria  |
| TSS                        | total suspended solids  |
| U.S.C.                     | United States Code  |
| USGS                       | U.S. Geological Survey  |
| VAOT                       | vehicles-at-one-time  |
| VELB                       | valley elderberry longhorn beetle   |
| VQO                        | visual quality objective  |
| WECC                       | Western Electricity Coordinating Council  |
| WROS                       | Water Recreation Opportunity Spectrum   |
| WUA                        | weighted usable area  |

## EXECUTIVE SUMMARY

On July 16, 2009, Pacific Gas and Electric (PG&E) filed an application for a new major license for its McCloud-Pit Hydroelectric Project, Project No. 2106 (project). The 368-megawatt (MW) project is located on the McCloud and Pit Rivers in Shasta County, California, and consists of three power generating developments (James B. Black, Pit 6, and Pit 7). These developments collectively include four reservoirs, three powerhouses, five dams, two tunnels, an afterbay, and associated equipment and transmission facilities. The project is described in more detail in section 2.1.1, *Existing Project Facilities*. The project occupies 1,651.4 acres of federal lands managed by the U.S. Department of Agriculture – Forest Service (Forest Service).

### **Proposed Action**

To improve aquatic resources, PG&E proposes changes to existing operations, including higher minimum instream flow releases in two project reaches: Lower McCloud River and Iron Canyon Creek. In addition, PG&E proposes measures to protect sensitive species and measures to maintain and enhance existing recreation opportunities as well as to provide additional recreational facilities. Furthermore, PG&E proposes to develop and/or implement the following plans: a Large Woody Debris (LWD) Management Plan; an Erosion and Sediment Monitoring and Control Plan; a Gravel and Coarse Sediment Monitoring Plan; a water quality and temperature monitoring plan; an Aquatic Biological Monitoring and Management Plan; a Vegetation Management Plan; a Terrestrial Management Plan; a Recreation Management Plan; a Project Sign and Education Plan; a Historic Properties Management Plan (HPMP); a Road and Transportation Facilities Management Plan; a Hazardous Substance Management Plan; and a Visual Quality Management Plan. PG&E's measures are described in more detail in section 2.2, *Applicant's Proposal*. Finally, PG&E proposes to construct a new powerhouse at the base of McCloud dam and a powerhouse at Pit 7 afterbay dam, along with associated transmission facilities.

### **Public Involvement and Areas of Concern**

PG&E utilized the Federal Energy Regulatory Commission's (FERC or the Commission) Integrated Licensing Process (ILP) to prepare its license application. The intent of the Commission's pre-filing process under the ILP is to initiate public involvement early in the project planning process and to encourage citizens, governmental entities, Tribes, and other interested parties to identify issues and information needs prior to an application being formally filed with the Commission. As part of the pre-filing process, we distributed Scoping Document 1 to interested parties on September 25, 2006, and issued a letter responding to comments made on Scoping Document 1 on October 8, 2007. Scoping meetings were held in Redding, California, on October 23 and 24, 2006. On December 1, 2009, after the final license application filing, we requested comments, conditions, and recommendations in response to our notice of application ready for environmental analysis.

The primary issues associated with relicensing the project are appropriate minimum flows in project-affected reaches; assessment of project effects on special status species; effects of any new minimum flow regime on angling, whitewater boating, and reservoir-based recreation; assessment of project effects on recreation facilities; and potential effects of project operation on water quality, aquatic habitat, and fish.

### **Draft Environmental Impact Statement**

On July 31, 2010, we issued a draft Environmental Impact Statement (EIS) for the McCloud-Pit Project that analyzed environmental impacts of PG&E's proposal, as well as the comments, conditions, and recommendations we received. We requested that comments on the draft EIS be filed by September 28, 2010. In addition, we hosted two public comment meetings September 9, 2010 in order to receive oral testimony on the draft EIS recommendations. In appendix A of this final EIS, we summarize the written and oral comments received; provide responses to those comments; and indicate, where appropriate, how we have modified the text for the final EIS.

In its November 29, 2010, filing of modified section 4(e) conditions, the Forest Service agrees in many cases with our recommendations in the draft EIS. Additionally, in its November 24, 2010, filing, PG&E supports the modified Forest Service conditions, except those pertaining to instream flows at McCloud dam (condition 19), road and transportation facility management (condition 29), and recreation development management (condition 30). In its filing, PG&E withdraws its alternative 4(e) conditions except for conditions 19, 29, and 30.

After reviewing the comments on the draft EIS and the filings related to the 4(e) conditions, we have revised some of our recommendations for the final EIS. The following recommendations differ from those in the draft EIS:

- (1) PG&E should implement the Forest Service's specified instream flows below McCloud dam rather than those originally proposed by California Trout, Trout Unlimited, and McCloud River Club;
- (2) PG&E should file an annual report with the Commission on the activities of the Interagency Fish Passage Steering Committee;
- (3) PG&E should include modifications to some of the species-specific monitoring schedules included in the draft Aquatic Biological Monitoring Plan and draft Terrestrial Biological Management Plan that the Forest Service submitted with its modified 4(e) conditions (Forest Service, 2010d, Enclosure 3);
- (4) PG&E should include additional parameters regarding the use of pesticides and herbicides associated with future project operation and maintenance (O&M) in the Vegetation and Invasive Weed Management Plan;

- (5) If PG&E is unable to secure the use of the land at the Star City site for a campground, PG&E should file a plan with the Commission for approval for a different campground location at McCloud reservoir;
- (6) PG&E should construct a new campground at the Gap Creek site for single unit campsites; and
- (7) PG&E should provide streamflow data from gage MC-7 in addition to gage MC-1 and reservoir drawdown information to the public via its website on the internet.

Finally, we no longer recommend that PG&E develop a plan to enhance angling access to Iron Canyon Creek.

### **Alternatives Considered**

This final EIS analyzes the effects of continued project operation and recommends conditions for a new license for the project. In addition to PG&E's proposal, we consider two alternatives: (1) staff alternative, and (2) no action—continued operation with no changes.

#### *Staff Alternative*

Under the staff alternative, the project would include most of PG&E's proposed measures and would be operated to maintain existing flows in the Pit 7 reach of the Pit River, but would include higher instream flows than proposed by PG&E in the Lower McCloud River bypassed reach and in the Iron Canyon Creek bypassed reach. The staff alternative also includes the following measures:

- development and/or implementation of plans for gravel and coarse sediment management, water quality and temperature monitoring, aquatic biological monitoring, vegetation and invasive species management, terrestrial biological management, recreation development and management, fish stocking, historic properties management, and visual resources, with staff modifications;
- ramping rates to protect fish, macroinvertebrates, and foothill yellow-legged frogs;
- O&M of gages to measure streamflows;
- foothill yellow-legged frog surveys; and
- real-time monitoring of water temperatures to assist in determining effects of mudflows from Mud Creek on project waters in the Lower McCloud River.

The staff alternative is based in part on recommendations made by the Forest Service, United States Department of Interior – Fish and Wildlife Service (FWS); California Department of Fish and Game (California Fish and Game), California Trout, Trout Unlimited, McCloud River Club, and American Whitewater. We include most, but not all, of the section 4(e) conditions filed by the Forest Service in the staff alternative.

## Project Effects

The project alters flows in the McCloud and Pit Rivers and Iron Canyon Creek via water storage in four reservoirs and one afterbay, and diversion of flows to generate power at three powerhouses. Existing and potential project effects resulting from the current O&M of the McCloud-Pit Project include: the lack of LWD below McCloud dam; trapped sediments behind McCloud dam resulting in a degraded aquatic habitat below the dam; erosion and fine sediment delivery to stream channels; lower instream flows due to water diversions; a lack of flow ramping during spill events; increased water temperature, turbidity, and contaminants in project-stream reaches; introduction and spread of invasive weed species; avian collision and electrocution at project transmission lines; accessibility of project waters for recreational access (boating and angling); potential adverse effects to historic properties; and decreased aesthetic values throughout the project area.

In recognition of these existing and potential project effects, the table below summarizes the measures proposed to mitigate these effects associated with the three alternatives considered in this final EIS.

| <b>Resource</b>          | <b>No-Action Alternative</b>  | <b>Proposed Action</b>  | <b>Staff Alternative</b> |
|--------------------------|---|---|--------------------------|
| <b>Generation</b>        | 1,542.2 gigawatt-hours (GWh)  | 1,524.3 GWh   | 1,502.2 GWh              |
| <b>Geology and Soils</b> | Continued removal of LWD behind McCloud dam   | Prepare an LWD Management Plan to facilitate the placing of LWD downstream of McCloud dam | Same as proposed action  |
|                          | Continue to maintain roadways and implement best management practices (BMPs) to reduce sediment input to project waters | Implement Erosion and Sediment Monitoring and Control Plan to minimize erosion            | Same as proposed action  |

| <b>Resource</b>          | <b>No-Action Alternative</b>                         | <b>Proposed Action</b>   | <b>Staff Alternative</b>  |
|--------------------------|--|--|---|
|                          |  | Monitor gravel and coarse sediment that could benefit downstream aquatic habitat | The proposed action plus implement a Gravel and Coarse Sediment Management Plan to add 150 to 600 tonnes of gravel and coarse sediment, from Star City Creek or other potential sites, to the Lower McCloud River periodically for protection of geology and soil resources |
| <b>Aquatic Resources</b> | Provide existing minimum flows in all stream reaches | Higher minimum instream flows below McCloud and Iron Canyon dams                 | Higher minimum instream flows below McCloud and Iron Canyon dams consistent with a more natural spring hydrograph   |

| Resource | No-Action Alternative | Proposed Action   | Staff Alternative  |
|----------|-----------------------|---|--|
|          |                       | No ramping rates for seasonal minimum flow changes, but upramping at 100 cubic feet per second (cfs) per hour prior to uncontrollable spills at McCloud dam | Upramping at 100 cfs per hour prior to uncontrollable spills at McCloud dam<br>Downramping at 150 cfs each 48 hours at McCloud dam during spills controllable by valve<br>Maximum upramping during controllable spills at 200 cfs each 24 hours at McCloud dam<br>Upramping and downramping related to testing of the flow valve at Iron Canyon dam in 20-cfs increments |
|          |                       | Move streamflow measurements for McCloud dam from gage MC-1 to MC-7   | Measure streamflow compliance at two compliance points (MC-7 and MC-1)   |
|          |                       | No Aquatic Biological Monitoring Plan   | Implement an Aquatic Biological Monitoring Plan  |
|          |                       | Implement water quality monitoring plan   | Same as proposed action  |
|          |                       |   | File annual reports on the reintroduction and status of listed salmonids in the project area.  |

| <b>Resource</b>              | <b>No-Action Alternative</b>   | <b>Proposed Action</b>  | <b>Staff Alternative</b>   |
|------------------------------|--|---|--|
| <b>Terrestrial Resources</b> | Continue to implement vegetation management programs around project facilities | <p>Implement Vegetation Management Plan to guide restoration using native plants and manage invasive plants</p> <p>Implement BMPs to protect wetlands during construction of McCloud transmission line</p> <p>Use native vegetation during restoration of areas disturbed by project-related activities</p> | Implement a Vegetation Management Plan as proposed under Forest Service condition 25 with modifications to include provision of information to managers regarding sensitive species, protection of culturally significant plant populations, provisions for the use of herbicides and pesticides, and implementation of BMPs to protect wetlands                                 |
|                              | Monitor bald eagle territories   | Implement Wildlife Management Plan  | <p>Implement a Terrestrial Biological Management Plan as proposed under Forest Service condition 26 with modifications to include monitoring schedules and limited operating periods</p> <p>Prepare biological evaluations for special status species and biological assessments for threatened and endangered species prior to new construction within the project boundary</p> |

| <b>Resource</b>                          | <b>No-Action Alternative</b>   | <b>Proposed Action</b>  | <b>Staff Alternative</b>   |
|--|--|---|--|
|  |  | Implement Avian Power Line Interaction Committee (APLIC) standards for transmission lines to minimize avian collision and electrocution hazards   | Same as proposed action  |
| <b>Threatened and Endangered Species</b> | Implement Valley Elderberry Longhorn Beetle (VELB) Conservation Program          | Same as no-action plus conduct pre-construction surveys for Pacific fisher and to minimize effects on northern spotted owl  | Same as proposed action  |
| <b>Recreation Resources</b>              | Fund California Fish and Game trout stocking program                             | Continue funding to California Fish and Game for stocking trout annually and to evaluate fish stocking program  | Stock 60,000 pounds of trout annually at the project and develop and implement a fish stocking plan to evaluate stocking success at the project                            |
|  | Continue to operate and maintain existing recreational facilities at the project | Develop and implement Recreation Development and Management Plan to include rehabilitation and upgrades to existing recreation facilities, reservoir water surface management, recreation monitoring, and a Signage and Education plan, providing streamflow information to the public via the internet | Same as proposed action but include posting of streamflow data at MC-7 on the internet in addition to MC-1, consultation with American Whitewater and Friends of the River |

| <b>Resource</b> | <b>No-Action Alternative</b> | <b>Proposed Action</b>   | <b>Staff Alternative</b>   |
|-----------------|------------------------------|--|--|
|                 |                              | Construct new day-use area, reconstruct and extend existing boat ramp, and add parking at Tarantula Gulch  | Same as proposed action but add lighting at Tarantula Gulch boat ramp  |
|                 |                              | Provide a formal day-use area and campground at McCloud reservoir at Star City   | Same as proposed action  |
|                 |                              | Conduct a feasibility study to find a suitable location for a floating dock or pier and trail at McCloud reservoir and construct if feasible   | Same as proposed action  |
|                 |                              | Construct day-use areas at McCloud reservoir at Red Banks and Tarantula Gulch inlet  | Same as proposed action  |
|                 |                              | Construct three access points to McCloud reservoir at Battle Creek and on each side of McCloud dam   | Same as proposed action  |
|                 |                              | At McCloud and Iron Canyon reservoirs, assess and implement closures of user-created roads leading to the shoreline of McCloud and Iron Canyon reservoirs, in coordination with the Forest Service | Same as proposed action with inclusion of trails and dispersed use sites in the assessment and closures; expand to include area inside project boundary at both McCloud and Iron Canyon reservoirs |

| <b>Resource</b> | <b>No-Action Alternative</b> | <b>Proposed Action</b>  | <b>Staff Alternative</b>  |
|-----------------|------------------------------|---|---|
|                 |                              | Construct a day-use site and access trail along the Lower McCloud River, at the base of McCloud dam                                 | Same as proposed action   |
|                 |                              | Reconstruct Hawkins Landing boat ramp and campground and provide additional parking, restroom facilities                            | Same as proposed action   |
|                 |                              | Conduct a site evaluation and provide three paved parking areas along FR37N78 with shoreline access points to Iron Canyon reservoir | Same as proposed action   |
|                 |                              | Construct new boat ramp and shoreline access at Iron Canyon reservoir   | Same as proposed action with the inclusion of adding lighting at the boat ramp  |
|                 |                              | Relocate (if feasible) or reconstruct Deadlun Campground if a suitable location is found  | Reconstruct Deadlun Campground to provide double and triple sites and construct new campground at Gap Creek for single unit campsites |
|                 |                              | Remove snow at Iron Canyon dam boat ramp and access road when project operations require snow removal from Oak Mountain Road        | Same as proposed action   |

| <b>Resource</b> | <b>No-Action Alternative</b> | <b>Proposed Action</b>   | <b>Staff Alternative</b>  |
|-----------------|------------------------------|--|---|
|                 |                              | Evaluate the feasibility of constructing a pedestrian shoreline access trail at the upper end of Pit 7 reservoir, downstream of Pit 6 powerhouse tailrace, and construct if suitable location found              | Construct the shoreline access trail  |
|                 |                              | Conduct feasibility assessment for providing boat put-in or boat hand- launch at Montgomery Creek, near the lower end of Pit 7 reservoir, if not feasible construct a fishing access trail with boat hand-launch | Conduct a site evaluation to determine the location of a pedestrian shoreline access trail at the lower end of Pit 7 reservoir with paved parking and construct this facility |
|                 |                              | Reconstruct Fenders Flat day-use area (above Pit 7 afterbay dam) and boat ramp   | Same as proposed action   |
|                 |                              | If the Pit 7 afterbay powerhouse is constructed, provide access near the proposed Pit 7 afterbay powerhouse, and provide parking at the end of the powerhouse access road or along Fenders Ferry Road            | Same as proposed action   |

| <b>Resource</b>                | <b>No-Action Alternative</b>                                     | <b>Proposed Action</b>   | <b>Staff Alternative</b>   |
|--------------------------------|--|--|--|
|                                |  | Develop and implement Project Patrol Plan to provide project patrols   | No requirement for Project Patrol Plan, patrols, or funding for law enforcement position                               |
| <b>Cultural Resources</b>      |  | Implement a final HPMP   | Implement the final HPMP upon license issuance   |
|                                | Continue employee environmental training and sensitivity program | Continue employee environmental training and sensitivity program as part of the HPMP   | Same as proposed action  |
|                                |  | Provide program to educate public about cultural significance of area (with assistance from Pit River Tribe, Winnemem Wintu Tribe, and the Forest Service) | Same as proposed action  |
| <b>Land Use and Aesthetics</b> | Continue to maintain all project roads and facilities            | Develop and implement a Road and Transportation Facility Management Plan for project roads   | Same as proposed action plus revise project boundary to include all project roads and existing recreational facilities |
|                                |  | Execute a separate memorandum of understanding (MOU) with the Forest Service for areas with shared responsibility  | Outside of licensing proceeding  |

| <b>Resource</b> | <b>No-Action Alternative</b>  | <b>Proposed Action</b>  | <b>Staff Alternative</b>   |
|-----------------|---|---|--|
|                 | Continue to implement the Spill Prevention, Control, and Countermeasures Plan and the Hazardous Materials Business Plan | Same as no-action   | Same as no-action, but file existing Spill Prevention, Control, and Countermeasures Plan and Hazardous Materials Business Plan with the Commission |
|                 |   | Identify specific visual quality mitigation measures and develop an implementation schedule | Same as proposed action  |
|                 |   | Develop and implement a Fire Response Plan  | Same as proposed action  |

### **Conclusions**

Based on our analysis, we recommend licensing the project as proposed by PG&E, with some staff modifications and additional measures (staff alternative), as described previously under *Alternatives Considered*.

In section 4.2 of the EIS, *Comparison of Alternatives*, we compare the total project cost of obtaining power from a likely alternative source of power in the region (annual power value, table 4-3), for each of the alternatives identified above. Our analysis shows that during the first year of operation under the no-action alternative the project produces power at a cost of \$23,102,000, or about \$111,085,000 [\$72.52/megawatt hours (MWh)] less than the cost of alternative power. Under the applicant's proposal, the project would produce power at a cost of \$33,291,000, or about \$100,085,000 (\$65.66/MWh) less than the cost of alternative power. Under the staff-recommended alternative, the project would produce power at a cost of \$33,951,000, or about \$97,492,000 (\$64.90/MWh) less than the cost of alternative power. With regards to PG&E's proposed additional generation units at McCloud dam and Pit 7 afterbay, we find that the cost of these new units may exceed the potential power benefits; however, PG&E has not yet determined the final size of the units and their hydraulic capacity. Until PG&E decides on the final capacity of the units, we make no recommendation regarding the proposed additional generation units.

We choose the staff alternative as the preferred alternative because:  
(1) the project would provide a dependable source of electrical energy for the region

(1,502,200 megawatt-hours annually); (2) the project may save the equivalent amount of fossil fueled generation and capacity, thereby continuing to help conserve non-renewable energy resources and reduce atmospheric pollution; and (3) the recommended environmental measures proposed by PG&E, as modified by staff, would adequately protect and enhance environmental resources affected by the project. The overall benefits of the staff alternative would be worth the cost of the proposed and recommended environmental measures.

## **1.0 INTRODUCTION**

### **1.1 APPLICATION**

On July 16, 2009, Pacific Gas and Electric (PG&E) filed an application to relicense its 368-megawatt (MW) McCloud-Pit Project (P-2106) with the Federal Energy Regulatory Commission (FERC or Commission). The McCloud-Pit Project is located on the McCloud and Pit Rivers in Shasta County, California, and consists of three existing developments (James B. Black, Pit 6, and Pit 7; figure 1-1). Project features collectively include two storage reservoirs (McCloud and Iron Canyon reservoirs), two regulating reservoirs (Pit 6 and Pit 7 reservoirs), one afterbay (Pit 7 afterbay), two tunnels, three powerhouses (James B. Black, Pit 6, and Pit 7 powerhouses), and associated equipment and transmission facilities. PG&E proposes to construct two new generation facilities at the base of McCloud dam (5 to 8 MW) and at the base of Pit 7 afterbay dam (10 MW), including a transmission line. A portion of the route of the proposed McCloud transmission line would cross about 5 miles of the southern portion of Siskiyou County. The current license expires July 31, 2011. The average annual energy generation (1979-2004) for James B. Black, Pit 6, and Pit 7 powerhouses is 656.3, 373.8, and 512.1 gigawatt-hours (GWh), respectively.

The project currently occupies 1,651.4 acres of federal lands, managed by the U.S. Department of Agriculture – Forest Service (Forest Service). The proposed new generation facilities would add about 45.4 additional acres within the project boundary, of which about 4.6 acres would be federally-owned lands managed by the Forest Service.

### **1.2 PURPOSE OF ACTION AND NEED FOR POWER**

#### **1.2.1 Purpose of Action**

The purpose of the McCloud-Pit Project is to continue to provide a source of hydroelectric power. Therefore, under the provisions of the Federal Power Act (FPA), the Commission must decide whether to issue a license to PG&E for the McCloud-Pit Project and what conditions should be placed on any license issued. In deciding whether to issue a license for a hydroelectric project, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (e.g., flood control, irrigation, and water supply), the Commission must give equal consideration to the purposes of: (1) energy conservation; (2) the protection of, mitigation of damage to, and enhancement of fish and wildlife (including related spawning grounds and habitat); (3) the protection of recreational opportunities; and (4) the preservation of other aspects of environmental quality.

Issuing a new license for the McCloud-Pit Project would allow PG&E to continue to generate electricity at the project for the term of a new license, making electric power from a renewable resource available to its customers.

This final environmental impact statement (EIS) assesses the effects associated with operation of the proposed project, examines alternatives to the proposed project, and makes recommendations to the Commission on whether to issue a new license, and if so, recommends terms and conditions to become a part of any license issued.

In this EIS, we assess the environmental and economic effects of continuing to operate the project: (1) as proposed by PG&E and (2) as proposed by PG&E with our recommended measures (the staff alternative). We also consider the effects of the no-action alternative. Important issues that are addressed include appropriate minimum flows in project-affected reaches, assessment of project effects on special status species, effects of any new minimum flow regime on recreation, and potential effects of project operation on water quality, aquatic habitat, fish, and recreational access.

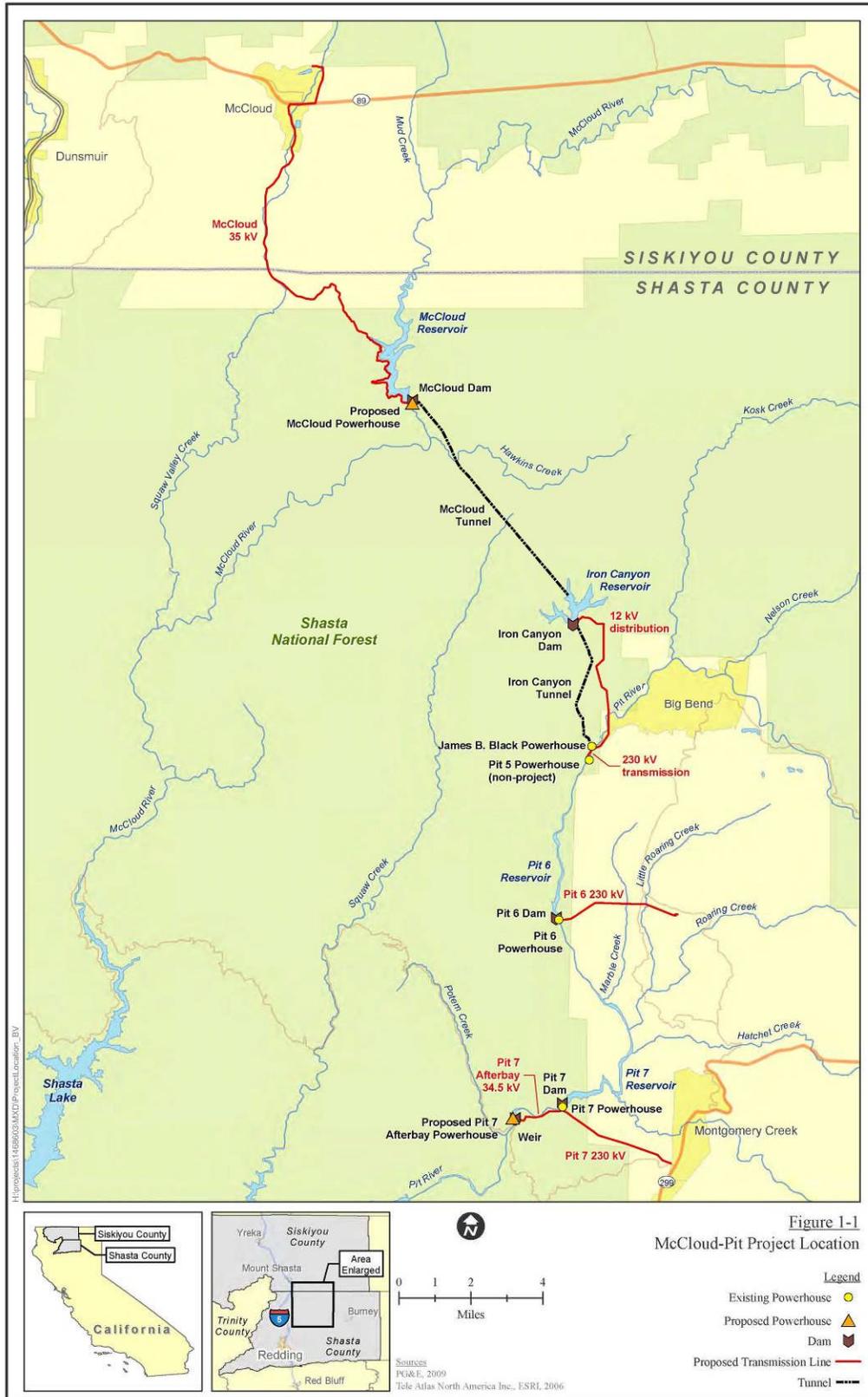


Figure 1-1. McCloud-Pit Project, location map. (Source: PG&E, 2009a)

## **1.2.2 Need for Power**

The project is located in the California-Mexico Power area of the Western Electricity Coordinating Council (WECC). According to the North American Electricity Reliability Corporation (NERC, 2009), which forecasts electrical supply and demand nationally and regionally, summer total internal demands for the California-Mexico Power area is projected to grow at an annual compound rate of 0.9 percent from 2009 to 2018. Annual energy use is projected to grow at an annual compound rate of 1.3 percent. NERC forecasts that about 31,613 MW of capacity will be added to the California-Mexico Power area of WECC over the project planning period (2009 – 2018). The project could continue to meet part of the existing load requirements within a system in need of resources. In addition, pursuant to California Senate Bill 1078 passed in September 2002, the proposed new small hydro powerhouses may qualify as “eligible renewable energy resources,” and could be used to help meet California’s Renewable Portfolio Standard.

California’s principal energy agencies (the California Energy Commission, California Public Utility Commission, and California Power Authority) developed a common policy vision calling for: optimizing energy conservation and resource efficiency; meeting new generation needs first with renewable energy resources and distributed generation, then with clean fossil fuel generation; and improving the bulk electricity transmission grid and distribution infrastructure. The California Energy Commission projects that the statewide annual peak demand will grow an average of 1.35 percent between 2008 and 2018.

We conclude that power from the McCloud-Pit Project could continue to meet a need for power in the WECC region in both the short- and long-term. The project provides low-cost power that may displace non-renewable, fossil-fired generation and contributes to a diversified generation mix. Displacing the operation of fossil-fueled facilities may avoid some power plant emissions and creates an environmental benefit.

## **1.3 STATUTORY AND REGULATORY REQUIREMENTS**

The license for the McCloud-Pit Project is subject to numerous requirements under the FPA and other applicable statutes. Major regulatory and statutory requirements are summarized in table 1-1 and described below.

Table 1-1. Major statutory and regulatory requirements for the McCloud-Pit Hydroelectric Project.

| Requirement  | Agency  | Status   |
|--|---|--|
| Section 18 of the FPA (fishway prescriptions)        | U.S. Department of Interior (Interior) – Fish and Wildlife Service (FWS); U.S. Department of Commerce – National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) | FWS reserved its authority to prescribe fishways on January 28, 2010. NMFS reserved its authority on January 29, 2010.   |
| Section 4(e) of the FPA (land management conditions) | Forest Service  | The Forest Service provided conditions on January 29, 2010, one revised condition on March 1, 2010, and modified conditions on November 29, 2010.  |
| Section 10(j) of the FPA                             | California Department of Fish and Game (California Fish and Game); NMFS   | On January 29, 2010, NMFS provided section 10(j) recommendations. California Fish and Game provided recommendations on February 2, 2010.   |
| Clean Water Act water quality certification          | California State Water Resources Control Board (California Water Board)   | PG&E filed an application for water quality certification with the California Water Board on January 27, 2010. PG&E withdrew that application and simultaneously re-filed its application by letter dated January 5, 2011. Certification due by January 5, 2012. |

| <b>Requirement</b>                        | <b>Agency</b>                 | <b>Status</b>  |
|---|-------------------------------|--|
| Endangered Species Act (ESA) consultation | FWS                           | We requested concurrence from FWS on our “not likely to adversely affect” determination on listed species under its jurisdiction. On December 21, 2010, FWS filed a letter concurring with our conclusions presented in the EIS. |
| Coastal Zone Management Act consistency   | California Coastal Commission | Relicensing the project would not influence resources in the designated coastal zone.  |

### **1.3.1 Federal Power Act**

#### **1.3.1.1 Section 18 Fishway Prescriptions**

Section 18 of the FPA states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the secretaries of Commerce or Interior. By letter filed January 28, 2010, the U.S. Department of the Interior (Interior) requested that a reservation of authority to prescribe fishways be included in any project license for the McCloud-Pit Project. NMFS filed a request for reservation of authority on January 29, 2010.

#### **1.3.1.2 Section 4(e) Conditions**

Section 4(e) of the FPA provides that any license issued by the Commission for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. The Forest Service filed 34 section 4(e) conditions for the McCloud-Pit Project on January 29, 2010, and one revised condition on March 1, 2010. The Forest Service filed modified 4(e) conditions on November 29, 2010. These conditions are described under section 2.2.4, *Modifications to the Applicant’s Proposal—Mandatory Conditions*, summarized in table 5-3, analyzed in the appropriate resource sections of section 3, *Environmental Analysis*, and discussed in section 5, *Staff’s Conclusions*.

#### **1.3.1.3 Alternative Conditions under the Energy Policy Act of 2005**

The Energy Policy Act of 2005 provides parties to this licensing proceeding the opportunity to propose alternatives to 4(e) conditions. No trial-type hearings were

requested, but PG&E provided 16 alternative 4(e) conditions and California Trout, Trout Unlimited, and McCloud River Club provided one alternative condition.<sup>7</sup> On November 24, 2010, PG&E withdrew 13 of its alternative 4(e) conditions in full and one alternative condition in part. We discuss these alternative conditions in the appropriate resource analysis sections of this EIS and in section 2.2.4.2, *Alternative 4(e) Conditions Pursuant to the Energy Policy Act of 2005*. We discuss our conclusions in section 5, *Staff's Conclusions*.

#### **1.3.1.4 Section 10(j) Recommendations**

Under section 10(j) of the FPA, each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project, unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

On January 29, 2010, NMFS filed 12 recommendations under section 10(j) for the McCloud-Pit Project. California Fish and Game filed three recommendations on February 2, 2010. In the draft EIS, we made a preliminary determination that 10 of the recommendations made by NMFS and two of the recommendations made by California Fish and Game were within the scope of section 10(j). Of those 12 recommendations, we adopted three and partially adopted one. We did not adopt the remaining eight recommendations made by NMFS because they may be inconsistent with the comprehensive planning standard of section 10(a) and the equal consideration provision of section 4(e) of the FPA.

Commission staff held a 10(j) meeting with NMFS in Sacramento, California, on November 17, 2010, in an attempt to resolve these preliminary inconsistencies. California Fish and Game did not request its own 10(j) meeting; however, the agency attended the November 17, 2010, meeting.

We summarize these recommendations in table 5-1, analyze them in the appropriate resource sections in section 3, *Environmental Analysis*, and present our

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<sup>7</sup> McCloud RiverKeepers, American Whitewater, and Friends of the River also filed alternative conditions; however, in its September 27, 2010, letter, the Forest Service stated that because these filings occurred after the March 18, 2010, deadline for filing alternative conditions, these filings should not be classified as alternative condition filings to the Forest Service's preliminary section 4(e) conditions. As such, in this final EIS, we discuss and analyze these recommendations in section 3.3.2, *Aquatic Resources*, and present our conclusions in section 5, *Staff's Conclusions*.

conclusions in section 5, *Staff's Conclusions*. We also discuss and address the agency recommendations in section 5.4.1, *Fish and Wildlife Agency Recommendations*.

### **1.3.2 Clean Water Act**

Under section 401 of the Clean Water Act, a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the Clean Water Act. By letter dated January 27, 2010, PG&E submitted its application for water quality certification to the California Water Board. By letter dated February 26, 2010, the California Water Board documented receipt of the application on January 27, 2010.

By letter filed September 22, 2010, the California Water Board notes that while it has 1 year to act on an application for water quality certification, all of the information necessary for it to act on the application must be submitted, and environmental documents necessary to comply with the California Environmental Quality Act (CEQA) must be finalized. By letter dated October 27, 2010, PG&E filed a reply to the California Water Board's comments. Additionally, by letter dated January 5, 2011, PG&E withdrew its original application for water quality certification and simultaneously re-filed its application. Consequently, the water quality certification is due by January 5, 2012.

### **1.3.3 Endangered Species Act**

Section 7 of the ESA requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. Four federally-listed species have the potential to occur in the project vicinity: northern spotted owl, valley elderberry longhorn beetle (VELB), California red-legged frog, and Pacific fisher. Our analyses of project effects on threatened and endangered species are presented in section 3.3.4, *Threatened and Endangered Species*, and our recommendations in section 5.2, *Comprehensive Development and Recommended Alternative*.

In the draft EIS, we concluded that relicensing of the McCloud-Pit Project, as described under the staff alternative, would have no effect on the California red-legged frog and would not likely adversely affect the VELB, Pacific fisher, and northern spotted owl. On August 6, 2010, we issued a letter seeking concurrence from FWS on this determination, indicating that the draft EIS would serve as our biological assessment of the proposed licensing on listed species. On December 23, 2010, FWS filed a letter concurring with our determination.

### **1.3.4 Coastal Zone Management Act**

Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 United States Code (U.S.C.) § 1456(3)(A), the Commission cannot issue a license for

a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification.

The project is located in the Sierra Nevada Mountains and is not located within the boundary of a designated Coastal Zone Management Program, which extends from a few blocks to 5 miles inland from the sea ([www.coastal.ca.gov](http://www.coastal.ca.gov)), and relicensing the project would not affect resources within the boundary of a designated coastal zone. Therefore, the project is not subject to California coastal zone program review and no consistency certification is needed. We provided a copy of the draft EIS to the California Coastal Commission for review and received no comment from that agency.

### **1.3.5 National Historic Preservation Act**

Section 106 of the National Historic Preservation Act (NHPA) requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties (TCPs), and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places (National Register).

To meet the requirements of section 106, the Commission intends to execute a Programmatic Agreement (PA) with the California State Historic Preservation Officer (SHPO) for the protection of historic properties from the effects of the operation of the McCloud-Pit Hydroelectric Project. The terms of the PA, a draft of which was issued August 26, 2010, ensure that PG&E addresses and treats all historic properties identified within the project's area of potential effects through the implementation of PG&E's Historic Properties Management Plan (HPMP).

### **1.3.6 California Environmental Quality Act**

CEQA is the California counterpart to the National Environmental Policy Act (NEPA). CEQA went into effect in 1970 for the purpose of monitoring land development in California through a permitting process. This statute, enacted to protect the health of the environment from current and future development, requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. CEQA applies to all discretionary activities proposed to be undertaken or approved by California state and local government agencies. The California Water Board, which must act on PG&E's request for water quality certification for the project (see section 1.3.2, *Clean Water Act*), is the lead agency under CEQA.

Under CEQA, an environmental impact report (EIR) is prepared when the public agency finds substantial evidence that the project may have a significant effect on the environment. An EIR is the public document used to analyze the significant

environmental effects of a proposed project, to identify alternatives, and to disclose possible ways to reduce or avoid the possible environmental damage. CEQA guidelines state that when federal review of a project is also required, state agencies are encouraged to integrate the two processes to the fullest extent possible, which may include a joint EIS/EIR. While this document is not a joint EIS/EIR, the California Water Board has the opportunity to use this document, as appropriate, to satisfy its responsibilities under CEQA. As such, we invited the California Water Board's comments on the draft EIS as they may pertain to the agency's use of the final EIS for CEQA purposes. By letter dated September 22, 2010, the California Water Board commented that its staff may rely on sections of the EIS and additional analysis to comply with CEQA. The California Water Board also noted that, for projects with less than significant environmental effects, a negative declaration or mitigated negative declaration can be issued.

One element needed in an EIR, but not required by NEPA, is a discussion of a program for monitoring or reporting on mitigation measures that were adopted or made conditions of project approval. The monitoring or reporting program must ensure compliance with mitigation measures during project implementation. The program may also provide information on the effectiveness of mitigation measures. Although discussion of the mitigation reporting or monitoring program can be deferred until the final EIR or, in some cases, after project approval, it is often included in the draft EIR to obtain public review and comment.

In section 3 of this EIS, *Environmental Analysis*, we describe each potential environmental resource impact, our analysis of each recommended mitigation measure, and our conclusion with respect to the effectiveness of each measure in addressing the impact. In section 5.2, *Comprehensive Development and Recommended Alternative*, we list the mitigation measures, and monitoring and reporting requirements we recommend for inclusion in any license issued for the McCloud-Pit Project. Additionally, any conditions of the water quality certification that may be issued for this project will become an enforceable part of any license issued for this project. To specifically address CEQA requirements with respect to mitigation monitoring, appendix B, *McCloud-Pit Project Mitigation and Monitoring Summary*, identifies each potentially significant impact of relicensing the McCloud-Pit Project, lists the project changes or mitigation measures that are recommended for inclusion in a new license to avoid or reduce the impact, and describes the monitoring and reporting measures PG&E would undertake to ensure the project changes and mitigation measures are implemented as intended.

Another analysis required under CEQA but not required in an EIS is a description of any growth-inducing effects caused by the project. For this relicensing, higher minimum instream flows would translate to less annual power generation of the project. A net reduction in power generation would not facilitate population growth or remove an obstacle to growth. PG&E, however, also is proposing to construct new powerhouses at the McCloud and Pit 7 afterbay dams, and associated transmission lines. Increased power generation would facilitate population growth and remove a potential obstacle to growth.

## 1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 Code of Federal Regulations [CFR] §5.1-5.16) require that applicants consult with appropriate resource agencies, tribes, and other entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, the ESA, the NHPA, and other federal statutes. Pre-filing consultation must be complete and documented according to the Commission's regulations.

### 1.4.1 Scoping

Under the Commission's regulations, issuing a licensing decision for any project first requires preparation of either an environmental assessment or an EIS, in accordance with NEPA. The preparation of an environmental assessment or EIS is supported by a scoping process to ensure the identification and analysis of all pertinent issues. We issued a notice of intent to prepare an EIS on December 1, 2009.

On September 25, 2006, the Commission issued Scoping Document 1 to enable resource agencies; the Winnemem Wintu Tribe, Pit River Tribe, and Redding Rancheria (Tribes); and other interested parties to more effectively participate in and contribute to the scoping process. In Scoping Document 1, we requested clarification of preliminary issues concerning the McCloud-Pit Project and identification of any new issues that needed to be addressed. On October 8, 2007, we issued a letter responding to comments made on Scoping Document 1.

We held two public scoping meetings regarding the project, on October 23 and 24, 2006, in Redding, California. We issued notices for the scoping meetings in a local newspaper and the *Federal Register*. Based on completion of sign-in sheets at the scoping meetings, 25 individuals attended the October 23 evening scoping meeting, and 32 individuals attended the October 24 morning scoping meeting. In addition, we conducted an environmental site review of the project area on September 19 and 20, 2006, and several of the individuals who also attended one or both of the scoping meetings attended the site review. We also issued notices for the environmental site review in a local newspaper and the *Federal Register*.

We requested that written comments regarding the project be filed with the Commission by November 23, 2006. In addition to the oral comments received during the scoping meetings, we received written scoping comments from the following entities:

| <b>Commenting entity</b>             | <b>Date of filing</b> |
|--------------------------------------|-----------------------|
| Redding Rancheria                    | November 13, 2006     |
| PG&E                                 | November 20, 2006     |
| National Park Service (Park Service) | November 21, 2006     |

| <b>Commenting entity</b>                                    | <b>Date of filing</b> |
|---|-----------------------|
| Forest Service  | November 21, 2006     |
| California Fish and Game                                    | November 21, 2006     |
| California Trout, Friends of the River, and Trout Unlimited | November 22, 2006     |
| Pit River Tribe   | November 24, 2006     |
| California Water Board                                      | November 22, 2006     |
| The Hearst Corporation                                      | November 24, 2006     |
| Sierra Pacific Industries                                   | November 28, 2006     |

### **1.4.2 Interventions**

On December 1, 2009, the Commission issued a public notice accepting the application and soliciting motions to intervene. This notice set a 60-day period during which interventions could be filed, ending February 1, 2010. The Commission also solicited interventions in its July 30, 2010, public notice of the availability of the draft EIS. This notice set a 60-day period during which interventions could be filed, ending September 28, 2010. In response to these notices, the following entities filed motions to intervene in this proceeding:

| <b>Entity</b>  | <b>Date of filing</b>                            |
|--|--|
| California Fisheries and Water Unlimited   | December 3, 2009;<br>amended<br>December 4, 2009 |
| Forest Service   | December 10, 2009                                |
| Anglers Committee  | December 10, 2009                                |
| Friends of the River and American Whitewater   | December 18, 2009                                |
| Winnemem Wintu Tribe   | December 22, 2009                                |
| California Salmon and Steelhead Association  | December 30, 2009                                |
| Center for Water Advocacy  | January 8, 2010                                  |
| California Sportfishing Protection Alliance  | January 13, 2010                                 |
| California Trout, Trout Unlimited, and Northern California Council, Federation of Flyfishers | January 26, 2010                                 |
| California Water Board   | January 28, 2010                                 |

| <b>Entity</b>            | <b>Date of filing</b>          |
|--------------------------|--------------------------------|
| McCloud River Club       | January 28, 2010               |
| Interior                 | February 1, 2010               |
| NMFS                     | January 29, 2010               |
| The Fly Shop             | January 29, 2010               |
| McCloud RiverKeepers     | February 1, 2010               |
| California Fish and Game | February 1, 2010               |
| Pit River Tribe          | February 8, 2010 <sup>a</sup>  |
| The Hearst Corporation   | February 16, 2010 <sup>a</sup> |

<sup>a</sup> Late intervention granted by Commission notice issued February 25, 2010.

### 1.4.3 Comments on the Application

On December 1, 2009, the Commission issued a Ready for Environmental Analysis Notice and requested comments, recommendations, and terms and conditions (subject to sections 4(e), 10(a), 10(j) and 18 of the FPA) with a filing deadline of February 1, 2010.<sup>8</sup> The following entities filed comments, terms, conditions, prescriptions, or recommendations:

| <b>Commenting entity</b>                 | <b>Date of filing</b>  |
|--|--|
| Forest Service                           | December 21, 2009<br>January 29, 2010 – filed one 4(e) condition revised in part |
| California Fisheries and Water Unlimited | January 19, 2010   |
| FWS                                      | January 28, 2010   |
| NMFS                                     | January 29, 2010   |
| American Whitewater                      | February 2, 2010   |
| Winnemem Wintu Tribe                     | February 1, 2010   |
| California Fish and Game                 | February 2, 2010   |
| Forest Service                           | March 1, 2010  |
| PG&E                                     | March 3, 2010  |

<sup>8</sup> Several comments were received after the filing deadline, but are still considered in this EIS.

| <b>Commenting entity</b>                                  | <b>Date of filing</b> |
|---|-----------------------|
| California Trout, Trout Unlimited, and McCloud River Club | March 4, 2010         |
| California Water Board                                    | March 8, 2010         |
| The Hearst Corporation                                    | March 16, 2010        |
| PG&E  | March 16, 2010        |
| PG&E  | March 22, 2010        |
| The Hearst Corporation                                    | March 22, 2010        |
| American Whitewater and Friends of the River              | March 30, 2010        |
| American Whitewater and Friends of the River              | March 31, 2010        |
| McCloud RiverKeepers                                      | April 14, 2010        |
| McCloud RiverKeepers                                      | April 22, 2010        |
| PG&E  | April 23, 2010        |
| Winnemem Wintu Tribe                                      | May 26, 2010          |

#### **1.4.4 Comments on Draft Environmental Impact Statement**

The Commission sent the draft EIS to the U.S. Environmental Protection Agency (EPA) and made the draft available to the public on July 30, 2010. The Commission requested that any comments on the draft EIS be filed by September 28, 2010. In addition, the Commission held two public meetings in Redding, California, on September 9, 2010, to receive oral testimony on the draft EIS, and the transcripts from these meetings were filed in the administrative record for the project. In appendix A, we summarize the written and oral comments received; provide responses to those comments; and indicate, where appropriate, how we have modified the text of the final EIS.

## **2.0 PROPOSED ACTION AND ALTERNATIVES**

### **2.1 NO-ACTION ALTERNATIVE**

Under the no-action alternative, the McCloud-Pit Project would continue to operate under the terms and conditions of the existing license, and no new environmental protection, mitigation, or enhancement measures would be implemented. We use this alternative to establish baseline environmental conditions for comparison with other alternatives.

#### **2.1.1 Existing Project Facilities**

Located in the McCloud and Pit River drainages of Northern California, the McCloud-Pit Project involves the transfer of water from the McCloud River basin to the Lower Pit River basin. McCloud reservoir is located on the McCloud River, which originates at Moosehead Creek, southwest of Mt. Shasta, and flows in a southwesterly direction before entering Shasta Lake, a reservoir formed by the U.S. Department of Interior – Bureau of Reclamation’s Shasta dam at the confluence of the Pit, Sacramento, and McCloud Rivers. From McCloud reservoir, water is transferred via a tunnel to Iron Canyon reservoir, which is located on Iron Canyon Creek, a tributary of the Pit River. Water from Iron Canyon reservoir flows, via a tunnel, to the James B. Black powerhouse, located on the Pit River, just downstream of PG&E’s Hat Creek and Pit 3, 4, 5 projects. The water from the McCloud River drainage then enters the Pit River and travels through the Pit 6 and Pit 7 developments before entering Shasta Lake. Although the project diverts water from the McCloud River basin to the Lower Pit River basin, both basins drain to Shasta Lake. The project is located entirely within the Sacramento River Hydrologic Region of California and both drainages are located along the western slope of the Cascade Range.

The McCloud-Pit Hydroelectric Project commenced commercial operation in 1965-1966. The project is composed of three hydroelectric developments: James B. Black, Pit 6, and Pit 7, each of which is described below. During the period from 1979 to 2004, the developments have annually generated an average of 1,542 GWh of power, respectively. The locations of the various facilities and features are presented in figure 2-1, and a schematic of project facilities is provided in figure 2-2.

##### **2.1.1.1 James B. Black Development**

###### **McCloud Dam and McCloud Reservoir**

McCloud dam is a 241-foot-high, 630-foot-long earth- and rock-filled dam located on the McCloud River that impounds McCloud reservoir. The McCloud reservoir has a surface area of 520 acres and a maximum storage capacity of about 35,197 acre-feet. The spillway (elevation 2,696.0 feet above mean sea level [feet msl]) is on the south side of the dam. The reservoir has a normal maximum water surface elevation of 2,680 feet msl. The dam’s spillway is equipped with three radial gates measuring 27 feet by 24.5 feet that

return spillage flows to the McCloud River. The dam also has a 7-foot-diameter diversion/outlet tunnel that runs under the dam to a 24-inch Howell-Bunger valve for releasing instream flows to the McCloud River, as well as an 84-inch-diameter butterfly valve for emergency use to control reservoir levels. Controls for the diversion/outlet tunnel are located at the intake within McCloud reservoir.

### **McCloud Tunnel**

McCloud dam diverts flows from the McCloud River via a 7.2-mile-long lined and unlined tunnel and a 563-foot-long pipeline section at Hawkins Creek crossing that hydraulically links McCloud reservoir and Iron Canyon reservoir. An intake tower within McCloud reservoir collects water for the McCloud tunnel, which is about 17 feet in diameter, and heads southeasterly to Iron Canyon reservoir. The differential in water surface elevations between the two reservoirs controls the amount of water drafted through the tunnel. The McCloud tunnel diversion results in an approximately 24-mile-long bypassed reach of the McCloud River, between the project reservoir and Shasta Lake.

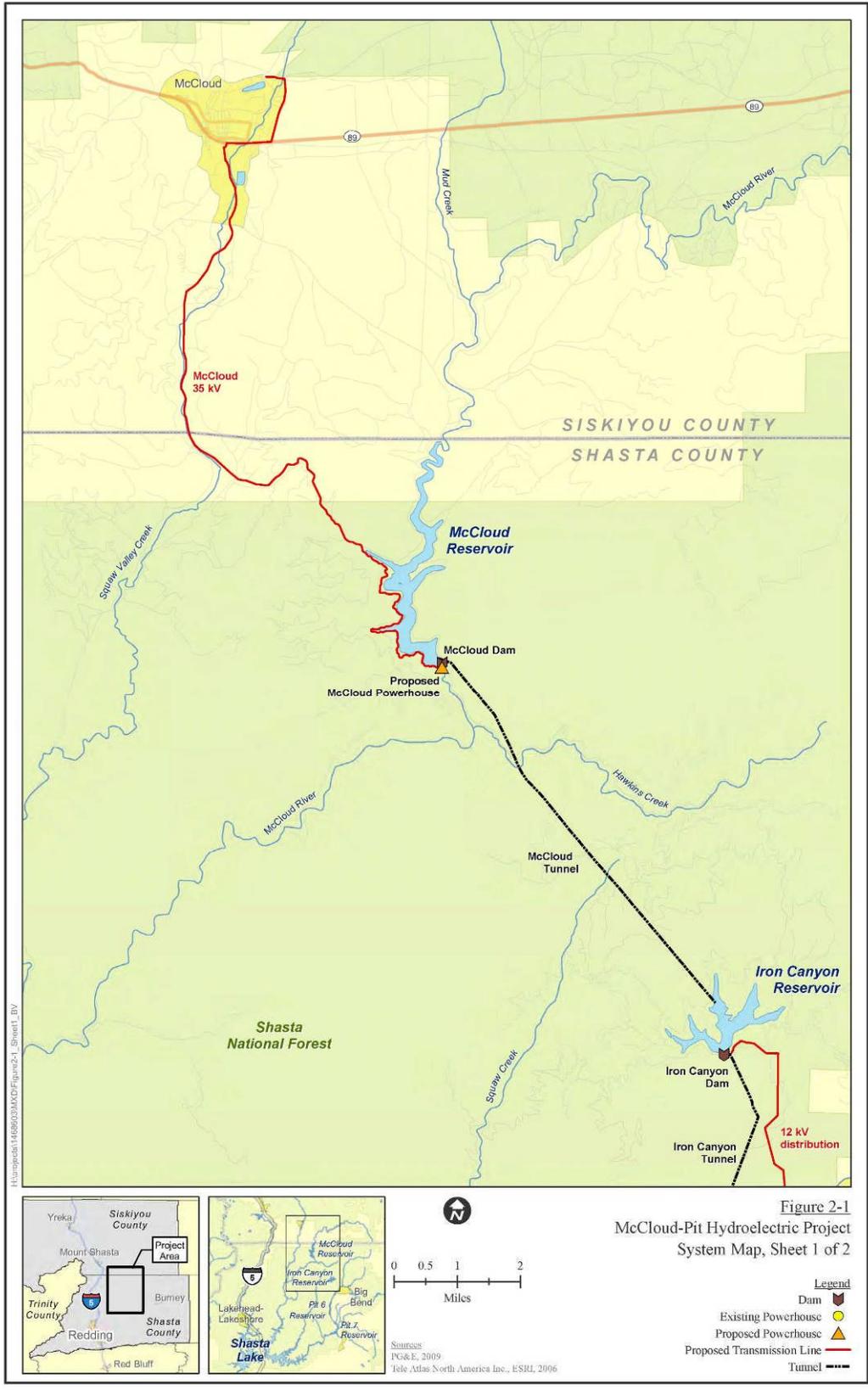


Figure 2-1. McCloud-Pit Project, system map. (Source: PG&E, 2009a)

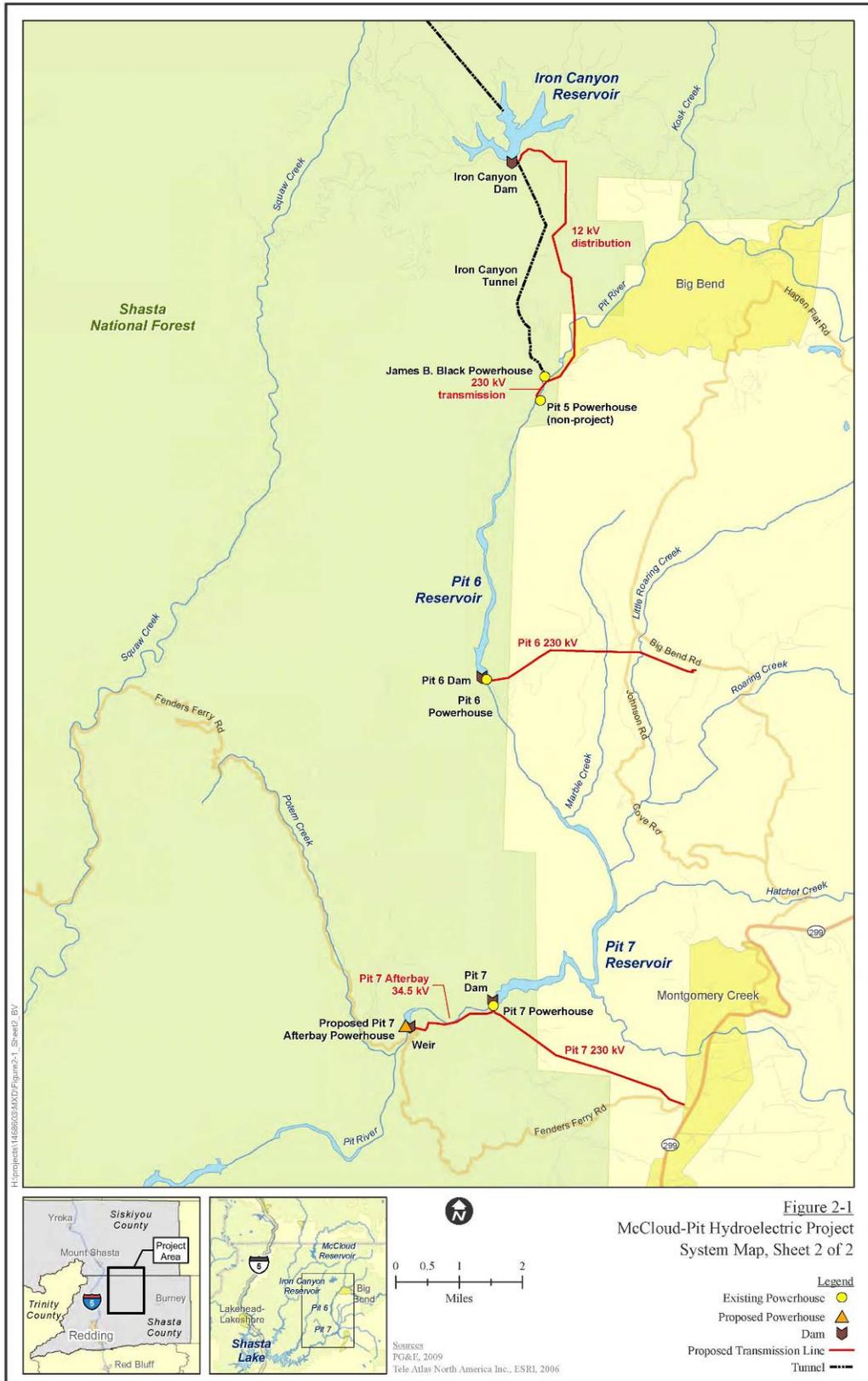


Figure 2-1 (continued). McCloud-Pit Project, system map. (Source: PG&E, 2009a)

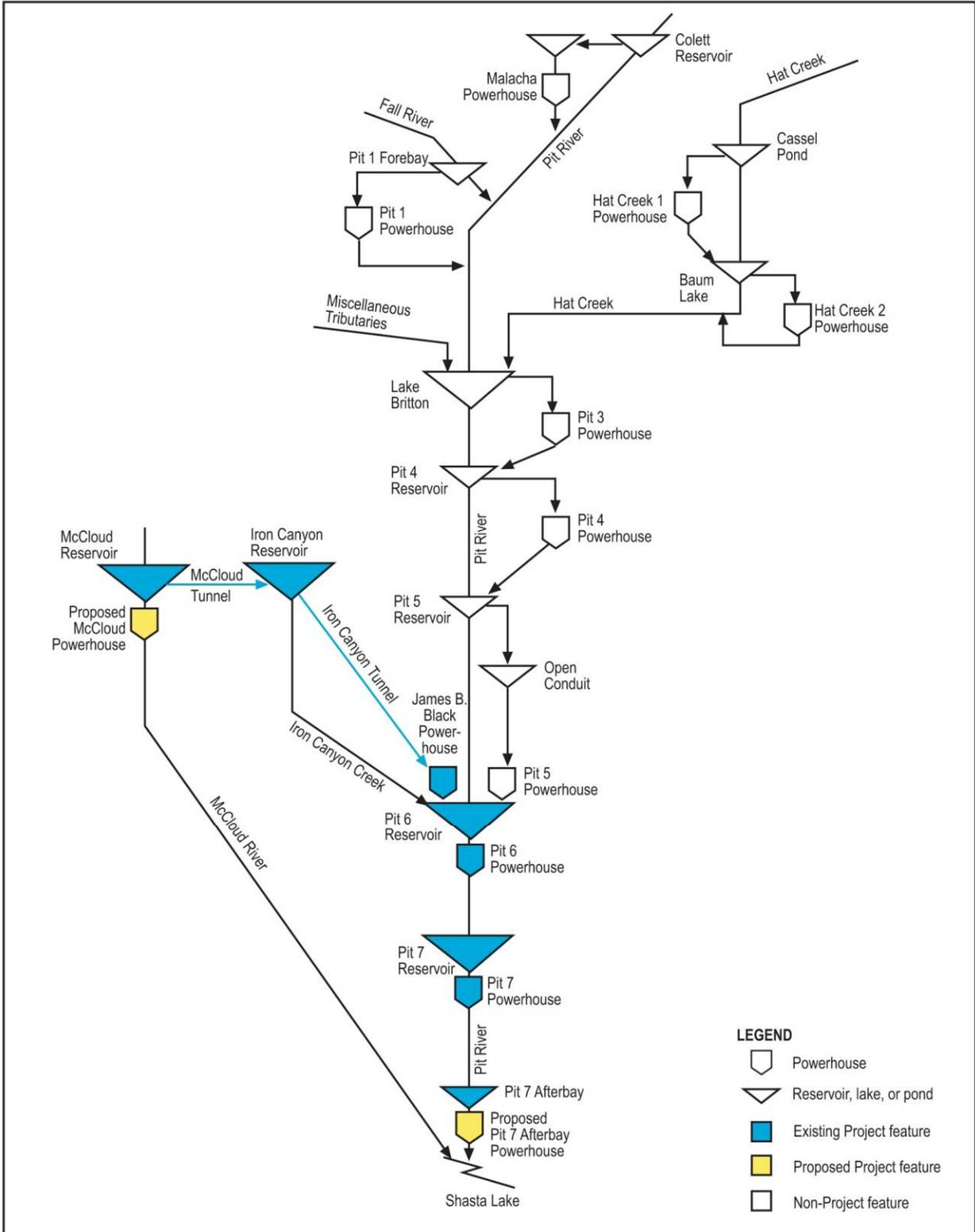


Figure 2-2. Schematic of the McCloud-Pit Project.

## **Iron Canyon Dam and Reservoir**

A 214-foot-high and 1,130-foot-long earth-filled dam impounds Iron Canyon Creek water to create Iron Canyon reservoir. The reservoir has a maximum storage capacity of 24,241 acre-feet with about a 500-acre surface area. The dam has a slide gate leading to a 48-inch-diameter pipe for instream flow releases to Iron Canyon Creek. Normal maximum water surface elevation within the reservoir is 2,664 feet msl.

## **Iron Canyon Tunnel and Penstock**

The 2.9-mile-long, 18-foot-diameter Iron Canyon tunnel diverts water from Iron Canyon reservoir. An associated 1,194-foot-long, 11.5-foot-diameter pipeline at the Willow Spring Creek crossing, and a 5,467-foot-long, 11.5-foot-diameter steel penstock provides water to James B. Black powerhouse. The penstock bifurcates before James B. Black powerhouse to deliver water flow to the two turbine generator units. The tunnel and penstock have a total flow capacity of 2,000 cubic feet per second (cfs). The Iron Canyon tunnel diversion results in an approximately 4-mile-long Iron Canyon Creek bypassed reach leading to the Pit 6 reservoir.

## **James B. Black Powerhouse**

James B. Black powerhouse is located on the northwest bank of the Pit River, about 0.5 mile upstream of the Pit 5 powerhouse (FERC project no. 233). The powerhouse is a three-level, reinforced-concrete structure containing two vertical shaft impulse turbines rated at 104,000 horsepower (hp) each. They operate at a normal maximum gross head of 1,226 feet. Two vertical axis outdoor generators, Unit 1 rated at 94.8 megavolt-ampere (MVA) and Unit 2 rated at 92.6 MVA, are connected to a three-phase, 86-MVA transformer bank. Their combined maximum capacity is 172 MW. Average annual generation within the past 25 years at the station is 656.3 GWh. Flows discharge from this powerhouse via a tailrace leading directly from the generation units to the Pit River.

## **Transmission**

The primary transmission lines (230 kilovolt [kV]) extend about 0.5 mile from the transformer bank in the switchyard adjacent to James B. Black powerhouse to the switchyard adjacent to the non-project Pit 5 powerhouse.

### **2.1.1.2 Pit 6 Development**

#### **Pit 6 Dam and Reservoir**

Pit 6 dam and reservoir are located on the Pit River downstream of James B. Black powerhouse. The 183-foot-high, 560-foot-long concrete gravity Pit 6 dam has a crest elevation of 1,432 feet msl. The top of the dam contains a trash rake, motors for two 42-foot-high by 49-foot-long slide gates, and a control building. The control building houses a hydraulic system for two low-level 8-foot-diameter outlets at the base of the dam. The Pit 6 reservoir has a maximum storage capacity of about 15,619 acre-feet and a maximum surface area of about 268 acres. The normal maximum water surface elevation

of the reservoir is 1,425 feet msl. The reservoir serves as the forebay for Pit 6 powerhouse. Two 18-foot-diameter steel penstocks with a total flow capacity of 6,470 cfs extend 602 feet from the dam to the Pit 6 powerhouse turbines located at the base of the dam.

### **Pit 6 Powerhouse**

Pit 6 powerhouse is located along the east bank of the Pit River at the base of Pit 6 dam. The powerhouse is a four-level, reinforced concrete structure, three levels of which are below grade. The structure contains two vertical-shaft, Francis reaction turbines, rated at 53,000 hp each and operating at a normal maximum gross head of 155 feet. There are two outdoor vertical axis generators, rated at 44 MVA each, with each unit connected to a three-phase, 44-MVA transformer bank that steps up plant output to 230 kV. The maximum generator capacity is 80 MW. Average annual generation over the last 25 years is 373.8 GWh. Water is discharged from the Pit 6 powerhouse directly into the Pit 7 reservoir.

### **Transmission**

The primary transmission lines extend about 3.3 miles from the switchyard adjacent to Pit 6 powerhouse to PG&E's interconnected transmission system.

#### **2.1.1.3 Pit 7 Development**

### **Pit 7 Dam and Reservoir**

Pit 7 dam and reservoir are located on the Pit River downstream of Pit 6 powerhouse. Pit 7 dam is a 228-foot-high and 770-foot-long concrete gravity dam. The top of the dam contains a trash rake, motors for two 49-foot by 42-foot slide gates at the crest of the dam, and a control building. The control building houses hydraulic controls for two 8-foot-diameter low-level outlets at the base of the dam. Pit 7 reservoir has a maximum storage capacity of 34,142 acre-feet and a surface area of about 468 acres at a normal maximum water surface elevation of 1,270 feet msl. As with Pit 6 reservoir, Pit 7 reservoir serves as the forebay for Pit 7 powerhouse. Two penstocks, 15 feet in diameter, extend 572 feet from the dam to the turbines in the powerhouse, located at the base of the dam. Total flow capacity within the penstocks is 7,440 cfs.

### **Pit 7 Powerhouse**

Pit 7 powerhouse is located along the east bank of the Pit River at the base of the Pit 7 dam. The powerhouse consists of a four-level, reinforced concrete structure, three levels of which are below grade. The powerhouse contains two vertical-shaft, reaction turbines that are rated at 70,000 hp each and operate at a normal maximum gross head of 205 feet. Two vertical axis generators are rated at 52.2 (Unit 2) and 62.1 (Unit 1) MVA, respectively. Their maximum combined capacity is 112 MW. Each unit is connected to a three-phase, 58-MVA transformer bank that steps up plant output to 230 kV. The average annual generation over the last 25 years is 512 GWh. Water is discharged from Pit 7 powerhouse directly into Pit 7 afterbay.

## **Transmission**

The primary transmission lines extend about 3.5 miles from the switchyard adjacent to Pit 7 powerhouse to PG&E's interconnected transmission system.

### **Pit 7 Dam and Afterbay**

Pit 7 afterbay has a surface area of about 69 acres at a normal "maximum" water surface elevation of 1,067 feet msl (maximum water surface of Shasta Lake). The afterbay dam is a 30-foot-high, steel reinforced, rock-fill structure, including a variable width concrete gravity regulations weir section. Pit 7 afterbay serves to attenuate changes in the water flow from Pit 7 dam and powerhouse before entering Shasta Lake, which abuts and sometimes inundates the afterbay.

#### **2.1.1.4 Existing Project Boundary**

The existing project boundary, consisting of lands necessary for the safe operation and maintenance (O&M) of the project and other purposes, such as recreation, shoreline control, and protection of environmental resources, includes about 3,707.6 acres of land in Shasta County, California.

The project boundary generally only encompasses project facilities, including: dams and diversions; impoundments; water conveyances and associated structures; access roads and trails; transmission, communication, and control lines; powerhouses; gaging stations; and helicopter landing sites used for access to project structures. The project boundary also includes land adjacent to project features and the width of these zones varies depending on the feature. The current project boundary encloses the project facilities associated with the three developments (James B. Black, Pit 6, and Pit 7) along the McCloud and Pit Rivers, and lands within Shasta-Trinity National Forest.

The project currently contains six existing recreation sites within the project boundary. These sites include: (1) the Forest Service's Star City dispersed recreation site at McCloud reservoir; (2) the existing Tarantula Gulch boat launch at McCloud reservoir; (3) PG&E's Hawkins Landing campground at Iron Canyon reservoir; (4) PG&E's Hawkins Landing boat launch at Iron Canyon reservoir; (5) the Forest Service's Fenders Flat car-top boat launch at Pit 7 afterbay dam; and (6) the Forest Service's existing Deadlun Creek campground.

PG&E proposes to expand the project boundary to include: (1) all proposed recreation development at McCloud, Iron Canyon, and Pit 7 reservoirs and Pit 7 afterbay area and (2) the right-of-way for the proposed McCloud and Pit 7 afterbay transmission lines.

About 45 percent of the land (1,651.4 acres) within the project boundary is owned by the United States and is managed by the Forest Service as part of Shasta-Trinity National Forest. PG&E owns 1,239.4 acres (33 percent) of the land within the project boundary, and the remaining 816.8 acres are privately owned.

### **2.1.2 Project Safety**

The McCloud-Pit Project has been operating under the existing license for more than 48 years, during which time Commission staff have conducted operational inspections focusing on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operation, compliance with the terms of the license, and proper maintenance. In addition, the project has been inspected and evaluated every 5 years by an independent consultant, and a consultant's safety report has been filed for Commission review. As part of the relicensing process, the Commission staff would evaluate the continued adequacy of the proposed project facilities under a new license. Special articles would be included in any license issued, as appropriate. Commission staff would continue to inspect the project during the new license term to assure continued adherence to the Commission-approved plans and specifications; special license articles relating to construction, operation, and maintenance; and accepted engineering practices and procedures.

### **2.1.3 Existing Project Operation**

The project operates both as a peaking system and a load-following system throughout the year, using the available water supply after satisfying minimum instream flow requirements.

James B. Black, Pit 6, and Pit 7 powerhouses are typically operated on a peaking basis. The powerhouses' output varies on an hourly basis from minimum or no load during the off-peak periods, up to the powerhouses' maximum output during peak demand periods. During the mid-peak demand periods, the powerhouses are operated near their more efficient loads depending on the available flow. During periods of high flow, the powerhouses are operated at their maximum capacities in order to minimize spill.

Operations of McCloud and Iron Canyon reservoirs are coordinated to optimize use of water. The movement of water through the tunnel from McCloud reservoir to Iron Canyon reservoir and through a tunnel and penstock from Iron Canyon reservoir to James B. Black powerhouse is carefully planned to prevent spills at Iron Canyon reservoir and minimize spills at McCloud reservoir. The water surface elevation in Iron Canyon reservoir is regulated through the operation of James B. Black powerhouse. The relative level of McCloud reservoir and Iron Canyon reservoir determines the rate of flow through the tunnel connecting the two reservoirs. When spill conditions are forecast because of high inflows to the reservoirs, Iron Canyon reservoir is drawn down to avoid use of its spillway while maximizing the tunnel flow and minimizing spill at McCloud dam. Iron Canyon reservoir does not spill, while McCloud reservoir, on average, spills about 4 out of every 10 years.

## **2.1.4 Existing Environmental Measures**

The current license for the project includes minimum flow requirements for McCloud and Iron Canyon dams (article 31). For McCloud dam, requirements include a 50-cfs flow release from May through November and a 40-cfs flow release from December through April, as measured at gage MC-7, with additional releases as necessary to maintain minimum flows of 160 to 210 cfs at gage MC-1 near Ah-Di-Na. Flows of at least 3 cfs are required to be released to Iron Canyon Creek downstream of Iron Canyon dam at all times.

To facilitate use of the boat ramp during the recreation season from May 15 to October 15, PG&E voluntarily keeps the water surface elevation of Iron Canyon reservoir at or above elevation 2,615 feet msl, instead of the minimum elevation of 2,593 feet msl allowed by the current license.

Land use is regulated under article 56 and is subject to the Shasta County general plan, Shasta-Trinity National Forest Land and Resource Management Plan and the McCloud River Coordinated Resource Management Plan. The current license articles also include requirements for fire prevention and suppression.

PG&E is a participant in the McCloud River Coordinated Resource Management Plan, which provides for coordinated management of the McCloud River by federal and state resource agencies, adjacent landowners, and conservation organizations. Any changes in the operation of the McCloud dam are expected to undergo review by the Coordinated Resource Management Plan coordinating group (McCloud River Coordinated Resource Management Plan, 1991). Also, the Shasta-Trinity National Forest Land and Resource Management Plan guides protection of environmental resources (Forest Service, 1995).

## **2.2 APPLICANT'S PROPOSAL**

### **2.2.1 Proposed Project Facilities**

PG&E proposes to construct a new powerhouse at the base of McCloud dam and a new powerhouse at Pit 7 afterbay dam, along with associated transmission facilities. PG&E also proposes to construct four new recreational facilities at McCloud reservoir, two new recreation facilities at Iron Canyon reservoir, one new recreation facility at Pit 6 reservoir, and two new recreation facilities at Pit 7 afterbay dam.

#### **2.2.1.1 McCloud Development**

At McCloud Development, PG&E proposes to construct a powerhouse located at the base of McCloud dam. Generation output from the proposed powerhouse would be connected to a new transmission line that would be routed from the proposed powerhouse to connect to an existing substation located about 14 miles to the north, in the town of McCloud, California. The McCloud Development would use water stored in McCloud reservoir and released into the Lower McCloud River to meet instream flow

requirements, and no new impoundments are proposed. With a flow range of 150 to 400 cfs, the turbine and generator set would have an installed capacity of about 5 to 8 MW. The proposed McCloud Development would have an average range of annual energy production of 30 to 40 GWh, and average monthly generation would be about 2.5 to 3.3 GWh. PG&E proposes to base the final size of the unit, powerhouse hydraulic capacity, and average annual energy production on instream flow requirements included in the new project license.

The proposed powerhouse would be positioned to the south of the current outlet works control building and would be a reinforced concrete-and-block masonry structure designed to enclose and protect the electro-mechanical generation equipment, withstand area snow loads, and prevent vandalism. It would be accessed via the existing project road that connects to Forest Road (FR) 38N11.

The powerhouse would be equipped with a single vertical-axis Francis turbine. The turbine, which would have a discharge diameter of about 54 inches, would operate at about 450 revolutions per minute. The direct-coupled synchronous generator rating would range from 5,600 to 7,500 kilowatts (kW).

The proposed transmission line route from the powerhouse would follow FR 38N11 and then county roads to the existing substation about 14 miles north in the town of McCloud.

#### **2.2.1.2 Pit 7 Afterbay Development**

PG&E also proposes to construct facilities at Pit 7 Afterbay Development, including a powerhouse located on the west side of Pit 7 afterbay dam at the regulating weir. Generation output from the proposed powerhouse would be connected to a new transmission line that would be routed from the powerhouse to connect to the switchyard located about 1.6 miles to the east at the existing Pit 7 powerhouse. The proposed facilities would have no meaningful storage and would operate in a run-of-the-river mode. The available flows for energy production would be dictated by the operation of the upstream Pit 7 powerhouse.

The proposed Pit 7 afterbay powerhouse would use water released upstream from Pit 7 powerhouse and dam and no new impoundments are proposed. The proposed powerhouse would be configured for two horizontal-axis synchronous generating units, each rated at 5,500 kW and housed in a 30-foot-wide by 110-foot-long intake approach bay. Each of the generating bays would have a design flow of 2,500 cfs. The upstream entrance to each intake bay would include a trash rack to stop large debris from entering the unit. Two radial gates about 26 feet wide by 52 feet high would be constructed upstream of the unit to regulate flow and for dewatering the turbine pit. A roller gate would be constructed at the downstream end of each bay or the tailrace to prevent backwatering during maintenance. A combination of ramps, walkways, and ladders would be used in each bay to allow for maintenance access and to support the gate operator mechanism. A 20-foot-wide bypass flow bay, which would house a radial gate

and operator, would be built in the first phase of construction. The bypass flow bay would be used to pass river flows during the second phase of construction and during times of non-generation. The bypass flow bay also would require a walkway to allow maintenance and operation access and support the gate operator mechanism. A new access road would be constructed to access the powerhouse for construction, operation, and maintenance. The access road would extend between Fenders Ferry Road and the afterbay, just west of Fenders Ferry Bridge. Based on a flow range of 2,500 to 5,000 cfs, the two-unit powerhouse would accommodate turbine and generator sets capable of an installed capacity of about 5 MW each for a total of 10 MW. The average monthly generation from this proposed powerhouse would be about 4.2 GWh.

The proposed powerhouse substation would be fenced and located on the ground near the control house, but above the maximum anticipated flood and tailwater levels. Substation equipment would include a step-up substation to transform energy for the transmission line. Powerhouse controls and switchgear would be installed in a separate building located on the right bank of the river, positioned above the maximum anticipated water level and inside the substation fence. The building would house the required equipment for control and protection of the generation units and would be equipped with electric heating and cooling. The transmission line would be a 1.6-mile-long, 34.5-kV, wooden-pole line connecting the proposed powerhouse to a new 34.5- to 230-kV transformer, positioned at or near the existing 230-kV Pit 7 switchyard. A new 230-kV circuit breaker and disconnect switch would be connected by a short span to the main bus of the existing Pit 7 switchyard.

### **2.2.2 Proposed Project Operation**

Future operation of existing project structures would be generally consistent with existing operation. One significant change in future operation, however, is related to minimum flow releases, as described below (Measures 5, 7, and 8). PG&E also proposes to release recreational flows below McCloud dam (Measure 6).

The proposed McCloud powerhouse would generate electricity with water stored in McCloud reservoir and released into the Lower McCloud River to meet instream flow requirements, and no new impoundments are proposed. The final size of the unit, powerhouse hydraulic capacity, and average annual energy production would be determined based on instream flow requirements included in the new project license.

The proposed Pit 7 afterbay powerhouse would operate in run-of-the-river mode.

### **2.2.3 Proposed Environmental Measures**

In its new license application, PG&E proposed the following protection and enhancement measures:

#### **General**

- Consult annually with the Forest Service (Measure 1).

- Conduct annual training in coordination with the Forest Service, to familiarize project staff with local resource issues, special status species, noxious weeds, procedures for reporting to the Forest Service, and applicable Forest Service orders (Measure 2).
- Obtain Forest Service approval of designs and schedules for any changes to project construction and activities (Measure 4).

### **Geology and Soils**

- Implement a Large Woody Debris (LWD) Management Plan that calls for transporting LWD from McCloud reservoir and depositing it in the Lower McCloud River (Measure 11).
- Develop and implement an Erosion and Sediment Monitoring and Control Plan that specifies treatment criteria; methods for inventorying, monitoring, and reporting; and protocols for emergency erosion control. The plan would include provisions for detecting and treating new erosion sites, as well as treating and monitoring existing sites (Measure 12).

### **Aquatic Resources**

- Increase minimum instream flow releases below McCloud dam to the McCloud River, and move the point for measuring compliance about 4 miles upstream to the base of McCloud dam. The proposed target minimum instream flow below McCloud dam is 220 cfs from December through April and 150 cfs from May through November (Measure 5).
- Increase minimum instream flows below Iron Canyon dam to Iron Canyon Creek from 3 cfs, year-round, to a varied scenario of flows from 5 to 20 cfs, depending on time of year and water year type (Measure 7).
- Implement an upramping rate measure for the Lower McCloud River, identical to the existing voluntary operational practice, which would be implemented during uncontrolled spill events (Measure 9).
- Continue providing a minimum flow release of 150 cfs to the Pit River below Pit 7 dam when Shasta Lake is lower than 1,055 feet msl to maintain water flow in the Pit 7 afterbay (Measure 8).
- Develop and implement a water quality monitoring plan, which would provide for continued monitoring of water temperature and turbidity for selected sites at which PG&E has been monitoring since about 1987, and add monitoring the effects of changes to instream flow releases on water temperature and turbidity and monitoring bacteria in McCloud and Iron Canyon reservoirs (Measure 10).
- Prepare, for Forest Service approval, a biological evaluation of the potential effects of any proposed action to construct project features on Forest Service lands on special status species. The evaluation would include procedures to

minimize any adverse effects, meet any management plan restrictions, and monitor implementation and effectiveness of any measures taken as part the construction (Measure 15).

- Develop a Wildlife Management Plan for aquatic and terrestrial species that includes monitoring methodologies, pre-construction survey protocols, and avoidance and protection measures for special status mollusks, Shasta salamander, foothill yellow-legged frog, and northwestern pond turtle (Measure 14).

### **Terrestrial Resources**

- Develop a Vegetation Management Plan in consultation with resource agencies to ensure that PG&E: (1) identifies, monitors, and protects individuals and populations of special status species, and culturally significant plant species to maintain well-distributed, viable populations; (2) specifies allowable treatment methods for project O&M practices to minimize the introduction and spread of invasive plant species; (3) protects wetland areas; and (4) restores native vegetation in areas disturbed by project operation and activities (Measure 13).
- Develop a Wildlife Management Plan for aquatic and terrestrial species that describes monitoring methodologies, pre-construction survey protocols, and avoidance and protection measures for VELB, northern goshawk, bald eagle, peregrine falcon, willow flycatcher, communities of breeding birds, special status bats, and forest carnivores (Measure 14).
- Modify any existing power line that does not meet established Avian Power Line Interaction Committee (APLIC) standards for preventing bird electrocution; construct any new power lines to meet the established standards (Measure 16).
- Prepare, for Forest Service approval, a biological evaluation of the potential effects of any proposed action to construct project features on Forest Service lands. The evaluation would include procedures to minimize any adverse effects, meet any management plan restrictions, and monitor implementation and effectiveness of any measures taken as part the construction. This measure would apply to and protect terrestrial and aquatic Forest Service special status species (Measure 15).

### **Threatened and Endangered Species**

- Pacific fisher: Perform pre-construction surveys using passive detection systems, such as baited camera stations. Survey methods from the scientific literature, and any available standard species survey protocols, would be considered in defining the survey approach. Avoidance, protection, and mitigation measures would be used at construction sites (Measures 14 and 15).

- Northern spotted owl: Conduct protocol-level surveys prior to construction and implement appropriate mitigation measures if required, or alternatively assume the presence of spotted owls, and propose measures, as appropriate, to address potential project-related effects. If spotted owls are detected, implement restrictions on project activities near nest sites documented during pre-construction surveys or other observations. Define the seasonal timing and the buffer distance around occupied sites for each type of activity. Ensure that these restrictions are generally consistent with those applied by the Forest Service at other occupied sites in the vicinity (Measure 14).

### **Recreation Resources**

- Obtain Forest Service approval of final design before construction of project facilities occurs on National Forest System (NFS) lands to ensure that any concerns about consistency with the Shasta-Trinity National Forest Land and Resource Management Plan, including visual quality objectives, are addressed when planning, designing, and constructing project facilities and implementing project measures (Measures 3 and 19).
- Continue funding to California Fish and Game for stocking rainbow trout or kokanee in the drainages of the Pit and McCloud Rivers below the uppermost project development to Shasta Lake. This measure would continue to enhance recreational fishing in project waters (Measure 17).
- Develop and implement a Recreation Development and Management Plan to address recreation resource needs at the project. A number of sub-plans are proposed in the project Recreation Plan: (1) a Signage Plan to provide directions to project recreation opportunities and inform visitors about applicable rules and regulations; (2) a surface water and shoreline management plan to manage reservoir use at McCloud reservoir; (3) an Interpretive and Education Plan to enhance visitor experience; and (4) a Recreation Monitoring Plan to provide information that could be used to implement actions to address the effects of recreation use throughout the license term (Measure 19).
- Include the following facilities at McCloud reservoir in the project Recreation Plan: a walk-in campground at Star City, four day-use facilities, reservoir shoreline access (i.e., parking areas with pedestrian shoreline access trails) at three access points, and a whitewater put-in at the base of McCloud dam (Measure 19).
- Include the following facilities at Iron Canyon reservoir in the project Recreation Plan: a boat launch near the dam and reservoir shoreline access after conducting a site evaluation (i.e., three parking areas with pedestrian shoreline access trails) (Measure 19).
- Reconstruct Forest Service facilities (Tarantula Gulch boat launch, if feasible, and Deadlun Campground) and PG&E-owned facilities at Hawkins Landing.

- Reconstruction at Deadlun Campground would include redesigning the facility to include additional overnight capacity. Upgrade Hawkins Landing to Forest Service standards, resurface the access road, and replace or repair the surfacing that connects to the concrete ramp. If feasible within site constraints, extend the boat ramp at Tarantula Gulch. After construction or reconstruction, the facilities would become project recreation facilities, and PG&E would be responsible for O&M for the facilities, including fee collection (Measure 19).
- Provide hosts at project campgrounds (Measure 19).
  - Develop in consultation with the Forest Service and implement a Project Patrol Plan to include NFS lands within the project area or affected by project facilities, access areas, and dispersed use sites to respond to concerns about trash, vandalism, and improper or disruptive visitor behavior near project reservoirs (Measure 20).
  - Include the following proposed facilities at Pit 7 afterbay in the project Recreation Plan: a day-use area at Fenders Flat and, if the Pit 7 afterbay powerhouse is constructed, pedestrian access to the shoreline between the powerhouse and the bridge. Grade and maintain the access road to the car-top boat launch and continue to prohibit public access to the Pit 7 afterbay water surface and shoreline (Measure 19).
  - Assess and implement, in coordination with the Forest Service, closures of existing and future user-created roads leading to the shoreline. This measure would prohibit vehicle access between certain forest roads and the shoreline except to developed facilities and prohibit dispersed camping and off-highway vehicle (OHV) use between the roads and the shoreline (Measure 19).
  - Provide a recreation flow event from McCloud dam when natural spill of at least 300 cfs for seven consecutive days during the period of April 1 through October 31 has not occurred at any time in the three previous calendar years (Measure 6).
  - Provide real-time flow information on the internet (gage MC-1) in the Lower McCloud River. Inform the public via internet if the project reservoir levels are sufficient for launching boats (i.e., end of the launch lanes are sufficiently submerged). Provide flow and boat launch information so visitors will know when conditions are suitable for their activities (Measure 19).
  - Conduct feasibility studies to evaluate the potential for constructing a few recreation facilities as suggested at meetings among relicensing participants and construct if feasible. At McCloud reservoir, evaluate locations for a floating dock or pier and trail for fishing and swimming. At Pit 7 reservoir, evaluate the feasibility of providing shoreline access at the upper end of the reservoir and a hand launch boat put-in where Montgomery Creek enters the reservoir (Measure 19).

## **Cultural Resources**

- Develop and implement the HPMP. The plan has been developed in consultation with the Tribes and Forest Service; however, consultation will continue until the Commission approves the HPMP. Specifications are included in the plan to avoid or manage any potential project-related adverse effects on properties that are unevaluated, eligible for, or listed on the National Register (Measure 22).

## **Land Use and Aesthetic Resources**

- Prepare a Road and Transportation Facilities Management Plan for NFS roads or project roads affecting NFS resources (Measure 18).
- Plan and create, in coordination with the Forest Service, shaded fuel breaks around all project recreation facilities that would be constructed and maintained by PG&E (Measure 19).
- Develop a Fire Response Plan to address ongoing concerns about wildland fire and potential damage to project infrastructure and forest resources. This measure would provide pre-suppression coordination with fire management agencies; describe hazard reduction treatments; and identify contacts, equipment, personnel, and access routes that can be immediately referenced to support suppression actions. It would also specify requirements for reporting project-caused fires and supporting fire investigations (Measure 21).

### **2.2.4 Modifications to the Applicant's Proposal—Mandatory Conditions**

The following mandatory conditions have been provided and are evaluated in this document.

#### **2.2.4.1 Section 4(e) Federal Land Management Conditions**

In a January 29, 2010, filing with the Commission, the Forest Service submitted terms and conditions pursuant to section 4(e) of the FPA, including 18 standard Forest Service conditions and 16 project-specific resource protection conditions. On March 1, 2010, the Forest Service revised one condition in part, condition 19, *Streamflow*. The Forest Service modified four standard conditions and 14 resource-specific protection conditions with its filing of modified 4(e) conditions on November 29, 2010.

On December 14, 2010, the Forest Service filed a settlement agreement between PG&E and the Forest Service for non-project recreation facilities (specifically, Ash Camp, Ah-Di-Na Campground, and the Lower McCloud River Trail) and roads in the Shasta-Trinity National Forest, which are also detailed in the Forest Service's 4(e) conditions.

Of the Forest Service's 34 conditions, we consider the 18 standard conditions (conditions 1 through 18) to be administrative or legal in nature and not specific

environmental measures. With the exception of Forest Service condition 1, *Consultation*, condition 11, *Protect Forest Service Special Status Species*, and condition 15, *Pesticide Use Restrictions on NFS Lands*, we do not analyze these conditions in this EIS. We analyze conditions that we consider to be environmental measures in section 3, *Environmental Analysis*, and we summarize our analysis of these measures in section 5.4.2, *Forest Service 4(e) Conditions*.

The initial and revised Forest Service conditions that we analyze in this document specify that PG&E:

- Consult with the Forest Service annually on measures needed to ensure protection and utilization of the National Forest resources affected by the project. [Forest Service condition 1]
- Prepare and submit a biological evaluation to the Forest Service before taking action to construct new project features that may affect Forest Service special status species or their critical habitat. [Forest Service condition 11]
- Obtain prior written approval from the Forest Service for use of pesticides on NFS lands or in areas affecting NFS lands. Pesticide use would be excluded from NFS lands within 500 feet of known locations of Shasta salamanders, northwestern pond turtles, foothill yellow-legged frogs, or known locations of Forest Service special status or culturally significant plant populations. [Forest Service condition 15]
- Maintain specified minimum streamflows in project reaches in accordance with the provisions described in the Forest Service filing. The minimum instantaneous 15-minute streamflow shall be at least 80 percent of the prescribed mean daily flow for those minimum streamflows less than or equal to 10 cfs, and at least 90 percent of the streamflows required to be greater than 10 cfs. Should the mean daily flow as measured be less than the required mean daily flow but more than the instantaneous flow, PG&E shall begin releasing the equivalent under-released volume of water within 7 days of discovery of the under-release. [Forest Service condition 19]
- Determine the water type year for minimum flow compliance based on the California Department of Water Resources (DWR) Bulletin 120 water year forecast of unimpaired runoff for the McCloud River above Shasta Lake. [Forest Service condition 19, part 2]
- Operate, maintain, and modify (if necessary) gages needed to determine river stage and minimum streamflow, and measure and document all instream flow releases in publicly available formats. [Forest Service condition 19, part 3]
- Prepare a water quality and temperature monitoring plan in consultation with agencies and approved by the Forest Service. [Forest Service condition 20]

- Prepare an LWD Plan in consultation with agencies and approved by the Forest Service. [Forest Service condition 21]
- Prepare an Erosion and Sediment Control Management and Monitoring Plan developed in consultation with agencies and approved by the Forest Service. [Forest Service condition 22]
- Develop a Gravel and Coarse Sediment Management Plan in consultation with agencies and approved by the Forest Service. [Forest Service condition 23]
- Note: The Forest Service withdrew condition 24 on November 29, 2010.
- Develop a Vegetation and Invasive Weed Management Plan, in consultation with agencies and approved the Forest Service, to address special status species, aquatic and terrestrial invasive species, and revegetation source plant populations, including culturally significant plants, within the project boundary and adjacent to project features directly affecting NFS lands including roads and distribution and transmission lines. [Forest Service condition 25]
- Develop a Terrestrial Biological Management Plan, including Forest Service special status species potentially affected by the project on NFS lands. Ensure that all power poles conform to APLIC guidelines. [Forest Service condition 26]
- Develop an Aquatic Biological Monitoring Plan, in consultation with agencies and approved by the Forest Service. [Forest Service condition 27]
- Note: The Forest Service withdrew condition 28 on November 29, 2010.
- File a Road and Transportation Facility Management Plan, approved by the Forest Service, for protection and maintenance of project and project-affected roads on or affecting NFS lands. [Forest Service condition 29]
- Prepare a Recreation Development and Management Plan in consultation with agencies and approved by the Forest Service to address recreation resource needs associated with the project that includes the following components: O&M, recreation survey and monitoring, project patrol, reservoir surface water management, and construction and reconstruction of recreation facilities. All new and reconstructed project recreation facilities would comply with federal accessibility standards and include the following facilities:
  - Reconstruct Tarantula Gulch boat launch;
  - Develop campground and day-use area at Star City;
  - Develop day-use areas at Tarantula Gulch inlet and Red Banks;
  - Create reservoir access points at Battle Creek and on each side of McCloud dam;
  - Construct a day-use area at the base of McCloud dam;

- Provide three reservoir access sites at Iron Canyon reservoir;
  - Construct Iron Canyon dam boat ramp;
  - Reconstruct Hawkins Landing Campground and boat ramp;
  - Reconstruct Deadlun campground;
  - Construct new Gap Creek Campground;
  - Develop two surfaced parking areas with reservoir access trails below Pit 6 dam to provide fishing access and boating put-in onto the upper Pit 7 reservoir;
  - Develop road access to a surfaced parking area and short walkway to put-in/take-out onto the lower Pit 7 reservoir, either at Montgomery Creek or near the Pit 7 dam;
  - Construct day-use area at Fenders Flat in vicinity of boat launch;
  - Reconstruct car-top boat launch near Fenders Flat; and
  - Investigate known safety and public access issues at Pit 7 afterbay dam. [Forest Service condition 30]
- In collaboration with the Forest Service, develop and implement a project Sign and Interpretive/Education Plan for all non-traffic signs within the project, and an interpretive and educational component that includes a website for public information and informational kiosks. [Forest Service condition 31]
  - Develop procedures and a timeline for mitigation measures to provide for visual quality of project and project-affected NFS lands. [Forest Service condition 32]
  - Develop a Fire and Fuels Management Plan, in consultation with agencies and approved by the Forest Service, for prevention, reporting, and emergency response to fires in the vicinity of the project resulting from project operations. The plan shall address fuels treatment, prevention and response, and investigation of project-related fires. [Forest Service condition 33]
  - File an HPMP approved by the Forest Service with the Commission. [Forest Service condition 34]

#### **2.2.4.2 Alternative 4(e) Conditions Pursuant to the Energy Policy Act of 2005**

The Energy Policy Act of 2005 provides parties to this licensing proceeding the opportunity to propose alternatives to mandatory conditions. On March 4, 2010, PG&E filed alternatives to 16 of the Forest Service's 4(e) conditions. By letter dated November 24, 2010, PG&E withdrew 13 of its alternative 4(e) conditions in full and part of alternative condition 19. PG&E states that it has not reached agreement with the Forest Service on parts of condition 19 and on conditions 29 and 30. While our list of

PG&E's and others' alternative 4(e) conditions reflects their current status, we continue to analyze all alternative 4(e) conditions in this EIS, regardless of that status.

- PG&E alternative condition 12 – proposed that access to Forest Service lands within the licensed area be permitted by the Forest Service specifically for the protection, administration, management, and utilization of Forest Service lands, in a manner that did not require PG&E to disproportionately bear costs;
- PG&E alternative condition 18 – proposed that this Forest Service condition be limited to PG&E-proposed ground-disturbing activities on or directly affecting Forest Service lands and eliminated requirements for PG&E to bear Forest Service staff-related time and expenses;
- PG&E alternative condition 19, part 1, subpart b – proposes minimum streamflow requirements and measurement for McCloud River below McCloud dam.
- PG&E alternative condition 19, part 1, subpart c – proposed minimum streamflow requirements and measurement for Iron Canyon Creek below Iron Canyon dam and allowed for a longer scheduling timeframe for the adjustment of flows and dam tests;
- PG&E alternative condition 19, part 2 – proposes that compliance with flow changes be implemented within five business days for Iron Canyon dam between February and May, to account for potential weather-related access difficulties.
- PG&E alternative condition 20 – addressed the timeframe for the development of the water quality and temperature monitoring plan as well as access issues, such as those related to private property and inclement weather, associated with the installation of water quality sensors and temperature monitoring;
- PG&E alternative condition 23 – addressed the conditions for implementation of a Gravel and Coarse Sediment Management and Monitoring plan, and defined the monitoring area and sediment augmentation metric and methods;
- PG&E alternative condition 24 – stated that PG&E does not anticipate a need for development of a dredging plan;
- PG&E alternative condition 25 – proposed a new timeframe for development of a Vegetation and Invasive Weed Management and Monitoring Plan, the definition of culturally significant plants, invasive weed monitoring priorities and intervals, and geographic monitoring boundaries;
- PG&E alternative condition 26 – proposed a new timeframe for development of a Terrestrial Biological Management and Monitoring plan, identified targeted populations and habitat for monitoring, monitoring intervals, and the timeline and focus for APLIC recommended upgrades;

- PG&E alternative condition 27 – proposed a new timeframe for development of an Aquatic Biological Management and Monitoring Plan, identified non-project roads and eliminates associated fish passage responsibilities, and addressed fish monitoring in project reservoirs;
- PG&E alternative condition 28 – proposed that PG&E would provide the Forest Service copies of its existing Spill Prevention, Control, and Countermeasures Plans and Hazardous Materials Business Plans for the project in lieu of a plan approved by the Forest Service for oil and hazardous substances storage and spill prevention and cleanup;
- PG&E alternative condition 29 – clarifies road segments that would be covered by the Road and Transportation Facility Management Plan;
- PG&E alternative condition 30 – proposes to remove the requirement for Forest Service approval of the Recreation Development and Management Plan; modifies specific components of the Recreation Plan, including recreation facility enhancements and recreation facility construction and site assessment schedules; clarifies the applicability of recreation monitoring to project facilities and project lands and waters; specifies that existing recreation facilities would be included within the project boundary after reconstruction; and modifies the schedule for surface sweeps of McCloud and Iron Canyon reservoirs and boat ramps;
- PG&E alternative condition 31 – specified that for the Informational Sign Plan, PG&E would provide project recreation information, except for confidential business information, to the Forest Service for posting on the Forest Service’s website;
- PG&E alternative condition 32 – proposed to define the applicability of specific mitigation measures as existing and proposed project facilities, clarifies terminology, and accounts for an apparent inconsistency between the assigned visual quality objective (VQO) and the appearance of the project area;
- PG&E alternative condition 33 – proposed minor clarifications to the Fire and Fuels Plan; and
- PG&E alternative condition 34 – proposed clarifications in terminology and allowances for modifications to the HPMP upon completion of an ethnographic study, clarifies conditions for National Register site evaluation, and ensured collaborative HPMP development and appropriate consideration of new cultural materials.

On March 4, 2010, California Trout, Trout Unlimited, and McCloud River Club filed an alternative to Forest Service condition 19:

- Forest Service condition 19, part 1 – California Trout, Trout Unlimited, and McCloud River Club recommend modifications to streamflow requirements for

McCloud River below McCloud dam, including a minimum baseflow of 200 cfs at MC-1 and summer base flows at MC-1 of 200 cfs or the historic average summer base flows, whichever is higher.

The Forest Service filed its analysis of the alternative 4(e) conditions with its modified 4(e) conditions on November 29, 2010. The Forest Service modified 18 conditions and withdrew two conditions as a result of its analysis and discussions with PG&E and other interested parties. By letter dated November 29, 2010, California Trout, Trout Unlimited, and McCloud River Club state their agreement with the Forest Service's modified condition 19.

### **2.3 STAFF ALTERNATIVE**

After evaluating PG&E's proposal and recommendations from resource agencies and other interested parties, we compiled a set of environmental measures that we consider appropriate for addressing the resource issues raised in this proceeding, calling this the staff alternative. The staff alternative includes some measures included in PG&E's proposal and some of the Forest Service's section 4(e) conditions and PG&E's alternative section 4(e) conditions, section 10(j) recommendations, section 10(a) recommendations, and measures developed by Commission staff.

The staff alternative incorporates PG&E's proposed environmental measures (see section 2.2.3, *Proposed Environmental Measures*), as modified by staff (indicated by *italics*):

#### **Geology and Soils**

- Prepare an LWD Management Plan.
- Prepare an Erosion and Sediment Monitoring and Control Plan.

#### **Aquatic Resources**

- Continue to implement the current minimum flow release schedule for the Pit 7 afterbay reach.
- Implement upramping rates of no more than 100 cfs per hour prior to the start of an uncontrolled spill event at McCloud dam.
- Develop and implement a water quality monitoring plan.

#### **Recreation Resources**

- Develop and *implement* a Recreation Development and Management Plan that would include: location, conceptual designs, and schedules for upgrading existing recreation facilities and constructing new recreation facilities, *including the reevaluation of the facilities for degradation at mid-license term or 25 years, whichever is greater*; plans using the Forest Service design standards (including applicable standards for providing access to users with disabilities); and details regarding O&M activities at *all recreation facilities*

*including existing and new project recreation facilities. The plan also should incorporate the following components:*

- A Project Sign Plan that includes an interpretive and education component;
  - Monitoring, visitor surveys, and use estimation with report concurrent with the recreation Form 80 reporting. This measure also should include details addressing collection of annual use data at facilities where passes/fees are collected; consultation with the Forest Service on the survey methods for the Recreational Resource Survey; and consultation every 6 years (concurrent with the recreation Form 80) with the Forest Service, appropriate agencies, and interested parties to review and adjust project-wide recreation management objective, if needed; and
  - A water surface management plan to manage reservoir use at McCloud reservoir. This plan component would include installing speed limit signs in the northern end of the reservoir, LWD removal from the reservoir, points of public access to the shoreline, and boating speeds. This measure would also include details addressing monitoring and management of recreation user safety, including developing protocols for all project reservoirs for preventing/removing unapproved buoy courses, approved use of docks, and measures to prevent unauthorized access to project lands and waters; *annual* surface sweeps of McCloud and Iron Canyon reservoirs and boat ramps to remove logs and other debris; *monitoring boat use on McCloud and Iron Canyon reservoirs every 6 years coinciding with the recreation Form 80 schedule*; and reassessing water surface management mitigations every 6 years.
- Provide real-time streamflow (gages MC-1 and MC-7) and drawdown information to the public *via PG&E's website* on the internet.
  - At McCloud and Iron Canyon reservoirs, assess and implement closures of user-created roads, *trails, and dispersed use sites* leading to the shoreline of McCloud and Iron Canyon reservoirs, in coordination with the Forest Service.

#### McCloud Reservoir

- Within 5 years of Commission approval of the Recreation Plan, reconstruct the Tarantula Gulch boat ramp to California Department of Boating and Waterways (California Boating) standards with one lane ramp, provide a boarding dock, and extend the launch ramp to 3 feet (vertical) below the minimum operating pool elevation, including redesigning the parking lot to maximize parking spaces and a day-use area.
- Within 5 years of Commission approval of the Recreation Plan, provide access points (paved parking and shoreline access trail) at Battle Creek, West dam, and East dam.

- Within 5 years of Commission approval of the Recreation Plan, provide day-use areas at Red Banks and the intersection of Tarantula Gulch access road and FR 11.
- Within 5 years of Commission approval of the Recreation Plan, develop a formal campground and day-use area at Star City with walk-in sites (estimate six sites), paved parking, vault restroom, potable water, tables, fire rings/grills, trash receptacles/removal, and host site.
- Conduct a feasibility study to find a suitable location for a floating dock or pier and trail at McCloud reservoir and construct the facilities if feasible.

#### Lower McCloud River

- Within 5 years of Commission approval of the Recreation Plan, provide a *day-use facility* at the base of McCloud dam and provide parking, vault restroom, trash receptacle/removal, and shoreline pedestrian access trail on river left to the pool below the spillway. *This measure is modified to recommend that the trail accommodate fishing and boating access and to include an access road.*

#### Iron Canyon Reservoir

- Within 5 years of Commission approval of the Recreation Plan, reconstruct Hawkins Landing Campground to the Forest Service standards and provide potable water and reconstruct or resurface the access road to allow all-season use.
- Within 5 years of Commission approval of the Recreation Plan, retain concrete ramp surface at Hawkins Landing Boat Launch and replace or repair the surfacing that connects to the concrete ramp. *This measure is modified to include specifications for reconstruction of boat ramp surface (length and width, but not grade) to meet California Boating standards for one lane, and for construction of a parking area.*
- Within 5 years of Commission approval of the Recreation Plan, reconstruct Deadlun Campground to the Forest Service standards and increase capacity by about 10 sites to provide about 37 sites and provide potable water a shoreline access trail. *This measure is modified to specify that the campground be reconstructed to accommodate double and triple campsites.*
- Within 5 years of Commission approval of the Recreation Plan, construct a new boat launch at the east end of Iron Canyon dam that meets California Boating standards and provide vault restroom, picnic tables, potable water, and trash receptacles/removal. *This measure is modified to recommend that the boat ramp be operable at minimum operating pool, and that snow be removed from the parking area and ramp when project operations require snow removal from Oak Mountain Road.*

- Conduct a site evaluation to determine the location of three paved parking areas along FR 37N78, each with a capacity of up to three vehicle parking spaces and a pedestrian shoreline access trail. *This measure is modified to specify that once three suitable locations are identified, design and construct these project facilities.*
- Allow public use of at least one campground year-round. *This measure is modified to specify that a schedule for implementation would be included in the Recreation Plan.*

#### Pit 7 Reservoir

- Conduct a site evaluation to determine the location of a pedestrian shoreline access trail at the upper end of Pit 7 reservoir, downstream of Pit 6 powerhouse tailrace. *This measure is modified to include consultation with the Forest Service, and once a suitable location is found, constructing this facility within 5 years of Commission approval of the Recreation Plan. The facility would include a trailhead, parking for up to three vehicles, and hand-launch boating access.*

#### Pit 7 Afterbay

- Within 2 years of Commission approval of the Recreation Plan, grade and maintain FR 35N66 from its intersection with FR 37N78 to the car-top boat launch. Provide a vault restroom near the car-top boat launch.
- Continue to prohibit public access to Pit 7 afterbay water surface and shoreline by maintaining fencing, signage, and patrols.
- If the Pit 7 afterbay powerhouse is constructed, provide a paved parking area for two to three vehicles at the end of the powerhouse access road or along Fenders Ferry Road and provide a vault restroom, trash receptacle/removal, and pedestrian access to the shoreline between the powerhouse and Fenders Ferry Bridge. *This measure is modified to condition the day-use area on public safety and homeland security needs.*
- Within 5 years of Commission approval of the Recreation Plan, provide a day-use site at Fenders Flat with a capacity of five sites, parking, vault restroom, tables, fire grills, and trash receptacles/removal, and coordinate with the Forest Service to develop and implement a plan to revegetate disturbed areas and prevent vehicle access beyond the access road and parking area.

#### **Land Use and Aesthetic Resources**

- Develop, file, and implement, within 1 year of license issuance, a Road and Transportation Facilities Management Plan for all project roads.
- Develop, file, and implement, within 1 year of license issuance, a Fire Prevention and Response Plan.

- Include all existing project roads and recreation sites within the project boundary and file a revised exhibit G with the Commission within 1 year of license issuance.
- Develop, file, and implement, within 1 year of license issuance, visual quality management tasks and a timeline.

**Additional Measures Identified by Staff**

In addition to PG&E’s proposed measures listed above (and modified as indicated), the staff alternative also includes the following additional measures identified by staff based on agency, tribal, and non-governmental organization specifications, recommendations, and our analysis.

**Geology and Soils**

- Within 12 months of license issuance, develop and implement a Gravel and Coarse Sediment Management Plan in consultation with agencies and approved by the Forest Service. Employ an adaptive management approach to monitoring with Bald Mountain Creek confluence serving as the downstream terminus for the monitoring program, and augment gravel and coarse sediment periodically. Evaluate Star City Creek as a primary source of gravel, and evaluate other potential alternate local sites, such as Tarantula Gulch delta in the development of the Coarse Sediment Management Plan.

**Aquatic Resources**

- Within 90 days of license issuance, release mean daily flows of at least 175 cfs year round from the McCloud dam (as measured at MC-7) such that the mean daily flow at Ah-Di-Na (MC-1) is at least 200 cfs. Augment flows during the period February 15 through August 31 as follows:

| Month          | Lower McCloud River Flows (cfs) by Water Year <sup>a</sup> |                          |
|----------------|--|--------------------------|
| February 15-29 | 0-75% RO <sup>b</sup>                                      | No flow change           |
|                | 76-89% RO <sup>b</sup>                                     | No flow change           |
|                | 90-99% RO <sup>b</sup>                                     | Increase flow by 75 cfs  |
|                | 100-119% RO <sup>b</sup>                                   | Increase flow by 125 cfs |
|                | ≥120% RO <sup>b</sup>                                      | Increase flow by 175 cfs |

| Month  | Lower McCloud River Flows (cfs) by Water Year <sup>a</sup> |                          |
|--|--|--------------------------|
| March 1-15   | 0-75% RO <sup>b</sup>                                      | No flow change           |
|  | 76-89% RO <sup>b</sup>                                     | Increase flow by 50 cfs  |
|  | 90-99% RO <sup>b</sup>                                     | Increase flow by 50 cfs  |
|  | 100-119% RO <sup>b</sup>                                   | Increase flow by 100 cfs |
|  | ≥120% RO <sup>b</sup>                                      | Increase flow by 150 cfs |
| March 16-31  | 0-75% RO <sup>c</sup>                                      | No flow change           |
|  | 76-89% RO <sup>c</sup>                                     | No flow change           |
|  | 90-99% RO <sup>c</sup>                                     | Increase flow by 50 cfs  |
|  | 100-119% RO <sup>c</sup>                                   | Increase flow by 50 cfs  |
|  | ≥120% RO <sup>c</sup>                                      | Increase flow by 150 cfs |
| April 1-15   | 0-75% RO <sup>c</sup>                                      | No flow change           |
|  | 76-89% RO <sup>c</sup>                                     | No flow change           |
|  | 90-99% RO <sup>c</sup>                                     | No flow change           |
|  | 100-119% RO <sup>c</sup>                                   | Increase flow by 50 cfs  |
|  | ≥120% RO <sup>c</sup>                                      | Increase flow by 50 cfs  |
| <p><b>If the release from McCloud dam (MC-7) on April 15 is equal to or greater than 200 cfs:</b><br/> On each Friday after April 15, decrease the flow by 50 cfs per week until the flow reaches 200 cfs, then maintain 200 cfs release at McCloud dam (MC-7) through June 30<br/> July 1 through August 31: release 175 cfs at MC-7, but maintain at least 215 cfs at Ah-Di-Na (MC-1)<br/> Beginning September 1: Release 175 cfs at MC-7, but maintain at least 200 cfs at Ah-Di-Na (MC-1)</p> <p><b>If the release from McCloud dam (MC-7) on April 15 is less than 200 cfs:</b><br/> Beginning April 16: Release 175 cfs at MC-7, but maintain at least 200 cfs at Ah-Di-Na (MC-1).</p> |  |                          |

<sup>a</sup> Using most recent California Department of Water Resources Sacramento Valley Water Year Type Index forecast

<sup>b</sup> February 1 runoff percentage from DWR Bulletin 120 for McCloud River above Shasta Lake

<sup>c</sup> March 1 runoff percentage from DWR Bulletin 120 for McCloud River above Shasta Lake.

- Implement a minimum flow release schedule for the Iron Canyon dam reach, as follows:

| <b>Release from Iron Canyon Dam (cfs) by Water Year-type</b> |                  |                     |  |
|--|------------------|---------------------|--|
| <b>Month</b>   | <b>Wet</b>       | <b>Above Normal</b> | <b>Below Normal, Dry, Critically Dry</b> |
| October  | 10               | 7                   | 7  |
| November   | 10               | 7                   | 7  |
| December   | 15               | 10                  | 7  |
| January  | 15               | 10                  | 7  |
| February   | 15               | 10                  | 7  |
| March  | >20 <sup>a</sup> | 15                  | 10                                       |
| April  | >20 <sup>a</sup> | 15                  | 10                                       |
| May  | 15               | 10                  | 7  |
| June   | 15               | 10                  | 7  |
| July   | 10               | 7                   | 7  |
| August   | 10               | 7                   | 7  |
| September  | 10               | 7                   | 7  |

<sup>a</sup> In March and April of wet water years, the flow control valve on Iron Canyon dam shall be fully opened. Mean daily flow shall be at least 20 cfs during this period.

- Downramp all spill events controllable at McCloud dam by valve operation at a maximum rate of 150 cfs per 48 hour until the prescribed minimum instream flow value is reached and upramp operational controllable spills at McCloud dam at a maximum rate of 200 cfs per 24-hour period.
- Determine water year type based on the forecast of unimpaired runoff of the McCloud River above Shasta Lake as provided by DWR Bulletin 120 or its successor.
- Operate, maintain, and modify (if necessary) gages needed to determine river stage and minimum streamflow; measure and document all instream flow releases in publicly available formats.
- Develop and implement an Aquatic Biological Monitoring Plan, as specified by Forest Service condition 27, for fish, benthic macroinvertebrates, special status aquatic mollusks, other special status species, and invasive aquatic species, with the inclusion of monitoring schedules specific to each component of the plan. The special status species section of the Aquatic Biological

Monitoring Plan also should incorporate a monitoring plan for northwestern pond turtles and foothill yellow-legged frogs. The number of sites, site locations, sampling methods, and data protocols should be consistent with relicensing studies.

- File an annual report on the reintroduction and status of listed anadromous species in the project area. The report should detail the steps that have been taken in the reintroduction, a status of the findings and actions of the Interagency Fish Passage Steering Committee, and should include the comments of NMFS.

### **Terrestrial Resources and Threatened and Endangered Species**

- Implement a Vegetation and Invasive Weed Management Plan, as specified by Forest Service condition 25, with modifications to include provision of information to managers regarding sensitive species, protection of culturally significant plant populations, provisions for the use of herbicides and pesticides, and implementation of BMPs to minimize effects on wetlands.
- Implement a Terrestrial Biological Management Plan, as specified by Forest Service condition 26, with the inclusion of species-specific monitoring modifications and limited operating periods. Prepare biological evaluations for special status species and biological assessments for threatened and endangered species prior to construction.

### **Recreation Resources**

- Stock 60,000 pounds of trout annually at the project, develop (for Commission approval) and implement a fish stocking plan in consultation with California Fish and Game within 1 year of license issuance, and evaluate and monitor the amount of fish to be stocked every 6 years.
- Provide lighting at both the Tarantula Gulch and Iron Canyon boat launches.
- Conduct a site evaluation to determine the location of a pedestrian shoreline access trail at the lower end of Pit 7 reservoir, with paved parking. Once a suitable location is found, construct this facility within 5 years of Commission approval of the Recreation Plan.

### **Cultural Resources**

- Implement the final HPMP (PG&E, 2010b) upon license issuance.

### **Land Use and Aesthetic Resources**

- File copies of the existing Spill Prevention, Control, and Countermeasures Plan and Hazardous Materials Business Plan with the Commission and provide copies to the Forest Service and the Central Valley Regional Water Quality Control Board (Central Valley Regional Water Board) within 30 days of license issuance and continue to implement these plans.

## **2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS**

### **2.4.1 Issuing a Non-Power License**

A non-power license is a temporary license that the Commission terminates when it determines that another governmental agency will assume regulatory authority and supervision over the lands and facilities covered by the license. At this point, no agency has suggested a willingness or ability to do so. No party has sought a non-power license, and we have no basis for concluding that the project should no longer be used to produce power. Thus, we do not consider a non-power license a realistic alternative to relicensing in this circumstance.

### **2.4.2 Federal Government Takeover of the Project**

We do not consider federal takeover to be a reasonable alternative. Federal takeover and operation of the project would require Congressional approval. Although that fact alone would not preclude further consideration of this alternative, there is no evidence to indicate that federal takeover should be recommended to Congress. No party has suggested federal takeover would be appropriate, and no federal agency has expressed an interest in operating the project.

### **2.4.3 Project Retirement**

Project retirement could be accomplished with or without removal of the dams. Either alternative would involve denial of the relicense application and surrender or termination of the existing license with appropriate conditions and cessation of power generation at the project, resulting in the following effects:

- Energy currently generated at the project by a renewable resource would be lost.
- There would be significant costs involved in retiring the powerhouse and appurtenant facilities.
- The environmental enhancements currently proposed by PG&E would be foregone.
- If the dam and control structures were removed, the original riverine habitat could not be reestablished because of the presence of Shasta dam and Shasta Lake, which inundates the Lower McCloud River and abuts the Pit 7 afterbay. Also, the presence of Shasta dam prevents unobstructed fish passage into areas upstream, including the McCloud-Pit Project.
- If the dam and control structures were removed, the existing recreational, residential, and commercial interests around the project would be compromised.

- The potential for environmental effects such as the release of sediments accumulated behind the dam to the river downstream and loss of lacustrine habitats and wetlands could occur.

The removal of the dam and control structures, however, would restore some riverine habitat, eliminate any fish entrainment mortality that may be occurring, provide recreational riverine boating, provide the potential for future unobstructed fish passage if Shasta dam were removed, and allow the Tribes to potentially re-establish some of their traditional uses of the river that occurred prior to impoundment.

Despite these potential benefits, we do not regard this alternative as reasonable in view of the many more potential losses.

The second project retirement alternative would involve retaining the dam and control structures and disabling or removing equipment used to generate power. Project works would remain in place and could be used for historic or other purposes. This alternative would require us to identify another government agency with authority to assume regulatory control and supervision of the remaining facilities. No agency has stepped forward to assume regulatory control and no participant has advocated this alternative; therefore, we have no basis for recommending this action. Furthermore, because the power supplied by the project is needed, a source of replacement power would have to be identified. In these circumstances, we do not consider removal of the electric generating equipment to be reasonable alternative.

For these reasons, we do not consider dam removal a reasonable alternative to relicensing the project with appropriate protection, mitigation, and enhancement measures.

### 3.0 ENVIRONMENTAL ANALYSIS

In this section, we present: (1) a general description of the project vicinity; (2) an explanation of the scope of our cumulative effects analysis; and (3) our analysis of the proposed action and other recommended environmental measures. Sections are organized by resource area (aquatic, recreation, etc.) and we first describe each resource's affected environment, which includes historic and current conditions. The existing condition is the baseline against which environmental effects of the proposed action and alternatives are compared. Next, we describe the environmental effects of the proposed project, including an assessment of the effects of proposed protection, mitigation, and enhancement measures, and any potential cumulative effects of the proposed action and alternatives. Unless otherwise identified, the source of our information is the license application for the project (PG&E, 2009a). We provide citations for information obtained from other sources, including subsequent filings related to the project.

#### 3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The project is located along the western slope of the Cascade Range in the Central Valley of northern California, within Shasta County and the Shasta-Trinity National Forest.<sup>9</sup> The project area originates at McCloud reservoir and occupies the McCloud and Lower Pit River Basins to Shasta Lake. The project area is entirely contained within the Sacramento River Hydrologic Region of California and specifically includes the following: McCloud reservoir; McCloud River from McCloud reservoir downstream to the confluence with Squaw Valley Creek; Iron Canyon reservoir and Iron Canyon Creek from Iron Canyon dam downstream to the Pit River; the Pit River downstream of the James B. Black powerhouse to the Pit River arm of Shasta Lake immediately downstream of Pit 7 afterbay; and tributaries that flow into the project reservoirs. The maximum elevation of the project area is about 2,680 feet, the normal maximum water surface elevation of McCloud reservoir.

The area surrounding the project is primarily federal forest land with rural communities and one larger incorporated city (>80,000 residents) nearby. Land uses in and around the project area include recreational and commercial activities such as fishing, swimming, timber harvest, and wildlife management. Water uses such as municipal and domestic supply, power production, recreation, warm- and cold-water spawning, and wildlife habitat are also associated with the project area.

The Cascades are a chain of active and explosive volcanic cones that extend from British Columbia in the north to Mount Lassen, California. Mount Shasta, the headwater region of the McCloud River system associated with the project, is the second highest volcano within the Cascade Range. To the east of the Cascades, the geologic setting

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<sup>9</sup> A portion of the route of the proposed McCloud transmission line crosses about 5 miles of the southern portion of Siskiyou County.

transitions into one dominated by formations associated with the Modoc Plateau; the major drainage of the Modoc Plateau is the Pit River, which is meandering and low-gradient in its upper reaches until it enters the canyon topography upstream of Shasta Lake, including the Pit 6 and Pit 7 Developments. Rivers and streams of the project area are typically steep gradient and highly confined, resulting in minimal flood plain development.

The project vicinity has a temperate climate with warm, dry summers and cool winters. Moderate snowfall occurs above elevations of 5,000 feet, and precipitation falls predominantly as rain at lower elevations. The National Weather Service maintains a monitoring station (No. 045449) in the town of McCloud, which has documented July air temperatures from an average maximum high of 87.8 degrees Fahrenheit (°F) to an average minimum low of 47.6°F. Air temperatures in January range from an average maximum high of 45.7°F to an average minimum low of 23.6°F. Annual mean precipitation at McCloud is 50.57 inches, most (78 percent) of which falls between November and March, and annual mean snowfall is 81.5 inches.

The project area is characterized by a variety of vegetation types typical of mixed woodland and mid-elevation forest habitats found in the southeastern Klamath Mountains and west-slope southern Cascade regions. More than three-quarters of the land is occupied by Douglas-fir–Ponderosa pine, Douglas-fir, and mixed conifer forests. The remaining land supports a wide array of vegetation types where plant species diversity is high due to the complex topography of the project area. In general, the topographical features of the project area preclude extensive wetland habitat, although wetland-associated vegetation often exists adjacent to and within the active river channel, and additional wetlands occur in small patches along the reservoirs.

In addition to the McCloud-Pit Hydroelectric Project, which is the only hydroelectric project on the McCloud River, PG&E owns and operates other projects in the Pit River watershed: Pit 1 Project (FERC No. 2687); Pit 3, 4, and 5 Project (FERC No. 233); and Hat Creek Project (FERC No. 2661). Tributaries to the Pit River also have several smaller-scale hydroelectric projects. These other hydroelectric systems receive and regulate flows from most of the Pit River watershed upstream of the town of Big Bend.

### **3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS**

According to the Council on Environmental Quality's regulations for implementing NEPA (50 CFR §1508.7), an action may cause cumulative effects if its impacts overlap in space and time with the impacts of other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities.

Based on information in the license application, agency comments, public comments, other filings related to the project, and staff analysis, we identified water quality and fisheries as having the potential to be cumulatively affected by the continued operation and expansion of the McCloud-Pit Project, in combination with other past, present, and future activities that occur in the McCloud and Pit River watersheds. These cumulative effects are discussed in more detail in section 3.3.2.3, *Cumulative Effects* (Aquatic Resources).

### **3.2.1 Geographic Scope**

The geographic scope of the cumulative effects analysis defines the physical limits or boundaries of the proposed action's effects on resources. Because the proposed action would affect resources differently, the geographic scope for each resource may vary. For most fisheries and water resources, the geographic scope would include all project reservoirs (McCloud, Iron Canyon, Pit 6, and Pit 7), Pit 7 afterbay, tributaries that flow into the reservoirs, and streams downstream of the project reservoirs, including the McCloud River from McCloud reservoir downstream to the confluence with Squaw Valley Creek, Iron Canyon Creek from Iron Canyon dam downstream to the Pit River, and the Pit River downstream of the James B. Black powerhouse to the Pit River arm of Shasta Lake, immediately downstream of the Pit 7 afterbay.

### **3.2.2 Temporal Scope**

The temporal scope of our cumulative analysis in the EIS will include past, present, and future actions and their possible cumulative effects on each resource. Based on the license term, the temporal scope will look 30 to 50 years into the future, concentrating on the effect of reasonably foreseeable future actions on the resources. The historical discussion will be, by necessity, limited to the amount of available information for each resource.

## **3.3 PROPOSED ACTION AND ACTION ALTERNATIVES**

This section outlines environmental effects of the proposed action and action alternatives with regard to: (1) geology and soils, (2) aquatic resources, (3) terrestrial resources, (4) threatened and endangered species, (5) recreation resources, (6) cultural resources, and (7) land use and aesthetic resources.

In discussing environmental effects, we review the proposals submitted by the applicant, agencies, and the public in accordance with the ILP. As summarized in section 2.2, *Applicant's Proposal*, we specifically discuss in each section, where applicable:

- The applicant's proposed protection, mitigation, and enhance measures included in its license application filed on July 16, 2009;
- The Forest Service's 4(e) conditions filed on January 29, 2010;

- The Forest Service’s modified condition 19 filed on March 1, 2010;
- PG&E’s alternative 4(e) conditions filed on March 3, 2010;
- PG&E’s modified alternative 4(e) conditions filed on November 24, 2010; and
- The Forest Service’s modified 4(e) conditions filed on November 29, 2010.

In the draft EIS, we analyzed the Forest Service’s January and March conditions and PG&E’s March alternative conditions. In this final EIS, we revise our analysis, as necessary, to reflect the Forest Service’s and PG&E’s November filings, which substantially revised their earlier proposals. We also address comments on the draft EIS in this final EIS; in appendix A, we provide a summary of those comments and our responses.

### **3.3.1 Geology and Soils**

#### **3.3.1.1 Affected Environment**

##### **3.3.1.1.1 Geologic Setting**

The McCloud-Pit Hydroelectric Project covers three major geologic terranes which affect surficial processes, erodibility, and drainage development: the Eastern Klamath belt, the Western Cascades terrane, and the High Cascades terrane. The majority of the upper basin of McCloud dam is located in the High Cascades and Western Cascades terranes, and the lower basin occurs almost entirely in the Eastern Klamath belt. The entire Lower McCloud River and portions of the Iron Canyon Creek watershed and the Lower Pit River are located within the Eastern Klamath belt.

The landscape in the project vicinity reflects widespread regional uplift and fluvial incision resulting in highlands and deep canyons. The upper portion of McCloud reservoir is underlain by shale and greywacke sandstone. In the middle portion of McCloud reservoir, metavolcanic rocks are juxtaposed against outcrops of limestone and interbedded tuffaceous mudstone and sandstone. Erosion tendencies along riparian slopes in the Lower McCloud River vary according to the adjacent rock type. Mafic flows, tuffaceous mudstone, and minor amounts of limestone occur in the lower portion of the reservoir and downstream of McCloud dam, and exposed rocks are strongly jointed and moderately fractured, forming steep slopes that are generally erosion-resistant. Fractured and weathered metasedimentary and metavolcanic rocks, however, are relatively weak and prone to mass wasting in areas with steep slopes. Survey sites in and around Hawkins Creek are underlain by shale, siltstone, and metavolcanic rocks, with gentle to steep slopes covered with gravelly soils and typically supporting dense mixed conifer and oak woodland vegetation.

In the Lower McCloud River watershed, soils mantling steep slopes overlaying metasedimentary and metavolcanic rocks are typically thin and rocky, except in areas with convergent topography, where a thicker mantle of soil and colluvium is more susceptible to landslides and debris flow during intense storm events. Active and

dormant landslide scars are susceptible to secondary erosion by rock fall and shallow debris slides. Intensely weathered, fine-grained, and highly erodible sedimentary rocks surrounding Iron Canyon reservoir and the upper portions of Pit 6 Powerhouse Road are particularly susceptible to erosion when disturbed, as are potentially unstable landforms on fractured metamorphic rocks in the Oak Mountain Road corridor and inner gorge of the Lower Pit River.

Soil conditions around the Lower Pit River include highly weathered upland surfaces which are in some places composed of saprolite. These soils are susceptible to erosion and have potential for high fine sediment yields if sparsely vegetated or denuded. Soils mantling the generally steep sided canyon slopes are thin and rocky. Debris flows commonly are triggered on steep canyon slopes with convergent topography and thick soil mantle during and following major storm events. These conditions are commonly found in the area of Iron Canyon reservoir and dam, as well as in the area of the James B. Black Development.

### **Seismicity**

Available seismic data for the project area are classed as Critical Energy Infrastructure Information. The Commission's Dam Safety Program regulations (18 CFR part 12D) require PG&E to retain an independent consultant every 5 years to inspect, review data, and prepare project safety reports to be submitted to the Commission. The California Water Code requires seismic stability adequacy for all dams under the jurisdiction of the California Department of Water Resources, Division of Safety of Dams, which are in general satisfied by the same requirements of 18 CFR part 12D. The most recent part 12D safety reports for the McCloud, Iron Canyon, Pit 6, and Pit 7 dams were prepared in October 2006.

#### **3.3.1.1.2 Reservoir Shorelines**

##### **McCloud Reservoir**

In general, shorelines around McCloud reservoir are underlain by resistant bedrock that limits the degree to which the shoreline can be eroded as a result of fluctuations in the reservoir water level. McCloud reservoir shorelines can be classified into four types: (1) convex, bedrock controlled shorelines overlain by coarse rock debris with moderate to steep slopes and shallow soils; (2) shorelines with convex to uniform slope profiles in protected cove locations with low to moderate slopes and fine-grained sandy loam soils; (3) steep to very steep shorelines with shallow erosional scarps and loose underlying rocky colluviums and sandy loam soils that support stands of mixed conifer and shrubs; and (4) shorelines with active shallow soil erosion or rock slide activity with very steep slopes and little or no vegetative cover. Surveys of the McCloud reservoir shoreline revealed few erosion sites, all of which had relatively low impact potential (table 3-1). PG&E has mitigated moderate erosion due to drainage or surface runoff that has occurred at a few recreation areas associated with McCloud reservoir

(Tarantula Gulch Recreation Area, Ash Camp and Ah-Di-Na Campgrounds, Star City Creek).

### *Erosion Sites*

Sites for erosion evaluation in the project area were selected based on their potential to affect aquatic resources of concern (water quality and biota), project infrastructure, public and private access, and public health and safety. Sediment delivery to McCloud reservoir has occurred where shoreline slopes are characterized as type 4 and where stream crossings along FR 38N11 have gullied, resulting in sediment delivery below the high water shoreline. Multiple road-related erosion sites were identified along FR 38N11, in the proposed areas for future powerhouse and transmission line development. Additionally, the actively eroding slopes of the McCloud tunnel spoils, where they are composed of finer-grained material and located directly adjacent to Hawkins Creek, may increase delivery of fine sediment to Hawkins Creek. However, most of the Hawkins Creek channel is buffered from the spoil slopes by floodplain surfaces covered by dense riparian vegetation.

### *Sediment Delivery*

Young volcanic rocks and unconsolidated surficial deposits in the Upper McCloud River Basin form large areas with little runoff or sediment delivery to the Upper McCloud River. However, natural debris flows originating from the unconsolidated inner gorge slopes of Mud Creek Canyon high on the southeast flank of Mount Shasta have historically delivered large quantities of fine sediment to the Upper McCloud River during summer months (Osterkamp et al., 1986), and sediment delivery from debris flows in Mud Creek constitutes a large fraction of the sediment currently stored in McCloud reservoir. McCloud dam and McCloud reservoir trap all coarse sediment (>2 millimeters) delivered from upstream source areas. Sediment delivery from tributaries draining steep topography surrounding McCloud reservoir constitutes the majority of the coarse sediment stored in the McCloud reservoir: about 937,400 tonnes representing an average annual coarse sediment yield of about  $140 \pm 30$  tonnes per square kilometer per year. Other direct sediment delivery to McCloud reservoir is attributed primarily to road-related erosion. Gully erosion extending from suspended culverts or shallow erosion associated with very steep, barren fill slopes are the two most common modes of erosion along FR 38N11, between McCloud dam and Tarantula Gulch. Although active erosion was identified at site-specific locations, the potential risk to the road infrastructure remains negligible.

Table 3-1. Distribution of erosion inventory sites for the McCloud reservoir and Lower McCloud River study region.  
(Source: PG&E, 2009a)

| Rank <sup>a</sup> | Number of Erosion Sites |                                      |              |        |           |           |                | Total |
|-------------------|-------------------------|--------------------------------------|--------------|--------|-----------|-----------|----------------|-------|
|                   | Roads                   | Proposed Infrastructure <sup>b</sup> | Mass Wasting | Spoils | Shoreline | Tributary | Recreation Use |       |
| High              | 5                       | 6                                    | --           | --     | --        | --        | 3              | 14    |
| Medium            | 5                       | 17                                   | 3            | 4      | --        | --        | 10             | 39    |
| Low               | 1                       | 7                                    | --           | 3      | 4         | 2         | 10             | 27    |
| <b>Total</b>      | 11                      | 30                                   | 3            | 7      | 4         | 2         | 23             | 80    |

<sup>a</sup> Rank is based on the potential for the site to cause future effects to project infrastructure or water resources of concern by direct sediment delivery, relative to all inventory sites. A percentile greater than 75 is considered High; a percentile between 25 and 75 is considered Medium, and a percentile less than 25 is considered Low.

<sup>b</sup> Proposed Infrastructure, defined in Study Region 1 by the proposed McCloud powerhouse and proposed McCloud transmission line, includes road-related erosion sites surveyed along FR 38N11 between McCloud dam and the town of McCloud, California.

### *Large Woody Debris*

In the McCloud basin, LWD can play an important role in channel formation and as aquatic and riparian habitat for aquatic and wildlife resources. LWD is delivered to the system via areas of mass wasting and toppling of tree or large limbs as a result of bank undercutting and during storm events. LWD in tributaries of the upper McCloud basin is carried progressively downstream during periods of high water discharge. Prior to construction of McCloud dam, LWD from the upper basin would continue to be redistributed through the Lower McCloud River during storm events. Presently, LWD from the upper basin is trapped and accumulates over time in McCloud reservoir. For the safety of recreational boaters and protection of dam structures, PG&E is required under the existing license to regularly capture and remove LWD accumulated behind McCloud dam.

### **Iron Canyon Reservoir**

Iron Canyon reservoir and dam are underlain by volcanoclastic and pyroclastic rocks, and argillite and tuffaceous sandstone, as well as weathered, clay-rich, and friable sedimentary rocks. Outcrops of weakly metamorphosed and moderately to strongly weathered, interbedded sedimentary rocks in this region express a wide range of rock resistance. Shoreline slopes are moderate (30 to 65 percent) to steep (>65 percent).

The highly weathered soils and saprolite in this area are easily eroded, particularly where sparsely vegetated, and are potential sources of sediment. Slopes around the northern and western portions of Iron Canyon reservoir range from gentle to moderate but become steep along the southern margin in areas adjacent to the dam. Gentle to steep slopes surrounding the reservoir and dam support mixed conifers, oak woodland, and riparian vegetation.

The two predominant soil types in shoreline areas are loose, gravelly sandy loam soils and cohesive, clay loam soils. Shoreline erosion of up to about 3 feet above the water line occurs at locations where tree stumps and roots have been exposed and is common around the reservoir perimeter, indicating shoreline lowering since completion of Iron Canyon dam in 1965. There are deeply incised gullies where stream channels enter the reservoir. Concentrated surface runoff from spur roads has caused lesser amounts of gully erosion below the high water shoreline. Slumping and shallow scarps were observed in relatively few shoreline areas, on moderately steep slopes and steep hillslopes above the high water line.

### *Erosion Sites*

Surveys of the Iron Canyon reservoir shoreline identified five erosion sites, all of which have low to medium impact potential (table 3-2). The Iron Canyon reservoir perimeter road has 22 erosion sites associated with road drainage diversions, plugged or restricted ditch relief structures, and OHV use; 15 of these were classified as low to medium impact. Concentrated surface runoff has resulted in rill erosion along steep, unpaved road surfaces. During erosion inventories, PG&E observed delivery of fine

sediment to Iron Canyon reservoir and tributary stream channels at the majority of erosion sites surveyed along the perimeter road.

Two former borrow pits located northeast of Iron Canyon dam were evaluated during field surveys. The northernmost borrow pit showed extensive evidence of past and active gully erosion at numerous locations across the disturbed hillslope. It appears that significant headward erosion into brittle, clay-rich sediments has occurred since excavation of the borrow pit. Two deep gully channels incise up to 2,500 feet of slope extending to Iron Canyon reservoir. Thick accumulations of sediment were stored behind grade control structures installed along these gully channels, and some of the grade control structures near the gully headwalls have failed. The Forest Service has implemented measures to control severe gully erosion at this site.

#### *Large Woody Debris*

In the Iron Canyon basin, LWD plays an important role in channel formation and as habitat for fish and aquatic resources. LWD is delivered to the system via areas of mass wasting and toppling of tree or large limbs as a result of bank undercutting and during storm events. LWD in tributaries to Iron Canyon reservoir is carried progressively downstream during periods of high water discharge. Prior to construction of Iron Canyon dam, LWD would continue to be redistributed down Iron Canyon Creek to the Pit River during storm events. Presently, LWD from tributaries to Iron Canyon reservoir is trapped and accumulates over time in the reservoir. For the safety of recreational boaters and protection of dam structures, PG&E has instituted a program to periodically capture and remove LWD from Iron Canyon reservoir.

Table 3-2. Distribution of erosion inventory sites for the Iron Canyon reservoir and dam study region. (Source: PG&E, 2009a)

| Rank <sup>a</sup> | Number of Erosion Sites |                         |              |        |           |           |                | Total |
|-------------------|-------------------------|-------------------------|--------------|--------|-----------|-----------|----------------|-------|
|                   | Roads                   | Proposed Infrastructure | Mass Wasting | Spoils | Shoreline | Tributary | Recreation Use |       |
| High              | 7                       | --                      | --           | 1      | --        | --        | --             | 8     |
| Medium            | 12                      | --                      | 2            | 7      | 3         | 6         | 4              | 34    |
| Low               | 3                       | --                      | --           | 3      | 2         | 11        | 2              | 21    |
| <b>Total</b>      | 22                      | 0                       | 2            | 11     | 5         | 17        | 6              | 63    |

<sup>a</sup> Rank is based on the potential for the site to cause future effects to project infrastructure or water resources of concern by direct sediment delivery, relative to all inventory sites. A percentile greater than 75 is considered High; a percentile between 25 and 75 is considered Medium, and a percentile less than 25 is considered Low.

### *Sediment Delivery*

Sources of fine sediment to Iron Canyon reservoir include road erosion into tributaries to Iron Canyon reservoir, active erosion from the borrow pits northeast of Iron Canyon dam, and concentrated road runoff along the Iron Canyon dam access road. Additionally, the reservoir shoreline, with erosion ranging from localized to extensive, is a major contributor of fine sand, silt, and clay to the reservoir. Channel banks along tributaries above the high water shoreline are protected mostly by dense riparian vegetation or bedrock outcrops, but actively eroding channel banks in reaches below the high water shoreline with bedrock channel beds have a high potential to deliver sediment to the reservoir. Finally, rill erosion and soil disturbance related to unrestricted OHV use is a widespread source of direct fine sediment delivery to Iron Canyon reservoir.

#### **3.3.1.1.3 Project Reaches**

##### **Lower McCloud River**

### *Sediment Delivery*

In contrast to the Upper McCloud River Basin, the Lower McCloud River Basin is comprised almost entirely of steep slopes and a dense, deeply incised channel network that promotes a more peaked response to storm events and higher rates of coarse sediment delivery by mass wasting. Cumulative sediment supply to the Lower McCloud River under regulated conditions ranges from 1,450 tonnes per year at the Hawkins Creek confluence to 7,050 tonnes per year at the Squaw Valley Creek confluence. Under unimpaired conditions, the Lower McCloud River was likely supply limited from McCloud dam to at least Bald Mountain Creek. Large alluvial bedforms such as point bars and island bars occur infrequently and are relatively immobile due to their coarse-grained composition. LWD does not influence channel morphology or sediment storage in the Lower McCloud River. The number and distribution of erosion sites in this area is provided in table 3-1.

At McCloud dam, a tight meander bend located directly across from the bottom of the spillway lies within sheared metavolcanic and sedimentary bedrock and is subject to erosion during large spillway releases. Future large spillway releases have the potential to further erode rock in the meander bend and associated low saddle as well as in the embankment supporting the road. Rock fall and shallow landslides have produced dry ravel (loose rock particles) along steep cut slopes, and deposited rock and debris into the inboard ditch associated with FR 38N11 as it traverses relatively steep terrain immediately downstream of McCloud dam. Mass wasting associated with sites in this area indicates a potential to affect road access and deliver sediment to the McCloud River. Sediment produced by episodic erosion during large spillway releases and chronic secondary erosion of the retreating cliff face across from McCloud dam is delivered directly to the Lower McCloud River, indicating a high potential for future mass wasting in the vicinity.

The Lower McCloud River is a mixed bedrock-alluvial channel with high transport capacity relative to sediment supply and generally low volumes of active sediment storage. Channel reach morphology in the Lower McCloud River broadly transitions from predominantly step pool upstream of Ah-Di-Na to alternating plane bed and pool riffle downstream of Ah-Di-Na, reflecting an overall decrease in slope and confinement and an increase in mobile sediment supply. The resistant bedrock and boulder channel boundaries in the Lower McCloud River render channel geometry less sensitive to changes in hydrologic and sediment supply regimes. Large, immobile grains within the Lower McCloud River reduce the shear stress available for transporting finer mobile sediment and create velocity shadows that induce deposition of finer material, forming one of the primary storage elements of mobile coarse sediment within the active channel. Similarity in the size of coarse sediment supplied by major tributaries and the size of mobile deposits in the mainstem Lower McCloud River emphasizes the importance of coarse sediment inputs from major tributaries (e.g., Hawkins Creek, Ladybug Creek, Bald Mountain Creek, Claiborne Creek, Squaw Valley Creek) in supplying the mobile sediment fraction, including spawning gravel size classes, to the McCloud River downstream of McCloud dam.

Bed mobility and transport capacity in the Lower McCloud River are primarily controlled by differences in channel slope which generally follow a downstream decreasing continuum. Bed mobilization occurs at an estimated 1,030 cfs in the vicinity of Ah-Di-Na and at 2,060 cfs between Claiborne Creek and Squaw Valley Creek. Initial mobilization of more mobile sediment patches in most locations occurs at flows >620 cfs. Annual average bedload transport capacity peaks in the vicinity of Ah-Di-Na and declines downstream, reaching a minimum between Claiborne Creek and Squaw Valley Creek. The presence of suspended sediment in the Lower McCloud River, including sediment delivery from Mud Creek, is discussed in section 3.3.2.1.2, *Water Quality*.

#### *Large Woody Debris*

Because LWD from the upper McCloud basin is trapped and removed from behind McCloud dam, the quantity of LWD is reduced in the Lower McCloud River. LWD inventories show that there is very little LWD stored in the Lower McCloud River channel between McCloud dam and Shasta Lake. Below Squaw Valley Creek, the Lower McCloud River is subject to higher flow variation and debris inputs from multiple tributaries, so the effect of McCloud dam on the quantity and distribution of LWD is diminished.

#### **Iron Canyon Creek**

##### *Sediment Delivery*

Accelerated sediment delivery in Iron Canyon Creek is related to erosion of the access road to the Iron Creek gage and related spur roads, rilling of the native hillslopes adjacent to the east and west dam abutments, and entrainment of fine sediment stored in Iron Canyon reservoir in the vicinity of the valve intake. The consequent accelerated

delivery of fine sediment to Iron Canyon Creek and the absence of flow releases that frequently mobilize sediment have resulted in increased fine sediment storage in the bed and banks of the relatively low-gradient channel reach immediately downstream of Iron Canyon dam. Geomorphic monitoring demonstrates that annual valve releases would effectively reduce fine sediment accumulation in the reach immediately downstream of Iron Canyon dam.

Increases in suspended sediment concentrations in Iron Canyon Creek and the Pit River due to interbasin transfer between the McCloud River Basin and the Iron Canyon Creek and Pit River Basins during episodic mass-wasting events is minimal and discussed in more detail in section 3.3.2.1.2, *Water Quality*.

#### *Large Woody Debris*

Based on field observations, the recruitment of LWD to Iron Canyon Creek is comparable to regional creeks and environments. The quantity of LWD is consistently distributed longitudinally along the stream channel between Iron Canyon dam and Pit River. Experimental flow releases at Iron Canyon dam indicated that LWD was mobilized when flows exceeded the bankfull discharge.

#### **Lower Pit River**

Project areas characterized in the Lower Pit River include those in the vicinity of Oak Mountain Road, Pit 6 Powerhouse Road, Pit 7 Powerhouse Road, and the Proposed Pit 7 afterbay powerhouse and transmission line. The topography in the Oak Mountain Road (FR 37N34) corridor north of the Pit 6 reservoir is moderately steep to steep, with dormant landslides and debris basins on very steep, southeast-facing slopes from the ridgeline to the Pit River (Forest Service, 2005). In the Lower Pit River, gentle to moderate slopes are underlain by resistant volcanic rocks which are relatively stable, with localized debris basins on steeper slopes leading to the Pit River. Shallow debris slides coalesce and areas of active rock-fall occur along the steep inner gorge slopes of Pit River Canyon.

PG&E reported 54 observed erosion sites along the Oak Mountain Road corridor, about 59 percent of which were identified as road-related (table 3-3). Sites along this road and associated spur roads have a moderate to high potential to deliver sediment to Iron Canyon reservoir, tributaries to Iron Canyon Creek, or the Pit River. Additionally, concentrated surface runoff and road-related erosion along spur roads to the Willow Creek siphon have potential to deliver sediment to Willow Springs Creek and interrupt access to project facilities.

Erosion is also evident in a few locations along the edge of the Iron Canyon tunnel spoils (table 3-3), which are near the ridgeline of a tributary to Iron Canyon Creek west of the penstock pipe and downstream of the Iron Canyon tunnel portal. PG&E attributes two existing shallow debris slides to the settling of the spoils. Downslope, two gully channels are scoured to bedrock and have coalesced, delivering sediment directly into an Iron Canyon Creek tributary.

PG&E mitigated the effects of a 1997 storm-related large debris flow that destroyed stream crossing structures. The debris flow scar from this storm remains a major potential sediment source. Other debris flow-related mitigation includes the repair of the James B. Black penstock pipe that ruptured after a 1978 bedrock landslide, and associated bedrock stabilization. PG&E's subsequent creation of a Penstock Safety Program ensures routine evaluation and review of penstock alignment and adjacent slopes.

PG&E identified additional erosion sites further downstream in the Lower Pit River (table 3-4). Along Pit 6 Powerhouse Road, there is evidence of past and active erosion in several areas. Concentrated surface runoff from culvert outlets and diverted road drainage has caused gully erosion and shallow slope failure of soils and engineered road fill. Debris slide scars along steep inner gorge slopes exposed unconsolidated fluvial gravels overlying metasedimentary bedrock.

The access road to the Pit 7 powerhouse traverses moderately steep, well-vegetated slopes. Aggraded ditch relief structures, suspended culvert outfalls, diverted road runoff, and fluvial erosion along channel bank toe slopes has caused surface and gully erosion at the outboard road edge at several sites. Thinly bedded metasedimentary bedrock along the access road is relatively resistant to erosion and shows only a few localized shallow slide scars at steep to near vertical road cut banks.

Table 3-3. Distribution of erosion inventory sites for the Oak Mountain Road Study Region. (Source: PG&E, 2009a)

| Rank <sup>a</sup> | Number of Erosion Sites |                         |              |        |           |           |                | Total |
|-------------------|-------------------------|-------------------------|--------------|--------|-----------|-----------|----------------|-------|
|                   | Roads                   | Proposed Infrastructure | Mass Wasting | Spoils | Shoreline | Tributary | Recreation Use |       |
| High              | 17                      | --                      | 10           | 1      | --        | --        | --             | 28    |
| Medium            | 14                      | --                      | 6            | 2      | 1         | 2         | --             | 25    |
| Low               | 1                       | --                      | --           | --     | --        | --        | --             | 1     |
| <b>Total</b>      | 32                      | 0                       | 16           | 3      | 1         | 2         | 0              | 54    |

<sup>a</sup> Rank is based on the potential for the site to cause future effects to project infrastructure or water resources of concern by direct sediment delivery, relative to all inventory sites. A percentile greater than 75 is considered High; a percentile between 25 and 75 is considered Medium, and a percentile less than 25 is considered Low.

Table 3-4. Distribution of erosion sites in the Lower Pit River Study Region. (Source: PG&E, 2009a)

| Rank <sup>a</sup> | Number of Erosion Sites |                         |              |        |           |           |                | Total |
|-------------------|-------------------------|-------------------------|--------------|--------|-----------|-----------|----------------|-------|
|                   | Roads                   | Proposed Infrastructure | Mass Wasting | Spoils | Shoreline | Tributary | Recreation Use |       |
| High              | 6                       | --                      | --           | --     | --        | --        | --             | 6     |
| Medium            | 17                      | 1                       | --           | 1      | --        | --        | --             | 19    |
| Low               | 3                       | 1                       | --           | 2      | --        | --        | 1              | 7     |
| <b>Total</b>      | 26                      | 2                       | 0            | 3      | 0         | 0         | 1              | 32    |

<sup>a</sup> Rank is based on the potential for the site to cause future effects to project infrastructure or water resources of concern by direct sediment delivery, relative to all inventory sites. A percentile greater than 75 is considered High; a percentile between 25 and 75 is considered Medium, and a percentile less than 25 is considered Low.

### *Proposed Infrastructure*

PG&E evaluated slope conditions in the vicinity of the proposed location for the Pit 7 afterbay powerhouse and transmission line. This area is characterized by moderate to steep (40–65 percent) slopes underlain by massive to fractured volcaniclastic bedrock and overlain by shallow, rocky soils that support mature conifers and understory shrubs. PG&E observed old shallow landslide scars in this area but no active erosion. A narrow and benched ridgeline along the northern divide of this second drainage provides potentially suitable sites for the new powerhouse. Bedrock outcrops at the terminus of this ridge form a nearly vertical slope above the west abutment of the Pit 7 afterbay dam.

As planned, the proposed transmission line has an initial trajectory of south 10° east leading from the proposed Pit 7 afterbay powerhouse to FR 35N23. The proposed alignment traverses an active gully and steep, inner gorge slopes between the east abutment of Pit 7 afterbay dam and FR 35N23. An alternative alignment for the transmission line would traverse more gentle slopes (<50 percent) underlain at shallow depths by bedrock.

### *Sediment Delivery*

Active erosion along the steep inner gorge portion of Pit 6 Powerhouse Road has caused delivery of unconsolidated sediment and spoils material to the Pit River. Active gully incision from a non-project road, FR 34N17, has caused multiple gully channels to form on lower gradient toe slopes located within the project area with a high potential for direct delivery of eroded sediment to the Lower Pit River.

#### **3.3.1.2 Environmental Effects**

Continued operation of the McCloud-Pit Project could affect geology and soils in the watershed by affecting streamflow, sediment trapping and transport, and geomorphic characteristics of the stream channel. PG&E proposes infrastructure additions that may affect geology and soils in the watershed, and PG&E's proposed license measures focus on minimizing issues that may result from the installation of the proposed infrastructure as well as address operation and management issues that have been observed during project operation in the current term of the license. Observed issues include trapping of LWD; erosion from bare surfaces, rockfalls, road-related surfaces, tunnel spoils, and borrow pits; reservoir sedimentation; and project effects on sediment supply and transport.

Continued operation of the project may influence the rate of erosion in the watershed and the trapping of sediment in project reservoirs. Project operations may also limit LWD retention and sediment storage in the Lower McCloud River. Therefore, PG&E proposes to develop an Erosion and Sediment Monitoring and Control Plan and an LWD Management Plan. Additionally, the Forest Service, NMFS, and FWS have recommended that PG&E develop a plan for gravel and coarse sediment management, which was not included in the final license application.

## Large Woody Debris

LWD can provide habitat structure in streams and affect sediment storage and channel morphometry through its effect on the distribution of flows and water velocity within the stream channel and sediment mobilization and transport. LWD can provide cover and holding habitat for fish, serve as substrate for growth of epibenthic algae and invertebrates, and affect sediment deposition and scouring. Loss of LWD could result in reduced complexity of aquatic habitat and reduced carrying capacity for aquatic biota.

In Iron Canyon Creek, LWD is abundant and project operations appear to have little or no effect on LWD supply, based on observations that LWD recruitment downstream of Iron Canyon dam is comparable to regional creeks and environments. The volume of LWD in Iron Canyon Creek is consistently distributed longitudinally in the stream channel, which may indicate that LWD mobilization happens on a regular basis despite flow regulation.

In the Lower McCloud River, the large channel width, high stream power, and normally low LWD loads due to project operations result in limited opportunity for LWD retention and associated long-term sediment storage within the bank full channel perimeter. LWD from the upper watershed accumulates in McCloud reservoir during high flow events, and under the current license, PG&E generally removes LWD to protect the McCloud dam structure. These active safety measures, as well as the dam itself, reduce the supply of LWD and impede the transport of LWD from the upper reaches of the McCloud River to the lower reaches of the river below McCloud dam.

In its license application, PG&E proposes to prepare an LWD Management Plan, in consultation with the Forest Service, within 1 year after license issuance. The plan would provide an operating procedure to facilitate the placing of woody debris downstream of McCloud dam to replace LWD removed from the system by O&M of the McCloud dam. The plan would specify size criteria, placement and storage sites, volume and frequency of placement, and monitoring procedures.

Forest Service condition 21 supports PG&E's proposal to prepare an LWD Management Plan approved by the Forest Service within 1 year of license approval.<sup>10</sup> The condition specifies that monitoring procedures included in the plan should assess mobilization of LWD from the augmentation site. In its November 29, 2010, filing the Forest Service included a draft LWD Plan as an enclosure to the filing (Forest Service, 2010d, Enclosure 3). In the draft plan, the Forest Service recommends a framework and guidelines for capture, removal, placement, storage, and monitoring of LWD from McCloud reservoir.

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<sup>10</sup> In its modified condition 21, the Forest Service changed the starting point for preparing project plans from license "issuance" to license "acceptance." In discussing Forest Service conditions throughout section 3.3, we have changed the term without highlighting it as a change from the original conditions filed in January 2010.

In its original condition 30, the Forest Service specified that LWD removed from reservoirs as part of recreation development, management, and monitoring may be re-introduced to the Lower McCloud River as directed in the LWD Management Plan. The Forest Service dropped this specification from modified condition 30.

NMFS also submitted comments on the proposed action, specifically stating that the LWD Management Plan should ensure that LWD inputs will not be prevented from migrating downstream, in order to maintain habitat benefits to both resident biota and anadromous listed salmonids.

#### *Our Analysis*

LWD contributes to productive aquatic ecosystems, and is an important component in the formation of complex aquatic habitat units and channel maintenance. LWD provides aquatic habitat along the margins and in the active portion of the river channel, riparian habitat on surfaces above the low-flow channel, and organic matter which supports the aquatic food web.

PG&E conducted inventories and aerial footage reviews of the Lower McCloud River that indicated little LWD storage between McCloud dam and Shasta Lake and few, if any, channel forming LWD elements. Although the frequency of smaller flood events is diminished by project operations, larger floods capable of mobilizing and redistributing LWD are uncontrolled and continue to occur on a regular basis. These floods, supplemented by placement of accumulated LWD from McCloud reservoir in downstream reaches, would increase the abundance of LWD in these reaches and provide habitat benefiting aquatic and riparian organisms in areas where LWD is retained within the active stream channel and adjacent riparian areas.

NMFS recommends that any LWD Management Plan should ensure that LWD inputs would not be prevented from migrating downstream. Presumably, the rate of LWD inputs from the upper watershed remains similar to that experienced during pre-project hydrologic conditions; however, the current hydrograph below the dam is significantly different from pre-project conditions. Therefore, the carrying capacity of the lower watershed is not likely able to accommodate the volume of LWD generated within the upper watershed.

The Forest Service specifies that monitoring procedures in the LWD Plan specifically assess mobilization of LWD from the augmentation site. Existing survey information documents the amount and distribution of LWD in the Lower McCloud River; however, there is an absence of data that indicates how effective the proposed minimum and periodic spill flows will be at mobilizing and distributing LWD. The Forest Service's recommended monitoring program would provide information necessary to assess whether the locations and quantity of LWD placement are appropriate to achieve the objectives.

## **Erosion and Sediment Control**

Surface erosion, increased overland flow, and mass wasting associated with project construction and maintenance could release fine sediment into project waterways; fine sediment can adversely affect environmental resources increasing turbidity and degrading coarse substrate used for spawning. PG&E proposes construction that could lead to stream sedimentation, increased turbidity, and geomorphic effects if proper erosion and sediment control measures are not implemented and maintained.

Reduction of seasonal high flow events as a result of project operations may contribute to the accumulation of fine sediment in spawning gravels, which could adversely affect trout spawning and incubation success and contribute to the encroachment of riparian vegetation into the stream channel. Sediment that originates from surface erosion, rockfalls, and mass wasting in the upstream watershed is generally transported downstream in the channel reaches and retained in reservoirs behind structures. An inventory by PG&E identified 56 erosion sites in the project vicinity that were ranked in the 75<sup>th</sup> percentile or above, indicating high potential of these sites to adversely affect project infrastructure or sediment delivery to streams.

In order to manage existing erosion and minimize future erosion and sediment delivery to stream channels, PG&E proposes to prepare an Erosion and Sediment Monitoring and Control Plan within 1 year after license issuance. PG&E would develop the plan in consultation with the Forest Service and other appropriate agencies. The plan would guide management of erosion and sediment control during the term of the new license and would include the following elements:

- Methods for ongoing inventory of project-related erosion and sedimentation;
- A schedule for periodic monitoring;
- An inventory of erosion sites (e.g., map and database) identified by periodic monitoring;
- Criteria for treating erosion sites;
- Protocols for emergency erosion and sediment control; and
- A process and schedule for reporting monitoring results, including periodic plan review and revision.

Inventory of project-related erosion and sedimentation would include project roads, facilities, infrastructure, reservoir shorelines, recreational use areas, and areas of mass wasting that are project-related or affected by project roads and facilities. Initial priority would be placed on the 56 sites ranked as having high erosion potential. Sites would be monitored for 5 years to assess erosion activity and associated causes. Annual monitoring reports would include a Forest Service-compatible database of erosion sites and detailed site-specific erosion and sediment control measures where necessary and appropriate. Botanical resources affected by project-related erosion would be revegetated

according to the Vegetation Management Plan, as discussed in section 3.3.3, *Terrestrial Resources*.

User-created OHV roads between the maintained Forest Service roads and reservoir shoreline are a source of erosion and direct input of fine sediment to Iron Canyon reservoir and tributaries. As part of the Recreation Plan, PG&E proposes to block access to and close these user-created roads and prevent the creation of new OHV roads in the future (see section 3.3.5.2, *Environmental Effects, Dispersed Use and OHV Use*). Erosion sites associated with OHV roads located within the project boundary would be included in the inventory of locations for prioritization, monitoring, and mitigation.

Forest Service condition 22 specifies that, within 1 year after license acceptance, PG&E should file with the Commission its Erosion and Sediment Control Management and Monitoring Plan developed in consultation with the conditioning agencies<sup>11</sup> and other interested parties. The condition specifies that the plan should be approved by the Forest Service and should provide direction for managing erosion and controlling sediment during the term of the new license. Furthermore, the Forest Service states that during planning, and before any new construction or non-routine maintenance projects with the potential for causing erosion or stream sedimentation on or affecting Forest Service lands, PG&E should develop site-specific erosion control plans that will be approved by the Forest Service. The plans would include measures to control erosion, stream sedimentation, dust, and soil mass movement.

In its November 29, 2010 filing, the Forest Service included a draft Erosion and Sediment Control Management Monitoring Plan as an enclosure to the filing (Forest Service, 2010d, Enclosure 3). In the draft plan, the Forest Service recommends the minimum components necessary to treat erosion and control sedimentation within the project and project-affected lands during the term of the new license.

Ground-disturbing activities have the potential to disturb soil integrity. Forest Service condition 18 specifies that if PG&E proposes additional future ground-disturbing activities, PG&E should consult with the Forest Service to determine the scope of work and potential for project-related effects, and whether additional information would be required to proceed with the planned activity. This condition and the PG&E alternative are discussed further in section 3.3.7, *Land Use and Aesthetic Resources*.

NMFS filed a 10(j) recommendation, with concurrence from FWS, stating that as soon as listed salmonids are documented in the McCloud River and affected by the

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<sup>11</sup> In its November 29, 2010, filing, the Forest Service replaced California Water Board and California Fish and Game with “Conditioning Agencies,” a term which it did not define. In discussing Forest Service conditions throughout section 3.3, we have changed the term without highlighting it as a change from the original conditions filed in January 2010.

project, PG&E should implement flow regimes and non-flow-related measures necessary to mitigate impacts of the project's facilities and operations on sediment movement and deposition, river geometry, and channel characteristics. According to the 10(j) recommendation, these actions would include mitigation of impacts on stream competence, capacity, floodplain conductivity, bank stability, and extent, duration, and repetition of high flow events. This recommendation is discussed further in section 3.3.2, *Aquatic Resources*.

In addition to formal 10(j) recommendations, NMFS submitted comments on the proposed action, specifically stating that the Erosion and Sediment Monitoring and Control Plan should consider the habitat and biological criteria needs of listed salmonids, particularly because sediment could have adverse effects on spawning substrate and water quality that are important for listed salmonids. The extent to which the plan would monitor or reduce sediment inputs from the project may be beneficial to most aquatic biota, including listed salmonids. The plan should consider the seasonal timing of construction and O&M activities which could affect listed salmonids as well as the sediment/erosional inputs and resulting turbidity.

Although no measures are proposed to address reservoir sedimentation or the few areas of surface erosion (including mass wasting and rockfalls), studies, environmental site reviews, and agency and stakeholder discussions concluded that these issues do not present significant risk during the term of the proposed license.

#### *Our Analysis*

PG&E's proposal for management and control of erosion and sedimentation would provide for periodic monitoring, inventory, and prioritization of potential erosion sites, identification of criteria and procedures for controlling/mitigating erosion sites, development of emergency response protocols to manage erosion and sedimentation, and establish annual mechanisms for reporting and agency review of procedures and actions. This proposal would provide mitigation for existing erosion sites and prevention of erosion and sedimentation associated with project infrastructure and future project actions. It also assures consultation with Forest Service and other appropriate agencies in developing the plan and subsequent periodic annual review by these agencies of the plan and actions taken. The annual review would include updates to the Forest Service-compatible database of erosion sites and detailed site-specific control measures. The proposal would provide controls necessary to protect water quality, aquatic and riparian habitat from the effects of erosion and sedimentation. Periodic review by the Forest Service would provide a mechanism to insure that the measures implemented are appropriate and adequate to prevent water quality and aquatic habitat impacts.

As part of the Recreation Plan, PG&E proposes to block access to, and prohibit use of, user-created OHV roads and prevent future creation of such roads. Project road locations that are a direct source of erosion and fine sediment loading have been identified in the erosion site inventory and would be remediated as prioritized under the

Erosion and Sediment Monitoring and Control Plan. Site prioritization and mitigation methods would be subject to Forest Service review on at least an annual basis.

Monitoring implemented as part of routine safety inspections at penstocks and project water conveyance structures would minimize the risk of erosion associated leakage or potential failure of such structures as occurred at the Iron Canyon penstock.

Developing and implementing an appropriate Erosion and Sediment Monitoring and Control Plan for active erosion sites and future construction activities, as specified by Forest Service condition 22, would minimize the release of disturbed sediment into waterways, and therefore would minimize effects on water quality, aquatic habitat, and public health and safety. Use of a ranking system to prioritize the severity of erosion sites would provide a system for immediate mitigation and minimize any potential impacts to waterbodies or public safety. Proper revegetation and post-construction monitoring would ensure that disturbed areas are restored with native species, and that gullying or other forms of erosion do not occur as a result of construction disturbance. Monitoring the effectiveness of erosion control treatment measures would aid in determining if further control measures are necessary.

The NMFS 10(j) recommendation included general measures to affect sediment movement and deposition, substrate quality, and channel characteristics to support listed anadromous salmonids. No specific measures or procedures are recommended. The Keswick and Shasta dams on the Sacramento River downstream of the McCloud dam are existing barriers to upstream passage of anadromous salmonids including Chinook salmon and steelhead. None of the listed anadromous salmonids would be expected to have access to habitat in the Lower McCloud River until upstream migration of listed species is implemented through Shasta Lake. Therefore, the general recommendations by NMFS would provide no benefit for listed species at this time. The Central Valley Project and State Water Project in the Central Valley, California—a document commonly referred to as the Operations Criteria and Plan Biological Opinion (OCAP BiOp; NMFS, 2009a), issued on June 4, 2009, provides NMFS's review of the proposed long-term operations of the Central Valley Project and State Water Project in California, and its effects on listed anadromous fishes and marine mammal species, and designated and proposed critical habitat, in accordance with section 7 of the ESA. As part of the reasonable and prudent alternative (RPA) of the OCAP BiOp, studies are to be implemented to assess the feasibility to facilitate fish passage over the Keswick and Shasta dams on the Sacramento River downstream of the McCloud dam. Feasibility studies to assess the suitability and functionality of existing or potential habitat for spawning and rearing of listed salmonids are expected to begin in January 2010 and continue through January 2012. Based on the results of the feasibility studies, a pilot program could be implemented to re-introduce listed anadromous species to habitat above Shasta and Keswick dams beginning in March 2012. If this pilot-program proves successful, a long-term anadromous fish passage program would be implemented by January 31, 2010 which would include structural and operational modifications to dams to provide both upstream and downstream fish passage. Implementation of the RPA of

the OCAP BiOp could result in the future presence of listed salmonids in the Lower McCloud River and waters of the McCloud-Pit project below McCloud dam as early as 2012. Additionally, in October 2009, NMFS issued the Public Draft Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and Central Valley Spring-run Chinook Salmon and the Distinct Population Segment of Central Valley Steelhead (Public Draft Recovery Plan; NMFS, 2009b). This Public Draft Recovery Plan identified the McCloud River as a “high” priority habitat for supporting spawning populations of these listed salmonids and provided that, as part of the recovery strategy, habitat evaluations and feasibility studies including fish passage logistics be implemented to support re-introduction efforts in habitat above Shasta dam. The RPA for the OCAP BiOp adopted this action.

### **Gravel and Coarse Sediment**

McCloud dam and reservoir trap coarse sediment (>2 millimeters) delivered from upstream sources, limiting available gravel and coarse sediment that in an unregulated system would support and enhance aquatic habitat in the Lower McCloud River. Reduction in sediment supply to the Lower McCloud River due to sediment trapping in McCloud reservoir decreases with distance downstream of McCloud dam as a result of sediment input from tributaries and riparian areas; the effect ranges from a 94 percent reduction at the Hawkins Creek confluence to a 78 percent reduction at the Squaw Valley Creek confluence. In response to project operations, the Lower McCloud River from about 5 to 8 kilometers downstream of McCloud dam is the reach most likely to exhibit degraded habitat characterized by coarsening of the bed surface and reduction in the frequency and quantity of mobile sediment deposits.

Coarsening of the river bed surface may result in coarse sediment habitat that is no longer considered optimal for salmonid spawning. Finer sediments are the first to mobilize as flows begin to increase; the largest components of the substrate (e.g., boulders) may be mobilized only at the highest spill flows. As flows below the dam continue to move coarse sediment downstream, no coarse sediment is supplied to the reach from the upper watershed above the dam to replenish it. This eventually may leave only the largest boulders which are only moved by infrequent floods. NMFS (2010) has expressed concern that this process can trap fine particles and lock the bed in a pavement-like state called “armoring,” making it harder for salmonids to dig spawning redds, which typically consist of loose gravel that can be easily excavated by the fish. Project operations could result in long-term minor to moderate adverse impacts on aquatic habitat.

The reach below McCloud dam is confined by relatively undeformable bedrock and boulder and has a steeper slope than reaches below Hawkins Creek. Consequently, this reach has relatively high capacity for sediment transport, but limited storage capacity for cobble, gravel, and finer sediment. The fine sediment fraction comprised only 10 to 11 percent of bulk sediment in the mainstem and major tributaries to the Lower McCloud River. Some fining of the substrate in the Lower McCloud River was observed at the

confluence of major tributaries, but decreased quickly moving downstream. This would indicate that while substrates below the dam may have coarsened, armoring is not a widespread condition in the Lower McCloud River.

In its original condition 23, the Forest Service specified that PG&E should develop and implement a Gravel and Coarse Sediment Management Plan within 1 year of license issuance, in consultation with the Forest Service, California Fish and Game, the California Water Board, and other interested parties, and with approval of the Commission and the Forest Service. The plan would require the addition of 150 to 600 tonnes (depending on monitoring results) of gravel and coarse sediment (8-128 millimeters) to the Lower McCloud River, with inputs specifically within the reach between the McCloud dam spillway and the Hawkins Creek confluence. Although the Forest Service did not specify a source for the material, it recommended that PG&E consider using sorted gravel and coarse sediment from extensive deposits at the Star City Creek inlet in McCloud reservoir. The Forest Service specified that the material would be placed in the Lower McCloud River between the spillway and Hawkins Creek confluence. The plan would also include monitoring of the Lower McCloud River between the McCloud dam and Bald Mountain Creek confluence to evaluate the biological population trends of trout and macroinvertebrates that are affected by gravel and coarse sediment, long-term changes in channel morphology, and the fate of introduced gravels and coarse sediment over the course of the license term. This monitoring component would be integrated into the Biological Monitoring Plan,

PG&E alternative condition 23 proposed to revise the time to develop the Gravel and Coarse Sediment Management Plan to 2 years, to allow for receipt of license articles from the Commission and collaborative plan development. PG&E also proposed that gravel and coarse sediment introductions occur periodically rather than annually and that the source of the coarse sediment would be the delta deposit at the head of the Star City Creek arm of McCloud reservoir, where the coarse sediment will be excavated “in the dry” and not dredged. Coarse sediment augmentation would occur as far upstream in the specified Lower McCloud River reach (between the spillway and the Hawkins Creek confluence) as operationally feasible and cost effective. PG&E proposed that the monitoring component of the plan cover the Lower McCloud River between McCloud dam and Ladybug Creek rather than Bald Mountain Creek. PG&E also proposed that implementation would be contingent on receipt of section 401 water quality certifications, a streambed alteration agreement from California Fish and Game, and a section 404 permit from the U.S. Army Corps of Engineers with terms and conditions that do not substantively alter the cost or specifications of the action proposed. If this is not the case, or if for any reason the sediment currently stored in the Star City Creek delta is considered to be of insufficient quantity or quality, PG&E proposed that it then would be exempt from the Forest Service’s original condition 23.

In its November 29, 2010 filing, the Forest Service modified condition 23 to specify that the source of material would be “coarse sediment deposits within McCloud reservoir,” and it specifies that the placement site would be the Lower McCloud River

directly below the spillway splash pool. The Forest Service included a draft Coarse Sediment Management Plan in the filing (Forest Service, 2010d, Enclosure 3). In the draft plan, the Forest Service recommends an adaptive management framework for collection, storage, and placement of coarse sediment into the Lower McCloud River. The plan would require the periodic, rather than annual, addition of gravel and coarse sediment to the Lower McCloud River, with inputs specifically within the reach between the McCloud dam spillway and the Hawkins Creek confluence. The coarse sediment would be excavated during low water from Star City Delta (or Tarantula Gulch if sediment at Star City Delta is unsuitable) in the first year following license acceptance and continue until sufficient quantities are reached. In its November 24, 2010 filing, PG&E accepts the Forest Service's modified condition and withdraws its alternative condition 23. California Fish and Game recommends that PG&E prepare a Gravel and Sediment Management Plan requiring the annual addition of 150 tonnes of gravel and sediment to the McCloud River, between the dam spillway and the confluence with Hawkins Creek. California Fish and Game recommends that PG&E consider using the Star City Creek inlet as a material source. As part of the long-term monitoring component of this plan, California Fish and Game's recommendation incorporates amphibians as an indicator species for assessing ecosystem health.

Forest Service condition 24 specified that PG&E should prepare a reservoir dredging plan in consultation with the Forest Service and approved by the Commission and the Forest Service, if required for the purposes of increasing gravel and sediment supply or for removing sediment from reservoirs to accomplish project management objectives. The plan should be filed not less than 90 days prior to any proposed or scheduled reservoir dredging operations and should include details regarding the following: dredging location, amount, and timing; dredged material amount, composition, and size; stockpile site identification; equipment, road access, and material storage/staging needs; conditions to minimize related ecological impacts; and public notification.

PG&E alternative condition 24 proposed that PG&E does not anticipate a need for dredging during the license term, because PG&E alternative condition 23 proposed excavation of material during periods when reservoir water surface elevations would be below the Star City Creek delta. This plan for gravel and coarse sediment management would eliminate the need for dredging within McCloud reservoir and the associated requirement for a dredging plan and permit. In its November 29, 2010, filing, the Forest Service drops condition 24 after analyzing PG&E's alternative condition. In its November 24, 2010, filing, PG&E withdraws its alternative condition 24.

NMFS, with concurrence from FWS, recommends that, as soon as listed salmonids are documented in the McCloud River and affected by the project, PG&E should design and implement a listed salmonid gravel substrate augmentation plan, in consultation with the U.S. Bureau of Reclamation, NMFS, FWS, California Fish and Game, and the Commission, and with the approval of the Commission and NMFS.

### *Our Analysis*

The development and implementation of a Gravel and Coarse Sediment Management Plan, and monitoring and adaptive management of gravel and coarse sediment augmentation as specified by Forest Service condition 23 would help mitigate project effects on aquatic habitat. Gravel and coarse sediment augmentation below McCloud dam would likely mimic patterns of sediment deposition created below downstream tributary confluences in the Lower McCloud River. Gravel introduction below McCloud dam would have the effect of contributing the gravel and sediment equivalent of an additional tributary to the most supply-limited reach of the Lower McCloud River. Increasing the availability of gravel in the affected reach could benefit aquatic resources by increasing the availability and quality of salmonid spawning habitat, as well as aquatic habitat in general. Increasing the amount of gravel deposits could also increase the amount of invertebrate habitat that is available within the stream substrate, and enhancing invertebrate production could increase the biomass of fish species that can be supported by the invertebrate forage base in the reach.

Recommendations regarding the amount and timing of gravel augmentation covered a broad range from California Fish and Game's recommendation to provide 150 tonnes of gravel and coarse sediment annually to the Forest Service's specification to provide 150 to 600 periodically. This range reflects the uncertainty as to how much and how quickly sediment would be mobilized and distributed through the downstream reach and the sediment storage capacity of the reach. Forest Service modified condition 23 specifies placement of material periodically based on an adaptive management approach to be provided in the Gravel and Coarse Sediment Management Plan. This approach recognizes that the rate of mobilization and downstream dispersion of gravel and coarse sediment depends on river flow and that spill flows capable of mobilizing larger sediment material occur at a frequency of about 4 out of 10 years at McCloud dam. As opposed to a fixed annual augmentation schedule, the Forest Service's specification to periodically augment coarse sediment in the Lower McCloud River based on spring flows and spill events would provide a more flexible mechanism for determining the volume and frequency of sediment introduction necessary to enhance aquatic habitat below McCloud dam.

PG&E proposed to use the Star City Creek delta as the source of gravel and sediment, but did not propose to explore an alternate source of material if Star City Creek proves to be inadequate for any reason. The Forest Service's draft Coarse Sediment Management Plan recommends that PG&E use delta deposits at Star City Creek as a source of gravel and sediment, and if necessary, evaluate Tarantula Gulch delta deposit as another potential local source. Identifying an alternative coarse sediment source would provide the necessary volumetric, physical, and chemical characteristics, as well as the logistics for transport, and would be prudent to ensure the suitability of alternative source material for augmentation. The Forest Service withdrew condition 24, which specified that PG&E should prepare a reservoir dredging plan, if required, for the purposes of increasing gravel and sediment supply, because excavation of coarse sediment material

would only be required within the dry portion of the delta with ground-based equipment. While dredging would allow for the collection of locally suitable source material, the technique is often costly, and may pose additional environmental risks, including, but not limited to, the release of mercury and increased turbidity. Use of sediment deposits at the mouth of the Star City Creek tributary, located adjacent to the McCloud reservoir, would provide material with a natural size range typical of the regional sources in the upper McCloud watershed. The proposed monitoring component of the Gravel and Coarse Sediment Management Plan would provide procedures to determine how the introduced gravel and coarse sediment are distributed downstream and the potential benefit to aquatic resources, while the adaptive management approach would provide a mechanism for modifying the gravel and sediment augmentation program based on the observations from the monitoring program.

In its alternative condition 23, PG&E proposed that monitoring for the gravel and coarse sediment program focus on the measurement of changes to the physical characteristics of the substrate through the reach targeted for augmentation. In its original condition 23, the Forest Service specified that the monitoring plan be integrated with the Biological Monitoring Plan. Although the Forest Service dropped that specification from modified condition 23, habitat monitoring is still included as a component of the Forest Service's draft Aquatic Biological Monitoring Plan. The two monitoring plans would allow for the evaluation of the gravel augmentation program on the physical habitat as well as the associated changes to the biological resources and provide an effective and efficient means for analyzing the success and potential benefits of the program to aquatic resources.

In its modified condition 23, the Forest Service removed its original specification that the geographic scope of monitoring encompass the reach from the McCloud dam to Bald Mountain Creek. In the draft Coarse Sediment Management Plan, the Forest Service recommends that monitoring occur in the reach of the Lower McCloud River from the McCloud dam spillway to a suitable point near or downstream of Hawkins Creek confluence to be determined in the final plan. PG&E originally proposed that monitoring extend to Ladybug Creek, about a mile and a half upstream of Bald Mountain Creek and 3.5 miles downstream of Hawkins Creek. PG&E suggested this as the downstream limit to monitoring because pre-licensing studies indicated a suitable mix of gravel substrate for spawning below Ladybug Creek. Three of the Habitat Criteria Mapping (HCM) study sites (HCM-02, HCM-03, and HCM-04) are located between Ladybug Creek and Bald Mountain Creek. The reach between Ladybug Creek and Bald Mountain Creek could provide a good baseline for evaluating the success of the program given the pre-licensing data for the three HCM study sites and the fact that good quality spawning substrate currently exists in this reach.

California Fish and Game's recommendation is generally consistent with the Forest Service and PG&E's alternative. Relative to the monitoring plan California Fish and Game specifically recommended the use of amphibians as indicators of success of the gravel and coarse sediment augmentation program. We note that while the foothill

yellow-legged frog is the only amphibian in the area likely to benefit from gravel augmentation, it is not found in these upper reaches of the Lower McCloud River because water temperatures are generally too cold to support the species. Within the proposed coarse sediment and gravel augmentation reach, fish, particularly salmonids, and invertebrates are more likely to benefit from augmentation than amphibians. Monitoring focused on fish and invertebrates would provide data that is more indicative of a biological response to gravel and coarse sediment augmentation. PG&E provides a rationale for completion of the gravel and coarse sediment management and monitoring plans 2 years following issuance of the new license rather than 1 year proposed by Forest Service. However, because the Forest Service and PG&E have worked collaboratively on the draft Coarse Sediment Management Plan and it is substantially complete, we expect that 1 year would be adequate for consultation, completion of the plan, and securing all approvals and permits.

The recommendations by NMFS and FWS are made relative to augmentation of gravel substrate for listed salmonids when they are documented in the Lower McCloud River and affected by the project. The Keswick and Shasta dams on the Sacramento River downstream of the McCloud dam are existing barriers to upstream passage of anadromous salmonids including Chinook salmon and steelhead. None of the listed anadromous salmonids would be expected to have access to habitat in the Lower McCloud River if and until upstream migration of listed species is implemented through Shasta Lake. Therefore, management of gravel spawning substrate recommended by NMFS and FWS would provide no benefit for listed species at this time. As part of the RPA for the OCAP BiOp and consistent with the Public Draft Recovery Plan for listed salmonids, feasibility studies are to be implemented to assess the suitability of habitat for listed salmonids and to assess fish passage logistics over the Keswick and Shasta dams on the Sacramento River downstream of the McCloud dam. Feasibility studies to assess habitat for listed salmonids are expected to begin in January 2010 and continue through January 2012 and, based on the results of these studies, a pilot program could be implemented to re-introduce listed salmonids to habitat above Shasta and Keswick dams beginning in March 2012. Based on the results of the pilot-program, a long-term anadromous fish passage program to provide both upstream and downstream fish passage could be implemented by January 31, 2020. Therefore, these actions could result in the future presence of listed salmonids in the Lower McCloud River and waters of the McCloud-Pit project below McCloud dam as early as 2012. Implementation of the Gravel and Coarse Sediment Management Plan and monitoring of changes to the physical habitat conditions would provide information to assess the potential benefits of the plan to resident wild and reintroduced anadromous salmonids. The proposed monitoring program would provide a mechanism for adapting the augmentation program to benefit listed anadromous species, if necessary, if and when they are present and affected by the project.

### **3.3.2 Aquatic Resources**

#### **3.3.2.1 Affected Environment**

##### **3.3.2.1.1 Water Quantity**

##### **Water Storage and Hydrology**

The McCloud-Pit Hydroelectric Project includes two major storage reservoirs, two regulating reservoirs, one afterbay, two tunnels, and three powerhouses and associated transmission facilities. Key characteristics of the five project basins, including inflow, surface area, length, storage capacity, releases, and drainage area are described below.

McCloud reservoir has a maximum surface area of 520 acres, is 5 miles long, and has a maximum storage capacity of about 31,197 acre-feet. The reservoir shoreline is 14 miles long. The McCloud River watershed above McCloud reservoir includes the highest altitude within the project vicinity and thus has the largest amount of snowmelt influence of the four reservoirs. As a result, McCloud reservoir receives a large component of base flow from springs (about 700 cfs) that discharge groundwater from the aquifer to the east of Mount Shasta into the McCloud River and its tributaries. Another noteworthy contribution comes from glacial melt from Konwakiton Glacier, one of several glaciers located on Mount Shasta's southeastern slopes just above Mud Creek. A number of small tributaries flow directly into McCloud reservoir, including Huckleberry Creek, which also carries most of the flow diverted from Mud Creek. Water is normally released from McCloud reservoir to Iron Canyon reservoir via McCloud tunnel and to the Lower McCloud River via the McCloud dam spillway and a low-level outlet tunnel.

Iron Canyon reservoir has a surface area of 506 acres, is 1 mile long, and has a maximum storage capacity of about 24,241 acre-feet. The reservoir shoreline is 11 miles long. The majority of the water in Iron Canyon reservoir originates in the McCloud River watershed and is diverted via McCloud tunnel. Iron Canyon reservoir is also the confluence point of five small streams: Gap Creek, Little Gap Creek, Cedar Salt Log Creek, Deadlun Creek, and McGill Creek. Water is normally released from Iron Canyon reservoir to Pit 6 reservoir through the James B. Black powerhouse on the Pit River via Iron Canyon tunnel, an associated pipeline, and a steel penstock. The minimum and maximum recorded daily flows through James B. Black powerhouse are 0 and 2,280 cfs, respectively, and the historical mean and median daily discharges are 900 and 863 cfs, respectively (U.S. Geological Survey [USGS] gage 11363910/MC-11). Iron Canyon reservoir also releases to Pit 6 reservoir via a low-level slide gate to Iron Canyon Creek.

Pit 6 reservoir has a surface area of 265 acres, is about 5 miles long, and has a maximum storage capacity of about 15,619 acre-feet. The reservoir shoreline is 5 miles long. The watershed contributing to Pit 6 reservoir begins on the Pit River at Pit 5 dam and includes the mainstem Pit River and its tributaries, including Iron Canyon Creek downstream of Iron Canyon dam. The watershed of one major tributary in this area, Kosh Creek, constitutes almost half of the Pit 6 reservoir watershed. Water is normally

released from Pit 6 reservoir through the Pit 6 powerhouse to the Pit River and Pit 7 reservoir. The minimum and maximum recorded daily flows through Pit 6 powerhouse are 0 and 8,650 cfs, respectively, and the historical mean and median daily discharges are 4,193 and 3,800 cfs, respectively (USGS gage 11364150/PH-63).

Pit 7 reservoir has a surface area of 468 acres, is 8 miles long, and has a maximum storage capacity of about 34,142 acre-feet. The reservoir shoreline is 16 miles long. The two primary tributaries to the Pit River in the watershed contributing inflow to Pit 7 reservoir are Roaring Creek and Hatchet Creek. Water is normally released from Pit 7 reservoir through the Pit 7 powerhouse to the Pit River and Pit 7 afterbay before continuing to Shasta Lake. The minimum and maximum recorded daily flows through Pit 7 powerhouse are 0 and 9,080 cfs, respectively, and the historical mean and median daily discharges are 4,231 and 3,760 cfs, respectively (USGS gage 11364800/PH-64).

Pit 7 afterbay has a surface area of about 69 acres at normal “maximum” surface elevation of 1,067 feet, which is the maximum water surface of Shasta Lake. The afterbay is located immediately downstream from the Pit 7 powerhouse and has no storage capacity. Flows from Pit 7 reservoir are regulated with the V-notch weir in the Pit 7 afterbay dam. Changes in water flow from the Pit 7 dam and powerhouse are attenuated by the afterbay.

Table 3-5 shows physical characteristics of each reservoir and the Pit 7 afterbay, and figure 3-1 shows historic trends in storage for each reservoir. Table 3-6 provides minimum required flow releases to Lower McCloud River and Iron Canyon Creek, and tables 3-7 through 3-18 provide regulated flows compared to estimated unimpaired flows for each of the main project reaches. We provide a discussion of instream flow requirements for aquatic species in section 3.3.2.1.3, *Aquatic Biota*.

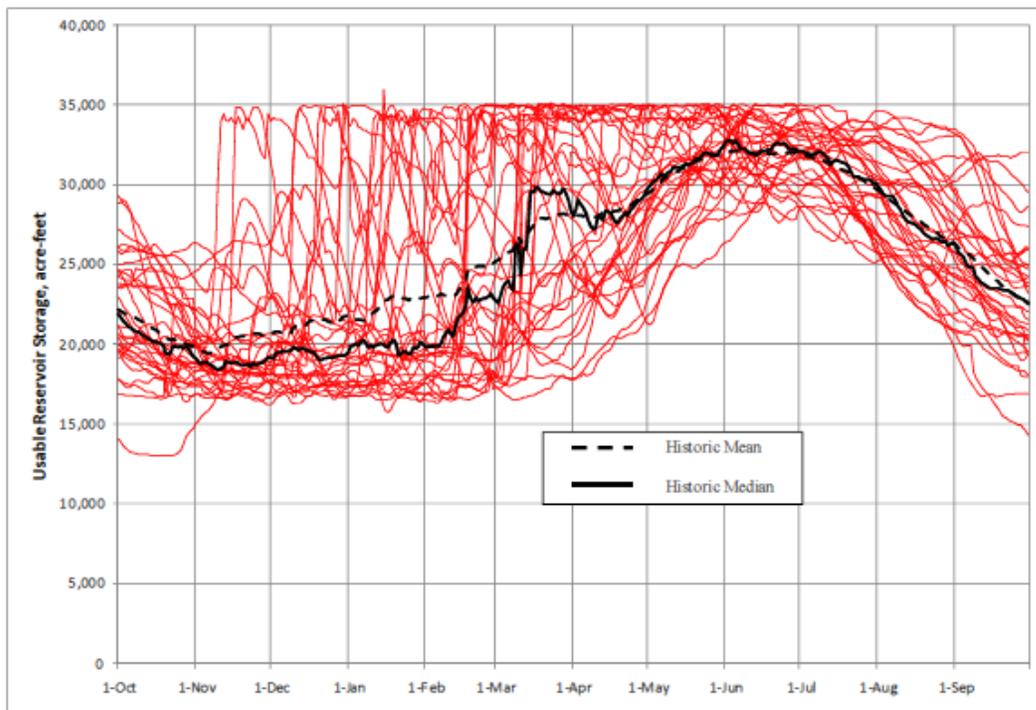
Table 3-5. Reservoir and afterbay characteristics. (Source: Staff, based on specifications provided in PG&E, 2009a)

| Basin                 | Elevation (feet)   |                    | Storage capacity<br>(acre-feet) |
|-----------------------|--------------------|--------------------|---------------------------------|
|                       | Normal<br>Maximum  | Normal<br>Minimum  | Gross                           |
| McCloud reservoir     | 2,680              | 2,635              | 31,197                          |
| Iron Canyon reservoir | 2,664              | 2,593 <sup>a</sup> | 24,241                          |
| Pit 6 reservoir       | 1,425              | 1,385              | 15,619                          |
| Pit 7 reservoir       | 1,270              | 1,235              | 34,142                          |
| Pit 7 afterbay        | 1,067 <sup>b</sup> | 1,036 <sup>c</sup> | 0                               |

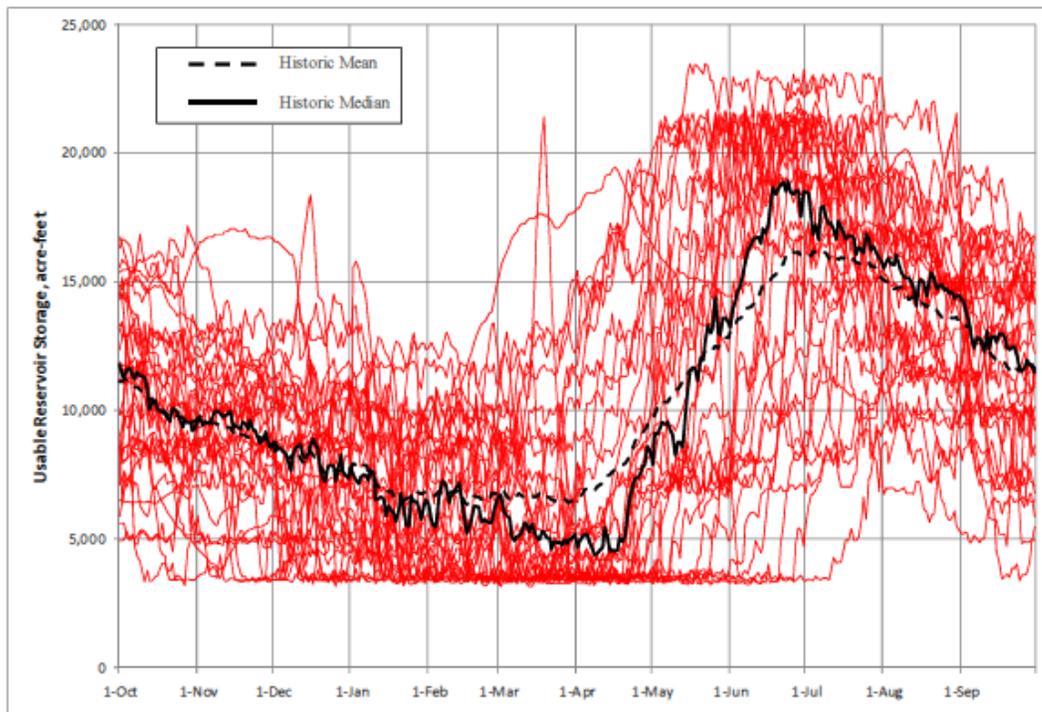
<sup>a</sup> 2,615 feet during summer recreation season.

<sup>b</sup> Shasta Lake at full pond.

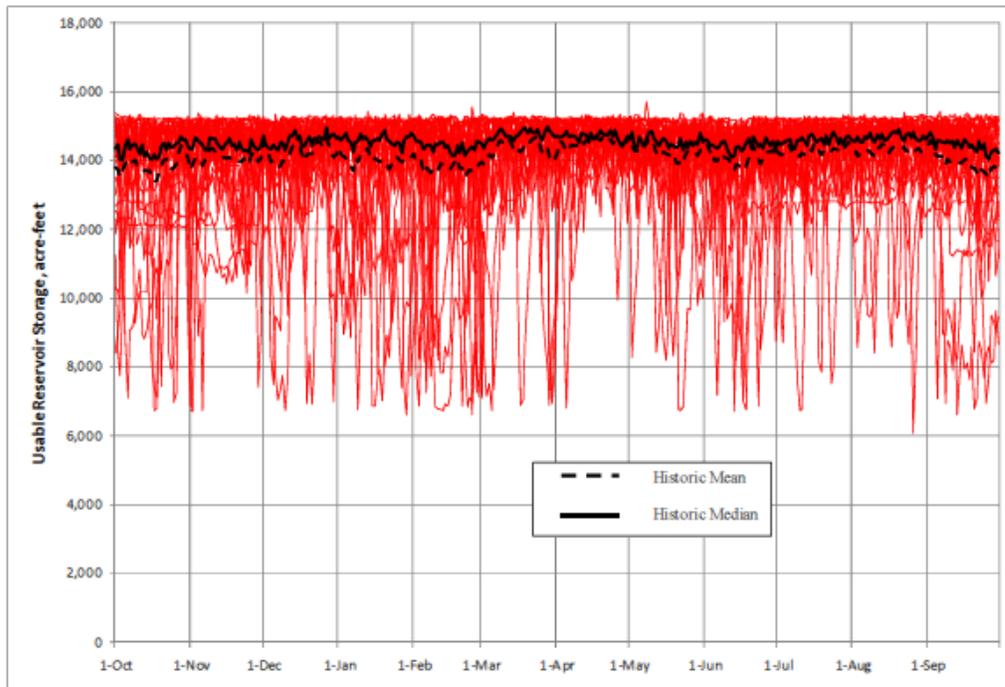
<sup>c</sup> Elevation of afterbay weir v-notch invert.



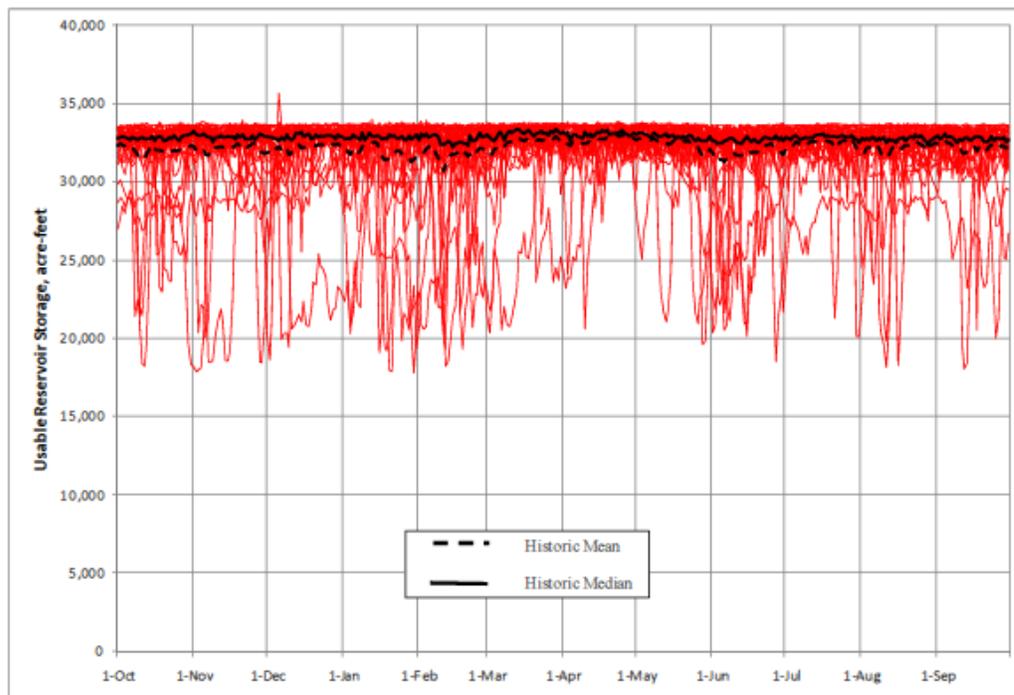
a) McCloud Reservoir



b) Iron Canyon Reservoir



**c) Pit 6 Reservoir**



**d) Pit 7 Reservoir**

Figure 3-1. Historic median and mean daily reservoir storage for McCloud-Pit Hydroelectric Project reservoirs, water years 1974<sup>a</sup> through 2006. (Source: PG&E 2009a)

<sup>a</sup> Pit 7 reservoir data represent water years 1975 through 2006.

Table 3-6. Current required releases to Lower McCloud River and Iron Canyon Creek.  
(Source: Adapted by staff, from PG&E, 2009a)

| <b>Reservoir</b>  | <b>Gage Location<br/>(USGS/PG&amp;E No.)</b> | <b>Date</b>                                | <b>Required Minimum<br/>Flow (cfs)</b> |                     |     |
|-------------------|--|--|--|---------------------|-----|
| McCloud           | McCloud Dam<br>(11367760/MC-7)               |  | <b>All Years</b>                       |                     |     |
|                   |  | May 1–Nov 30                               | 50                                     |                     |     |
|                   |  | Dec 1–Apr 30                               | 40                                     |                     |     |
|                   |  |  | <b>Normal<br/>Year</b>                 | <b>Dry<br/>Year</b> |     |
|                   |  | Ah-Di-Na (11367800/MC-1)                   | Jan 1–Feb 28                           | 160                 | 160 |
|                   |  |  | Mar 1–Apr 30                           | 170                 | 170 |
|                   |  |  | May 1–May 15                           | 170                 | 160 |
|                   |  |  | May 16–Aug 31                          | 200                 | 160 |
|                   | Sep 1–Dec 15                                 | 210  | 180                                    |                     |     |
|                   | Dec 15–Dec 31                                | 170  | 170                                    |                     |     |
| Iron<br>Canyon    | Iron Canyon Dam<br>(11363930/MC-10)          |  | <b>All Years</b>                       |                     |     |
|                   |  | Year-round                                 | 3                                      |                     |     |
| Pit 6             | N/A  | N/A  | N/A                                    |                     |     |
| Pit 7             | Downstream of Pit 7 Dam<br>(11365000/PH-47)  | When Shasta Lake<br>elevation <1,055 feet. | 150                                    |                     |     |
| Pit 7<br>Afterbay | N/A  | N/A  | N/A                                    |                     |     |

Table 3-7. Mean, minimum, and maximum unimpaired flows in the McCloud River above McCloud reservoir for water years 1974–2006 (USGS gage 11367500/MC-3); all flows are unimpaired at this location. (Source: PG&E 2009)

| Month     | Regulated Flow (cfs) |         |         | Unimpaired Flow (cfs) |         |         |
|-----------|----------------------|---------|---------|-----------------------|---------|---------|
|           | Mean                 | Minimum | Maximum | Mean                  | Minimum | Maximum |
| January   | NA                   | NA      | NA      | 941                   | 532     | 11,900  |
| February  | NA                   | NA      | NA      | 990                   | 541     | 6,490   |
| March     | NA                   | NA      | NA      | 1,133                 | 577     | 8,330   |
| April     | NA                   | NA      | NA      | 1,117                 | 647     | 3,930   |
| May       | NA                   | NA      | NA      | 1,097                 | 576     | 3,190   |
| June      | NA                   | NA      | NA      | 935                   | 566     | 2,250   |
| July      | NA                   | NA      | NA      | 831                   | 559     | 1,390   |
| August    | NA                   | NA      | NA      | 795                   | 552     | 1,130   |
| September | NA                   | NA      | NA      | 775                   | 546     | 1,080   |
| October   | NA                   | NA      | NA      | 757                   | 546     | 1,140   |
| November  | NA                   | NA      | NA      | 801                   | 541     | 4,170   |
| December  | NA                   | NA      | NA      | 854                   | 537     | 9,700   |

Table 3-8. Mean, minimum, and maximum regulated flows in the McCloud tunnel for water years 1974–2006 (USGS gage 11367720/MC-8); all flows are regulated at this location. (Source: PG&E 2009a)

| <b>Month</b> | <b>Regulated Flow (cfs)</b> |                |                | <b>Unimpaired Flow (cfs)</b> |                |                |
|--------------|-----------------------------|----------------|----------------|------------------------------|----------------|----------------|
|              | <b>Mean</b>                 | <b>Minimum</b> | <b>Maximum</b> | <b>Mean</b>                  | <b>Minimum</b> | <b>Maximum</b> |
| January      | 879                         | 271            | 1,620          | NA                           | NA             | NA             |
| February     | 934                         | 0              | 1,470          | NA                           | NA             | NA             |
| March        | 1,051                       | 0              | 1,580          | NA                           | NA             | NA             |
| April        | 1,053                       | 337            | 1,590          | NA                           | NA             | NA             |
| May          | 957                         | 266            | 1,460          | NA                           | NA             | NA             |
| June         | 841                         | 0              | 1,430          | NA                           | NA             | NA             |
| July         | 769                         | 321            | 1,420          | NA                           | NA             | NA             |
| August       | 726                         | 16             | 1,210          | NA                           | NA             | NA             |
| September    | 689                         | 296            | 1,320          | NA                           | NA             | NA             |
| October      | 652                         | 159            | 1,220          | NA                           | NA             | NA             |
| November     | 668                         | 180            | 1,420          | NA                           | NA             | NA             |
| December     | 775                         | 237            | 1,540          | NA                           | NA             | NA             |

Table 3-9. Mean, minimum, and maximum regulated and unimpaired flows in the McCloud River at the McCloud dam for water years 1974–2006 (USGS gage 11367760/MC-7, synthesized unimpaired hydrology data). (Source: PG&E 2009a)

| Month     | Regulated Flow (cfs) |         |         | Unimpaired Flow (cfs) |         |         |
|-----------|----------------------|---------|---------|-----------------------|---------|---------|
|           | Mean                 | Minimum | Maximum | Mean                  | Minimum | Maximum |
| January   | 228                  | 40      | 17,646  | 1,198                 | 589     | 16,544  |
| February  | 201                  | 39      | 5,546   | 1,283                 | 594     | 8,792   |
| March     | 250                  | 39      | 8,690   | 1,437                 | 703     | 11,646  |
| April     | 206                  | 40      | 3,529   | 1,325                 | 714     | 5,497   |
| May       | 247                  | 44      | 2,100   | 1,248                 | 637     | 4,108   |
| June      | 206                  | 58      | 1,680   | 1,043                 | 618     | 2,646   |
| July      | 175                  | 131     | 346     | 915                   | 607     | 1,571   |
| August    | 179                  | 121     | 223     | 869                   | 598     | 1,248   |
| September | 192                  | 116     | 228     | 846                   | 590     | 1186    |
| October   | 193                  | 45      | 251     | 829                   | 592     | 1,557   |
| November  | 200                  | 47      | 4,630   | 917                   | 585     | 6,546   |
| December  | 163                  | 39      | 3,025   | 1,035                 | 585     | 13,096  |

Table 3-10. Mean, minimum, and maximum regulated and unimpaired flows in the McCloud River at Ah-Di-Na for water years 1974–2006 (USGS gage 11367800/MC-1, synthesized unimpaired hydrology data). (Source: PG&E 2009a)

| Month     | Regulated Flow (cfs) |         |         | Unimpaired Flow (cfs) |         |         |
|-----------|----------------------|---------|---------|-----------------------|---------|---------|
|           | Mean                 | Minimum | Maximum | Mean                  | Minimum | Maximum |
| January   | 384                  | 153     | 25,200  | 1344                  | 596     | 19,207  |
| February  | 408                  | 147     | 9,110   | 1452                  | 604     | 10,081  |
| March     | 484                  | 143     | 11,800  | 1614                  | 738     | 13,556  |
| April     | 362                  | 149     | 5,690   | 1,441                 | 732     | 6,399   |
| May       | 350                  | 146     | 3,620   | 1,319                 | 653     | 4,593   |
| June      | 248                  | 157     | 1,405   | 1,084                 | 628     | 2,880   |
| July      | 205                  | 148     | 343     | 939                   | 610     | 1,716   |
| August    | 204                  | 150     | 278     | 885                   | 602     | 1,295   |
| September | 217                  | 162     | 265     | 861                   | 594     | 1,222   |
| October   | 217                  | 178     | 447     | 847                   | 598     | 1,808   |
| November  | 257                  | 178     | 5,690   | 966                   | 589     | 8,005   |
| December  | 284                  | 163     | 17,000  | 1,129                 | 589     | 14,992  |

Table 3-11. Mean, minimum, and maximum regulated and unimpaired flows in the McCloud River above Shasta Lake for water years 1974–2006 (USGS gage 11368000/MC-5, synthesized unimpaired hydrology data). (Source: PG&E 2009a)

| Month     | Regulated Flow (cfs) |         |         | Unimpaired Flow (cfs) |         |         |
|-----------|----------------------|---------|---------|-----------------------|---------|---------|
|           | Mean                 | Minimum | Maximum | Mean                  | Minimum | Maximum |
| January   | 1,376                | 208     | 44,999  | 2,336                 | 644     | 39,007  |
| February  | 1,564                | 217     | 18,700  | 2,609                 | 675     | 21,662  |
| March     | 1,647                | 226     | 26,000  | 2,776                 | 831     | 27,756  |
| April     | 1,034                | 209     | 12,400  | 2,113                 | 807     | 13,109  |
| May       | 730                  | 212     | 7,220   | 1,699                 | 756     | 8,192   |
| June      | 452                  | 194     | 2,266   | 1,294                 | 689     | 4,103   |
| July      | 329                  | 191     | 945     | 1,063                 | 637     | 2,419   |
| August    | 289                  | 187     | 485     | 971                   | 619     | 1,507   |
| September | 294                  | 191     | 549     | 938                   | 605     | 1,371   |
| October   | 311                  | 196     | 2,310   | 941                   | 617     | 3,671   |
| November  | 561                  | 216     | 15,900  | 1,270                 | 614     | 18,855  |
| December  | 908                  | 202     | 31,100  | 1,753                 | 617     | 29,092  |

Table 3-12. Mean, minimum, and maximum regulated and unimpaired flows in Iron Canyon Creek at Iron Canyon dam for water years 1974–2006 (USGS gage 11363930/MC-10, synthesized unimpaired hydrology data). (Source: PG&E 2009a)

| Month     | Regulated Flow (cfs) |                  |                    | Unimpaired Flow (cfs) |         |         |
|-----------|----------------------|------------------|--------------------|-----------------------|---------|---------|
|           | Mean                 | Minimum          | Maximum            | Mean                  | Minimum | Maximum |
| January   | 3.9 <sup>a</sup>     | 0.4 <sup>a</sup> | 11.0 <sup>a</sup>  | 67                    | 3       | 1,341   |
| February  | 13.8 <sup>a</sup>    | 2.0 <sup>a</sup> | 538.0 <sup>a</sup> | 78                    | 3       | 931     |
| March     | 9.8 <sup>a</sup>     | 2.7 <sup>a</sup> | 501.0 <sup>a</sup> | 79                    | 4       | 961     |
| April     | 3.8 <sup>a</sup>     | 2.6 <sup>a</sup> | 6.4 <sup>a</sup>   | 45                    | 3       | 454     |
| May       | 3.9 <sup>a</sup>     | 2.5 <sup>a</sup> | 7.4 <sup>a</sup>   | 26                    | 4       | 244     |
| June      | 3.9                  | 2.6              | 7                  | 14                    | 2       | 92      |
| July      | 3.9                  | 2.7              | 7                  | 8.4                   | 2       | 48      |
| August    | 3.9                  | 0.4              | 7.6                | 5.8                   | 1.2     | 18      |
| September | 3.9                  | 2.7              | 7.8                | 5.2                   | 0.7     | 24      |
| October   | 3.9 <sup>a</sup>     | 2.7 <sup>a</sup> | 8.1 <sup>a</sup>   | 6                     | 0.8     | 126     |
| November  | 3.9 <sup>a</sup>     | 2.7 <sup>a</sup> | 9.1 <sup>a</sup>   | 21                    | 2       | 735     |
| December  | 3.8 <sup>a</sup>     | 0.4 <sup>a</sup> | 15.0 <sup>a</sup>  | 42                    | 2       | 955     |

<sup>a</sup> Regulated data set is incomplete (0.25 percent missing data).

Table 3-13. Mean, minimum, and maximum regulated and unimpaired flows in the Pit River below the Pit 5 dam for water years 1974–2006 (USGS gage 11363000/PH-27, synthesized unimpaired hydrology data). (Source: PG&E 2009a)

| Month     | Regulated Flow (cfs) |         |         | Unimpaired Flow (cfs) |         |         |
|-----------|----------------------|---------|---------|-----------------------|---------|---------|
|           | Mean                 | Minimum | Maximum | Mean                  | Minimum | Maximum |
| January   | 1,014                | 46      | 30,200  | 4,255                 | 2,076   | 32,529  |
| February  | 1,252                | 47      | 36,500  | 4,812                 | 1,884   | 36,882  |
| March     | 1,586                | 50      | 15,700  | 5,347                 | 2,220   | 20,517  |
| April     | 1,004                | 45      | 12,000  | 4,440                 | 2,037   | 17,020  |
| May       | 805                  | 67      | 17,500  | 3,930                 | 1,812   | 20,328  |
| June      | 274                  | 107     | 5,460   | 2,946                 | 1,724   | 9,533   |
| July      | 145                  | 78      | 322     | 2,411                 | 1,620   | 4,220   |
| August    | 155                  | 72      | 1,940   | 2,305                 | 1,618   | 3,438   |
| September | 143                  | 89      | 3,160   | 2,358                 | 1,627   | 3,783   |
| October   | 149                  | 88      | 2,770   | 2,525                 | 1,655   | 3,745   |
| November  | 240                  | 48      | 7,450   | 2,941                 | 1,865   | 12,110  |
| December  | 459                  | 39      | 15,200  | 3,409                 | 2,035   | 19,721  |

Table 3-14. Mean, minimum, and maximum regulated and unimpaired flows at the Pit 5 powerhouse for water years 1974–2006 (USGS gage 11362700/PH-69); all flows are regulated at this location. (Source: PG&E 2009a)

| <b>Month</b> | <b>Regulated Flow (cfs)</b> |                |                | <b>Unimpaired Flow (cfs)</b> |                |                |
|--------------|-----------------------------|----------------|----------------|------------------------------|----------------|----------------|
|              | <b>Mean</b>                 | <b>Minimum</b> | <b>Maximum</b> | <b>Mean</b>                  | <b>Minimum</b> | <b>Maximum</b> |
| January      | 2,955                       | 196            | 4,184          | NA                           | NA             | NA             |
| February     | 3,179                       | 0              | 4,330          | NA                           | NA             | NA             |
| March        | 3,500                       | 1,020          | 4,250          | NA                           | NA             | NA             |
| April        | 3,233                       | 114            | 4,330          | NA                           | NA             | NA             |
| May          | 3,002                       | 0              | 4,240          | NA                           | NA             | NA             |
| June         | 2,517                       | 0              | 4,140          | NA                           | NA             | NA             |
| July         | 2,120                       | 0              | 3,989          | NA                           | NA             | NA             |
| August       | 2,032                       | 0              | 4,000          | NA                           | NA             | NA             |
| September    | 2,124                       | 0              | 4,060          | NA                           | NA             | NA             |
| October      | 2,286                       | 0              | 4,058          | NA                           | NA             | NA             |
| November     | 2,535                       | 0              | 4,138          | NA                           | NA             | NA             |
| December     | 2,699                       | 0              | 4,520          | NA                           | NA             | NA             |

Table 3-15. Mean, minimum, and maximum regulated and unimpaired flows in the Pit River at the Pit 7 dam for water years 1974–2006 (USGS gage 11365000/PH-47, synthesized unimpaired hydrology data). (Source: PG&E 2009a)

| Month     | Regulated Flow (cfs) |         |         | Unimpaired Flow (cfs) |         |         |
|-----------|----------------------|---------|---------|-----------------------|---------|---------|
|           | Mean                 | Minimum | Maximum | Mean                  | Minimum | Maximum |
| January   | 6,216                | 466     | 43,500  | 5,533                 | 2,144   | 52,183  |
| February  | 7,017                | 376     | 49,000  | 6,302                 | 1,985   | 42,933  |
| March     | 7,765                | 740     | 32,800  | 6,844                 | 2,702   | 33,957  |
| April     | 6,428                | 291     | 32,400  | 5,305                 | 2,254   | 25,088  |
| May       | 5,419                | 533     | 22,200  | 4,419                 | 2,005   | 22,173  |
| June      | 3,876                | 145     | 10,800  | 3,217                 | 1,825   | 10,219  |
| July      | 3,216                | 30      | 8,240   | 2,571                 | 1,677   | 4,679   |
| August    | 3,024                | 62      | 6,940   | 2,415                 | 1,667   | 3,569   |
| September | 3,080                | 71      | 7,980   | 2,458                 | 1,669   | 3,968   |
| October   | 3,325                | 140     | 14,500  | 2,647                 | 1,727   | 5,798   |
| November  | 4,046                | 356     | 20,000  | 3,333                 | 1,932   | 22,384  |
| December  | 4,752                | 257     | 32,600  | 4,212                 | 2,115   | 37,874  |

Table 3-16. Mean, minimum, and maximum regulated and unimpaired at the James B. Black powerhouse for water years 1974–2006 (USGS gage 11363910/MC-11); all flows are regulated at this location. (Source: PG&E 2009a)

| Month     | Regulated Flow (cfs) |         |         | Unimpaired Flow (cfs) |         |         |
|-----------|----------------------|---------|---------|-----------------------|---------|---------|
|           | Mean                 | Minimum | Maximum | Mean                  | Minimum | Maximum |
| January   | 973                  | 0       | 1,950   | NA                    | NA      | NA      |
| February  | 1,025                | 0       | 1,920   | NA                    | NA      | NA      |
| March     | 1,142                | 0       | 2,020   | NA                    | NA      | NA      |
| April     | 1,080                | 0       | 1,970   | NA                    | NA      | NA      |
| May       | 972                  | 0       | 2,060   | NA                    | NA      | NA      |
| June      | 856                  | 0       | 1,910   | NA                    | NA      | NA      |
| July      | 835                  | 0       | 1,970   | NA                    | NA      | NA      |
| August    | 808                  | 0       | 2,280   | NA                    | NA      | NA      |
| September | 779                  | 0       | 1,970   | NA                    | NA      | NA      |
| October   | 732                  | 0       | 2,000   | NA                    | NA      | NA      |
| November  | 744                  | 0       | 2,010   | NA                    | NA      | NA      |
| December  | 860                  | 0       | 2,000   | NA                    | NA      | NA      |

Table 3-17. Mean, minimum, and maximum regulated and unimpaired at the Pit 6 powerhouse for water years 1974–2006 (USGS gage 11364150/PH-63); all flows are regulated at this location. (Source: PG&E 2009a)

| <b>Month</b> | <b>Regulated Flow (cfs)</b> |                |                | <b>Unimpaired Flow (cfs)</b> |                |                |
|--------------|-----------------------------|----------------|----------------|------------------------------|----------------|----------------|
|              | <b>Mean</b>                 | <b>Minimum</b> | <b>Maximum</b> | <b>Mean</b>                  | <b>Minimum</b> | <b>Maximum</b> |
| January      | 4,804                       | 606            | 8,520          | NA                           | NA             | NA             |
| February     | 5,236                       | 48             | 8,090          | NA                           | NA             | NA             |
| March        | 5,940                       | 1,090          | 8,080          | NA                           | NA             | NA             |
| April        | 5,477                       | 279            | 8,200          | NA                           | NA             | NA             |
| May          | 4,778                       | 0              | 7,900          | NA                           | NA             | NA             |
| June         | 3,755                       | 56             | 7,680          | NA                           | NA             | NA             |
| July         | 3,221                       | 0              | 6,430          | NA                           | NA             | NA             |
| August       | 3,061                       | 0              | 6,680          | NA                           | NA             | NA             |
| September    | 3,087                       | 0              | 6,330          | NA                           | NA             | NA             |
| October      | 3,194                       | 0              | 6,380          | NA                           | NA             | NA             |
| November     | 3,611                       | 0              | 8,020          | NA                           | NA             | NA             |
| December     | 4,207                       | 0              | 8,650          | NA                           | NA             | NA             |

Table 3-18. Mean, minimum, and maximum regulated and unimpaired at the Pit 7 powerhouse for water years 1974–2006 (USGS gage 11364480/PH-64); all flows are regulated at this location. (Source: PG&E 2009a)

| <b>Month</b> | <b>Regulated Flow (cfs)</b> |                |                | <b>Unimpaired Flow (cfs)</b> |                |                |
|--------------|-----------------------------|----------------|----------------|------------------------------|----------------|----------------|
|              | <b>Mean</b>                 | <b>Minimum</b> | <b>Maximum</b> | <b>Mean</b>                  | <b>Minimum</b> | <b>Maximum</b> |
| January      | 5,068                       | 136            | 9,240          | NA                           | NA             | NA             |
| February     | 5,546                       | 0              | 9,030          | NA                           | NA             | NA             |
| March        | 6,228                       | 772            | 9,080          | NA                           | NA             | NA             |
| April        | 5,741                       | 70             | 8,980          | NA                           | NA             | NA             |
| May          | 4,999                       | 330            | 8,990          | NA                           | NA             | NA             |
| June         | 3,760                       | 20             | 8,660          | NA                           | NA             | NA             |
| July         | 3,155                       | 0              | 8,240          | NA                           | NA             | NA             |
| August       | 2,941                       | 0              | 6,940          | NA                           | NA             | NA             |
| September    | 3,022                       | 0              | 6,620          | NA                           | NA             | NA             |
| October      | 3,172                       | 0              | 8,090          | NA                           | NA             | NA             |
| November     | 3,605                       | 0              | 9,050          | NA                           | NA             | NA             |
| December     | 4,342                       | 0              | 9,035          | NA                           | NA             | NA             |

## **Consumptive Use**

Although designated beneficial uses include domestic and municipal water supply in the Lower McCloud River and domestic and municipal water supply, stock watering, and irrigation in the Pit River, consumptive uses of water within the project area are minimal.

### **3.3.2.1.2 Water Quality**

The Central Valley Regional Water Board defines water quality criteria for the Sacramento River and its tributaries and formally designates existing and potential beneficial uses and water quality objectives. The McCloud River is designated in the Central Valley Regional Water Board *Water Quality Control Plan for the Sacramento and San Joaquin River Basins* (basin plan; Central Valley Regional Water Board, 2007) for municipal and domestic water supply, contact and non-contact recreation (including fishing, canoeing, and kayaking), power production, cold freshwater habitat, coldwater spawning, and wildlife habitat. The Pit River in the project area is designated for all of the beneficial uses designated for the McCloud River, as well as for water supply for irrigation and stock watering, warm freshwater habitat, and warmwater spawning. Basin plan objectives that are applicable to project-affected waters are described in table 3-19.

The McCloud River is not listed under section 303d of the Clean Water Act as an impaired water body. However, the Pit River is listed for nutrients, organic enrichment/low dissolved oxygen (DO), and water temperature, with agriculture and grazing cited as the probable sources of impairment; the river is targeted as low priority for the development of total maximum daily load (TMDL) standards, with proposed TMDL completion in 2013 (California Water Board, 2006).

Table 3-19. Water quality objectives to support designated beneficial uses in the project area. (Source: PG&E, 2009a)

| <b>Water Quality Objective</b> | <b>Description</b>  |
|--------------------------------|---|
| Bacteria                       | <p>Fecal coliform concentration: less than a geometric average of 200 per 100 milliliters water on five samples collected in any 30-day period and less than 400 per 100 milliliters on 10 percent of all samples taken in a 30-day period.</p> <p><i>Escherichia coli</i> concentrations: less than a geometric average of 126 per 100 milliliters of water on five samples collected in any 30-day period and less than 235 per 100 milliliters on 10 percent of all samples taken in a 30-day period. Basin plan criteria for fecal coliform will be replaced with criteria for <i>E. coli</i> following approval of the amendment (Central Valley Regional Water Board, 2002) by the State Board, Office of Administrative Law and EPA.</p> |
| Biostimulatory Substances      | <p>Water shall not contain biostimulatory substances that promote aquatic growth in concentrations that cause nuisance or adversely affect beneficial uses.</p>   |
| Chemical Constituents          | <p>Waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. Although certain trace element levels have been applied to particular water bodies, no portion of the project-affected area is cited within the basin plan. In addition, waters designated for municipal or domestic use must comply with portions of title 22 of the California Code of Regulation.</p>   |
| Color                          | <p>Water shall be free of discoloration that causes a nuisance or adversely affects beneficial uses.</p>  |
| DO                             | <p>Monthly median of the average daily DO concentration shall not fall below 85 percent of saturation in the main water mass, and the 95 percent concentration shall not fall below 75 percent of saturation. Minimum level of 7 milligrams per liter. When natural conditions lower DO below this level, the concentrations shall be maintained at or above 95 percent of saturation.</p>  |
| Floating Material              | <p>Water shall be free of floating material in amounts that cause nuisance or adversely affect beneficial uses.</p>   |
| Oil and Grease                 | <p>Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.</p>  |

| <b>Water Quality Objective</b> | <b>Description</b>   |
|--------------------------------|--|
| Pesticides                     | Waters shall not contain pesticides or a combination of pesticides in concentrations that adversely affect beneficial uses.  |
| pH                             | The pH of surface waters will remain between 6.5 to 8.5, and cause changes of less than 0.5 in receiving water bodies.   |
| Radioactivity                  | Radionuclides shall not be present in concentrations or accumulate in the food web to an extent that is harmful to human, plant, animal or aquatic life.   |
| Sediment                       | The suspended sediment load and suspended-sediment discharge rate of surface waters shall not be altered in such a manner as to cause a nuisance or adversely affect beneficial uses.  |
| Settleable Material            | Waters shall not contain substances in concentrations that result in the deposition of material that causes a nuisance or adversely affects beneficial uses.   |
| Suspended Material             | Waters shall not contain suspended material in concentrations that cause a nuisance or adversely affect beneficial uses.   |
| Tastes and Odor                | Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes and odors to domestic or municipal water supplies, fish flesh, or other edible products of aquatic origin, or substances that cause nuisance or otherwise adversely affect beneficial uses.   |
| Toxicity                       | All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. Compliance with this objective will be determined by analysis indicator organisms, species diversity, population density, growth anomalies, and biotoxicity tests as specified by the Regional Water Quality Control Board. |
| Turbidity                      | In terms of changes in turbidity (nephelometric turbidity units [NTU]) in the receiving water body: where natural turbidity is 0 to 5 NTU, increases shall not exceed 1 NTU; where 5 to 50 NTU, increases shall not exceed 20 percent; where 50 to 100 NTU, increases shall not exceed 10 NTU; and where natural turbidity is greater than 100 NTU, increase shall not exceed 10 percent.        |

| Water Quality Objective | Description  |
|-------------------------|--|
| Water Temperature       | The natural receiving water temperature of interstate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Quality Control Board that such alteration in water temperature does not adversely affect beneficial uses. Increases in water temperatures must be less than 2.8 degrees Celsius (°C) above natural receiving-water temperature. |

### Water Quality Standards

Water quality in the project area was determined to be generally in accordance with basin plan objectives, with only one potential exceedance of basin plan criteria for pH, which PG&E considered to be insignificant, and no exceedances for other parameters. Monitoring results and the observed exceedance are summarized below.

#### *Chemical Constituents*

Sampling has demonstrated low levels of chemical constituents regulated under title 22 of the California Code of Regulations. Although limited data are available on metals in the McCloud and Pit Rivers, samples collected in 1985-1986 indicated generally low metals concentrations near or below laboratory reporting limits. Levels of minerals in samples collected in the project area and surrounding watershed in 2007 did not exceed the applicable maximum contaminant levels.

Although little data exist on anthropogenic pollutants such as oil and grease, pesticides, and herbicides in project-affected waters, pesticide screening samples collected upstream of Shasta Lake in the Pit and Lower McCloud Rivers in 1999 and 2000, respectively, contained low pesticide levels.

#### *Dissolved Oxygen*

Generally, measured DO levels in project-affected waters remained above the 7 milligrams per liter basin plan standard at all times. During one sampling event, DO saturation near the bottom of McCloud reservoir dropped below 85 percent, and in one case, it dropped below 75 percent. However, monthly median DO remained above 85 percent, as required by the basin plan criterion. During a short period in late June 2004, PG&E reported DO concentrations near 3 milligrams per liter in the McCloud River, downstream of McCloud dam that quickly rose to 10 milligrams per liter. PG&E attributed the anomalous DO measurements to an equipment malfunction.

### *Toxicity*

Ammonia levels measured for this study were well below toxicity thresholds. A limited amount of rainbow trout tissue sampling for mercury was conducted in the Pit and McCloud Rivers, with mercury concentrations of about 0.05 milligram per kilogram.

Measurements were taken in summer, 2007, at the sediment-water interface of McCloud and Iron Canyon reservoirs to assess oxidation-reduction potential (a measure of anoxia sometimes used to indicate conditions suitable for mercury methylation); data were above the range typically associated with methylation. No mining activities occur within 1 mile from project boundaries, limiting potential sources and input of metals to the project-affected portion of the system.

### *Water Temperature*

*McCloud Reservoir*—The water temperatures and water quality conditions in McCloud reservoir support a coldwater trout fishery. Although project operations influence seasonal water quality conditions in McCloud reservoir and water temperatures in the Lower McCloud River are affected by releases from McCloud reservoir, measurements of water temperature in the reservoir (<20 degrees Celsius [°C]) were well within the tolerance range of salmonids and generally met basin plan criteria.

Temperatures in McCloud reservoir reflect the large volume of cool water entering the reservoir from the spring-fed Upper McCloud River and the relatively short residence time of water in the reservoir. Daily average surface water temperatures at upstream reservoir stations in McCloud reservoir ranged from 6.9°C in May to 16°C in August, while downstream reservoir stations were somewhat warmer. For example, daily average surface water temperatures at the most downstream reservoir station ranged from about 12.0°C in May to 20°C in August, cooling to less than 10°C in October. Overall, water temperature changes from upstream of McCloud reservoir to downstream do not differ by more than 1.6°C at any time and are comparable to the normal heating expected along the pre-project river length. Despite surface water warming, hypolimnetic release temperatures below McCloud dam are cold because of the steep thermocline and large hypolimnion.

Reservoir temperature profiles in summer from 2006–2008 were characterized by a relatively shallow (0–3 meters ) epilimnion, a 3–6 meter thermocline (metalimnion) characterized by sharply reduced temperatures with depth, and a deep (40–52 meters) thermally stable hypolimnion that extends beneath the thermocline to the reservoir bottom. The stratification period typically extends from early June to late September in the project area. A coldwater pool, operationally defined as all depths exhibiting water temperatures less than 10.0°C, ranged in thickness from 137.8 feet (42 meters) in August to 167.3 feet (51 meters) in June, 2008.

Minimum flow releases from McCloud dam to the Lower McCloud River are withdrawn from a low-level gate near the bottom of the reservoir. During 2007–2008, daily average temperatures from the bottom of the reservoir ranged from 7.0°C in May to

10.1°C in August. Water temperatures at the elevation of the intake for McCloud tunnel (elevation 2,556 feet), which leads to Iron Canyon reservoir, never exceeded 10.3°C.

*Lower McCloud River*—River temperatures below McCloud dam as observed during 2008 monitoring efforts increased during spring and summer spill events, due to water releases from the warmer epilimnion of the reservoir. Although these temperature increases were conferred downstream, the effects of the spills diminished with tributary flow augmentation from upstream to downstream, and water temperatures near Shasta Lake did not exceed 19°C.

Under current minimum flows, water temperatures in the Lower McCloud River remain below 18.8°C for the entire 24-mile-long reach year-round. Temperatures vary seasonally, increasing from June to mid-July, remaining warmest in mid-summer, and declining from mid- to late August through September. Hourly temperature averages never exceeded 20°C, except at the most downstream site above Shasta Lake. During the 2006-2008 monitoring period, daily average water temperatures recorded in tributaries to the Lower McCloud River ranged from 6 to 19.7°C from May through October and were both slightly warmer and more variable than daily average temperatures in the mainstem McCloud River. As expected, tributary temperatures varied with ambient air temperature and the coldest tributary measured, Ladybug Creek, was generally 3-4°C cooler than the lower elevation Claiborne and Squaw Valley Creeks.

*Iron Canyon Reservoir*— Water temperatures in Iron Canyon reservoir are influenced by water delivered from the McCloud reservoir hypolimnion, some surface water warming and entrainment within Iron Canyon reservoir, and the relatively short residence time. The water temperatures and water quality conditions in the reservoir include a well-developed thermocline and a deep thermally stable hypolimnion, which supports a coldwater trout fishery. The temperature of flows from the bottom of the dam was similar to the temperature of the McCloud River upstream of McCloud reservoir (which reflects cold groundwater input).

The summer (June to September) temperature differences between monitoring stations above the reservoir and below the Iron Canyon dam are small: a 0.14°C decrease per mile was observed under hot meteorological conditions (water temperatures exceeded 13.1°C above the reservoir and 12.7°C below the dam no more than 10 percent of the time), whereas a 0.03°C increase was observed under normal temperature conditions (water temperatures exceeded 12.0°C above the reservoir, 12.1°C below the dam, and 15.0°C above the Pit River confluence no more than 50 percent of the time).

The thermal structure of Iron Canyon reservoir was characterized by a warmer epilimnion underlain by a thermocline extending to about 4 to 10 meters deep throughout the spring to late summer. Surface water temperatures ranged from 12.3 to 22.5°C in July 2006–2008. In the hypolimnion strata, water temperatures near the bottom of the reservoir ranged from 11.0 to 12.3°C in July 2006–2008. Although project operations influence water quality conditions in Iron Canyon reservoir, water quality measurements were well within the tolerance range of salmonids (<20°C) and met basin plan criteria.

*Iron Canyon Creek*—Water is discharged from the Iron Canyon reservoir hypolimnion to Iron Canyon Creek at an elevation of 2,565 feet and the James B. Black powerhouse intake at an elevation of 2,556 feet. Under current operating conditions, cold hypolimnetic (deep) releases of water from Iron Canyon reservoir and low residence times tend to reduce the temperature variability immediately below the dam, and result in downstream Iron Canyon Creek temperatures that are virtually identical to temperatures above the reservoir. Water temperatures in Iron Canyon Creek below the dam from June through September of 2006-2008 exhibited daily average temperatures from 10 to 17°C.

Although the upstream site below the dam exhibited very small diel and seasonal fluctuations due to reservoir releases of thermally isolated hypolimnetic water, water temperatures downstream of Iron Canyon dam do not change significantly with change in streamflow, largely due to the abundance of shade along the stream channel. Stations located downstream exhibited patterns that more closely reflect ambient meteorological conditions, increasing temperatures from May to July and declining from late August to early October. Downstream from the monitoring station below the dam to the station above the confluence with the Pit River, water temperature increased an average of about 0.64°C per mile under normal meteorological thermal conditions.

*Pit 6 and Pit 7 Reservoirs*—Water diverted from the McCloud River enters the Pit River watershed at James B. Black powerhouse, having traversed through two tunnels and Iron Canyon reservoir. Daily average temperatures at surface water monitoring sites in the Pit River reservoirs were comparatively warmer than those observed in the McCloud River Basin. The thermal structures of Pit 6 and Pit 7 reservoirs were similar during the 2007-2008 monitoring period and reflected the large flow volume and short residence time of water in the reservoirs. Water temperature and water quality conditions in the Pit 6 and Pit 7 reservoirs support a transitional-zone fish assemblage including native tule perch, hardhead, Sacramento pikeminnow, and Sacramento sucker, which is similar to other Pit reservoirs upstream of the project area. Pit 7 reservoir also supports small populations of largemouth and smallmouth bass, tui chub, and rainbow trout.

Unlike the Lower McCloud River and Iron Canyon Creek watersheds, temperatures in the Pit River watershed did not exhibit increasing variability with distance downstream. The differences on average (normal condition) between monitoring stations above the reservoir and James B. Black powerhouse represented a sharp decline in temperature: 5.6°C within less than 0.1 mile. After mixing with flow from the upstream Pit 3, 4, and 5 Project, temperatures increase an average of about 0.1°C per mile, which reflects the limited stratification and low residence time of water in Pit 6 and 7 reservoirs. Ambient daily average temperatures at stations above the project area ranged from 12 to 22°C from June through September.

*Pit River*—Daily average temperatures below the interbasin transfer entering through James B. Black powerhouse were cooler, with temperatures downstream of the Pit 6 powerhouse less than 19°C. Below Pit 7 reservoir, the river water temperature reaches a maximum of 18 to 20°C during the middle to late summer with a diel variation

of 2 to 7°C during the spring, summer, and early fall. There is a steady decline in water temperatures in the fall and winter, with minimum water temperatures at all sites near 4°C. Samples collected in 2007 showed that the water temperature in the Pit River watershed was well within the tolerance range of salmonids, native minnows, and suckers and met basin plan criteria.

### *pH*

Analysis of historical and recent data indicates that measured pH values throughout the project area and surrounding watershed occasionally approach or exceed the basin plan water quality objectives, which specify an acceptable pH range of 6.5-8.5. Monitoring efforts in 2007 and 2008 revealed two potential exceedances: a pH of 8.9 was measured in the metalimnion of McCloud reservoir in June 2007, and a pH of 9.1 was measured in McCloud River downstream of Squaw Valley Creek in May 2008. However, historical data show that comparable pH levels occur naturally in the system, and lower pH measurements were typically recorded in the vicinity of these elevated readings, which indicate that the exceedance was a natural episodic event and not likely representative of conditions in the river as a whole.

### *Biostimulatory Substances*

Although biostimulatory substances are of general concern in the Pit River (California Water Board, 2006), levels of all nutrients measured throughout the project area were low, and chlorophyll-*a* levels were below the method detection limit of 0.05 milligram per liter at every site sampled. Although *in situ* DO data suggested some localized algal growth at intermediate depths in both McCloud and Iron Canyon reservoirs in the summer, such growth is typical in lakes in the region.

### *Coliform Bacteria*

The state water quality criteria for the protection of waters used for water contact recreation are based on the collection of a minimum of five fecal coliform samples within a 30-day period. Although there is no basin plan criterion for total coliform, the levels found in project-affected waters in summer, 2007, were slightly in excess of the 230 most probable number per 100 milliliters criterion in the EPA (2003) guidelines for water contact recreation. Heavier recreational use associated with the 2008 Labor Day weekend in Iron Canyon reservoir and its tributaries did not appear to significantly alter fecal coliform concentrations. Overall, historical and recent sampling in project-affected waters, including recreational areas in McCloud and Iron Canyon reservoirs, resulted in generally low concentrations of total coliform, fecal coliform, and *E. coli*.

### **Sediment Transport and Supply**

Mud Creek, a tributary upstream of McCloud dam, adversely affects water clarity in the Lower McCloud River by periodically delivering large amounts of fine volcanic sediment from the Konwakiton glacier on Mount Shasta directly into McCloud reservoir. Project operations affect the volume, rate, and timing of sediment transport downstream. The increased turbidity in McCloud reservoir and the Lower McCloud River associated

with these natural occurring events continues to be a fishery and aesthetic concern. Increased turbidity is known to alter fish feeding behavior (Barrett et al., 1992; Tippetts and Moyle, 1978), as well as impair angling conditions (see section 3.3.5, *Recreation Resources*). PG&E conducted an extensive suspended sediment monitoring program in the project area during 2007 and 2008, and results of that monitoring are discussed below.

#### *Turbidity Upstream of McCloud Reservoir*

Mud Creek streamflow is routed by an upstream landowner to Huckleberry Creek, which flows into the head of McCloud reservoir. Suspended sediment levels entering McCloud reservoir are largely a function of conditions in the Mud Creek drainage.

Under base-flow conditions, synoptic sampling of total suspended solids (TSS) at the mouth of Mud Creek / Huckleberry Creek ranged from 13 to 141 milligrams per liter (2 to 113 NTU). However, because sampling was not continuous and spring-fed Huckleberry Creek mixes with Mud Creek before it reaches McCloud reservoir, these data can under-represent suspended sediment and turbidity levels in Mud Creek. Synoptic sampling of TSS in Mud Creek above the Highway 89 bridge during non-event periods ranged from 54 to 1,260 milligrams per liter (15 to 840 NTU), whereas continuous data from this site showed turbidity exceeding 1,600 NTU on a regular basis.

The maximum continuous turbidity monitoring in Mud Creek during high flow events was beyond the instrument maximum range of 1,602 NTU, and PG&E assumed actual levels to be significantly greater than this maximum value. TSS sampling in Mud Creek that occurred during these events showed concentrations of up to 9,360 milligrams per liter.

#### *Turbidity in McCloud Reservoir*

There is sustained transport of sand and coarser material from Mud Creek into McCloud reservoir during all periods of active transport. Project operations influence the capture and re-sorting of coarse sediments stored in a McCloud reservoir deltaic deposit downstream of the mouth of Huckleberry Creek, the capture and settling of finer sediments stored in the distal portions of the reservoir, and sediment transport through the reservoir to downstream reaches.

Depending on the elevation of the reservoir, bed materials collected from the active channel in Mud Creek are deposited either at the confluence of Mud Creek / Huckleberry Creek with the McCloud River or moved rapidly downstream to areas exhibiting reservoir-like properties and deposited in a submerged delta. The leading edge of this deltaic deposit terminates about 2.5 miles downstream of the Mud Creek / Huckleberry Creek confluence and 2.5 miles upstream of the dam. As reservoir levels are drawn down, this deltaic material is re-suspended and transported by incoming flows to the next depositional zone, forming a wedge-shaped deposit that gradually moves downstream.

During a Mud Creek event, the highest density sediment plume enters McCloud reservoir and travels rapidly along the reservoir bottom to the low level outlet located near McCloud dam. As the event pulse moves through the reservoir, a process of diffusion takes place where turbidity spreads and disperses into the greater reservoir water column, reducing its density and spreading into the upper hypolimnion and metalimnion in areas with neutral density that can suspend the plume at mid-depths. Depending on the size of the event and associated turbulent mixing and upward current induced by surface winds, the mid-depth, lower density plume can, at times, reach the surface layer and become visible. The stratification of turbidity in McCloud reservoir within the water column allows reservoir fish to use other portions of the water column as refugia. Depending on the size of the event pulse, the plume arrives at the dam anywhere from 1 to 3 days after entering the reservoir.

#### *Turbidity Downstream of McCloud Reservoir*

Project operations can also alter sediment transport characteristics from McCloud reservoir and into the Lower McCloud River as well as the introduction of sediments into the Iron Canyon and Pit River watersheds through interbasin transfer.

Under base-flow conditions, suspended sediment values ranged from <2.0 to 4 milligrams per liter TSS (0.5 to 3.6 NTU) in the Lower McCloud River. These base-flow conditions are generally significantly lower than reported above for Mud Creek / Huckleberry Creek. Although the absolute concentration of the event pulse is diluted by the reservoir receiving waters, wave action and scour during reservoir drawdown can remobilize sediments stored in the reservoir, and turbidity downstream of McCloud reservoir during Mud Creek events is significantly higher than under base-flow conditions. Continuous turbidity monitoring over five events in August-October 2007, and August-September 2008, showed downstream turbidity levels in the Lower McCloud River ranging from 65 to 300 NTU below McCloud reservoir, 12 to 155 NTU above Claiborne Creek, and 5 to 72 NTU above Shasta Lake. TSS sampling that occurred during these events showed TSS concentrations of up to 167 milligrams per liter below McCloud reservoir (nearly two orders of magnitude less than the peak reported in Mud Creek). Depending on the size of the Mud Creek wasting event, the post-event “cleansing” period can last anywhere from a few days to more than a week. Turbidity levels typically spike on the day the event pulse reaches the dam outlet and then decline significantly over the next several days (typically 4-8 days).

In the Iron Canyon watershed, turbidity levels within the interbasin transfer from the McCloud River watershed during Mud Creek events were slightly above those found during base-flow conditions due to a number of factors: dilution, dispersion, and diffusion due to the large volume of the two upstream reservoirs, as well as the elevation of the discharge intake/outlet structures relative to the elevations of turbidity plumes associated with a particular event. Continuous data at Iron Canyon dam measured maximum daily average turbidity during two August-September, 2008, Mud Creek events of 5.5 NTU, representing a change of 4.2 NTU above pre-event levels.

Under base-flow conditions in the Pit River watershed, turbidity ranges were 0.8 to 2.1 NTU (3 to 6 milligrams per liter TSS) upstream of James B. Black powerhouse, 1.5 to 4.1 NTU (2 to 3 milligrams per liter TSS) below Pit 6 powerhouse, and 1.1 to 6.8 NTU (2 to 5 milligrams per liter TSS) below Pit 7 powerhouse. These baseline turbidity data indicate that conditions in the Pit River upstream of the James B. Black powerhouse (above the interbasin transfer) were similar to those measured downstream of the Pit 5 powerhouse (downstream of all diversion inputs) during non-event periods.

During periods when mass wasting is occurring upstream on Mount Shasta, some signal of Mud Creek turbidity reaching the Iron Canyon Creek sites was apparent, with turbidity increases of up to 4 NTU above pre-event levels in August and September, 2008. However, the large volume of flow coming from the Pit 3, 4, and 5 project, as well as settling that occurs in Pit 6 and Pit 7 reservoirs, attenuates any potential effects of turbidity in the Pit River system. Only one of the two major turbidly events occurring in 2008 was measured by the continuous recording sensor in the Lower Pit River; the maximum turbidity at this site during the August 2008 Mud Creek event was measured as 2.6 NTU, about 1 NTU above pre-event levels.

The increases in suspended sediment concentrations and turbidity in Iron Canyon Creek and the Pit River, resulting from interbasin transfer between the McCloud River basin and the Iron Canyon Creek and Pit River basins during episodic mass-wasting events, caused temporary exceedances of basin plan criteria. However, as stated above, the suspended sediment levels in the Pit River watershed resulting from water transfers from McCloud reservoir during Mud Creek events were minimal (<4.5 NTU) and would not deleteriously affect fish populations in Pit 6 reservoir or in downstream impoundments.

### **3.3.2.1.3 Aquatic Biota**

The project area supports both stream and reservoir fisheries. Project stream reaches include a rainbow and brown trout fishery in the Lower McCloud River and Iron Canyon Creek. The project reservoirs—Pit 6 and 7 reservoirs and Pit 7 afterbay—also support native minnow, sucker, and tule perch populations. In this section we describe the aquatic habitats and aquatic biota within project-area waters.

#### **Important and Special Status Fish Species**

Rainbow and brown trout support important recreational fisheries in the project area. The McCloud River historically had the southernmost and only bull trout (*Salvelinus confluentus*) population in the state of California until it was extirpated in 1975. The river also supported Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*Oncorhynchus mykiss*), and occasional coho salmon (*Oncorhynchus kisutch*). The Pit 6 reservoir supports a population of hardhead, a California species of concern and a Forest Service sensitive species.

Coastal rainbow trout are the trout species native to most west-side watersheds, and were historically found below an elevation of 4,900 feet, but have been introduced

throughout the western Sierra Nevada including most of the project area. Rainbow trout spawn in the spring, although the specific spawning time is influenced by factors such as the genetic strain of the fish, water temperature, and period of daylight. Spawning usually occurs in gravel riffles or gravel pockets of small streams. Females excavate a nest, or “redd,” in the gravel and, after spawning, cover the eggs with gravel. After hatching, the fry remain in the gravels until their yolk sacs are absorbed. The fry then venture into open water, feeding on plankton and aquatic macroinvertebrates. As they mature, they begin to feed on aquatic and terrestrial insects, and large trout also feed on fish and crayfish.

Brown trout are an introduced species in California, and occur mainly in low- to mid-elevation ranges. Brown trout spawn in the fall, although the specific spawning time is influenced by factors such as the genetic strain of the fish, water temperature, and period of daylight. Spawning usually occurs in gravel riffles or gravel pockets of small streams. Despite differences in timing, the spawning and rearing characteristics of brown trout are similar to rainbow trout. Brown trout can be found in tributaries, rivers, lakes, and reservoirs. Adults generally remain near the bottom of pools, while juveniles can be found in riffles as well as in pools. Brown trout prefer temperatures below 20°C, and have high growth rates at water temperatures between 12 and 20°C (Moyle, 2002). Brown trout compete with other trout species for resources.

Hardhead are a large, native minnow generally found in undisturbed areas of larger low- to middle-elevation streams (elevation between 30 and 4,760 feet in the Sacramento and San Joaquin watersheds). Its range extends from the Kern River in the south to the Pit River in the north. Hardhead inhabit areas that have clear, deep pools with sandy, gravel/boulder substrates and slow water velocities (less than 0.05 feet per second). Hardhead co-occur with Sacramento pikeminnow and usually with Sacramento suckers, and tend to be absent from streams where introduced species, especially centrarchids, predominate. Hardhead have been identified in the Pit 6 and Pit 7 reservoirs during fish population surveys conducted in October 2007.

Prior to the completion of Shasta dam in 1942, Chinook salmon and other anadromous fishes were able to travel up the McCloud River as far as the 20-foot-high Lower Falls. Chinook salmon have been extirpated from the McCloud and Pit Rivers. In addition, the extirpation of Chinook populations had further impacts by affecting other species in the system, notably bull trout (originally identified as Dolly Varden) that feed on early life stages of Chinook (California Fish and Game, 1990). In 1950, Keswick dam was completed downstream of Shasta dam, further blocking anadromous fish passage 9 miles downstream of Shasta dam (Yoshiyama et al., 2001).

After the completion of McCloud dam in 1965, bull trout were present and spawning access remained available within the Upper McCloud River (above McCloud dam) and its tributaries, where both fry and juvenile rearing habitat are present. The construction of McCloud dam, which blocked access to downstream adult holding habitat, also created new adult habitat within the reservoir where cold, deep water was

abundant. However, following the construction of McCloud dam, the McCloud reservoir was extensively stocked with rainbow trout, brown trout, and brook trout, and was heavily promoted as a fishing destination. The brook trout did not survive or grow well, and California Fish and Game ceased stocking brook trout but continued stocking brown and rainbow trout. Bull trout harvest increased after McCloud reservoir opened to fishing in 1966, and fish were present above McCloud dam up until around 1971 (California Fish and Game, 1990). Although issues with the population were identified, angling restrictions for bull trout were not adopted until 1976 (California Fish and Game, 1990) when they had already been extirpated from the system. Given the loss of Chinook salmon as a food source, over-harvesting by anglers, and the introduction of non-native salmonids that most likely led to competition and hybridization between the species yielding sterile offspring, the extirpation of bull trout within the Upper McCloud River appears to be the cumulative effect of an array of stressors on the population to which construction of the McCloud dam may have been but one contributing factor. Attempts to reintroduce the species by California Fish and Game in the early 1990s were unsuccessful and the effort was subsequently abandoned.

Following construction of the McCloud dam and other management objectives, the fish community residing in the Lower McCloud River currently includes Sacramento pikeminnow, riffle sculpin, Sacramento sucker, rainbow trout, and brown trout, with additional fishes (e.g., smallmouth and spotted bass) likely entering the lower-most section of the river from Shasta Lake periodically or on a seasonal basis.

Currently, the upper portion of the Lower McCloud River is managed by California Fish and Game as a wild trout stream, and is therefore no longer stocked; however, California Fish and Game continues to stock sport fish in Shasta Lake. It is expected that a portion of the trout that California Fish and Game releases in Shasta Lake migrate upstream into portions of the Lower McCloud River. Monitoring conducted at a fish counting weir near Ladybug Creek indicated that brown trout appear highly migratory in comparison to rainbow trout within the Lower McCloud River (Moyle, unpublished; California Fish and Game, 1994). In addition, California Fish and Game released 127,252 Chinook salmon in Shasta Lake as part of an ongoing mark/recapture study funded by PG&E in 2005-2006 (letter from Jason F.R. Vann, License Coordinator, PG&E, October 31, 2008). However, no Chinook salmon were observed during the fall, 2007, McCloud River fish surveys.

As part of the RPA for the OCAP BiOp issued by NMFS on June 4, 2009 and consistent with the October 2009 Public Draft Recovery Plan for listed salmonids, studies are to be implemented to assess the feasibility to facilitate fish passage over the Keswick and Shasta dams on the Sacramento River downstream of the McCloud dam. Feasibility studies to assess the suitability and functionality of existing or potential habitat for spawning and rearing of listed salmonids are expected to begin in January 2010 and continue through January 2012. Based on the results of the feasibility studies, a pilot program could be implemented to re-introduce listed anadromous species to habitat above Shasta and Keswick dams. This pilot program would implement upstream fish

passage for listed salmonids through a “trap and transport” program beginning in March 2012. If this pilot-program proves successful, a long-term anadromous fish passage program would be implemented by January 31, 2020 which would include structural and operational modifications to dams to provide both upstream and downstream fish passage. Implementation of the RPA for the OCAP BiOp could result in the future presence of listed salmonids in the Lower McCloud River and waters of the McCloud-Pit project below McCloud dam as early as 2012.

### **Benthic Macroinvertebrates**

PG&E conducted benthic macroinvertebrate sampling in the project-affected reaches of the Lower McCloud River and Iron Canyon Creek in August and September, 2007, and November, 2008. During the 2007 sampling, PG&E also collected reference samples from Squaw Valley Creek, a tributary of the McCloud River and Clear Creek, a tributary to Iron Canyon reservoir. In addition, PG&E acquired historical (1999–2008) benthic macroinvertebrate data for The Nature Conservancy’s McCloud River Preserve for comparison purposes. From the 14 benthic samples collected by PG&E in 2007 and 2008, a total of 6,970 organisms comprising 95 distinct taxa were collected. Insects comprised a majority of the benthic community including 13 mayfly taxa, 19 stonefly taxa, 18 caddisfly taxa, and 9 beetle taxa. Other invertebrates included oligochaetes, clams, and gastropods.

A multimetric index (MMI) based on five metrics described by Rehn et al. (2007) was formulated for each sample taken within the project area. MMI values of Iron Canyon Creek were within or slightly below the range of MMI values of reference sites. MMI values from the McCloud River sites were lower when compared to MMI values of reference sites; however, MMI values generated from historical data collected over a 10-year period (1999–2008) on the McCloud River Preserve were consistently closer to those of the reference sites and notably higher than those collected from the other Lower McCloud River sites. Overall, the physical habitat data and benthic macroinvertebrate samples collected over 10 years within the project area generally indicated good aquatic habitat conditions and water quality.

### **Aquatic Mollusks**

An aquatic mollusk survey was conducted in the summer and fall, 2007, to inventory all mollusk species in the project vicinity including Forest Service special status aquatic mollusk species. In total, three species of freshwater mussels, four species of Sphaeriacean clams, and nine species of aquatic snails were found during the 2007 survey. The Forest Service special status freshwater mussel species *Anodonta californiensis/nuttalliana* was found in lentic habitat in the Pit 6 and Pit 7 reservoirs, and the Forest Service special status aquatic snail species *Fluminicola seminalis* was found in the Lower McCloud River at the confluence of Chatterdown Creek. No Forest Service special status aquatic mollusks were found in the proposed McCloud or Pit 7 afterbay construction area surveys.

## **Reservoir Fish**

In total, 20 different species have been documented in project reservoirs (table 3-20). During fish surveys conducted in the fall of 2007 and 2008, a total of 15 species were observed, including four species (bluegill, brook trout, channel catfish, and spotted bass) that had not been previously documented. Five species (bigeye marbled sculpin, common carp, green sunfish, pit roach, and speckled dace) that were historically observed in project reservoirs were not observed in the 2007 and 2008 surveys.

### *McCloud Reservoir*

Fish species that occur in McCloud reservoir include naturally spawned rainbow and brown trout and annually stocked hatchery raised rainbow trout. Brown trout, brook trout, and rainbow trout were captured in the reservoir during the 2007 surveys. Rainbow trout and brown trout were the more abundant species, representing more than 99 percent of the total catch during gill net surveys. Both species were distributed evenly around the reservoir and were captured in both shallow and deeper waters. Only one brook trout was collected in the reservoir. During electrofishing surveys, brown trout and rainbow trout were the only species collected. With the exception of brook trout, both juveniles and adults of trout species were captured. No records of historic fish sampling in McCloud reservoir were found for comparison to this study.

### *Iron Canyon Reservoir*

Rainbow trout and brown trout were captured in the reservoir during the 2007 surveys. Rainbow and brown trout comprised 76 and 24 percent of the total catch, respectively, during gill net surveys. Twenty-three fish consisting of rainbow trout and brown trout were captured by electrofishing in the reservoir. About 8 percent of the rainbow trout captured during fish surveys in Iron Canyon reservoir were identified as hatchery-origin fish. Both juveniles and adults of rainbow and brown trout were captured. No records of historic fish sampling in Iron Canyon reservoir were found for comparison to this study.

Table 3-20. Fish species documented in the McCloud-Pit Project reservoirs.

| Species                | McCloud Reservoir <sup>a</sup> | Iron Canyon Reservoir <sup>a</sup> | Pit 6 Reservoir | Pit 7 Reservoir | Pit 7 Afterbay <sup>a</sup> |
|------------------------|--------------------------------|------------------------------------|-----------------|-----------------|-----------------------------|
| bluegill               |                                |                                    |                 | ○               |                             |
| bigeye marbled sculpin |                                |                                    | ●               |                 |                             |
| brook trout            | ○                              |                                    |                 |                 |                             |
| brown trout            | ○                              | ○                                  |                 | ●               |                             |
| channel catfish        |                                |                                    | ○               |                 |                             |
| common carp            |                                |                                    | ●               |                 |                             |
| green sunfish          |                                |                                    | ●               |                 |                             |
| hardhead               |                                |                                    | ●○              | ●○              | ○                           |
| largemouth bass        |                                |                                    | ●               | ●○              |                             |
| Pit roach              |                                |                                    | ●               |                 |                             |
| Pit sculpin            |                                |                                    | ●               |                 | ○                           |
| rainbow trout          | ○                              | ○                                  | ●               | ●○              | ○                           |
| riffle sculpin         |                                |                                    | ●○              |                 |                             |
| Sacramento pikeminnow  |                                |                                    | ●○              | ○               |                             |
| Sacramento sucker      |                                |                                    | ●○              | ●○              | ○                           |
| smallmouth bass        |                                |                                    | ●               | ●○              | ○                           |
| speckled dace          |                                |                                    | ●               |                 |                             |
| spotted bass           |                                |                                    |                 |                 | ○                           |
| tui chub               |                                |                                    |                 | ○               |                             |
| tule perch             |                                |                                    | ●○              | ●○              |                             |

- <sup>a</sup> No historical data available.
- Species documented during 2007 and 2008 surveys.
- Species documented historically.

### *Pit 6 Reservoir*

Water temperature and water quality conditions in the Pit 6 reservoir support a transitional-zone fish assemblage including native tule perch, hardhead, Sacramento pikeminnow, and Sacramento sucker. During gill net surveys in 2007, tule perch and hardhead represented 54 and 36 percent, respectively, of the total catch. Other species collected in gill net surveys included Sacramento pikeminnow, Sacramento sucker, and channel catfish. A total of two fish (one hardhead and one riffle sculpin) were captured during electrofishing surveys. Six age classes of hardhead were identified in the reservoir. Small sample sizes for Sacramento pikeminnow and Sacramento sucker precluded definitive identification of age groups. Other fish historically documented in the reservoir, but not captured in 2007, include rainbow trout, largemouth bass, smallmouth bass, common carp, Pit roach (*Hesperoleucus mitriulus*), speckled dace (*Rhinichthys osculus*), Pit sculpin (*Cottus pitensis*), and bigeye marbled sculpin (California Fish and Game, 2001; PG&E, 2001). Additionally, channel catfish were captured in 2007, but not reported in previous years.

### *Pit 7 Reservoir*

Fish species that occur in the Pit 7 reservoir include tule perch, hardhead, Sacramento sucker, Sacramento pikeminnow, smallmouth bass, largemouth bass, rainbow trout, tui chub, and bluegill. During gill net surveys in 2007, tule perch was the most abundant species, representing 47 percent of the fish captured, followed by hardhead. During electrofishing surveys, Sacramento sucker was the most abundant species, representing 42 percent of the fish captured. Three fish species captured in 2007 (bluegill, Sacramento pikeminnow, and tui chub) were not reported in previous years.

### *Pit 7 Afterbay*

The reservoir fish assemblage in Pit 7 afterbay includes hardhead, Sacramento sucker, rainbow trout, spotted bass, smallmouth bass, and Pit sculpin. During gill net surveys in 2007, hardhead was the most abundant species, representing 86 percent of the fish captured, followed by Sacramento sucker. All other fish species represented less than 1 percent of the total fish captured. During the 2007 electrofishing surveys, hardhead was the dominant species captured followed by Sacramento sucker, rainbow trout, spotted bass, smallmouth bass, and Pit sculpin. Hardhead were primarily in the upstream portion of the impoundment (below Pit 7 dam), which has a more riverine character, while warmwater species (smallmouth and spotted bass) were primarily in the downstream, lacustrine portion of the impoundment near the Pit 7 afterbay dam. Additionally, more than 1,000 juvenile hardhead were observed within the upstream riverine portion of the impoundment during electrofishing in Pit 7 afterbay.

## **Stream Fish Populations**

PG&E conducted fish surveys at eight sites on the mainstem Lower McCloud River in fall, 2007, and three sites on Iron Canyon Creek in 2007 and 2008. A total of six species of fish were observed in the Lower McCloud River and Iron Canyon Creek

during these surveys. PG&E also conducted sampling at nine sites on the mainstem of the Lower McCloud River (including a new station between McCloud dam and Hawkins Creek) in 2009. These data were presented in updated Technical Memorandum 18 (November 2009); results were similar to 2007.

#### *Lower McCloud River*

The Lower McCloud River travels about 24 miles over an elevation range of 1,425 feet (1.1 percent average gradient) from 2,500 feet at McCloud dam to 1,075 feet at Shasta Lake (non-project). Groundwater springs provide a continuous source of cold water to the upper McCloud River. Flow in the Lower McCloud River is regulated by releases from McCloud dam, but receives significant groundwater discharge from springs and tributaries; water temperatures supporting the coldwater fishery averaged 9.0°C below McCloud dam and 14.6°C above Shasta Lake between May and October 2008. This cold water supports a viable trout fishery throughout the entire 24-mile-long reach. The Lower McCloud River also supports a Sacramento sucker / pikeminnow assemblage just above Shasta Lake; these species are typically associated with foothill elevations and transitional zone water temperatures and probably enter the lower river from Shasta Lake.

The current license establishes minimum instream flows below McCloud dam for the protection of aquatic resources and the high quality coldwater fishery. Flow in the Lower McCloud River ranges from a minimum monthly mean of 204 cfs in August to a maximum monthly mean of 484 cfs in March (as measured at gage MC-1). The Lower McCloud River hydrograph indicates a relatively stable base-flow regime with relatively minimal annual variance outside of natural high flow events driven by snow melt or prolonged moderately intense rainfall. The limited base-flow variability in the Lower McCloud River at gage MC-1 under regulated conditions is affected by minimum flow releases from McCloud dam for aquatic resources. Variability in the flow regime increases with distance downstream, due to significant tributary inflow at various locations. PG&E, as required by the current license (article 31), provides minimum instream flow releases with compliance determined at two locations: McCloud dam and the Lower McCloud River at Ah-Di-Na. At McCloud dam, required minimum flows are 50 cfs from May 1 through November 30, and 40 cfs from December 1 through April 30; actual flow releases are usually much higher in order to meet downstream requirements at the Ah-Di-Na gage. For the Lower McCloud River at Ah-Di-Na (gage MC-1), there are dual minimum flow requirements for dry and normal years: dry year minimum instream flow requirements range from 160 to 180 cfs, depending on the month. During normal years, the minimum instream flow requirement at Ah-Di-Na ranges from 160 to 210 cfs, depending on the month. Monthly average flows (April-October) at Ah-Di-Na (MC-1) for the period 1994-2006 are analyzed by water year type (table 3-21). Except during dry years, flows at this location were consistently greater than 215 cfs; during dry years monthly flows averaged more than 175 cfs.

Table 3-21. Average monthly flow (cfs) by water year type for 1994-2006 at Ah-Di-Na (MC-1).

|           | <b>Wet</b> | <b>Above<br/>Normal</b> | <b>Below<br/>Normal</b> | <b>Dry</b> |
|-----------|------------|-------------------------|-------------------------|------------|
| April     | 639        | 248                     | 222                     | 189        |
| May       | 629        | 217                     | 325                     | 177        |
| June      | 341        | 221                     | 229                     | 176        |
| July      | 227        | 224                     | 216                     | 176        |
| August    | 226        | 229                     | 218                     | 176        |
| September | 232        | 235                     | 236                     | 194        |
| October   | 226        | 228                     | 222                     | 238        |

Mud Creek, a tributary upstream of McCloud dam, can adversely affect water clarity in the reservoir and Lower McCloud River by periodically discharging large amounts of sediment composed of fine volcanic material released naturally from the Konwakiton glacier on Mount Shasta. Discharge of this suspended material from Mud Creek continues to be a fisheries and aesthetic concern affecting turbidity in the Lower McCloud River.

The dominant substrate in the Lower McCloud River is coarse-grained boulder/cobble with many large boulders and bedrock outcrops. Total spawnable gravel quantity increases gradually from McCloud dam downstream to near Ah-Di-Na Campground. Below Ah-Di-Na, overall spawnable gravel quantity increases down to Ladybug Creek. The quality of spawnable gravel improves from McCloud dam to Ladybug Creek; gravel quality upstream of Hawkins Creek was “fair” to “poor,” whereas gravel quality below Hawkins Creek was “good” on average. The number of brown trout redds observed also increased downstream to just below Ah-Di-Na Campground. Below Ah-Di-Na, the frequency of redds observed was low, although the abundance of spawnable gravel continued to increase. Overall, the majority of gravel patches were less than 100 square feet in size and ranged from “poor” to “excellent” in quality.

LWD in the river channel can provide a significant source of cover for juvenile and adult fish. A review of existing LWD inventories shows that there is very little LWD stored in the Lower McCloud River channel between McCloud dam and Shasta Lake. LWD transported from the upper watershed is trapped at McCloud reservoir and not distributed downstream to the Lower McCloud River.

Fishes observed in the Lower McCloud River in 2007 included rainbow trout, brown trout, riffle sculpin, unidentified sculpin species, Sacramento sucker, Sacramento pikeminnow, and unidentified minnow species. Rainbow trout and brown trout were observed in similar relative abundance at all sites. Rainbow trout were numerically dominant overall with the exception of the downstream-most site, which included a higher percentage of sculpin. Trout and sculpin species were distributed throughout the

Lower McCloud River. Sacramento suckers were only observed at the sites immediately upstream and downstream of Tuna Falls. Minnow species (including Sacramento pikeminnow) were observed only at the downstream-most site. During 1984-1987, surveys at a fish weir installed about 1 mile upstream of Shasta Lake on the Lower McCloud River documented brown trout, rainbow trout, Sacramento sucker, Sacramento pikeminnow, smallmouth bass, Chinook salmon, and kokanee. Observation from an upstream fish weir installed on the Lower McCloud River near Ladybug Creek during the same period documented brown trout and rainbow trout.

### *Iron Canyon Creek*

Iron Canyon Creek travels 4.6 miles over an elevation range of 1,041 feet (4.3 percent average gradient), from 2,470 feet at Iron Canyon dam to 1,430 feet at the confluence with Pit 6 reservoir. Iron Canyon Creek receives water from Iron Canyon reservoir, which receives water diverted from McCloud reservoir and from a few small tributary streams. Minimum streamflow in Iron Canyon Creek is maintained by a year-round minimum release of 3 cfs from Iron Canyon reservoir. Accretion from small tributary streams increases flow in Iron Canyon Creek by 2 to 3 cfs under low flow conditions. During non-runoff periods in 2007, moderate accretion sources increased flows at the mouth of Iron Canyon Creek by 2 to 4 cfs over the minimum release flow. Once a year, typically in the late fall or early winter, high flows are released down Iron Canyon Creek for a short period (usually under 30 minutes) during a valve exercise. Flow releases during this exercise vary depending on reservoir water levels, but were about 280 cfs in 2008, and are high enough to mobilize some LWD and transport fine sediments downstream.

Mean daily water temperatures at the mouth of Iron Canyon Creek ranged between 8.4°C and 17.3°C from May through October 2007. Temperatures immediately downstream of Iron Canyon dam exhibit minimal daily and monthly fluctuations, reflecting reservoir releases of cold hypolimnetic water. Pools make up 25 percent of the stream channel, with flatwater and riffle habitat accounting for the remaining 37 and 38 percent, respectively. The stream channel has an abundance of riparian shade and ample vegetative, structural, and LWD cover for fish. Excluding the lower and upper 0.5 mile, spawning substrate is evenly distributed longitudinally along the stream channel. Iron Canyon Creek supports a self-sustaining trout population.

During 2007 and 2008 surveys, three fish species were observed in Iron Canyon Creek including rainbow trout, Pit sculpin, and brown trout. Rainbow trout were observed at all sites and were numerically dominant overall, whereas brown trout were observed at the lower and upper sites and Pit sculpin were observed at the two lower sites.

### 3.3.2.2 Environmental Effects

#### Minimum Flows

Reduced flow and limited seasonal variation in flow associated with project operations at McCloud and Iron Canyon reservoirs and diversion of water to the project powerhouses affect habitat for aquatic biota and recreational opportunities in downstream reaches. Therefore, minimum instream flow requirements for the reaches in Lower McCloud River below McCloud dam, Iron Canyon Creek below Iron Canyon dam, and the Pit River below Pit 7 dam are established to meet both aquatic biota and recreational needs. Minimum flow levels may also substantially influence other resources including foothill yellow-legged frog breeding (see section 3.3.3, *Terrestrial Resources*), wading conditions for anglers and boating opportunities (see section 3.3.5, *Recreation Resources*), and project generation (see section 4.2, *Comparison of Alternatives*). Flows that support optimal conditions can differ significantly among these various resources and users. Therefore, PG&E, the resource agencies, and several non-governmental stakeholders provided alternative minimum flows to balance the requirements of these various resources.

#### *Flow Recommendation*

In its final license application, PG&E proposes a minimum flow regime for each of these reaches that varies by month and water year type to more closely reflect a natural hydrograph for the system and support aquatic resources and other users. PG&E alternative condition 19 proposes modifications to the instream flows specified by the Forest Service in its original condition 19. On March 1, 2010, the Forest Service modified its condition 19 to specify seasonal flow regimes for each of these reaches that are the same as the PG&E alternative flows. In all three flow scenarios, seasonal flow requirements for the Lower McCloud River and Iron Canyon Creek were tied to existing conditions in the watershed (DWR Bulletin 120). The three flow scenarios are shown in table 3-22 for the Lower McCloud River, table 3-23 for Iron Canyon Creek, and table 3-24 for the Pit River below Pit 7 dam. In all cases, the proposed flows are equal to or greater than the flows that are required in the current project license (table 3-6).

California Fish and Game and NMFS filed a 10(j) recommendation for the Lower McCloud River below McCloud dam (table 3-22). California Fisheries and Water Unlimited, and the California Salmon and Steelhead Association, support the existing daily flow requirements for the Lower McCloud River below McCloud dam. The McCloud River Club states that any significant increase in flows on the Lower McCloud River during the early fishing season could harm trout populations and the ability of anglers to safely fish during the spring season (see section 3.3.5, *Recreation Resources*) and cite the state classification and reputation of this reach as a world class wild trout fishery under existing conditions.

California Trout, Trout Unlimited, and McCloud River Club alternative condition 19 proposed modifications to instream flows when flows are increasing

between mid-March and mid-April (table 3-25). By recommending the minimum flows increase at a lower rate in relatively normal water years and decrease at a higher rate in wetter years, the California Trout, Trout Unlimited, and McCloud River Club alternative would increase the number of available angling days in late April and May. California Trout, Trout Unlimited, and McCloud River Club support the Forest Service's proposed minimum baseflow of 200 cfs at Ah-Di-Na (MC-1) but suggest that summer base flows at Ah-Di-Na should be the higher of (1) 200 cfs, or (2) the historic average summer base flows during normal years under the existing license (about 210 to 220 cfs).

McCloud RiverKeepers filed flow recommendations that proposed minimum flow releases at McCloud dam (MC-7) of 100 cfs year-round and a second compliance point at Ah-Di-Na (MC-1) with minimum flows ranging from 160 to 210 cfs (table 3-26). McCloud RiverKeepers' basis for its proposed flows is that they allow the project to produce more power than the Forest Service condition 19 flows and keep similar minimum flows as those under the current license will support existing fish populations.

NMFS filed a 10(j) recommendation that, as soon as listed salmonids are documented as within the McCloud River and affected by the project, PG&E should implement NMFS's instream flow release ranges from McCloud dam in July through September to meet the summer spawning thermal requirements for winter-run Chinook salmon. NMFS considers the presence of winter-run Chinook in the Lower McCloud River to be imminent given the implementation schedule for a fish passage pilot study listed as an RPA required by the OCAP BiOp and consistent with the Public Draft Recovery Plan for listed salmonids. This pilot study would evaluate the release of winter-run Chinook trapped below the Shasta dam in appropriate habitat upstream of Shasta Lake, including the Lower McCloud River in 2012 to 2015. Additionally, in its comments on the proposed action, NMFS recommends establishing a higher base flow downstream of McCloud dam so that the difference between typical winter/spring spills and base flow would not result in appreciable differences in habitat conditions.

In addition to formal 10(j) recommendations, NMFS also submitted comments on the proposed action, specifically stating that release volumes (and instream flows) downstream of McCloud dam should be within a range acceptable for meeting the physical habitat and biological criteria requirements of listed salmonids. According to the NMFS comment, in the event of a turbine shutdown, a continuous flow bypass would be required to maintain suitable ranges of flow releases beneficial to listed salmonids.

American Whitewater recommends the following flows at McCloud dam (table 3-27): peak flows of 600 cfs during April and ramping down through May in wet and above normal years; at least 400 cfs during the month of April in below normal water years; and flows of 300 cfs ramping down to 200 cfs base flows by the opening day of trout season in dry and critically dry years.

To support restoration of anadromous salmonids and the fish passage pilot study (RPA of the OCAP BiOp), the Winnemem Wintu Tribe recommends that the minimum flow increase to 300 cfs by 2013; and increase further by 2015 to 600 cfs in July and

400 cfs in August (table 3-28). During critically dry years, the Tribe also recommends that flows during September be increased to 400 cfs beginning in 2015. These flow recommendations are consistent with the upper range of flows proposed by NMFS for these months when listed anadromous species are present and affected by the project (table 3-22).

In its November 29, 2010 filing, the Forest Service modified condition 19 to specify that, during normal and above normal water years (flows at the McCloud dam greater than or equal to 200 cfs on 15 April) flows at Ah-Di-Na (MC-1) should be at least 215 cfs in July and August and then drop to 200 cfs in September. In their November 29, 2010 filing, California Trout, Trout Unlimited, and McCloud River Club concurred with the flows specified by Forest Service modified condition 19 filed on November 29.

### *Flow Compliance*

PG&E and the resource agencies also propose ways to comply with the minimum flows that differ. PG&E proposes that the minimum flow requirements be met on the basis of the seven-day running average of mean daily flow. PG&E proposes the following: (1) individual mean daily flows may be less than the required minimum streamflow; (2) the instantaneous 15-minute streamflow should be at least 90 percent of the required minimum streamflow; and (3) the seven-day running average of the daily mean be equivalent to or greater than the required minimum flow. This method is consistent with the compliance requirements in the license for the Pit 3, 4, and 5 project (FERC No. 233) upstream of the McCloud-Pit Project developments on the Pit River. California Fish and Game recommends and Forest Service condition 19 specifies that compliance for the Lower McCloud River and Iron Canyon Creek be based on two measurements of flow: instantaneous and 24-hour average. Instantaneous measurement of instream flows should occur at time intervals not to exceed 15 minutes; mean daily flow would be calculated from all instantaneous readings between midnight of one day and midnight of the next. California Fish and Game and the Forest Service specify that the instantaneous flow should be at least 80 percent of the specified mean daily flow for minimum flows less than or equal to 10 cfs, and at least 90 percent of the specified mean daily flow for minimum flows greater than 10 cfs. California Fish and Game and the Forest Service specify that, should the mean daily flow be less than the required mean daily flow, while the instantaneous flows are higher than the 80-90 percent required, PG&E should begin releasing the equivalent under-released volume of water within 7 days of discovery of the under-release. Credit for such additional releases would not exceed 20 percent of the instantaneous flow amount, when used to attain the equivalent of the under-released volume.

California Fish and Game recommends and Forest Service specifies that compliance with minimum instream flows at Pit 7 (table 3-23) should be based on instantaneous flow measurements.

Table 3-22. Minimum flows proposed, specified, or recommended for gage MC-7 below McCloud dam (USGS gage 11367760) by PG&E, the Forest Service, California Fish and Game, and NMFS. (Source: Staff)

| Release from McCloud Dam (cfs) by Water Year <sup>a</sup> |                                      |                          |                          |                          |                          |                               |                          |                          |
|---|--------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------------|--------------------------|--------------------------|
| All Water Years   |                                      |                          |                          |                          |                          | Normal                        | Dry                      | Critically Dry           |
| Month   | PG&E Final License Application (FLA) | PG&E Alt 4(e)            |                          | Forest Service           |                          | DFG & FS (original 1/29/2010) | NMFS <sup>e</sup>        |                          |
|   |                                      |                          |                          | Modified 3/1/2010        | Modified 11/29/2010      |                               |                          |                          |
| October   | 150                                  | 175 <sup>f</sup>         |                          | 175 <sup>f</sup>         | 175 <sup>f</sup>         | 200                           |                          |                          |
| November  | 150                                  | 175 <sup>f</sup>         |                          | 175 <sup>f</sup>         | 175 <sup>f</sup>         | 200                           |                          |                          |
| December  | Min. 200, Target 220                 | 175 <sup>f</sup>         |                          | 175 <sup>f</sup>         | 175 <sup>f</sup>         | 200                           |                          |                          |
| January   | Min. 200, Target 220                 | 175 <sup>f</sup>         |                          | 175 <sup>f</sup>         | 175 <sup>f</sup>         | 200                           |                          |                          |
| February 1-14   | Min. 200, Target 220                 | 175 <sup>f</sup>         |                          | 175 <sup>f</sup>         | 175 <sup>f</sup>         | 200                           |                          |                          |
| February 15-29  | Min. 200, Target 220                 | 0-75% RO <sup>b</sup>    | No flow change           | 0-75% RO <sup>b</sup>    | No flow change           | No flow change                | 0-75% RO <sup>b</sup>    | No flow change           |
|   |                                      | 76-89% RO <sup>b</sup>   | No flow change           | 76-89% RO <sup>b</sup>   | No flow change           | No flow change                | 76-89% RO <sup>b</sup>   | No flow change           |
|   |                                      | 90-99% RO <sup>b</sup>   | Increase flow by 75 cfs  | 90-99% RO <sup>b</sup>   | Increase flow by 75 cfs  | Increase flow by 75 cfs       | 90-99% RO <sup>b</sup>   | Increase flow by 50 cfs  |
|   |                                      | 100-119% RO <sup>b</sup> | Increase flow by 125 cfs | 100-119% RO <sup>b</sup> | Increase flow by 125 cfs | Increase flow by 125 cfs      | 100-119% RO <sup>b</sup> | Increase flow by 100 cfs |
|   |                                      | ≥120% RO <sup>b</sup>    | Increase flow by 175 cfs | ≥120% RO <sup>b</sup>    | Increase flow by 175 cfs | Increase flow by 175 cfs      | ≥120% RO <sup>b</sup>    | Increase flow by 150 cfs |

**Release from McCloud Dam (cfs) by Water Year<sup>a</sup>**

| All Water Years |                                      |                          |                          |                          |                          |                               |                          | Normal                   | Dry | Critically Dry |
|-----------------|--------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------------|--------------------------|--------------------------|-----|----------------|
| Month           | PG&E Final License Application (FLA) | PG&E Alt 4(e)            |                          | Forest Service           |                          | DFG & FS (original 1/29/2010) | NMFS <sup>e</sup>        |                          |     |                |
|                 |                                      |                          |                          | Modified 3/1/2010        | Modified 11/29/2010      |                               |                          |                          |     |                |
| March 1-15      | Min. 200, Target 220                 | 0-75% RO <sup>b</sup>    | No flow change           | 0-75% RO <sup>b</sup>    | No flow change           | No flow change                | 0-75% RO <sup>b</sup>    | No flow change           |     |                |
|                 |                                      | 76-89% RO <sup>b</sup>   | Increase flow by 50 cfs  | 76-89% RO <sup>b</sup>   | Increase flow by 50 cfs  | Increase flow by 50 cfs       | 76-89% RO <sup>b</sup>   | Increase flow by 50 cfs  |     |                |
|                 |                                      | 90-99% RO <sup>b</sup>   | Increase flow by 50 cfs  | 90-99% RO <sup>b</sup>   | Increase flow by 50 cfs  | Increase flow by 50 cfs       | 90-99% RO <sup>b</sup>   | Increase flow by 50 cfs  |     |                |
|                 |                                      | 100-119% RO <sup>b</sup> | Increase flow by 100 cfs | 100-119% RO <sup>b</sup> | Increase flow by 100 cfs | Increase flow by 100 cfs      | 100-119% RO <sup>b</sup> | Increase flow by 100 cfs |     |                |
|                 |                                      | ≥120% RO <sup>b</sup>    | Increase flow by 150 cfs | ≥120% RO <sup>b</sup>    | Increase flow by 150 cfs | Increase flow by 150 cfs      | ≥120% RO <sup>b</sup>    | Increase flow by 150 cfs |     |                |
| March 16-31     | Min. 200, Target 220                 | 0-75% RO <sup>c</sup>    | No flow change           | 0-75% RO <sup>c</sup>    | No flow change           | No flow change                | 0-75% RO <sup>c</sup>    | No flow change           |     |                |
|                 |                                      | 76-89% RO <sup>c</sup>   | No flow change           | 76-89% RO <sup>c</sup>   | No flow change           | No flow change                | 76-89% RO <sup>c</sup>   | No flow change           |     |                |
|                 |                                      | 90-99% RO <sup>c</sup>   | Increase flow by 50 cfs  | 90-99% RO <sup>c</sup>   | Increase flow by 50 cfs  | Increase flow by 50 cfs       | 90-99% RO <sup>c</sup>   | Increase flow by 50 cfs  |     |                |
|                 |                                      | 100-119% RO <sup>c</sup> | Increase flow by 100 cfs | 100-119% RO <sup>c</sup> | Increase flow by 100 cfs | Increase flow by 50 cfs       | 100-119% RO <sup>c</sup> | Increase flow by 100 cfs |     |                |
|                 |                                      | ≥120% RO <sup>c</sup>    | Increase flow by 150 cfs | ≥120% RO <sup>c</sup>    | Increase flow by 150 cfs | Increase flow by 150 cfs      | ≥120% RO <sup>c</sup>    | Increase flow by 150 cfs |     |                |

**Release from McCloud Dam (cfs) by Water Year<sup>a</sup>**

| All Water Years           |                                      |                                 |   |                                 |   |   |                          | Normal  | Dry | Critically Dry |
|---------------------------|--------------------------------------|---------------------------------|---|---------------------------------|---|---|--------------------------|---|-----|----------------|
| Month                     | PG&E Final License Application (FLA) | PG&E Alt 4(e)                   |   | Forest Service                  |   | DFG & FS (original 1/29/2010)   |                          | NMFS <sup>e</sup>                               |     |                |
|                           |                                      |                                 |   | Modified 3/1/2010               | Modified 11/29/2010   |   |                          |   |     |                |
| April 1-15                | Min. 200, Target 220                 | 0-75% RO <sup>c</sup>           | No flow change  | 0-75% RO <sup>c</sup>           | No flow change  | No flow change  | 0-75% RO <sup>c</sup>    | No flow change                                  |     |                |
|                           |                                      | 76-89% RO <sup>c</sup>          | No flow change  | 76-89% RO <sup>c</sup>          | No flow change  | No flow change  | 76-89% RO <sup>c</sup>   | No flow change                                  |     |                |
|                           |                                      | 90-99% RO <sup>c</sup>          | No flow change  | 90-99% RO <sup>c</sup>          | No flow change  | No flow change  | 90-99% RO <sup>c</sup>   | No flow change                                  |     |                |
|                           |                                      | 100-119% RO <sup>c</sup>        | Increase flow by 50 cfs   | 100-119% RO <sup>c</sup>        | Increase flow by 50 cfs   | Increase flow by 50 cfs   | 100-119% RO <sup>c</sup> | Increase flow by 50 cfs                         |     |                |
|                           |                                      | ≥120% RO <sup>c</sup>           | Increase flow by 50 cfs   | ≥120% RO <sup>c</sup>           | Increase flow by 50 cfs   | Increase flow by 50 cfs   | ≥120% RO <sup>c</sup>    | Increase flow by 50 cfs                         |     |                |
| April 16-<br>last Fri/Sat | Min. 200, Target 220                 | April 15 MC-7 Release ≥ 200 cfs | Decrease flow by 50 cfs each Friday after April 15 until flow is 200 cfs & maintain 200 cfs release at MC-7 through June 30 | April 15 MC-7 Release ≥ 200 cfs | Decrease flow by 50 cfs each Friday after April 15 until flow is 200 cfs & maintain 200 cfs release at MC-7 through June 30 | Decrease flow by 50 cfs each Friday after April 15 until flow is 200 cfs & maintain 200 cfs release at MC-7 through June 30 | 0-89% RO <sup>d</sup>    | Decrease flow by 50 cfs (maintain min. 200 cfs) |     |                |
|                           |                                      | April 15 MC-7 Release <200 cfs  | 175 cfs at MC-7; maintain at least 200 cfs at Ah-Di-Na (MC-1)   | April 15 MC-7 Release <200 cfs  | 175 cfs at MC-7; maintain at least 200 cfs at Ah-Di-Na (MC-1)   | 175 cfs at MC-7; maintain at least 200 cfs at Ah-Di-Na (MC-1)   | ≥90% RO <sup>d</sup>     | No flow change                                  |     |                |

**Release from McCloud Dam (cfs) by Water Year<sup>a</sup>**

| All Water Years                |                                      |   |   |                                      |                               |                   | Normal  | Dry  | Critically Dry |
|--------------------------------|--------------------------------------|---|---|--------------------------------------|-------------------------------|-------------------|---------|------|----------------|
| Month                          | PG&E Final License Application (FLA) | PG&E Alt 4(e)   | Forest Service  |                                      | DFG & FS (original 1/29/2010) | NMFS <sup>e</sup> |         |      |                |
|                                |                                      |   | Modified 3/1/2010   | Modified 11/29/2010                  |                               |                   |         |      |                |
| Last Fri/Sat in April-April 30 | Min. 200, Target 220                 |   |   |                                      |                               |                   |         |      |                |
| May                            | 150                                  | April 15 MC-7 Release ≥ 200 cfs      200 <sup>f</sup><br>April 15 MC-7 Release <200 cfs      175 <sup>f</sup> | April 15 MC-7 Release ≥ 200 cfs      200 <sup>f</sup><br>April 15 MC-7 Release <200 cfs      175 <sup>f</sup> | 200 <sup>f</sup><br>175 <sup>f</sup> | 200<br>200                    |                   |         |      |                |
| June                           | 150                                  | April 15 MC-7 Release ≥ 200 cfs      200 <sup>f</sup><br>April 15 MC-7 Release <200 cfs      175 <sup>f</sup> | April 15 MC-7 Release ≥ 200 cfs      200 <sup>f</sup><br>April 15 MC-7 Release <200 cfs      175 <sup>f</sup> | 200 <sup>f</sup><br>175 <sup>f</sup> | 200<br>200                    |                   |         |      |                |
| July                           | 150                                  | 175 <sup>f</sup>  | 175 <sup>f</sup>  | 175 <sup>g</sup>                     | 200                           | 400-600           | 400-600 | ~600 |                |
| August                         | 150                                  | 175 <sup>f</sup>  | 175 <sup>f</sup>  | 175 <sup>g</sup>                     | 200                           | 300-400           | 300-400 | ~400 |                |
| September                      | 150                                  | 175 <sup>f</sup>  | 175 <sup>f</sup>  | 175 <sup>f</sup>                     | 200                           | 150-300           | 150-300 | ~400 |                |

Notes:

<sup>a</sup> Using most recent California Department of Water Resources Sacramento Valley Water Year Type Index forecast.

- b February 1 McCloud runoff (RO) percentage from DWR Bulletin 120 for McCloud River above Shasta Lake.
  - c March 1 McCloud runoff (RO) percentage from DWR Bulletin 120 for McCloud River above Shasta Lake.
  - d April 1 McCloud runoff (RO) percentage from DWR Bulletin 120 for McCloud River above Shasta Lake.
  - e Flows recommended when listed salmonids are present in McCloud River.
  - f Mean daily flow at USGS gage 11367800 (MC-1) at Ah-Di-Na should be at least 200 cfs.
  - g If the release on April 15 is greater than 200 cfs, mean daily flow at USGS gage 11367800 (MC-1) should be at least 215 cfs. If the release on April 15 is less than 200 cfs, mean daily flow at MC-1 should be at least 200 cfs.
- Shaded values are consistent with flows specified in Forest Service modified condition 19 (November 29, 2010).  
The release requirement for the current license is 50 cfs from May 1 to Nov 30 and 40 cfs from Dec 1 to Apr 30 in all years.

Table 3-23. Minimum flows proposed, specified, or recommended for gage MC-10 below Iron Canyon dam (USGS gage 11363930). (Source: Staff)

| <b>Release from Iron Canyon Dam (cfs) by Water Year<sup>a</sup></b> |                 |                             |                  |            |                     |                             |           |            |  |                             |           |            |
|---|-----------------|-----------------------------|------------------|------------|---------------------|-----------------------------|-----------|------------|--|-----------------------------|-----------|------------|
| <b>Month</b>  | <b>Wet</b>      |                             |                  |            | <b>Above Normal</b> |                             |           |            | <b>Below Normal, Dry, Critically Dry</b> |                             |           |            |
|   | <b>PG&amp;E</b> |                             | <b>FS</b>        | <b>DFG</b> | <b>PG&amp;E</b>     |                             | <b>FS</b> | <b>DFG</b> | <b>PG&amp;E</b>                          |                             | <b>FS</b> | <b>DFG</b> |
|   | <b>FLA</b>      | <b>Alt 4(e)<sup>c</sup></b> |                  |            | <b>FLA</b>          | <b>Alt 4(e)<sup>d</sup></b> |           |            | <b>FLA</b>                               | <b>Alt 4(e)<sup>e</sup></b> |           |            |
| October   | 10              | 10                          | 10               |            | 7                   | 7                           | 7         |            | 5  | 7                           | 7         |            |
| November  | 10              | 10                          | 10               |            | 7                   | 7                           | 7         |            | 5  | 7                           | 7         |            |
| December  | 15              | 15 <sup>f</sup>             | 15               | same       | 10                  | 10 <sup>f</sup>             | 10        | same       | 7  | 7 <sup>f</sup>              | 7         | same       |
| January   | 15              | 15                          | 15               |            | 10                  | 10                          | 10        |            | 7  | 7                           | 7         |            |
| February  | 15              | 15 <sup>g</sup>             | 15               | as         | 10                  | 10 <sup>g</sup>             | 10        | as         | 7  | 7 <sup>g</sup>              | 7         | as         |
| March   | 20              | >20 <sup>b,g</sup>          | >20 <sup>b</sup> |            | 15                  | 15 <sup>g</sup>             | 15        |            | 10                                       | 10 <sup>g</sup>             | 10        |            |
| April   | 20              | >20 <sup>b,g</sup>          | >20 <sup>b</sup> | FS         | 15                  | 15 <sup>g</sup>             | 15        | FS         | 10                                       | 10 <sup>g</sup>             | 10        | FS         |
| May   | 15              | 15 <sup>g</sup>             | 15               |            | 10                  | 10 <sup>g</sup>             | 10        |            | 7  | 7 <sup>g</sup>              | 7         |            |
| June  | 15              | 15                          | 15               |            | 10                  | 10                          | 10        |            | 7  | 7                           | 7         |            |
| July  | 10              | 10                          | 10               |            | 7                   | 7                           | 7         |            | 5  | 7                           | 7         |            |
| August  | 10              | 10                          | 10               |            | 7                   | 7                           | 7         |            | 5  | 7                           | 7         |            |
| September   | 10              | 10                          | 10               |            | 7                   | 7                           | 7         |            | 5  | 7                           | 7         |            |

Notes:

<sup>a</sup> Using most recent California Department of Water Resources Sacramento Valley Water Year Type Index forecast.

<sup>b</sup> In March and April of wet water years, the flow control valve on Iron Canyon dam should be fully opened. Mean daily flow should be at least 20 cfs during this period.

<sup>c</sup> Defined as 120% or greater of average April-July forecasted runoff in DWR Bulletin 120 for McCloud River above Shasta Lake.

<sup>d</sup> Defined as 100-119% of average April-July forecasted runoff in DWR Bulletin 120 for McCloud River above Shasta Lake.

<sup>e</sup> Defined as less than 100% of average April-July forecasted runoff in DWR Bulletin 120 for McCloud River above Shasta Lake.

<sup>f</sup> Flow changes during December would be performed as soon as weather and site accessibility permit.

<sup>g</sup> Flow changes during these months would be made once, within five business days of the actual publication date of that month's DWR Bulletin 120, or as soon as permitted by weather and site accessibility.

Shaded values are consistent with flows specified in Forest Service modified condition 19 (November 29, 2010).

The release requirement for the current license is 3 cfs year-round. The previous month's flows would continue through the first several days of the months where forecasts are used to determine flows, until the new flow has been determined and the flow change made.

Table 3-24. Minimum flows proposed, specified, or recommended for gage PH-47 below Pit 7 dam (USGS gage 11365000). (Source: Staff)

| <b>Release from Pit 7 Dam (cfs)</b>           |                 |                                     |                                 |
|---|-----------------|-------------------------------------|---------------------------------|
| <b>PG&amp;E FLA</b>                           | <b>Alt 4(e)</b> | <b>Forest Service</b>               | <b>California Fish and Game</b> |
| 150 (when Shasta Lake elevation <1,055 feet.) | NA              | 150 (year-round instantaneous flow) | Same as Forest Service          |

Notes: Shaded values are consistent with flows specified in Forest Service modified condition 19 (November 29, 2010).

The release requirement for the current license is 150 cfs whenever the elevation of Shasta Lake is below 1,055 feet.

Table 3-25. Minimum flows proposed by the Forest Service, California Trout, Trout Unlimited, and McCloud River Club for gage MC-7 below McCloud dam (USGS gage 11367760). Specified flow increases are relative to flows specified in table 3-22 for the same date interval. Variations from Forest Service condition 19 are indicated in bold. (Source: Staff)

| <b>Release from McCloud Dam (cfs) by Water Year<sup>a</sup></b> |                                       |  |   |  |
|---|---------------------------------------|--|---|--|
| <b>Month</b>  | <b>FS (modified 11/29/2010)</b>       |  | <b>California Trout, Trout Unlimited, and McCloud River Club alt 4(e)</b> |  |
| March 16-31   | 100-119% RO <sup>b</sup>              | Increase flow by 50 cfs  | 100-119% RO <sup>b</sup>  | Increase flow by 50 cfs  |
|   | ≥120% RO <sup>b</sup>                 | Increase flow by 150 cfs   | ≥120% RO <sup>b</sup>   | Increase flow by 150 cfs   |
| April 1-15  | 100-119% RO <sup>b</sup>              | Increase flow by 50 cfs  | 100-119% RO <sup>b</sup>  | <b>No flow change</b>  |
|   | ≥120% RO <sup>b</sup>                 | Increase flow by 50 cfs  | ≥120% RO <sup>b</sup>   | Increase flow by 50 cfs  |
| April 16-<br>last Fri/Sat                                       | April 15 MC-7<br>Release ≥ 200<br>cfs | Decrease flow by 50 cfs<br>each Friday after April<br>15 until flow is 200 cfs<br>& maintain 200 cfs<br>release at MC-7 through<br>June 30 | April 15 MC-7<br>Release ≥ 200<br>cfs                                     | Decrease flow by 50 cfs each Friday after<br>April 15 ( <b>if 0-99%RO<sup>d</sup></b> ) <b>and by 75 cfs per<br/>week (if ≥100%RO<sup>c</sup>)</b> until flow is 200 cfs.<br><b>Decrease flow by 50 cfs each Friday after<br/>May 1 until flow is 200 cfs<sup>d</sup>.</b> Maintain 200<br>cfs release at MC-7 through June 30 |
| Last<br>Fri/Sat in<br>April-<br>April 30                        | April 15 MC-7<br>Release <200<br>cfs  | 175 cfs at MC-7;<br>maintain at least 200 cfs<br>at Ah-Di-Na (MC-1)  | April 15 MC-7<br>Release <200<br>cfs                                      | 175 cfs at MC-7; maintain at least 200 cfs at<br>Ah-Di-Na (MC-1)   |

<sup>a</sup> Using most recent California Department of Water Resources Sacramento Valley Water Year Type Index forecast.  
<sup>b</sup> March 1 McCloud runoff (RO) percentage for Lower McCloud River above Shasta Lake from DWR Bulletin 120.  
<sup>c</sup> April 1 McCloud runoff (RO) percentage for Lower McCloud River above Shasta Lake from DWR Bulletin 120.  
<sup>d</sup> Matches Forest Service original condition 19.

Table 3-26. Minimum flows (cfs) proposed by the McCloud RiverKeepers for gage MC-7 below McCloud dam (USGS gage 11367760) and for gage MC-1 at Ah-Di-Na (USGS gage 11367800) compared to revised Forest Service condition 19 and PG&E alternative condition 19. (Source: Staff)

| Month          | McCloud dam (MC-7) |                      | Ah-Di-Na (MC-1)      |             |          |
|----------------|--------------------|----------------------|----------------------|-------------|----------|
|                | Forest Service     | McCloud RiverKeepers | McCloud RiverKeepers |             |          |
|                |                    |                      | Forest Service       | Normal Year | Dry Year |
| January        | 175                | 100                  | 200                  | 160         | 160      |
| February       | 175-350            | 100                  | 200                  | 160         | 160      |
| March          | 175-650            | 100                  | 200                  | 170         | 170      |
| April          | 175-700            | 100                  | 200                  | 170         | 170      |
| May 1-15       | 175-550            | 100                  | 200                  | 170         | 160      |
| May 16-31      | 175-400            | 100                  | 200                  | 200         | 160      |
| June           | 175-200            | 100                  | 200                  | 200         | 160      |
| July           | 175                | 100                  | 200                  | 200         | 160      |
| August         | 175                | 100                  | 200                  | 200         | 160      |
| September      | 175                | 100                  | 200                  | 210         | 180      |
| October        | 175                | 100                  | 200                  | 210         | 180      |
| November       | 175                | 100                  | 200                  | 210         | 180      |
| December 1-15  | 175                | 100                  | 200                  | 210         | 180      |
| December 16-31 | 175                | 100                  | 200                  | 170         | 170      |

Table 3-27. Flows proposed, specified, or recommended at McCloud dam by American Whitewater. (Source: Staff)

| <b>Month</b> | <b>Wet and Above-Normal Water Years</b> | <b>Below-Normal Water Years</b> | <b>Dry and Critically Dry Water Years</b>                                    |
|--------------|---|---------------------------------|--|
| April        | Peak flows of 600 cfs                   | At least 400 cfs                | 300 cfs ramping down to 200 cfs baseflows by the opening day of trout season |
| May          | Ramping down to 200 cfs                 | Ramping down to 200 cfs         |  |

Table 3-28. Winnemem Wintu Tribe summer flow proposal to be achieved by 2015; flows consistent with upper range of NMFS recommendations (table 3-22). (Source: Staff)

| <b>Month</b> | <b>Wet Water Years</b> | <b>Normal Water Years</b> | <b>Dry and Critically Dry Water Years</b> |
|--------------|------------------------|---------------------------|---|
| July         | 600                    | 600                       | 600                                       |
| August       | 400                    | 400                       | 400                                       |
| September    | 300                    | 300                       | 400                                       |

### *Our Analysis*

To develop the flows proposed in its license application, PG&E used three flow studies (HCM, Individual Base Modeling [IBM], and Physical Habitat Simulation Modeling [PHABSIM]) as well as macroinvertebrate, fisheries, and riparian vegetation studies to determine appropriate flows for aquatic and terrestrial biota. The HCM method was used to estimate total available habitat area in the Lower McCloud River for each resident trout life stage in order to evaluate the effects of varying streamflow on rainbow and brown trout habitat. Evaluation of both rainbow and brown trout was also included in an IBM developed for two subreaches of the Lower McCloud River, which assessed key population responses, such as persistence, abundance, biomass, and size distributions under relevant hydrologic and thermal regimes. Instream flow incremental methodology (IFIM) and PHABSIM modeling were used to evaluate flow conditions and habitat criteria for each life stage of rainbow trout in Iron Canyon Creek downstream of Iron Canyon dam. In response to comments from resource agencies on the final license application, PG&E also performed PHABSIM model runs for resident rainbow and brown trout in the Lower McCloud River for comparison with HCM and IBM results.

PG&E used the HCM to estimate suitable habitat for trout below McCloud dam under flows of about 200, 300, 400, 600, 800, and 1000 cfs (as measured at the Ah-Di-Na gage) at sites upstream of Squaw Valley Creek and at flows of about 300, 400, 600, 800, and 1000 cfs at sites downstream of Squaw Valley Creek. PG&E, in cooperation with interested relicensing participants, developed habitat suitability criteria for rainbow and brown trout based on a review of existing literature; during the consultation process PG&E also agreed to incorporate habitat suitability criteria developed for the Yuba-Bear and Drum-Spaulding Projects. The habitat suitability criteria included water depth and velocity criteria for fry, juvenile, adult, and spawning life stages. The results of PG&E's HCM study shows that the lowest study flows likely provide the most suitable habitat for rainbow and brown trout in comparison to the other measured flows.

The Forest Service reviewed the results of the HCM to evaluate its value in determining minimum flows for McCloud dam. The Forest Service determined that in the upper reach of the study area, maximum trout habitat would occur at flows between 190 and 250 cfs. In the lower reach below Squaw Valley Creek, the Forest Service suggested that maximum trout habitat would occur at flows between 250 and 450 cfs; these flows would generally be achieved in this reach by the incremental accretion from tributaries entering the Lower McCloud River below the Ah-Di-Na gage (MC-1). However, the Forest Service and the California Water Board concluded that the HCM analysis was not an accurate tool to determine flows that would provide maximum habitat.

At the request of participants in the consultation process, PG&E also analyzed instream flows in the Lower McCloud River using IBM to evaluate the responses of rainbow trout and brown trout to various flow regimes and water quality conditions. PG&E evaluated five flow regimes in the model: unimpaired, historic (1990-2006),

constant year round, constant summer varying only in winter, and constant winter flows varying only in summer. Results of the unimpaired and historic flow evaluation predicted that trout abundance was higher under project flows compared to pre-project unimpaired flows. The results of the year-round flow evaluation predicted that increasing flow above about 200 cfs at Ah-Di-Na (MC-1) would not increase trout abundance and would decrease the relative abundance of rainbow versus brown trout. For varying summer flows, the model predicted that increasing summer flow above about 200 cfs would decrease relative abundance of rainbow trout. The varying winter flow evaluation produced variable results between sample sites: at the upper site near MC-1, the model predicted little change to trout abundance under simulated flows and at the lower site near MC-5, increasing flows above 200 cfs produced a decline in trout abundance. An increase in brown trout abundance was predicted as flows increased from 100 to 300 cfs. The results of the study suggest that more controlled flows at the McCloud dam may result in more stable habitat conditions for resident trout populations. PG&E noted that higher pre-project unimpaired flow regime may have been more suitable for extirpated species including listed salmonids and bull trout compared to resident trout; no model runs were performed using habitat criteria appropriate for either of these species. After reviewing the results, the Forest Service and the California Water Board concluded that the IBM analysis was not an accurate tool to determine flows that would provide maximum habitat.

PG&E used the PHABSIM model to compare spawning habitat in Iron Canyon Creek under the existing minimum flows to that under unimpaired flows. Compared to unimpaired conditions, the model results show the higher flows of the existing minimum flow regime at the top of the reach provide lower spawning weighted usable area (WUA) and the lower flows in the lower reach result in higher spawning WUA. The Forest Service evaluated the PHABSIM model results and noted that flows need to exceed 8 cfs before the entire channel and its margins are filled to some extent and flows in the range of 16 to 20 cfs provide some depth of flow in side channel areas. Furthermore, the Forest Service indicated base flow in the range of 7 to 10 cfs would be suitable for juveniles in the summer/fall period (July through October), and a spawning period flow in the range of 20 to 40 cfs is appropriate for March and April. Studies indicated that a self-sustaining rainbow trout population currently inhabits the waters of Iron Canyon Creek. Increasing the minimum instream flow from a year-round 3 cfs, to a seasonally variable flow, with a minimum of 7cfs will provide more usable habitat for all life stages of rainbow trout, while introducing a late winter-spring peak flow that mimics natural hydrologic conditions will provide more suitable habitat for spawning trout. Additionally, providing seasonally variable flow conditions will increase habitat heterogeneity, an important factor in providing for overall aquatic species diversity, and therefore, ecosystem health. The minimum mean daily flows specified by the Forest Service for Lower McCloud River, Iron Canyon Creek, and Pit River, shown in tables 3-22 through 3-24, are the same as PG&E alternative condition 19 flows during all months; however, PG&E recommended that flow changes during February through May at Iron Canyon dam

should be made within five business days of the actual publication date of that month's DWR Bulletin 120 because of potential seasonal access issues to the site. Similarly, PG&E recommended that flow changes in December be conducted as soon as weather and site accessibility permit. The Forest Service modified condition 19 concurs with PG&E's recommendation.

Flows recommended by California Fish and Game (see tables 3-22 through 3-24) are the same as those specified by the Forest Service's original condition 19, but are generally higher than the modified Forest Service condition 19 flows for the reach below McCloud dam. Following review of the modeling studies conducted by PG&E, California Fish and Game determined that a base flow of 200 cfs below McCloud dam as measured at USGS gage MC-7 should be implemented (compared to 175 cfs proposed by PG&E and specified by the Forest Service), with flow augmentation from February 14 to April 30. The flows recommended by California Fish and Game for Iron Canyon dam and Pit 7 afterbay are the same as the Forest Service specified flows.

As previously stated, during pre-license application consultation the resource agencies proposed several methods (HCM, IBM, PHABSIM) to analyze the relationship between flow and quality and quantity of aquatic habitat available to target species and life stages in the Lower McCloud River. Despite differences among methods, the optimum range of flow predicted to provide peak available habitat was relatively consistent among the models. PHABSIM modeling runs first using all study transects (TM-74) and second using a subset of transects (TM-75) provided nearly identical estimates of flows for peak habitat for each life stage evaluated, demonstrating the robustness of the model. Similarly results of IBM and HCM generally indicated that flows at the lower end of the range studied (175-200 cfs) provide greatest abundance or highest habitat values, respectively. Models used for analysis of aquatic ecosystems typically make various simplifying assumptions in order to simulate a very complex system. Depending on the associated assumptions, any model will have certain strengths and weakness that must be recognized. The PHABSIM model initially developed by FWS has received fairly universal acceptance for evaluation of the effects of flow on available habitat for a wide range of hydropower and water projects. Although it may not accurately depict the actual utilization of aquatic habitat, it does provide a reliable tool for comparative assessment of a wide range of flow conditions. Although HCM and IBM have not been widely used to evaluate flow scenarios for relicensing, they are accepted tools for scientific assessment of factors affecting aquatic populations. These three models take significantly different approaches to evaluate the effects of flow, but provide similar predictions of optimal conditions. We find that, taken in combination, the weight of evidence from these multiple analyses supports the flows recommended for protections and enhancement of the species evaluated, particularly resident trout.

The various flow recommendations from licensing participants are all designed to create a seasonal hydrograph that is more typical of natural patterns for the Lower McCloud River with increasing flows during late winter and early spring followed by decreasing flows through late spring to base flow through the summer and fall. The

major differences among flow recommendations from the participants relate to seasonal base flow, where base flow is measured, and the rate of increase and decrease around seasonal and event flow peaks during late winter through late spring.

All recommendations concur that compliance should be measured at McCloud dam (gage MC-7) to ensure that the desired minimum base flow and seasonal flow variation is achieved in the upper reach between the dam and Ah-Di-Na. Under the current license conditions, minimum flow compliance at gage MC-1 at Ah-Di-Na, and flow augmentation from Hawkins Creek provides the seasonal flow structure downstream of Ah-Di-Na. Forest Service modified condition 19 specifies and PG&E alternative condition 19 proposes a second compliance location at MC-1 to assure that minimum base flow downstream of this point is 200 cfs even during periods when flows from Hawkins Creek are very low. The Forest Service/PG&E proposal for base flow would provide minimum flow at McCloud dam (175 cfs) that is more than three times that required under the current license (50 cfs). The difference in available habitat (HCM or PHABSIM) or abundance of 1-year and older trout (IBM) between 175 and 200 cfs is generally less than 10 percent; habitat area available at 175 cfs is generally within 10 percent of peak area for resident fry, juvenile, and adult trout. Peak area for trout spawning was predicted by PHABSIM and HCM at between 300 cfs and 400 cfs; spawning habitat area at 175-200 cfs was predicted at less than 50 percent of peak. It should be noted that rainbow trout spawn during spring when most of the recommendations augment minimum flow to reflect a more typical natural seasonal hydrograph; thus, flows would typically be in the higher optimal range during rainbow trout spawning except during the driest years.

For the Lower McCloud River below McCloud dam, the Forest Service, PG&E, California Fish and Game recommend increasing flow twice a month beginning in mid-February depending on the relative rate of runoff in a given year as documented in DWR Bulletin 120. The flow increase recommended by Forest Service, PG&E, and California Fish and Game (table 3-22) for a given runoff condition (0-75 percent, 76-89 percent, 90-99 percent, 100-119 percent, and greater than 120 percent) is the same between March 1 and April 15. The first increase implemented on February 15 is 25 cfs higher in the Forest Service modified condition 19 and the PG&E alternative condition 19 than in the California Fish and Game recommendation when the runoff factor is 90 percent or higher. Beginning on April 16, PG&E agrees to decreasing flow at weekly intervals (as long as the flow is equal to or greater than 200 cfs) until flows at MC-7 reach 200 cfs or until May 1 when flows are set at 200 cfs at McCloud dam. On July 1, flow would be decreased to base flow conditions, 175 cfs at McCloud dam and 200 cfs at MC-1. The Forest Service specifies the same decrease in flows after April 15 as PG&E; however, the Forest Service specifies 215 cfs at MC-1 beginning July 1 if flows on April 15 are greater than or equal to 200cfs. On April 16, if the runoff factor is less than 90 percent, California Fish and Game recommends the same flow decrease as Forest Service/PG&E; however, if the runoff factor is greater than 90 percent, California Fish and Game recommends maintaining the existing flow until the last Friday in April then decreasing

to 200 cfs at McCloud dam. California Fish and Game's recommendation would increase flows more slowly during the first two weeks at the beginning of the late winter-spring flow augmentation, but maintain higher flows than Forest Service/PG&E during normal to wet years for a 2-week period at the end of April. The Forest Service/PG&E recommendation could benefit rainbow trout spawning for the two weeks early in the season, while the California Fish and Game recommendation could benefit late spawning rainbow trout during the last two weeks of the flow augmentation program. The difference in the actual benefit from these two flow scenarios to the trout population would probably vary from year to year depending on a range of additional factors that can influence the onset, duration, and success of spawning.

Forest Service modified condition 19, filed on November 29, 2010, would provide slightly higher flows during the summer during normal to wet years than its original condition 19. If the flow at MC-7 is equal or greater than 200 cfs on 15 April, the minimum flow at MC-1 in July and August would be 215 cfs instead of 200 cfs. Several commenters indicated that under the existing license, flows at Ah-Di-Na (MC-1) were commonly greater than the minimum 200 cfs proposed by the Forest Service's original condition 19. Using archived issues of DWR Bulletin 120, we classified each year between 1994 and 2006 according to water year type and then calculated average flow for each month based on water year type (table 3-21). During dry years, average flows were slightly above 175 cfs at Ah-Di-Na during summer (June-August); during below normal to wet years, average summer flows were generally between 215 cfs and 230 cfs. Forest Service modified condition 19 would also reduce the flow increase on 16 March from the 100 cfs specified in the original condition to 50 cfs (table 3-22) when the runoff percentage is between 100 and 119. These changes result in flows similar to those proposed by California Trout, Trout Unlimited, and McCloud River Club. In their November 29, 2010 filing, California Trout, Trout Unlimited, and McCloud River Club concurred with the Forest Service's November 29 modified condition.

Although California Fish and Game recommends minimum flows at 200 cfs during May through February 14 measured at one compliance point near the McCloud dam, the Forest Service specifies minimum flows of 175 cfs during the same period as measured at McCloud dam and 200/215 cfs as measured downstream of McCloud dam at USGS gage MC-1 (Ah-Di-Na). California Fish and Game did not provide quantitative evidence that an increase of 25 cfs at McCloud dam would provide a substantial improvement in fish habitat. Various modeling exercises performed by PG&E indicate that this 25 cfs increase would have a negligible effect on available aquatic habitat. The Forest Service indicated that the lower 175 cfs release from McCloud dam allows discharge from Hawkins Creek near Ah-Di-Na to exercise greater natural control on fluctuations in the seasonal hydrograph downstream of Ah-Di-Na. California Fish and Game noted that higher base flows from McCloud dam may provide better conditions for recreation and reduce the potential for excessive fish harvest during low flows; such effects on recreational fishing are discussed in section 3.3.5, *Recreation Resources*.

The original recommendations submitted by California Trout, Trout Unlimited, and McCloud River Club (table 3-25) for the late winter-spring flow augmentation on the Lower McCloud River differed slightly from Forest Service's March 1 modified condition 19, PG&E's alternative condition 19 and California Fish and Game's recommendation. During the second half of March, if the runoff factor is between 100 and 119 percent (above normal years), their flow recommendation would increase flows 50 cfs, half of that recommended originally by Forest Service/PG&E/California Fish and Game; during the first half of April, if runoff is 100 to 119 percent, they recommend no flow increase compared to 50 cfs increase originally recommended by Forest Service/PG&E/California Fish and Game. When flows begin decreasing on 16 April, if the runoff factor is greater than 100 percent, California Trout, Trout Unlimited, and McCloud River Club recommend decreasing flow by 75 cfs per week, 25 cfs higher than the Forest Service's original condition 19. The overall effect of the California Trout, Trout Unlimited, and McCloud River Club recommendation compared to the Forest Service condition 19 is to increase flows at a slower rate at the beginning of the season during normal to dry years and decrease flows at a faster rate at the end of the season during normal to wet years. These slight changes in the rate of increase and decrease in spring flows are not likely to have a significant effect on available habitat for various trout life stages, but could result in lower instream flows and associated more wadeable conditions, which we discuss in section 3.3.5, *Recreation Resources*, during the early trout fishing season.

California Trout, Trout Unlimited, and McCloud River Club indicated that their alternative flows would likely meet the needs of all life stages of rainbow and brown trout and provide optimum fishing conditions in the Lower McCloud River. Under these alternative flows, during the period March 16 to May 21 when the McCloud River runoff factor is 100 to 119 percent, the number of days when flows greater than 300 cfs would occur is about 60 days per year rather than about 95 days per year under the Forest Service condition 19 flows. During periods when runoff is equal to or greater than 120 percent, the number of days that flows would be greater than 300 cfs would be about 94 and the number days flows would be greater than 600 cfs would be 37, compared to 116 and 45 days, respectively, under Forest Service revised condition 19. All other seasonal flows for each runoff scenario would be the about same. The alternative flows proposed by California Trout, Trout Unlimited, and McCloud River Club may provide more days with optimum wading-condition flows (less than 300 cfs) for fishing (see discussion in section 3.3.5, *Recreation Resources*); however, there is no substantial evidence that these flows would provide additional benefit to resident fish populations.

The McCloud RiverKeepers recommends that minimum flows be established at 100 cfs year-round at McCloud dam and flows varying by month ranging from 160 to 210 cfs at MC-1 (table 3-26) with augmentation from Hawkins Creek. McCloud RiverKeepers based this recommendation on the existing quality of trout populations and the recreational fishery at lower flows under current license conditions and the significant decrease in flow available for power generation under the other relicensing

recommendations for flows. While this recommendation would increase minimum flows compared to the current license, it would not create a more natural seasonally varying flow regime supported by the other recommendations. Seasonal variation in flow typical of most streams in lower mountain and foothill landscapes can benefit aquatic habitat and a balanced aquatic ecosystem supporting a diverse seasonal forage base and robust age structure among species at the top of the food chain.

PG&E did not perform a flow-habitat study of the Pit 7 afterbay downstream of Pit 7 dam. However, PG&E proposes, California Fish and Game recommends, and the Forest Service specifies a minimum instream flow of 150 cfs in the Pit 7 afterbay, downstream of Pit 7 dam. This minimum instream flow proposal reflects current operating procedures. The Pit 7 afterbay is operated run-of-river; therefore, the relationship between flow and habitat is largely influenced by natural seasonal variability. The afterbay supports a diverse warmwater fish assemblage which exhibits a recurrent exchange with populations in the Pit River arm of Shasta Lake. Maintaining the 150 cfs minimum flow downstream of Pit 7 dam would ensure adequate flow to maintain habitat for aquatic organisms even during critically dry periods. Furthermore, the 150 cfs minimum flow would ensure continuity with the Pit River arm of Shasta Lake when Shasta Lake's water surface elevation is below 1,055 feet msl.

### **Ramping Rates**

Rapid changes in streamflow have the potential to strand and kill young fish and macroinvertebrates (Bradford et al., 1995; Hunter, 1992; Huntington, 2004), and may also cause adverse effects on amphibians including the early life stages foothill yellow-legged frogs. Under the existing license, there are no ramping rate requirements downstream of any project impoundments and no ramping is required when changing between seasonal required minimum flow rates. However, occasional upramping is conducted at the project prior to uncontrolled spill events in order to minimize effects to downstream aquatic habitat and to ensure public safety.

PG&E does not propose to implement any ramping except prior to the start of an uncontrolled spill event at McCloud dam, during which PG&E would make a good faith effort to ramp up water flows at a target rate of no more than 100 cfs per hour. These ramping rates are consistent with current practice, although the existing project license does not require ramping requirements downstream of any project impoundment. No ramping is proposed when making seasonally required changes to minimum flow rates.

California Fish and Game recommends and Forest Service condition 19 specifies that PG&E ramp down all McCloud dam spill events once the spill reaches 1,000 cfs, at which point the control valve could be used to control the discharge. Downramping would proceed at a 150-cfs decrease every 48 hours until the prescribed minimum instream flow value for that time period is reached. Additionally, operationally controllable spills would be upramped in increments not to exceed 200 cfs in a 24-hour period. Upramping and downramping related to testing of the flow valve at Iron Canyon dam should occur in 20-cfs increments, assuming a 200-cfs maximum. Ramping

increments would be spaced at least 15 minutes apart for upramping and 30 minutes apart for downramping. PG&E alternative condition 19 proposes the same ramping rates specified by Forest Service condition 19 and recommended by California Fish and Game for McCloud dam and Iron Canyon dam.

The Forest Service's original condition 19 specified valve safety compliance testing at Iron Canyon dam should only occur between March 5 and March 15. PG&E alternative condition 19, however, proposes an extension of the window available to perform valve safety testing for dam compliance at Iron Canyon dam to between March 1 and March 31, to allow for potential road access issues resulting from inclement late winter weather conditions. In its November 29, 2010, filing, the Forest Service modified condition 19 to specify that the valve safety testing for dam compliance at Iron Canyon dam be performed between March 1 and March 31, which concurs with PG&E alternative condition 19.

NMFS filed a 10(j) recommendation that PG&E should modify ramping to minimize impacts on listed salmonids, as soon as listed salmonids are documented as within the McCloud River and affected by the project.

American Whitewater and Friends of the River alternative condition 19 proposes modified downramping and upramping rates. American Whitewater and Friends of the River recommend downramping all spill events based on stage rather than flow at McCloud dam; that is, at a rate of 0.2 feet every 48 hours, as measured at MC-7, until the prescribed minimum flow is reached. Upramping during operationally controllable spills would be conducted at a rate not to exceed 1.0 foot every 24 hours, as measured at MC-7.

#### *Our Analysis*

PG&E did not conduct any analyses of the potential for fish stranding to occur in the project reaches. There is, however, some potential for fish to be stranded at times when flows are reduced following spill events or valve test flow releases. In these cases, implementing the ramping rates recommended by the Forest Service and California Fish and Game would help to limit the potential for stranding of fish and macroinvertebrates. Additionally, implementing ramping rates would decrease the potential to disrupt salmonid fry and foothill yellow-legged frogs, inhabiting shallow edge water habitats, which are particularly vulnerable to water velocity changes during up-ramping and stranding during downramping.

Expansion of the valve testing window from March 1 to March 31, as proposed by PG&E alternative condition 19 and specified by the Forest Service's November 29 modified condition 19 would provide flexibility, given that late winter weather conditions can make access to Iron Canyon dam difficult and road conditions unsafe during March. The timing, frequency, and magnitude of natural peak spring runoff events can be highly variable depending of storms and snowmelt; therefore shifting the valve test 1 to 2 weeks earlier or later to accommodate safety and access is not likely to have adverse effects on aquatic resources.

The potential for stranding of fish and other aquatic organisms during rapid changes in flow is a function of changes in water depth particularly in backwater and side channel areas rather than flow rate directly. However, the relationship between flow and water depth (stage-discharge) varies along the stream channel depending on the complexity and configuration of the channel cross-section and in particular the dimensions of the floodplain and side channels. USGS gages measure water surface level (feet), but flow (cfs) is calculated from stage-discharge relationships based on a series of field calibrations where cross-sectional area (square feet) and velocity (feet per second) are measured over a range of flows. USGS gage locations are typically selected specifically for uniform cross-sections with minimal complexity to provide an accurate and reliable stage discharge relationship to estimate flow. However, the location selected to establish a gage may not be indicative of the stage discharge relationship throughout the adjacent reach. The recommendation by American Whitewater to adjust the ramping rate based on stage (water level) rather than flows was based on the shape of the stage and discharge curves from the Ah-Di-Na gage. We provide an estimate of the stage-discharge relationship for Ah-Di-Na (table 3-29) for the range of operationally controllable flows (i.e., less than 1,000 cfs). At the downramping rate recommended by PG&E and California Fish and Game and specified by Forest Service condition 19 (150 cfs per 48 hours), the typical change in stage would be about 0.18 feet per day (2.2 inches per day) over a 10 day period to reduce flow from 1,000 cfs to 250 cfs. Numerous factors can affect the potential for stranding in addition to the rate of stage change, including beach and bar slope, species, and life stage, and attenuation of ramping downstream. In 2004, PacifiCorp reviewed factors affecting impacts of ramping for relicensing the Klamath River Project. This study evaluated natural rates of ramping from high flow events in unregulated stream reaches and looked at stranding rates below several dams at different ramping rates. Ramping rates of 0.1-0.6 feet/hour resulted in minimal stranding and were well within the natural range of rates to which resident and anadromous salmonids are adapted in unregulated systems. The ramping rate recommended by PG&E and California Fish and Game, and specified by Forest Service (150 cfs per 48 hours) would be about 0.01 feet/hour, at least an order of magnitude lower than the ramping rates specified by the Klamath River study for minimizing stranding. Given that the downramping rate of 150 cfs per 48 hours proposed at McCloud dam is relatively gradual and the stage-discharge relationship is dependent on channel configuration at any selected location, we find that flow (cfs) is an appropriate and generally accepted tool for management of ramping rates.

Table 3-29. Stage (feet) to discharge (cfs) conversion for Ah-Di-Na gage. (Source: Staff)

| <b>Gage<br/>(feet)</b> | <b>Flow (cfs)</b> |
|------------------------|-------------------|
| 1.0                    | 128               |
| 1.1                    | 152               |
| 1.2                    | 176               |
| 1.3                    | 202               |
| 1.4                    | 229               |
| 1.5                    | 257               |
| 1.6                    | 286               |
| 1.7                    | 317               |
| 1.8                    | 349               |
| 1.9                    | 382               |
| 2.0                    | 417               |
| 2.1                    | 453               |
| 2.2                    | 490               |
| 2.3                    | 529               |
| 2.4                    | 569               |
| 2.5                    | 611               |
| 2.6                    | 655               |
| 2.7                    | 700               |
| 2.8                    | 747               |
| 2.9                    | 795               |
| 3.0                    | 845               |
| 3.1                    | 898               |
| 3.2                    | 951               |
| 3.3                    | 1007              |

**Flow Monitoring and Determination of Water Year Type**

PG&E proposes to monitor compliance with minimum flows using existing USGS flow gages in each reach. For McCloud dam, minimum flows would be measured at two compliance points including USGS flow gage no. 11367760 (MC-7) or directly at McCloud dam and USGS flow gage no. 11367800 (Ah-Di-Na or MC-1); for Iron Canyon dam, minimum flows would be measured at USGS gage no. 11363930 (MC-10), and for Pit 7 dam, minimum flows would be measured at USGS gage no. 11365000 (PH-47).

Forest Service specifies that PG&E operate and maintain existing gages, under USGS supervision, that are needed to determine the river stage and minimum streamflow on the Lower McCloud River below McCloud dam, Pit River below Pit 7 dam, and Iron Canyon Creek below Iron Canyon dam. Forest Service also specifies the following: that

any modification of these gage facilities that may be necessary to measure the new minimum streamflow releases be completed within 3 years of issuance of the new license; that flows be documented in publicly available and readily accessible formats; that flow data at gage MC-1 be real-time data and posted on the California Data Exchange Center (CDEC) or its successor website; and that flow data be subject to quality assurance/quality control (QA/QC) review by PG&E before it is made available to USGS for review and publication on the internet. Forest Service further specifies that flow values (generally 15-minute recordings) used to construct the 24-hour average flows be made available to the resource agencies upon request.

In comments on the draft EIS, California Trout, Trout Unlimited, and Northern California Council, Federation of Fly Fishers recommended that real-time flow data from both MC-1 and MC-7 be made available on the internet; this would facilitate recreational user ability to monitor flow conditions that affect their respective recreational interests.

California Fish and Game filed a 10(j) recommendation that PG&E have only one McCloud dam compliance point at the upper gage nearest the dam (MC-7), instead of at the Ah-Di-Na gage (MC-1) below the confluence with Hawkins Creek. NMFS filed a concurring 10(j) recommendation, specifically stating that PG&E should move the McCloud dam compliance point either to McCloud dam or gage MC-7. This would allow accretion from Hawkins Creek 1 mile downstream to provide seasonal variability to the Lower McCloud River flow regime. The California Sportfishing Protection Alliance also supports moving the flow compliance point to just downstream of McCloud dam. In its modified condition 19, the Forest Service specifies that flows would be measured for compliance at both the Ah-Di-Na gage and either at gage MC-7 or directly at McCloud dam real-time flow data would be posted from gage MC-1 only.

Forest Service specifies the methodology that would be followed to determine the water year type that would guide the implementation of minimum flows. Forest Service specifies that PG&E use the forecast of unimpaired runoff of the McCloud River above Shasta Lake that is provided by the DWR Bulletin 120 report. Each month between January and April, PG&E would determine the water year type based on the Bulletin 120 water year forecast and would manage release rates in the minimum flow table for the month based on that forecast. The May forecast would be used to establish the final water year type for the remaining months of the water year. PG&E would implement minimum instream flows triggered by the water year within 2 business days of the actual publication date of Bulletin 120. PG&E alternately proposed that for Iron Canyon dam between February and May, given potential weather-related access difficulties, compliance with flow changes be implemented within five business days.

The Forest Service's original condition 19 specified that changes to minimum instream flows for Iron Canyon Creek below Iron Canyon dam be implemented within two business days of the actual publication date of DWR Bulletin 120. PG&E's alternative condition 19 proposes that flow changes in December and February through May be made within five business days of the actual publication of that month's DWR

Bulletin 120 or as soon as weather and site accessibility permit. Forest Service modified condition 19, filed on November 29, 2010, concurs with PG&E's alternative condition that minimum instream flow changes below Iron Canyon dam be made when weather and site accessibility permits but specifies that, if site access permits, flow changes be implemented within three business days of the actual publication date of that month's DWR Bulletin 120.

In its final license application, PG&E proposed methods to measure compliance with the proposed minimum flow releases at below McCloud dam and Iron Canyon dam. Under PG&E's proposal, flow would be measured instantaneously at 15-minute intervals, and mean daily flow would be the average of all instantaneous measurements collected over a 24-hour period. PG&E also proposes that all instantaneous measurements be within 90 percent of the target minimum flow. The method proposed by PG&E is consistent with the compliance protocol in the license for the Pit 3, 4, and 5 Project upstream of the McCloud-Pit Project developments on the Pit River.

Forest Service specifies and California Fish and Game recommends the same methods proposed by PG&E to measure compliance of flows below McCloud dam and Iron Canyon dam; however, Forest Service specifies and California Fish and Game recommends that the minimum instantaneous 15-minute streamflow shall be at least 80 percent of the prescribed mean daily flow for those minimum streamflows less than or equal to 10 cfs, and at least 90 percent of the prescribed mean daily flow for those minimum streamflows required to be greater than 10 cfs. In cases where the measured mean daily flow is less than the required mean daily flow but more than the instantaneous flow, PG&E would be required to release the equivalent under-released volume of water within 7 days of discovery of the under-release.

#### *Our Analysis*

The continued use of two compliance points for minimum flows at McCloud dam would ensure that adequate flows are provided in reaches directly below the dam and in the lower reaches that receive flow input from other tributaries to the Lower McCloud River.

Specifying the methodology for determining water year type would be an essential requirement for determining compliance with minimum flows under the new license, because it would aid PG&E in implementing the appropriate minimum flow release schedule and other measures that are dependent on water year. Water year types listed for Iron Canyon dam releases (wet, above normal, below normal, dry, and critically dry) correspond to the five runoff percent ranges (> 120 percent, 100-119 percent, 90-99 percent, 76-89 percent, and 0-75 percent) listed for McCloud River dam releases. We find that these ranges adequately capture the range of flow conditions and provide an appropriate mechanism and protocol to mimic a more natural hydrograph, capturing the late winter/spring snowmelt event(s). We also find that the most appropriate source of information to determine the water year type at both dams is the Lower McCloud River above Shasta Lake provided in Bulletin 120.

Funding the continued O&M of the USGS gages in each of the affected reaches, including any modifications that may be required to accurately measure minimum flows or ramping rates that are included in a new license, would help to ensure that these gages remain functional and can be used to effectively monitor compliance with flow-related measures included in the license.

Funding the operation of the gages also would help to ensure that flow data continues to be available to other water users in the basin and to the general public. Provision of flow data recorded at 15-minute intervals to the agencies upon request would help to verify compliance with any instantaneous flows and ramping rates that are included in the license. Flow data, following a QA/QC review, should be available to the public and accessible, including postings on the internet. Public availability of flow data recorded at both compliance locations (MC-1 and MC-7) on the Lower McCloud River would provide recreational and other water users with useful information on the conditions of project reaches and reservoirs as it pertains to their interests. The availability of real-time flow data at MC-7 would be valuable to whitewater enthusiasts given that the prime reach for whitewater boating considering accessibility (see section 3.3.5, *Recreation Resources*) would be between McCloud dam and Ah-Di-Na.

The methods to measure compliance with the proposed minimum flow releases proposed by PG&E are slightly different from the methods specified by Forest Service condition 19 and recommend by California Fish and Game; however, the two approaches appear to accomplish essentially the same goal. Both methods to measure flow compliance below McCloud dam allow the individual mean daily flows to be less than the required minimum streamflow but require the instantaneous, 15-minute streamflow to be at least 90 percent of the required minimum streamflow. PG&E proposes this same method to measure flow compliance below Iron Canyon dam, and it is consistent with the compliance protocol in the license for the Pit 3, 4, and 5 Project upstream of the McCloud-Pit Project developments on the Pit River. On the contrary, the Forest Service specifies and California Fish and Game recommends that instantaneous minimum flows below Iron Canyon dam be no less than 80 percent of the target when the target is less than 10 cfs. This method would provide more flexibility at Iron Canyon dam where target minimum flows for much of the year are less than 10 cfs. In addition, for minimum instream flow measurement at both McCloud dam and Iron Canyon dam, the Forest Service specifies and California Fish and Game recommends, that PG&E release an equivalent volume of water following periods of under-released flows. This requirement to compensate for under-released flows would assist PG&E in meeting minimum flow compliance at project reaches.

### **Water Quality Monitoring**

In its license application, PG&E proposed to prepare a water quality monitoring plan within 1 year after license issuance. PG&E would prepare the plan in consultation with the California Water Board, Forest Service, California Fish and Game, and other interested parties. The plan would include monitoring methodologies, survey rationale,

and water quality standards, as appropriate, for temperature, turbidity, and bacteria (total or fecal coliform), as well as a process and schedule for reporting survey and monitoring results.

In its original condition 20, the Forest Service specified content for the water quality and temperature monitoring plan for the project. Under the plan, the following would occur: periodic monitoring of all project reservoirs once every 5 years for contaminants; periodic monitoring of DO at McCloud, Pit 6, and Pit 7 reservoirs; annual monitoring (May-September) for 10 years, of potential water temperature effects to beneficial uses including recreation, aquatic habitats, and target species, as a result of modified instream flows and reservoir operations, with potential additional monitoring if temperatures above 20°C occur in reservoirs or downstream reaches; continuous turbidity monitoring in the Lower McCloud River (at MC-7 or MC-1) during the fishing season, as well as in Iron Canyon Creek (at MC-10) for at least 5 years after license issuance to ensure PG&E's repairs reduce sedimentation into the creek below the dam; and implementation of BMPs to satisfy Aquatic Conservation Strategy objectives within the Northwest Forest Planning Area.

PG&E alternative condition 20 proposed that the water quality and monitoring plan be filed within 2 years following issuance of license and appropriate consultation, and noted that routine maintenance and deployment of temperature and turbidity sensors may be delayed as a result of high flows or late snows during spring months. In addition, PG&E recommended that if turbidity and sedimentation in Iron Canyon Creek is reduced as a result of the erosion and sediment control measures during the first 5 years of monitoring and with the consent of the Forest Service, turbidity monitoring at this location would be terminated. Further, PG&E indicated that maintenance and installation of temperature sensors on private lands would be subject to landowner permission.

NMFS recommends that as soon as listed salmonids are documented as within the McCloud River and are affected by the project, PG&E should modify the project's structures or operations necessary to mitigate direct, indirect, or cumulative water temperature and quality impacts or enhance water temperature and quality conditions. According to the NMFS recommendation, these actions would include water temperature management to ensure the optimal survival and distribution of all life stages of anadromous listed salmonids within and downstream of the Commission-delineated physical project boundaries.

Forest Service condition 16 reserves the right for the Forest Service to modify its conditions to respond to any water quality certification issued for this project by the California Water Board.

In its November 29, 2010 filing, the Forest Service included modifications to condition 20. The provisions specified in Forest Service modified condition 20 are similar to those specified in the Forest Service's original condition 20, except that the Forest Service specifies that PG&E should produce the draft monitoring plan in consultation with the California Water Board, which is responsible for issuing the §401

water quality certification and compliance with water quality standards and designated uses. Under modified condition 20, the Forest Service would review and approve the final plan, which would then be submitted to the Commission. Additionally, the Forest Service specifies that temperature monitoring locations would be subject to permission to enter private lands and that if, before 5 years, PG&E proposes, and the Forest Service approves and other conditioning agencies agree, that erosion control repairs have effectively reduced sedimentation and turbidity below Iron Canyon dam, turbidity monitoring would no longer be necessary. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 20 and withdraws its alternative condition 20.

### *Our Analysis*

Development and implementation of the water quality and temperature monitoring plan would provide guidance and consistency for monitoring potential effects of project operations on water quality for the term of the license and ensure appropriate water quality conditions for aquatic biota. Monitoring temperature annually for a 10-year period would ensure that new project minimum flows and operations during all water-year types are not adversely affecting habitat conditions for aquatic species. Continuous monitoring of turbidity in the Lower McCloud River (at MC-7 or MC-1) during the fishing season and providing real-time data monitoring on the internet would be useful for determining the effects of mudflows from Mud Creek on the project waters and inform the public of such occurrences. The implementation of BMPs under the plan would also minimize potential effects to water quality from new construction or maintenance activities at the project and satisfy Aquatic Conservation Strategy objectives within the Northwest Forest Planning Area.

PG&E's proposed construction of the Pit 7 afterbay transmission line may result in soil erosion along inner gorge slopes, leading to increased sedimentation and turbidity in the Pit River. If this transmission line is constructed, a site-specific sediment and erosion control plan would be required to prevent increases in turbidity associated with construction. PG&E's plan to inventory erosion sites and implement erosion control measures at Iron Canyon reservoir and to monitor turbidity as specified by the Forest Service in Iron Canyon Creek for a minimum of 5 years would ensure that the erosion control practices are effective in reducing sedimentation in the Pit River. Allowing PG&E to cease turbidity monitoring below Iron Canyon dam following effective erosion control repairs within the first 5 years, and following approval by the Forest Service and other conditioning agencies, would allow monitoring to be adaptively managed.

Although measurements of fecal coliform or *E. coli* taken at McCloud or Iron Canyon reservoirs or McCloud River have not exceeded basin plan criterion, the periodic monitoring of all project reservoirs once every 5 years for *E. coli* and contaminants would serve to ensure proper water quality conditions for recreational users at the project. Periodic monitoring of DO at McCloud, Pit 6, and Pit 7 reservoirs for the term of the license would provide data for ongoing evaluation of habitat conditions for aquatic biota.

The Commission cannot require PG&E to access private land that is outside of the project boundary. PG&E would need to coordinate with private landowners to gain access to any private land outside of the project boundary, as proposed in PG&E alternative condition 20 and Forest Service modified condition 20. The number and location of monitoring points could be limited by access issues; however, involvement of the California Water Board in developing the monitoring plan and the Commission's authority to approve the final plan should provide adequate assurance that the monitoring program satisfies the program objectives.

In its final license application, PG&E proposed to develop and implement a water quality monitoring plan in consultation with agencies and stakeholders within 1 year of license issuance. The proposed water quality monitoring plan did not provide specific details associated with monitoring frequency, locations, or parameters. Development and implementation of the water quality monitoring plan specified by Forest Service modified condition 20 would ensure a consistent monitoring frequency and duration and provide specific locations and water quality parameters to be monitored for the term of the license.

The Lower McCloud River currently supports a thriving cold-water fishery. While different species possess differing optimal water quality and temperature conditions, current thermal conditions in the McCloud River are suitable to support salmonids, including listed anadromous salmonids. The Keswick and Shasta dams on the Sacramento River downstream of the McCloud dam are existing barriers to upstream passage of anadromous salmonids including Chinook salmon and steelhead. As part of the restoration plan for these listed species, studies are ongoing to assess the feasibility of alternatives to facilitate fish passage at these two structures and quality of available aquatic habitat in tributaries to Shasta Lake including the McCloud River. None of the listed anadromous salmonids would be expected to have access to habitat in the Lower McCloud River until upstream reintroduction of listed species is implemented through Shasta Lake. Therefore, at this time, the modification of project structures or operations to minimize or eliminate water temperature and quality conditions as recommended by NMFS would provide no benefit for listed species.

At this time it is not certain what effect the flow regime that would be part of the new license would have on water temperatures in this reach or on the cold water pool available below the thermocline in McCloud reservoir. The results of the water quality and temperature monitoring plan would provide data to evaluate water temperatures under the new flow regime and assess their compatibility with requirements of anadromous salmonid life stages. In addition, the habitat modeling performed by PG&E for the license application focused on habitat suitability for resident salmonids; data from this program and the Aquatic Biological Monitoring Plan (draft included in enclosure to the Forest Service modified conditions) would provide a basis for re-evaluating the models in terms of any potential reintroduction of listed anadromous salmonids.

## **Fish Entrainment at Project Tunnels and Intakes**

Entrainment of fish into hydroelectric intakes typically causes injury or mortality to a portion of the fish that are entrained, with mortality rates tending to be lower for smaller fish and higher for turbines that operate under a higher head, with higher rotational speeds, and with smaller passageways (Cook et al., 1997; Franke et al., 1997; Winchell et al., 2000). PG&E evaluated the potential for fish entrainment in its license application, and concluded that effects of the project on trout populations were likely to be minor, and did not propose any measures to reduce or mitigate for fish entrainment.

NMFS submitted comments on the final license application proposed action and action alternatives, stating that if listed salmonid species become established in the McCloud River and fish passage is prescribed over McCloud dam, then the powerhouse intakes would require appropriate screening.

### *Our Analysis*

PG&E developed and implemented a study in consultation with the agencies to assess the potential for entrainment losses to affect fish populations in the project area. The study included a tracking study, mark-recapture study, literature review, review of the likelihood of entrainment based on the physical characteristics of each intake, and assessment of fish populations upstream and downstream of each intake.

The results of PG&E's entrainment studies and literature review indicate that entrainment potential at the existing and proposed McCloud-Pit reservoir intakes is probably low because of generally slow maximum intake velocities compared to the swim burst rates of resident fish species, absence of obligatory migratory fish species, and low instances of interbasin fish movement. Although the fish stocking program proposed by PG&E and California Fish and Game is related to meeting recreational fishing demands, supplementation of wild fish would serve to augment fish populations in project reaches and offset the negligible effects of entrainment. PG&E and California Fish and Game could use population assessment data to guide the fish stocking program and ensure that the stocking effort is directed to reaches where it would provide the most benefit to trout populations.

The Keswick and Shasta dams on the Sacramento River downstream of the McCloud dam are existing barriers to upstream passage of anadromous salmonids including Chinook salmon and steelhead. As part of the restoration plan for these listed species, studies are ongoing to assess the feasibility of alternatives to facilitate fish passage at these two structures and the quality and availability of appropriate habitat in tributaries to Shasta Lake including the Lower McCloud River. None of the listed anadromous salmonids would be expected to have access to habitat in the Lower McCloud River until reintroduction of listed species is implemented through Shasta Lake. Therefore, the screening facilities recommended by NMFS would provide no benefit for listed species. At this time, the pilot study to introduce Chinook salmon into tributaries of Shasta Lake (RPA of the OCAP BiOp) in the timeframe of 2012 to 2015 could include

the Lower McCloud River. In its RPA for the OCAP BiOp, NMFS did not include re-introductions above McCloud dam, therefore the presence of listed-salmonids in the upper McCloud River is not imminent. PG&E's participation in the existing Interagency Fish Passage Steering Committee formed as part of the RPA of the OCAP BiOp would be beneficial in providing a mechanism for evaluating the need for the modification of project structures to reduce potential entrainment.

### **Fish Population Monitoring**

Monitoring of aquatic resources could provide a tool for assessing the success or identify appropriate modifications to either the new prescribed flow regimes or the Gravel and Sediment Management Plan. In its final license application, PG&E did not propose developing and implementing a fish population monitoring plan. Forest Service condition 27 specifies that, within 1 year after license acceptance, as a component of the Aquatic Biological Management Plan, PG&E develop a plan to monitor fish populations in project reaches, in consultation with the Forest Service, California Fish and Game, potentially affected tribes, and other interested parties.

The plan specified by the Forest Service would involve:

- Collection of data on population trends, age-class structure, and condition factors.
- A list of fish species to be monitored and use of same sampling methods established during relicensing surveys.
- Fish surveys would be conducted once every 3 years, or at frequency jointly agreed to by the agencies, potentially affected tribes, or other interested parties, for the first 9 years and then once every 5 years for the term of the license.
- PG&E would provide the results of fish monitoring to the agencies as a component of the aquatic biological monitoring technical report every 5 years. In addition to describing the results, the report would include a map (compatible with Forest Service geographic information system [GIS]) that includes baseline data from the licensing study plan surveys and updated data from periodic monitoring.

PG&E alternative condition 27 proposed the addition of a specific subsection entitled "fish populations" to the Aquatic Biological Management Plan specified by the Forest Service for clarity and specificity. In addition, PG&E indicated that fish population monitoring of project reservoirs was unnecessary since McCloud and Iron Canyon reservoirs are supported by trout stocking and there are no proposed changes to project operations in Pit 6 and Pit 7 reservoirs; furthermore, the final license application did not propose significant changes to reservoir operations and management that could reasonably be expected to affect reservoir populations. PG&E supported fish population monitoring in project streams as specified by Forest Service condition 27 with some minor changes to the methodology.

PG&E alternative condition 27 proposed that 1 year to develop the Aquatic Biological Management Plan following issuance of license, as specified by the Forest Service, would not provide adequate time to complete the plan. PG&E suggested that 2 years would be necessary to complete the plan and provided rationale for this determination based on the time required to receive license articles from the Commission; review, accept, and implement the license articles; procure a contractor; develop the draft plan; and schedule and complete relicensing participant meetings to review and finalize the plan. PG&E alternative condition 27 proposed a timeline for plan development of up to 16 months.

In its November 29, 2010 filing, the Forest Service included modifications to condition 27. The provisions specified in Forest Service modified condition 27 are similar to those specified in the Forest Service's original condition 27, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Aquatic Biological Monitoring Plan included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3). Specifically, the Forest Service specifies that fish population monitoring will be conducted only in the McCloud River, Iron Canyon Creek, and Pit 7 reservoir, rather than all project-affected streams and reservoirs, as specified in its original condition 27. Periodic fish monitoring would occur in Pit 7 reservoir once every 5 years. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 27 and withdraws its alternative condition 27.

#### *Our Analysis*

Monitoring fish populations would assist with determining the effects of any changes in operation or measures that are implemented in the new license to enhance resident fish populations, and for assessing whether any modifications or additional measures are needed. Potential changes to project operations under a new license could alter the existing flows and water quality characteristics of project streams and affect resident stream fish populations. Monitoring fish populations in project streams would help determine if changes to project operations under the new license are affecting fish populations. Because reservoir fish populations would likely be monitored as a component of plans to stock fish in project reservoirs, and no substantial changes to project reservoirs are expected as a result of the new license, additional monitoring of reservoir fishes under the Aquatic Biological Monitoring Plan would be redundant.

PG&E withdrew its alternative condition 27 in which it proposed 16 months for preparation of an approvable Aquatic Biological Management Plan. PG&E has worked collaboratively with the Forest Service on the draft Aquatic Biological Monitoring Plan included in Forest Service condition 27, and because it is substantially complete, we expect that 1 year should be adequate to complete the plan.

## **Benthic Macroinvertebrates**

The effects of project operations on sorting and distribution of stream substrate affects benthic habitat and could affect the benthic invertebrate community, an important source of forage for other aquatic biota including resident trout. Forest Service condition 27 specifies that, within 1 year after license acceptance, as a component of the Aquatic Biological Management Plan, PG&E monitor benthic macroinvertebrates in the Lower McCloud River and Iron Canyon Creek, in consultation with the Forest Service, potentially affected tribes, and other interested parties.

The monitoring specified by the Forest Service would involve:

- Collection of data on population robustness and heterogeneity, composition of functional feeding groups, and pollution tolerance and intolerance trends.
- Benthic macroinvertebrate sampling would be conducted once every 3 years during the first 9 years and then once every 5 years for the term of the license.
- PG&E may modify the number of sampling sites, site locations, and the frequency of monitoring, following consultation with the Forest Service, potentially affected tribes, and other interested parties.
- Ten percent of the benthic macroinvertebrate monitoring sites would be located within the first one and one-half miles of the Lower McCloud River below the McCloud dam.
- PG&E would provide the results of benthic macroinvertebrate sampling to the agencies as a component of the aquatic biological monitoring technical report every 5 years. In addition to describing the results, the report would include a map (compatible with Forest Service GIS) that includes base data from the study plan surveys and updated data from periodic monitoring.

PG&E alternative condition 27 proposed that periodic benthic macroinvertebrate sampling specified by Forest Service condition 27 should initiate following the “Commission’s acceptance of the monitoring plan” rather than following license issuance. PG&E also indicated that required consultation concerning modifications to sampling protocols should include only the Forest Service and other interested parties and that the number of sampling sites and site locations should be consistent with sites sampled during the relicensing studies on Forest Service lands. In addition, PG&E noted that sampling methods and data protocols used to monitor benthic macroinvertebrates should be the same as those used during the relicensing studies.

In its November 29, 2010 filing, the Forest Service included modifications to condition 27. The provisions specified in Forest Service modified condition 27 are similar to those specified in the Forest Service’s original condition 27, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Aquatic Biological Monitoring Plan included as an enclosure to the filing (Forest Service, 2010d,

Enclosure 3). In the draft plan, the Forest Service recommends monitoring of benthic macroinvertebrates in the Lower McCloud River and Iron Canyon Creek, calculating benthic community metrics using protocols identified in the Surface Water Ambient Monitoring Program, and comparing the results to baseline data collected in 2007 and 2008. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 27 and withdraws its alternative condition 27.

#### *Our Analysis*

Benthic macroinvertebrate monitoring would assist with determining the effectiveness of measures implemented in the new license for enhancing water quality, substrate characteristics, and resident fish populations, and for assessing whether any modifications or additional measures are needed.

Initiating the benthic macroinvertebrate monitoring component of the Aquatic Biological Monitoring Plan following Commission approval would provide adequate time to conduct sampling once every 3 years for the first 9 years (i.e., three annual surveys), and then every 5 years thereafter, as specified by the Forest Service.

Sampling benthic macroinvertebrates using the sampling methods and data protocols used during the relicensing studies would ensure the comparability of the methods and the data from the two programs, and would minimize biases associated with potential changes in sampling protocols. Sampling at site locations used during the relicensing studies would help in identifying changes, if any, to the benthic macroinvertebrate community following relicensing.

#### **Fish Passage and Restoration**

The design and condition of some culverts on reservoir tributaries at Forest Service roads could act as impediments to fish passage. In its original condition 27, the Forest Service specified that, within 1 year of license issuance, as a component of the Aquatic Biological Management and Monitoring Plan, PG&E develop specific management actions and schedule for providing fish passage and monitoring for affected reservoir streams, in consultation with the Forest Service, California Fish and Game, potentially affected tribes, and other interested parties.

These management actions specified by the Forest Service would include:

- Constructing or correcting fish passage structures on Deadlun, McGill, Cedar Salt Log, Little Gap, and Gap Creek on Iron Canyon reservoir and Tarantula Gulch and Battle Creek on McCloud reservoir.
- Maintaining the fish passage structures on an annual basis, if needed, concurrent with road condition surveys.
- Monitoring each stream reach every 3 years to determine fish passage structure effectiveness

- PG&E would provide the results of fish passage monitoring concurrently with aquatic monitoring reports.

PG&E alternative condition 27 proposed that roads impeding fish passage on tributaries to the project reservoirs are not project roads. However, PG&E did indicate that it would provide compensation to the Forest Service for fish passage maintenance as part of an off-license road agreement discussed in section 3.3.7, *Land Use and Aesthetic Resources*.

NMFS recommends that, as soon as listed salmonids are documented within the McCloud River and affected by the project, PG&E should, in consultation with the U.S. Bureau of Reclamation, NMFS, FWS, California Fish and Game, and the Commission, create and implement a Listed Salmonid Technical Integration Committee. According to the recommendation, the Listed Salmonid Technical Integration Committee would assess and mitigate the project's effects on listed salmonids. This committee could be integrated with the existing Interagency Fish Passage Steering Committee (or affiliated Technical Advisory Committees) to begin discussions of passage logistics at Shasta dam and habitat assessments that include studies of McCloud River historic anadromous salmonid habitats.

In its November 29, 2010 filing, the Forest Service included modifications to condition 27. The provisions specified in Forest Service modified condition 27 are similar to those specified in the Forest Service's original condition 27, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Aquatic Biological Monitoring Plan included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3). Specifically, Forest Service modified condition 27 specifies that fish passage condition monitoring will be conducted only at Gap Creek, Deadlun Creek, and Cedar Salt Log Creek road crossing around Iron Canyon reservoir, rather than construction, repair, maintenance, and monitoring of fish passage structures as specified in the Forest Service's original condition 27. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 27 and withdraws its alternative condition 27.

#### *Our Analysis*

PG&E conducted a survey of fish passage conditions within the inundation zone of the project reservoirs in October 2007 and found no impediments to fish passage; however, in the final license application, PG&E noted that upstream fish impediments may exist at road crossings along FR 37N78 upstream of the influence of reservoir fluctuations. The Forest Service owns and maintains the roads that may block fish passage to project reaches. The Forest Service roads span the project reaches with the use of culverts and bridges which may restrict flow and entrain large debris resulting in project reaches becoming impassable to some fish. Monitoring fish passage at Gap Creek, Deadlun Creek, and Cedar Salt Log Creek road crossing around Iron Canyon reservoir, and reporting the results to the Forest Service, would help identify and reduce impediments to fish passage during spawning migrations.

The Keswick and Shasta dams on the Sacramento River downstream of the McCloud dam are existing barriers to upstream passage of anadromous salmonids including Chinook salmon and steelhead. As part of the restoration plan (RPA of the OCAP BiOp) for these listed species, studies are ongoing to assess the feasibility of alternatives to facilitate fish passage at these two structures and the quality and availability of appropriate habitat in tributaries to Shasta Lake including the Lower McCloud River. None of the listed anadromous salmonids would be expected to have access to habitat in the Lower McCloud River until reintroduction of listed species is implemented through Shasta Lake. Currently, no anadromous salmonids have been documented within project reaches because of the existing barriers to upstream passage; therefore, at this time, NMFS's recommendation for PG&E to create a Listed Salmonid Technical Integration Committee to assess and mitigate the project's effects on listed salmonids would provide no direct benefit to listed salmonids. However, to avoid the possibility of the take of any listed species, it would be beneficial for PG&E to maintain awareness of the ongoing feasibility studies and the status of the potential re-introduction of listed anadromous species in the vicinity of the project. Therefore, we recommend that PG&E file an annual report with the Commission that details the status of listed anadromous species in the project vicinity. When the presence of listed anadromous fish in the project area is deemed imminent, this plan should provide an assessment of any project O&M measures that would have the potential to contribute to the take of any listed species. These annual reports, in combination with the implementation of various proposed monitoring programs for aquatic habitat, biota, and water quality parameters would provide a mechanism to allow for the various management programs to adapt to changing conditions in the project area, including new the more natural hydrograph and increased minimum flows and the introduction of new species of concern, such as listed anadromous salmonids.

### **Special Status Aquatic Mollusks**

During the relicensing studies, PG&E identified one special status aquatic mollusk (California floater) in Pit 6 and Pit 7 reservoirs. In addition, PG&E identified nugget pebblesnail inhabiting the Lower McCloud River, outside of the project boundary. In its original condition 27, the Forest Service specified that, within 1 year of license issuance, as a component of the Aquatic Biological Management Plan, PG&E monitor special status aquatic mollusks.

The monitoring specified by the Forest Service would involve:

- Monitoring population trends and changes in distribution of the California floater, nugget pebblesnail, scalloped juga, and montane peaclam.
- Special status aquatic mollusk monitoring would occur once every 3 years (or for a period determined by the Forest Service that is consistent with other monitoring requirements) during the first 9 years and once every 5 years for the term of the license.

PG&E alternative condition 27 disagreed with the Forest Service language and recommended that periodic monitoring may be conducted “for a period determined by the Forest Service to be sufficient that is consistent with other monitoring requirements.” In addition, PG&E recommended that periodic monitoring would begin in the third year after plan approval by the Commission. PG&E also recommended that sampling sites, locations, methods, and data protocols used to monitor special status aquatic mollusks should be the same as those used during the relicensing studies.

In its November 29, 2010, filing, the Forest Service included modifications to condition 27. The provisions specified in Forest Service modified condition 27 are similar to those specified the Forest Service’s original condition 27, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Aquatic Biological Monitoring Plan included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3). Forest Service modified condition 27 specifies that monitoring of aquatic special status species should also include northwestern pond turtles and foothill yellow-legged frog within project waters. Although the northwestern pond turtle and foothill yellow-legged frog have been moved from the Terrestrial Biological Management Plan to the Aquatic Biological Management Plan, the monitoring component for these species is discussed in section 3.3.3.2.2, *Wildlife, Special Status Wildlife Species*.

In the draft Aquatic Biological Monitoring Plan, the Forest Service recommends monitoring of special status aquatic mollusks in areas of potentially suitable habitat and known occupied sites within all project-affected waters. New surveys of potentially suitable habitat for special status aquatic mollusks would be conducted within 1 year following license acceptance, and then once every 10 years thereafter. Suitable habitat where special status aquatic mollusks were identified in previous surveys would be surveyed once every 10 years, beginning 5 years after the initial survey. Additionally, surveys of special status aquatic mollusks would be conducted prior to any construction within potentially suitable habitat areas. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 27 and withdraws its alternative condition 27.

#### *Our Analysis*

PG&E alternative condition 27 did not provide rationale for PG&E’s disagreement with the Forest Service’s specification to conduct monitoring for a period determined by the Forest Service. Because all other components of the Aquatic Biological Management Plan follow similar monitoring periods, it is assumed that the Forest Service may alter monitoring periods based on the results and the potential for inclusion of new species that might be found in the project area. The draft Aquatic Biological Monitoring Plan provided as an enclosure to Forest Service modified condition 27 recommends a schedule for monitoring surveys of aquatic mollusks that were previously identified, new surveys of potentially suitable habitat areas, and surveys of suitable habitat areas prior to any construction activities. The sampling frequency specified in Forest Service modified condition 27 would ensure consistency with other monitoring requirements under the

plan and would be sufficient to determine population trends and changes in distribution associated with conditions (e.g., water temperature, sedimentation rates) in project reaches during the term of the new license.

Monitoring special status aquatic mollusks using the standardized methods and data protocols used during the relicensing studies would ensure the comparability of the data from the two periods and projects without potential biases associated with any changes in sampling protocols. Surveying at site locations used during the relicensing studies would help identify changes, if any, to special status aquatic mollusks following relicensing. Additionally, new surveys of potentially suitable habitat areas within project-affected waters or construction areas would help detect any unknown populations of special status aquatic mollusks within project waters and help to minimize potential impacts of the project that were not realized from previous surveys.

The monitoring of special status aquatic mussels and the results from the monitoring program would provide periodic information to evaluate the condition of populations and the benefits to aquatic mollusks from improvements to water quality and quantity.

### **3.3.2.3 Cumulative Effects**

The development of hydroelectric projects on the Pit River, including the McCloud-Pit and Pit 3, 4, 5 Projects, has had cumulative effects on water resources and fisheries resources. These projects resulted in the conversion of a historically free-flowing river into a water body consisting of alternating flowing stream reaches and impoundments. This alteration to the Pit River has resulted in changes to aquatic habitat, water quality characteristics including DO and temperature, erosion and distribution of sediment including coarse gravel, distribution of LWD, depth regimes, and water velocities.

The presence and operation of the McCloud-Pit Project contributes to cumulative effects on water resources and fisheries resources within the McCloud and Pit River basins. Project effects on water temperatures are the result of interbasin water transfer from the McCloud reservoir to the Pit River watershed via the James B. Black powerhouse. Although ambient water temperatures on the Pit River above the James B. Black powerhouse ranged from 12 to 22°C from June through September, water entering through James B. Black powerhouse was cooler, with temperatures below Pit 6 powerhouse less than 19°C. However, during periods when cooler water inputs occur, there have been no observed effects to the native transition zone fish species in these reaches. The lack of observable effects is likely the result of the tolerance of transition zone fish to a wide range of temperatures. Therefore, the waters of the Pit River combined with inputs from the McCloud River basin seem to be capable of supporting both transition zone and coldwater fish species, and the cumulative effects of temperature changes on fish populations are insubstantial.

PG&E impoundments and tunnels also modify the duration, distribution, and dissipation of natural mudflows from Mud Creek through the Lower McCloud watershed and support interbasin transfer of material from these events which contributes to occasional cumulative increases of turbidity in the Pit River watershed. However, of two significant turbidity events associated with Mud Creek in 2008, only one was detected in the Pit River at about 1 NTU above ambient conditions, which did not exceed the basin plan numerical criteria for turbidity. Continued monitoring of turbidity levels in Iron Canyon Creek and the Pit River following future mud flow events would help to determine cumulative effects, if any, on the Pit River watershed resulting from the project.

The Lower McCloud River and Iron Canyon Creek support self-sustaining populations of rainbow trout, with the McCloud River highly regarded as a productive sport fishery. Operation of the project in accordance with the various proposed, recommended, and specified flow regimes may improve the production, growth, and condition of trout by providing more optimal flow-habitat during growth and spawning seasons.

Bull trout, at the southern extent of its range, was historically an important part of the aquatic community of the McCloud River. The extirpation of this species from the watershed is postulated to have been the cumulative effect of a number of factors including, but not limited to, loss of juvenile Chinook salmon, an important forage for bull trout, excessive fishing pressure in McCloud reservoir, competition from other managed game species (rainbow and brown trout), and reduction of habitat associated with construction of McCloud dam. Efforts by California Fish and Game in the 1970s to restore the species through stocking were unsuccessful. Restoration is not currently a primary management goal of the agency and no recommendations have been proposed specifically to support restoration of this species.

The McCloud and Pit River watersheds historically provided habitat for several listed species, including Chinook salmon and steelhead. Although the project dams act as barriers to upstream migration, construction of the Bureau of Reclamation's Shasta and Keswick projects downstream on the Sacramento River prevent access for these species to the upper Sacramento River and its tributaries, including the McCloud and Pit Rivers and their tributaries. As part of restoration plans for these species, studies are ongoing to evaluate options that would provide passage at the Keswick and Shasta projects.

Issued to the Bureau of Reclamation on June 4, 2009, the OCAP BiOp (NMFS, 2009a), provides NMFS's review of the proposed long-term operations of the Central Valley Project and State Water Project in California, and designated and proposed critical habitats, in accordance with section 7 of the ESA. As part of the RPA for the OCAP BiOp, studies are to be implemented to assess the feasibility to facilitate fish passage over Keswick and Shasta dams on the Sacramento River downstream of McCloud dam. In October 2009, NMFS issued the Public Draft Recovery Plan (NMFS, 2009b). This Public Draft Recovery Plan identified the McCloud River as a "high" priority habitat for

supporting spawning populations of these listed salmonids and provided that, as part of the recovery strategy, habitat evaluations and feasibility studies including fish passage logistics be implemented to support re-introduction efforts in habitat above Shasta dam. The RPA for the OCAP BiOp adopted this action.

An Interagency Fish Passage Steering Committee was created by the OCAP BiOp to oversee planning and implementation of the salmon reintroduction program. As part of the RPA for the OCAP BiOp, studies are to be implemented to assess the feasibility to facilitate fish passage over Keswick and Shasta dams on the Sacramento River downstream of McCloud dam. Feasibility studies to assess the suitability and functionality of existing or potential habitat for spawning and rearing of listed salmonids were expected to begin in January 2010 and continue through January 2012. Based on the results of the feasibility studies, a pilot program could be implemented to re-introduce listed anadromous species to habitat above Shasta and Keswick dams beginning in March 2012. Implementation of the pilot program could result in the future presence of listed salmonids in the Lower McCloud River and waters of the McCloud-Pit Project below McCloud dam as early as 2012. If this pilot-program proves successful, a long-term anadromous fish passage program could be implemented by January 31, 2020. Such a long-term program would include structural and operational modifications to dams to provide both upstream and downstream fish passage.

We note that there are uncertainties regarding the viability and implementation of reintroduction program set forth by the OCAP BiOp. In October 2010, the Interagency Fish Passage Steering Committee's Annual Report of Activities<sup>12</sup> indicated that the Bureau of Reclamation requested, but has not received funding for fiscal year 2012 and does not have dedicated fiscal year 2011 funding for the Fish Passage Program. The program is currently subsisting by requesting that partner agencies "...provide what support they are able to provide within existing budgets and staffing." In a letter filed January 18, 2010, PG&E reiterated that the Public Draft Recovery Plan has yet to be signed by the Secretary of Commerce, and therefore, has no legal effect. PG&E also indicated that on March 5, 2010, a United States District Court judge ruled that Bureau of Reclamation's adoption of and NMFS and Bureau of Reclamation's implementation of the OCAP BiOp RPA violated NEPA, since the agencies failed to conduct the required NEPA analysis before acting. PG&E suggests that any future implementation of the OCAP BiOp will require NEPA analysis

While the ultimate reintroduction of listed anadromous salmonids to the project area is uncertain, we discuss this issue further in section 5.2, *Comprehensive Development*, and make a recommendation regarding PG&E's role in future efforts concerning the reintroduction of anadromous salmonids.

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<sup>12</sup> Filed in the public record on January 25, 2011.

### **3.3.3 Terrestrial Resources**

#### **3.3.3.1 Affected Environment**

##### **3.3.3.1.1 Vegetation**

To provide baseline information on vegetation communities in the project area, PG&E conducted vegetation mapping efforts to characterize and quantify all existing vegetation types within 0.5 mile of the project boundary. Elevations in the study area range between 1,100 and 3,500 feet msl, with moderate to very steep terrain.

The project area includes a variety of upland vegetation types typical of mid-elevation forests and valleys found in the southeastern Klamath Mountains and southern Cascade regions, and is dominated by Douglas fir, Douglas fir-ponderosa pine, mixed conifer and canyon live oak plant communities that together comprise about 84 percent of the upland vegetation cover within the project area. Douglas fir-ponderosa pine is the most common vegetation type within the project area and generally occurs throughout all portions of the area. Associated understory species for the most common upland vegetation communities include small specimens of canopy species as well as shrubs and vine species. Groundcover varies from sparse to moderate for these communities and is characterized by various species of grasses and forbs.

Vegetation mapping within the proposed new construction and transmission line corridors identified a total of 17 vegetation series, three other vegetation types and three non-vegetated features. The non-vegetated features included the McCloud Cemetery, McCloud Golf Course, and paved roads. Together these three features encompassed about 159 acres (2 percent). As identified within the existing project area, uplands were primarily determined to be mixed conifer vegetation series (32 percent), ponderosa pine (31 percent), Douglas fir (6 percent) and Douglas fir-ponderosa pine (5 percent). The community of McCloud is represented by urban land (10 percent). Mixed willow riparian vegetation community and California annual grasslands were also relatively common (3 and 2 percent, respectively).

Other habitats encountered that are not defined by vegetation included littoral, riverine, lacustrine, and barren areas. Littoral habitats within the study area consist of the reservoir fluctuation zones surrounding lacustrine habitats. Most of these areas are devoid of vegetation, particularly around the steep shoreline of the McCloud reservoir. Portions of the littoral zone do support vegetation during draw-down periods, including various woody and herbaceous riparian and upland species such as cheat grass, intermediate wheatgrass, and prickly lettuce. Littoral habitats surrounding the more gradual slopes adjacent to Iron Canyon reservoir are characterized by denser vegetation, and in general, included a large number of weed species such as yellow star-thistle, Himalayan blackberry, Kentucky bluegrass, and woolly mullein. Over the project area, about 34 acres of littoral habitats were mapped.

Riverine habitat areas consisting of non-vegetated open water occur along the free-flowing portions of the Pit and McCloud Rivers. These areas are highly variable and

range between moderate, low gradient, and steep, moderate gradient stream reaches in moderate to well confined stream channels. About 240 riverine acres were mapped.

Lacustrine habitats within existing facilities are open water areas including areas inundated by the two project reservoirs as well as the Pit 6 and Pit 7 reservoirs, and Pit 7 afterbay. A total of about 1,056 acres of lacustrine habitat were mapped within existing facilities. A pond at the McCloud sewer treatment facility east of Squaw Creek Valley Road is within the proposed transmission line corridor and is about 11 acres.

Barren areas consist mainly of non-vegetated, man-made features scattered throughout the study area, such as fill slopes and old construction sites, non-vegetated landings resulting from previous logging operations, and naturally occurring rock outcrop and/or talus slope features. About 15 acres of barren areas were mapped in the project area; 22 acres were mapped along the proposed McCloud transmission line route.

### **Riparian and Wetland Vegetation**

Wetland and riparian habitats are dependent on particular hydrologic regimes and are, therefore, considered particularly sensitive to potential project effects. Historical photo analysis was conducted for the Lower McCloud River from McCloud dam downstream to Shasta Lake to analyze longitudinal changes in riparian vegetation distribution over time. Historical aerial photographs from the Forest Service were compared with PG&E's 2006 aerial photographs. Photographs of selected stream reaches were available for the years 1944, 1952, and 1970 (the project was constructed in 1965). Significant changes in the longitudinal and cross-sectional extent of riparian vegetation due to project-related flow alterations were not detected during this analysis.

In addition to reviewing aerial photographs, vegetation mapping identified about 493 acres of riparian habitat and less than one acre of wetland habitat within the project area; more than 631 acres of wetland habitat were identified along the proposed McCloud transmission line corridor due to the relatively low gradient, broad meadow features within the corridor. Spikerush vegetation series accounted for 85 percent (540 acres) of wetland vegetation. Overall, 121 vascular plant species, 10 vegetation series, and 18 provisional plant associations were identified in the riparian zone of the Lower McCloud River.

The riparian zone of the Lower McCloud River, as defined by the presence of riparian vegetation, is generally less than 75 feet wide because of the steep nature of the surrounding valley walls that form a confined channel. White alder vegetation type was the most common riparian plant community (65 percent of riparian cover) and occurred along most of the drainages within the project area as narrow to moderately wide bands of vegetation within and along the margins of river, stream, and other drainages. Mixed willow and big-leaf maple vegetation communities were also common and together comprised an additional 30 percent of riparian vegetation. Riparian habitat ground layer was characterized as open to dense in cover and dominated by rushes, sedges, forbs and

grasses. Spikerush, sedges, cattail, bulrush, were species indicative of wetlands within the project area.

Riparian studies in 2007 identified a gap in the age class distribution of white alder resulting from flooding in 1997, the largest annual peak flow in the 45-year record. The 1997 flood mobilized the channel bed and the resulting scouring action removed the existing riparian vegetation. Since then, no other bed-mobilizing flood events have occurred. Young white alder trees and other riparian vegetation have colonized the lower bank elevations of the Lower McCloud River and expanded laterally into the Lower McCloud River channel. Alterations in riparian vegetation structure were evident on gravel bar and split channel features in river reaches through Nature Conservancy and McCloud River Club owned lands upstream of the Squaw Valley confluence. Results of the aerial photograph interpretation of riparian vegetation determined that no distinct difference in vegetation character or longitudinal extent of riparian vegetation was apparent along the Lower McCloud River. Some areas of localized changes in density, height, and age of riparian vegetation have occurred within the active channel. Long-term shifts in species composition of riparian vegetation on mid-channel gravel and cobble bars versus along the channel banks were not evident during the study.

### **Noxious Weeds**

Botanical surveys for invasive plant species were conducted within the project area and included land adjacent to project facilities, designated and dispersed recreation sites, and proposed infrastructure construction areas and their associated buffers. In addition, incidental information on targeted invasive plant species located along cross sections of the Lower McCloud riparian corridor between McCloud dam and Squaw Valley Creek is included; this information was collected as part of the riparian vegetation study.

In order to differentiate the level of survey effort necessary for each species, this combined target list of species was divided into high, medium, and low priority species based on their abundance in mapped areas. As a result, 16 high-priority, 9 medium-priority, and 40 low-priority targeted, terrestrial invasive plant species were observed, for a total of 65 species. No invasive aquatic weed species were observed. Of all the targeted, high-priority invasive plant species that were surveyed, four species were particularly pervasive: yellow star-thistle, bull thistle, Himalayan blackberry, and spreading hedge-parsley. The most ubiquitous low-priority species were hedgehog dogtail and common St. Johnswort. Existing roads and transmission lines were heavily infested with noxious weeds due to the disturbed soils and maintenance activities. Reservoir shorelines also have high levels of infestation due to fluctuating water levels that allow noxious weeds to invade. New plants can become established as a result of water-borne seed transport, or seeds may be present within the soil bank of the shoreline and new plants can colonize newly emerging shorelines as water levels recede. Recreational activities such as boating can also break off portions of plants that can propagate.

Black locust, an invasive tree, occurs in the upland and riparian areas along the Lower McCloud River. The origination of black locust is in a former homestead in the Ah-Di-Na area, and the species' occurrence is concentrated at Ah-Di-Na though it is dispersed throughout the Lower McCloud River. No black locust was found at the most upstream or the most downstream study sites. The species prefers habitat of coarse-grained sediment in areas of infrequent inundation.

### **Special Status and Special Interest Plant, Lichen, and Fungi Species**

Consultation with agencies and a literature review were used to develop a list of special status plant, lichen, and fungi species with the potential to occur in the project area. Field botanical surveys were conducted to determine if populations of the listed species were present in the project area. A total of eight special status vascular plant species were located during the surveys. No special status lichen or fungi species were documented in the study area.

Shasta eupatorium is a perennial shrub in the sunflower family and endemic to Shasta County. It occurs from 1,300 to 5,900 feet msl in chaparral and lower montane coniferous forest with rocky carbonate soils or on limestone cliffs. One small patch of about five plants was found growing on a bank of exposed bedrock at a dispersed recreation site adjacent to the Lower McCloud River.

Butte County morning glory is a perennial, rhizomatous herb in the morning glory family endemic to California and found in the High Cascade Range, Klamath Range, and San Francisco Bay Area, as well as in Butte, Contra Costa, Del Norte, Mendocino, Shasta, and Tehama Counties. The Butte County morning glory prefers dry rocky soils and occurs from 1,900 to 5,000 feet msl in chaparral, open areas of lower montane coniferous forests and occasionally along roadsides. It blooms from May to July. Five populations of Butte County morning glory were found in the study area. One population was located in a shady location along Pit 6 Road, in lower montane coniferous forest flats; a second population was located along the Pit 6 transmission line, and the remaining three populations were all observed along the existing Pit 7 transmission line.

Northern clarkia is an annual herb in the primrose family and is endemic to California (Shasta and Trinity counties) growing from 1,300 to 4,400 feet msl in chaparral, cismontane (west of the Sierra Nevada) and foothill woodlands, as well as lower montane coniferous forest. The blooming period is June to September. A total of 20 northern clarkia populations were found throughout the study area: 16 populations along Oak Mountain Road, two along Pit 6 Road, and two along the Pit 6 transmission line.

Butte County fritillary is found only in Tehama, Butte, and Shasta Counties in the Cascade Range from 160 to 4,900 feet msl. A perennial herb in the lily family, Butte County fritillary and is conspicuous between March and June on dry benches and slopes, generally in chaparral, cismontane woodland, and in openings in lower montane coniferous forest. Six populations of Butte County fritillary were found within the

proposed Pit 7 afterbay powerhouse and proposed access road to Pit 7 afterbay powerhouse areas.

Howell's lewisia is a perennial herb in the purslane family distributed from Idaho through Oregon to Northern California. Specifically in California it is found in Shasta, Del Norte, Trinity, Humboldt, and Siskiyou Counties. It blooms from April to July on rock outcrops and canyon walls in broadleaf upland forest, chaparral, cismontane woodland, and lower montane coniferous forest at elevations ranging from 490 to 6,600 feet msl. One population of Howell's lewisia was found at a Lower McCloud River recreation site, and a second population was found at a recreation site between McCloud dam and Hawkins tunnel.

English peak greenbriar is a perennial, herbaceous vine endemic to California and is found in the Cascade and Klamath ranges, as well as Del Norte, Shasta, Siskiyou, and Trinity Counties, typically at elevations of 1,900 to 8,000 feet msl. It occurs primarily in association with alder thickets marshes and swamps, lake margins, stream banks including lake margins and stream banks within, lower montane and montane coniferous forest and deciduous forests. It blooms from May to July or August. Five populations of English peak greenbriar were documented along the Iron Canyon reservoir road.

Long-fruit jewel flower is a short-lived perennial herb in the mustard family endemic to California and more specifically to Butte, Shasta, and Tehama Counties. Recently described by Clifton and Buck (2007), long fruit jewel flower is limited to the eastern side of the Klamath Range at the southern edge of the Cascade Range and the western side of the northernmost Sierra Nevada Mountains. It occurs at elevations from 2,350 to 5,000 feet msl and blooms from April to September throughout cismontane woodlands and lower coniferous forest openings with a variety of soil types, often in disturbed areas. Three populations of this newly described species were documented: two populations along Oak Mountain Road and one population along the Pit 6 road.

Slender false lupine occurs in the Klamath and North Coast ranges in California north through Oregon, specifically in Del Norte, Humboldt, Shasta, Siskiyou, and Trinity Counties. It is found at elevations ranging from 300 to 4,500 feet msl in open, often dry sites (sometimes roadsides), including chaparral, cismontane woodland, lower montane coniferous forest, meadows and seeps, and north coast coniferous forest. An herb in the pea family, it blooms from March to July. Six populations of slender false lupine were located across the study area, one along Pit 7 afterbay road, two along Oak Mountain Road, and three populations along the proposed route for the Pit 7 afterbay transmission line.

Special interest plants include native plant populations suitable for revegetation source material; culturally significant plant species, as defined by the Tribes; and elderberry (*Sambucus mexicana*) plants suitable for supporting the federally threatened VELB, section 3.3.4, *Threatened and Endangered Species*.

A confidential list of culturally significant plants, including a threshold abundance criterion for each species, was developed in consultation with the Tribes during a series of meetings in early 2007. The list and survey results related to culturally significant plants was presented directly to the Tribes as a confidential report attachment and is also confidential. A total of 95 populations, containing 32 species of culturally significant species were located during the survey.

Elderberry is a large, deciduous, perennial shrub or small tree in the honeysuckle family. It typically occurs along stream banks and forest openings below 9,840 feet msl within a variety of habitats including chaparral, foothill woodland, red fir forest, riparian forest and woodland, and yellow pine forest throughout California. Fifteen populations of elderberry were documented in the McCloud reservoir, McCloud tunnel, Iron Canyon reservoir, Iron Canyon tunnel, Oak Mountain Road, and Pit 7 afterbay areas. Most of the populations were sparse, with between one and 10 individuals; however, two populations contained between 11 and 50 individuals and one population had more than 100. Aside from abundance, percent cover, and patch size, no additional VELB habitat-specific information (i.e., number of stems greater than or equal to 1-inch diameter at ground level and the presence or absence of VELB exit holes) was recorded for the elderberry population.

### **3.3.3.1.2 Wildlife**

#### **General Wildlife**

As a result of the diverse vegetation community structure within the project area, wildlife resources are also diverse and include common, resident, and migratory species. Invertebrates, amphibians, reptiles, birds, small and large mammals, game species, and special status species are represented. Wildlife resources were assessed using methodologies that included literature review, agency consultation, and field surveys. Unless otherwise noted, information for this section was derived from the license application and technical memos resulting from specific surveys and provided in the license application (PG&E, 2009a).

Sierran mixed conifer forest is the most common forest type in the project area, and provides habitat for small mammals such as chipmunks, western gray squirrel, deer mouse, and bats. Larger mammals typically found in Sierran mixed conifer forest include gray fox, black bear, and mule deer. Dead trees (snags) and large trees provide nesting sites for predatory birds (raptors) such as red-tailed hawks. Other species of birds typically found in this vegetation community include dark-eyed junco, mountain chickadee, Steller's jay, western wood-pewee, and northern flicker. Western fence lizard may also occur on the forest floor.

Montane hardwood is the second most frequent wildlife habitat type in the project vicinity. This woodland vegetation provides habitat for many species that are reliant on acorns as food. Many bird species such as western scrub jay, evening grosbeak, acorn woodpecker, white-breasted nuthatch, and Hutton's vireo utilize this habitat type (Forest

Service, 1995). Western gray squirrel, California ground squirrel, and chipmunks also rely on acorns. All of these species inadvertently distribute acorns and, as a result, enhance the growth of oaks in the community. This vegetation community also provides habitat for raptors including owls and hawks.

Similar to Sierran mixed conifer forest, ponderosa pine forest provides habitat for raptors including red-tailed hawk and small mammals such as western gray squirrel. Other species that may use this vegetation community include mountain quail, western scrub jay, and deer.

Blue oak-foothill pine woodlands are found between lower elevation grasslands and the lower montane mixed coniferous forest and, consequently, generally share species with adjacent vegetation communities resulting in a high diversity of wildlife species.

Mixed chaparral occurs adjacent to the previously described blue oak woodlands. Wildlife using chaparral habitat is varied and may include deer, bushtit, green-tailed towhee, wrentit, and mountain lion (Forest Service, 1995).

Many species depend upon riparian, wetland, or littoral habitat including beaver, muskrat, long-tailed weasel, American mink, California red-legged frog, black salamander, yellow warbler, willow flycatcher, and Pacific fisher. Freshwater emergent wetlands are used by aquatic and semi-aquatic species of wildlife including tailed frogs, northwestern pond turtle, bald eagle, river otter, water shrew, ducks, geese, and shorebirds (Forest Service, 1995).

Generally terrestrial wildlife species within the project area use the open water associated with the creeks and forebays of the project as foraging habitat and water source. The open water also provides resting and foraging habitat for aquatic bird species (grebes, waterfowl, wading birds, shorebirds, gulls, and terns) and aerial insect foragers such as swifts, swallows, flycatchers, and bats. Fish-eating species such as osprey, bald eagle, and belted kingfisher are also found. Many common mammals use open water as a source of drinking water, and raccoons forage for prey along the shoreline.

The developed/disturbed urban habitat surrounding the development facilities attracts species that are tolerant of human activity and have adapted to maintained vegetation (lawns and landscaped areas). Typical species include rock pigeons, western scrub jay, northern mockingbird, house finch, house sparrow, opossum, raccoon, and striped skunk.

A wide variety of game species occur within a variety of wildlife habitats in the project area including game birds such as band-tailed pigeons, blue grouse, mountain quail, mourning dove, ruffed grouse, wild turkey, California quail, ducks, and geese. Mammal species that are hunted include black bear, elk, mule deer, wild boar, gray squirrel, Douglas squirrel, hares, rabbits, bobcat, beaver, coyote, and gray fox (Forest Service, 1995). Amphibian and reptile surveys located ensatina, black salamander,

western fence lizard, western skink, ringneck snake, and western rattlesnake in the project area.

Bat species detected by acoustic and capture surveys in the project area, including existing and proposed infrastructure areas, include Mexican free-tailed bat, big brown bat, silver-haired bat, hoary bat, California myotis, long-eared myotis, fringed myotis, Yuma myotis, and western pipistrelle. Five other species were detected (pallid bat, Townsend's big-eared bat, spotted bat, western red bat, and western mastiff bat) and are discussed in the special status wildlife section below. Yuma myotis was the most abundant species captured during surveys, and was captured at the highest number of sites; this species was also detected at every acoustic survey site.

Survey results identified roost sites in the project area and include power-generation and dam structures, siphons, campground structures, overflow spillways, and a natural limestone cave complex on the west shore of McCloud reservoir. Two structures were confirmed to support day roosts for maternity colonies: James B. Black powerhouse and McCloud intake. Willow Creek siphon is also likely a maternity colony. These sites are critical to bats during the reproductive season, generally spring to fall. Winter hibernacula surveys were conducted at McCloud reservoir intake, McCloud dam diversion/outlet tunnel, Ah-Di-Na campground old cellar building, and Iron Canyon reservoir overflow spillway, but no evidence of hibernacula was observed.

### **Special Status Wildlife Species**

Special status wildlife species include species that may be protected by the state of California as endangered or threatened, California species of concern, California fully protected species, species identified as watchlist species by California Fish and Game, and other species identified as special animals by California Fish and Game. Also included are Forest Service Region 5 species of concern. Federally listed rare, threatened, or endangered species; candidate species for listing; and any applicable designated critical habitat for a listed species are discussed in section 3.3.4, *Threatened and Endangered Species*.

Based on discussions with California Fish and Game and FWS, PG&E developed a list of special status wildlife species that are known to occur or have the potential to occur where suitable habitat exists in the project area: VELB; bald eagle; golden eagle; northern goshawk; peregrine falcon; Northern spotted owl; willow flycatcher; bank swallow; greater sandhill crane; American marten; Pacific fisher; Sierra Nevada red fox; California wolverine; ringtail; pallid bat; spotted bat; Townsend's big-eared bat; western red bat; western mastiff bat; Shasta salamander; tailed frog; foothill yellow-legged frog; northwestern pond turtle; and 10 species of terrestrial mollusks, six of which are considered Forest Service special status species. As federal-listed species, VELB, northern spotted owl, Pacific fisher, and California red-legged frog are addressed in section 3.3.4, *Threatened and Endangered Species*.

Other species considered but eliminated from further discussion include: great gray owl, California spotted owl, bank swallow, southern torrent salamander and Cascades frog. Great gray owls are not discussed due to the distance of the project area from the typical range of the species (more than 150 miles) (California Wildlife-Habitat Relationships [CWHHR], 2010). The Forest Service identifies the range of northern spotted owls as north of the Pit River, and California spotted owls as south of the Pit River, and commented that the project is not within the range of the California spotted owl; therefore, it is not further addressed (PG&E, 2006). The project area does not provide suitable habitat for southern torrent salamander or Cascades frog.

#### *Terrestrial Mollusks*

Three of the 10 terrestrial mollusk species were detected within the project area: Shasta chaparral snail, Shasta hesperian, and the Oregon shoulderband snail.

*Shasta Chaparral Snail*—The Shasta chaparral snail is endemic to Shasta County and is generally found within 100 meters of lightly to deeply shaded limestone areas. In the project area it was detected at the Pit 6 and 7 reservoirs and facilities.

*Shasta Hesperian Snail*—The Shasta hesperian snail is found on damp ground near springs, seeps, and at stream margins under or on loose rocks, woody debris, or decaying leaves and is considered common along the middle reaches of the Pit River. It was the most abundant and ubiquitous of the special status terrestrial mollusk species detected within the project area. In the project area, it was found near year-round sources of water under rocks, leaf litter, or woody debris. This species was found at McCloud reservoir, Lower McCloud River; Iron Canyon reservoir, Iron Canyon Creek, Pit 6 reservoir and project facilities, and Pit 7 reservoir and facilities. The Shasta hesperian snail was found at the proposed Pit 7 powerhouse site and all of the sites along the proposed Pit 7 transmission line route. In the proposed McCloud construction site, the Shasta hesperian snail was found in low abundance at Tarantula Gulch.

*Oregon Shoulderband Snail*—The Oregon shoulderband snail is associated with talus and other rocky substrates wherever permanent ground cover such as rock fissures or LWD, or moisture is available but is somewhat adapted to dry conditions during a portion of the year. The Oregon shoulderband snail was found in the Lower McCloud River, Iron Canyon reservoir, James B. Black facilities, Pit 6 reservoir and project facilities, and the Pit 7 reservoir and project facilities. This species was also found in the study area associated with the proposed Pit 7 afterbay construction area where it was detected under boulders at the USGS gage building.

#### *Amphibians and Reptiles*

*Shasta Salamander*—The Shasta salamander is listed as threatened under the California ESA. The Shasta salamander primarily inhabits limestone outcrops and caves and adjacent slope habitats in mixed forests of Douglas-fir, foothill pine, and black and canyon oak, at elevations from 1,000 to 3,000 feet msl, though it may also use a variety of non-limestone habitats within its known range. The Shasta salamander lays and

broods its eggs in limestone caves in summer. Individuals were found at McCloud reservoir and Fenders Flat / Pit 7 afterbay dam during surveys.

*Tailed Frog*—The tailed frog is a California species of special concern. This species uses cold, rocky streams in humid forests of Douglas-fir, pine, spruce, hemlock, redwood, maple, and alder, with interspersed grassland or chaparral (Stebbins, 2003). Most breeding occurs in early fall; eggs are laid in June and July and attached to rocky streambed. Hatching occurs in August and September. Adult and tadpole stages of tailed frogs were found at Ladybug Creek, a tributary to the Lower McCloud River. The Forest Service commented on November 18, 2006, that the tailed frog is known to be present in the McCloud reservoir based on unpublished data from a Forest Service employee.

*Foothill Yellow-Legged Frog*—The foothill yellow-legged frog is a Forest Service sensitive species and a California species of special concern. The foothill yellow-legged frog inhabits small streams below 5,000 feet msl where breeding occurs in low to moderate gradient streams in shallow edgewater areas, often close to confluences with tributary streams. In the spring, the foothill yellow-legged frog deposits masses of eggs on the downstream side of cobbles and boulders in gently flowing water once water temperatures reach about 53 to 55°F. Tadpoles tend to remain near the hatching site; these areas are typically associated with edgewater habitat and are adjacent to riffles, cascades, main channel pools, and plunge-pools that provide escape cover and food. Tadpoles metamorphose into juvenile frogs in 3 to 4 months. Juvenile and adult individuals prefer perennial streams and ephemeral creeks with pools and areas that provide exposed basking sites and cool shady areas adjacent to the edge of the water.

During amphibian surveys in the project area, foothill yellow-legged frog individuals were observed at seven sites located between river mile 1.4 and 5.7 on the Lower McCloud River and in associated tributaries. Evidence of breeding (egg masses or tadpoles and post-metamorphic frogs (adults, juveniles, or young of the year) were observed at four mainstem sites. Post-metamorphic frogs were also observed in three tributaries. Twelve egg masses were observed in the Lower McCloud River between May 8 and June 10; seven of these showed evidence of successful hatching (tadpoles were found nearby), and the other five failed due to scouring, fungal infestation, or predation.

*Northwestern Pond Turtle*—The northwestern pond turtle, also called the north Pacific pond turtle or the western pond turtle, is a species of special concern in California. It is distributed from western Washington to northwest Baja California, mostly west of the Cascade-Sierra crest, and may be found at elevations up to 6,696 feet but mostly below 4,980 feet msl (Stebbins, 2003). It inhabits ponds, lakes, rivers, marshes, streams, and irrigation ditches with rocky or muddy bottoms and herbaceous vegetation. Natural Heritage records exist for this species in Shasta and Siskiyou Counties, and in the McCloud, Upper Pit and Lower Pit watersheds.

Surveys for northwestern pond turtle were conducted by boat in 2007 and 2008 in the McCloud, Iron Canyon, Pit 6, and Pit 7 reservoirs; individuals were found in the Pit 6

and Pit 7 reservoirs. In addition to the reservoir surveys, individuals were observed during surveys for foothill yellow-legged frog at four sites on the Lower McCloud River, in Pit 6 reservoir, and in Pit 7 reservoir.

All northwestern pond turtle individuals found in the Pit 6 and Pit 7 reservoirs were sighted in the lower reaches of the reservoirs. Areas of suitable habitat in Iron Canyon and McCloud reservoirs were found to be well above the waterline in 2008; refuge areas in shoreline brush and basking areas were greatly reduced by low water levels. It was surmised that it is unlikely that either Iron Canyon reservoir or McCloud reservoir supports a northwestern pond turtle population, although there is potential for individual turtles to escape detection. The tributary streams upstream of Iron Canyon reservoir are likely too small to support northwestern pond turtle populations. Those tributaries upstream of McCloud reservoir may lack sufficient slow-water habitat and may be too cold.

### *Birds*

*Bald Eagle*—The bald eagle was removed from the federal endangered species list in 2007; however, it continues to be protected by the federal Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act, as a California listed endangered species and fully protected species and as a Forest Service sensitive species.

The bald eagle tends to nest in areas of mature / late successional or old-growth forest where large trees are available for nest building in fairly close proximity to large bodies of water used for hunting. Winter habitat requirements include adequate food supplies and the presence of roosting sites generally located close to open water but which can be over 20 miles from foraging areas. Important perch and roost sites include snags and dead-topped, live trees in areas with minimal human disturbance. Fish are the primary diet, although waterfowl, gulls, and other birds; mammals; and carrion may also be taken.

PG&E has monitored all known bald eagle territories since the mid-1980s located within the area defined in the *Pit River Management Zone of the Pacific Bald Eagle Recovery Plan*, developed and implemented by FWS in 1986. Overall, the population of eagles has increased in the project area; nest success and productivity is below average for the state; and nests along reservoirs have had better productivity than those along rivers, suggesting that as the population increases in the area some territories are established in marginal habitat affecting nest success and productivity.

Prelicensing surveys located eight bald eagle nesting territories within the project area including two previously unknown territories on Chatterdown Creek and McCloud Bridge. Other territories in the project area located at McCloud reservoir, McCloud River, Iron Canyon reservoir (two), Pit 6 reservoir, and Pit 7 afterbay near Pit 7 dam. Winter sightings of adult bald eagle individuals near known territories indicate that pairs are likely year-round residents. Bald eagle prey studies in the 1980s at McCloud and Iron Canyon reservoirs revealed a diverse diet of salmonids; water and land birds; and

mammals including deer and squirrels; though it is suspected that salmonids make up a large portion of the diet of these eagles (Nevares et al., 2008a).

*Golden Eagle*—The golden eagle is protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act, and is a California fully protected species. Golden eagles use a variety of habitats including conifer, hardwood or mixed woodland, alpine, grassland, cliff, desert, savannah, and tundra. Golden eagles were noted as occurring in the project area for the Pit 1 new license environmental assessment, about 50 miles from the McCloud-Pit project (PG&E, 1999). No surveys were conducted in the McCloud-Pit project area for golden eagles.

*Northern Goshawk*—The northern goshawk, a large forest-dwelling raptor that uses a wide variety of habitat types, is a federal species of concern, California species of concern, and Forest Service sensitive species. The northern goshawk prefers dense, late successional stage forest for nesting that is interspersed with meadows and other openings, and low-elevation riparian habitats for foraging. The goshawk nesting period extends from mid-February through mid-September.

Surveys of potentially suitable habitat were conducted to determine if northern goshawks were present and if active nesting was occurring. The broadcast acoustical method was used for initial surveys, and the stand search method was used for follow up surveys. Two surveys occurred during the breeding season (June 1 through August 15) of 2007 and 2008. Although no active nests were identified, there were six northern goshawk detections during the 2007 survey season; no detections were documented during 2008 surveys. The majority (four) of the detections were associated with a suspected northern goshawk activity center located on Forest Service land about 0.5 mile south of Ah-Di-Na Campground. This area is considered a suspected northern goshawk activity center due to detections occurring in each survey period and the observation of at least two birds displaying aggressive/territorial behavior. The remaining detections occurred at the southeast end of the Pit 6 transmission line about 1.5 miles northwest of Wengler (Nevares and Lindstrand, 2008a).

*Peregrine Falcon*—The peregrine falcon was officially removed from the federal list of endangered species in 1999 and from the California state list in 2009 (California Fish and Game, 2010), but remains a California fully protected species, and is protected under the Migratory Bird Treaty Act of 1918. Individuals feed primarily on birds from warbler- to mallard-sized, taken in flight over various habitats including forest edges, meadows, and water bodies (reservoirs, rivers, and streams). Steep-walled canyons and limestone outcroppings provide potential nesting habitat for peregrine falcons. Eggs are laid and young are reared on ledges or in small caves. The breeding season extends from about March to mid-August, although timing can vary.

Several territories have been documented in the vicinity of the project area, and surveys to assess habitat and presence of nesting individuals resulted in the documentation of nesting pairs along almost all major project water bodies within the project area. Peregrine falcon nesting pairs were documented in large rock outcroppings

along the McCloud River, Iron Canyon Creek, Pit 7 reservoir, and Pit 6 reservoir. The 2007-2008 surveys also documented breeding at four territories and each nesting pair produced at least one young and, in most cases, two young were observed (Nevarés et al., 2008b).

*Willow Flycatcher*—Willow flycatcher is a California listed endangered species and a Forest Service species of concern. Suitable habitats occurring in the project area include “monotypic, willow, marsh-lake margin” and “mixed shrub riparian–varying stream size” habitat types and meet willow flycatcher protocol criteria of having patchy shrubby riparian vegetation, and at least some surface water or saturated soil during the early portion of the breeding season. Surveys conducted in 2008 detected non-territorial individuals in suitable habitat at the Cedar Salt Log, McGill Creek, and Fenders Flat / Pit 7 afterbay dam survey areas. The individuals detected are considered migrants; however, it is possible that some individuals may breed in the project area (Nevarés and Lindstrand, 2008b).

*Bank Swallow*—In California, the state-listed threatened bank swallow relies on naturally eroding habitats of major lowland river systems (California Fish and Game, 2003). This species nests in colonies and creates nests by burrowing into vertical banks of fine-textured soils. Currently, individuals are locally common only in portions of California where sandy, vertical bluffs or riverbanks are available. The current range for this species does not appear to overlap the project area.

*Greater Sandhill Crane*—The greater sandhill crane is a California fully protected species, and is state-listed as a threatened species. This species feeds on a variety of prey items (amphibians, snakes, invertebrates) as well as grasses and grains in wet meadows, flooded grain fields, pastures, shallow water habitats, and wetlands. Pairs return to the same territory and even the same approximate nest location every year (California Fish and Game, 2003). Based on the survey data recorded since 1981, areas of suitable wetland and meadow habitat in Shasta and Siskiyou Counties support breeding individuals; however, individuals in the project area are on the edge of their range (CWHR, 2010).

### *Mammals*

*American Marten*—American marten is a Forest Service species of concern. Natural heritage records exist for American marten in Shasta and Siskiyou Counties, and the Lower Pit and McCloud watersheds (NatureServe, 2009). Martens are medium-sized carnivores that inhabit dense, coniferous, mixed, or deciduous forests and occupy holes in tree stumps. Loss or degradation of habitat due to timber harvesting is the primary threat to this species. The project area is within the known range of American marten (CWHR, 2010); surveys were not conducted in the project area for this species.

*Sierra Nevada Red Fox*—The Sierra Nevada red fox is a state-listed threatened species. The range of the Sierra Nevada red fox is described as the southern Cascade Range in northern California, southeastward to the northern Sierra Nevada, and then

south along the Sierra Nevada crest to Tulare County. Preferred habitat for the Sierra Nevada red fox appears to be red fir and lodgepole pine forests in the sub-alpine, and in the alpine of the Sierra Nevada. The current status of the Sierra Nevada red fox is unknown, and threats to the species have not been identified. This species is assumed to be present in the project area though it was not detected during prelicensing surveys (PG&E, 2006).

*California Wolverine*—The California wolverine is a California listed threatened species and is also considered a California fully protected species. This species requires dense cover for resting and reproduction, and open areas for hunting. The home range size of the California wolverine is extremely variable (less than 39 square miles to over 347 square miles) and appears to depend on the abundance and distribution of food. Dens are found in trees, dead standing trees (snags), downed logs, abandoned beaver lodges, among boulders, rock ledges, in old bear dens, and in caves. Riparian areas are used as travel corridors. The environmental assessment for the Pit 1 license lists wolverines as present in the Pit 1 project area, which is located about 50 miles from the McCloud-Pit project (table 11, PG&E, 1999). The project area is within the known range of the California wolverine (CWHR, 2010), but no survey was conducted for this species. Though it was undetected during prelicensing surveys, the California wolverine is assumed to be present in the project area (PG&E, 2006).

*Ringtail*—The ringtail is an omnivorous, raccoon-like mammal and a California fully protected species found in desert scrub, chaparral, pine-oak or conifer woodland habitats with rocky areas and fallen log debris (NatureServe, 2009). It is known to occur near the project area in the Central Valley. PG&E reported ringtail in the Pit 1 environmental assessment for a new license; the Pit 1 project is located about 50 miles from the McCloud-Pit project (PG&E, 1999). No surveys were conducted in the project area for this species.

*Special Status Bats*— Four special status bat species—pallid bat, Townsend's big-eared bat, spotted bat, and western red bat—were detected during acoustic and capture surveys in the study area which included existing project structures, reservoirs, and project-affected stream reaches.

Pallid Bats. A California mammal species of special concern and Forest Service sensitive species, the pallid bat roosts in structures, cavities, and live or dead trees anywhere from the riparian zone to ridges above, or in rock features on slopes of river drainages. A pallid bat colony can range from 35 to 300 individuals. The pallid bat has one litter per year and often gives birth to twins. This species forages primarily on ground-dwelling arthropods, most frequently in riparian zones, open oak savannah, and open mixed deciduous forest habitats, and uses pools in rivers and streams as a source of water.

Individuals were captured at the Pit 6 and 7 dams and along the existing Pit 7 transmission line corridor. The capture of a juvenile at Pit 7 dam confirmed the presence of a reproductive population and acoustic records document the presence of this species

throughout the proposed McCloud and Pit 7 afterbay infrastructure sites during the summer breeding season (July through September). This species is not known to be migratory, and likely hibernates in the area, as suggested by one acoustic detection record from February, 2009, at the McCloud dam spillway.

Townsend's Big-Eared Bat. Townsend's big-eared bat is also a California mammal species of special concern and a Forest Service sensitive species and is widely distributed in the lava bed and limestone areas of Shasta, Siskiyou, and Modoc Counties where it roosts in tunnels, caves, mines, or rock shelters that are close to water. Townsend's big-eared bat forages in riparian zones as well as creek and river drainages feeding primarily on moths, and, like the pallid bat, uses pools in rivers and streams to drink. Colony size ranges from 35 to 500 individuals and adult females give birth to a single young per year. Acoustic records document the presence of Townsend's big-eared bat only in association with the exposed limestone along the margin of McCloud reservoir where one adult female (non-reproductive) was captured.

Spotted Bat. The spotted bat is a mammal species of special concern in California and, although rare and patchily distributed, is known to occur in the project vicinity. The spotted bat forages over open areas and along forest areas, particularly in association with wet meadows, and uses creeks and rivers as a source of water. This species roosts in rock features, often on steep slopes or rock outcrops associated with river drainages. The spotted bat is thought to be non-colonial, and females give birth to a single young each year.

Documented in the Pit 4 development area in 2000, individuals were detected acoustically in spring and late summer in a clearing adjacent to an inactive sewage lagoon near the town of McCloud, within the proposed construction footprint for the McCloud transmission line.

Western Red Bat. The western red bat is a California mammal species of special concern and a Forest Service sensitive species that is known to occur in the project vicinity, and likely uses the Pit and McCloud Rivers as migration corridors. This species roosts in riparian vegetation and uses riparian edge habitats as well as a variety of terrestrial and aquatic habitats for foraging. The western red bat is non-colonial, and females give birth to one litter of twins per year. Individuals were detected at proposed McCloud infrastructure sites, Pit 7 afterbay sites including the afterbay powerhouse construction site, and both proposed transmission corridors. During the survey effort, most acoustic records were between late July and early October, at a time when this species begins to move south in fall migration. Individuals were detected year-round at the proposed Pit 7 afterbay and existing Pit 7 transmission line sampling sites indicating that the Pit River may be a fall migration corridor for the western red bat, and that not all individuals migrate. No western red bat activity was recorded during the winter at proposed McCloud infrastructure sites.

*Western Mastiff Bat*—The western mastiff bat is found in rock features, often steep slopes or rock outcrops associated with river drainages, under slabs of exfoliating

granite, or in basaltic columns. Colony size ranges from 35 to 200 individuals. Females give birth to a single young each year. This species is an open-air forager, and has been detected flying/foraging over reservoirs elsewhere in their range. Individuals were detected acoustically at the Pit 6 dam in September, 2007, the first record of this species for the Pit River.

### **3.3.3.2 Environmental Effects**

#### **3.3.3.2.1 Vegetation**

##### **Upland Vegetation**

The vegetation community within the project area is relatively stable and is subject to disturbances from non-project related influences (rock slides, fire, disease, insect infestation). Periodic maintenance work along existing transmission lines, roads, tunnels, gages, powerhouses, associated facilities and reservoirs would cause short-term, minor localized disturbance or removal of vegetation. Mechanical activities such as snowplowing, road grading, ditch cleaning, and slide removal could cause surface to shallow depth disturbance of vegetation and top soil layers; however, no adverse effects to the existing seed bank within the soil would be expected. Over time, vegetation would be expected to reestablish as a result of pioneering of plant species in adjacent areas (with measures to control invasive species, erosion, and sedimentation), growth of plants from the existing seed bank, and restoration of native vegetation by PG&E. PG&E states in its license application that herbicide use is a part of road and facility maintenance, but no pesticides are used as a part of project O&M. However, the spraying of herbicides as part of future O&M activities to control undesirable vegetation such as non-native invasive or noxious weed species (section 3.3.3.1.1, *Vegetation, Noxious Weeds*) could cause localized loss of upland vegetation susceptible to the herbicide(s) being used.

Proposed construction of the two new powerhouses and the Pit 7 afterbay substation are associated with primarily developed areas surrounding the existing project dam structures. There would be temporary minor disturbance to upland vegetation during construction of the facilities and a permanent loss of vegetation within the footprint of the construction area.

The proposed Pit 7 afterbay transmission line would potentially remove vegetation along a corridor about 1.6 miles long and 150 feet wide. Disturbance or removal of vegetation along the construction corridor would be short-term. Upon completion of the transmission line, a 40-foot-wide corridor would undergo periodic maintenance to protect the transmission line from vegetation encroachment and allow access for maintenance and repairs. The McCloud transmission line is proposed as a corridor of about 14 miles in length and during construction would be about 150 feet wide; the final width of the transmission line is expected to be 25 feet. Construction of the proposed McCloud transmission line would require significant tree and vegetation clearing to establish the 150 foot-wide construction corridor. Tree removal would result in a long-term alteration of vegetation community structure. Post-construction, it is expected that the area would

gradually return to natural vegetation through pioneering from adjacent species (with measures to control invasive species), revegetation from the existing seed bank, natural succession, and restoration of native vegetation by PG&E.

PG&E proposed protection and enhancement measures designed to minimize the environmental effects of project operations and proposed construction on vegetation within the project area. In measure 13, PG&E proposed to develop a Vegetation Management Plan in consultation with the Forest Service and other appropriate agencies. The Vegetation Management Plan would guide the management of vegetation within the project and project-affected area including transmission line and would address vegetation-related issues at the project for the term of the new license. The Vegetation Management Plan would contain specific elements including: (1) identification, protection and monitoring of special status species potentially affected by project-related activities to maintain well-distributed, viable populations within the project-affected area; (2) protection of culturally significant plant populations potentially affected by project-related activities and to enhance populations when feasible opportunities exist; (3) invasive plant species management and monitoring to minimize the introduction and spread of noxious weeds and to assess the success of noxious weed management activities associated with project O&M activities; (4) use of BMPs to avoid or minimize effects on wetlands; and (5) restoration of native vegetation in relevant areas disturbed by project-related O&M activities within the project-affected area. In addition, employees would receive employee awareness training that would provide employees working within the project area with the knowledge base to ensure effects from disturbance and direct removal of vegetation are minimized and that revegetation activities are monitored. Employee awareness training would ensure the coordination of the implementation of the Vegetation Management Plan with other management plans. The Vegetation Management Plan would include a process and schedule for reporting survey and monitoring results and provide for periodic review and revision of the Vegetation Management Plan.

In its original condition 25, the Forest Service specified that PG&E file a Vegetation and Invasive Weed Management Plan developed in consultation with the Forest Service, appropriate County Agricultural Commissioner, California Department of Food and Agriculture, potentially affected tribes and other interest parties. The plan would be approved by the Forest Service and would be developed within 1 year of license issuance. Components of the plan included: treatment protocols and measures for removing or trimming vegetation within the project and project-affected area; protection of special status and culturally significant plants and populations; invasive species management and monitoring; and pesticide or herbicide use restrictions and prohibitions. Each component would provide specific guidance elements.

Treatment protocols and measures for removing or trimming vegetation included: (1) hazard tree removal and trimming and power line / transmission line clearing that would include slash disposal for both management protocols; (2) vegetation management for habitat improvement; (3) revegetation of disturbed sites, including standards of

success, monitoring schedule, and remediation measures; (4) soil protection and erosion control including use of certified weed-free straw and other methods that minimize the risk of introducing non-native invasive plant species; (5) establishment of and / or revegetation with culturally important plant species; and (6) use of clean, weed-free seed with guidance on the use of locally collected native seed, and a plan to collect and propagate or otherwise acquire an adequate supply of appropriate native plant material for use in erosion control.

In its original condition 25, the Forest Service specified that the plan include the development of a monitoring component for special status and culturally significant plants approved by the Forest Service. Current locations (including boundaries) for populations of special status and culturally significant plant species would be identified and delineated by GPS. Periodic monitoring of the known locations would occur every 5 years and every 10 years for the project and project-affected area to determine if additional special status or culturally significant species have become established in the project or project-affected area to provide measures for addressing populations of newly established species. Surveys would also be conducted for new, listed special status species potentially occurring within the project or project-affected area; if identified species would be monitored. Information on locations, protection, monitoring, and survey measures for sensitive, culturally significant, invasive species and other rare plant locations would be shared with managers of O&M activities of any power distribution lines that cross portions of the project area.

In its original condition 25, the Forest Service specified that the special status species survey element be initiated by consultation with the Forest Service, concurrent with the annual consultation meeting as specified in Forest Service condition 1, to review the most current list of special status plant species that might occur on Forest Service lands in the project area or the project-affected area. When species are added to any of the lists, consultation would determine if suitable habitat occurs on Forest Service lands and, within 1 year, PG&E would develop and implement a study plan in consultation with the Forest Service to reasonably assess the effects of the project on the species. PG&E would prepare a draft report that provides the objectives, methods, results, and recommended resource measures as appropriate, schedule for implementation, to the Forest Service for review and approval; the final report would be filed with the Commission and would include documentation of consultation.

PG&E alternative condition 25 proposed modifications to specific elements of the Forest Service's original condition 25, including an alternate schedule for preparation. PG&E stated that adequate protection and utilization of Forest Service lands would be contained within PG&E alternative condition 25 because PG&E would protect, mitigate and/or enhance populations of sensitive plant species potentially affected by project operations by conducting management and monitoring.

PG&E alternative condition 25 proposed that the preparation of the Vegetation and Invasive Weed Management Plan be made consistent with the original measure 13

schedule of “2 years after license issuance” instead of the 1 year that was specified in the Forest Service’s original condition 25. PG&E argued that providing 2 years instead of 1 year to prepare the plan would allow more careful planning and adequate schedule coordination among the various agencies and other interested parties involved in drafting a plan. During relicensing meetings, Forest Service staff stated that it desired consistency between McCloud-Pit license conditions and those developed for a nearby PG&E-owned project, Pit 3, 4, and 5. PG&E noted that 2 years would provide adequate time to achieve consistency with license conditions for McCloud-Pit and Pit 3, 4, and 5. To support its proposal of a 2-year time frame for preparing and implementing a Vegetation and Invasive Weed Management Plan, PG&E presented a timeline of about 9-16 months which would make the 1-year schedule proposed by Forest Service infeasible. PG&E also pointed out that there was nothing to preclude completion prior to the 2-year schedule proposed.

PG&E further proposed to limit the scope of the Forest Service’s original condition 25 to only culturally significant plant species associated with TCPs. Areas identified during relicensing surveys, that support populations of these plant species, are not considered to be TCPs subject to the requirements of section 106 of the NHPA unless they were also specifically identified by Tribal members. As a result, PG&E noted that there is no regulatory requirement to include culturally significant plant species in any long-term monitoring component for special status plant species as specified for inclusion in a Vegetation and Invasive Weed Management Plan by the Forest Service’s original condition 25.

The Hearst Corporation notes that Hearst lands surround the entire McCloud reservoir and expresses concern that the Forest Service’s original condition 25 would require PG&E to conduct surveys on private land. The Hearst Corporation suggests monitoring and management plans and surveys be limited to project-affected PG&E and national forest lands. In addition, The Hearst Corporation suggests that annual meetings also be opened to “project-affected” private landowners.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 25. The provisions specified in Forest Service modified condition 25 are similar to those specified in the Forest Service’s original condition 25, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Vegetation and Invasive Weed Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3). In the draft plan, the Forest Service recommends approaches for the revegetation of disturbed sites, including detailed standards of success, a monitoring schedule, and remediation measures. Additionally, in the draft plan, the Forest Service recommends the implementation of botanical management actions to improve wildlife habitat. In particular, the Forest Service recommends enhancement of special status species wildlife habitat, including the protection of willow and alder habitat for the willow flycatcher and riparian habitat for neotropical breeding birds (see the *Riparian and Wetland Vegetation* section, below), as well as nesting habitat for bald eagles and

northern spotted owls, and maternity sites for special status bats (section 3.3.3.2.2, *Wildlife*). In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 25 and withdraws its alternative condition 25.

### *Our Analysis*

Normal O&M activities currently have negligible effects on established vegetation within the project area. Proposed new construction within the project would have a long-term minor to moderate adverse effect on upland vegetation within the project area. Clearing for the construction of the Pit 7 access road and construction staging area would result in minor, long-term effects to vegetation. Clearing along transmission corridors would result in the loss of linear portions of existing vegetation communities; however, we expect that over the long-term the width of cleared area needed for construction would be revegetated and most vegetation would re-establish. Development and implementation of a Vegetation and Invasive Weed Management Plan would provide guidance for the restoration of vegetation using native plant species as well as monitoring to maximize the success of vegetation restoration efforts. Permanent loss of vegetation communities along the proposed transmission line corridors would occur. Vegetation within the permanent corridor would re-establish; however, the vegetation within the corridor would be managed and maintained as necessary and would be permanently altered from the original plant communities that existed prior to the construction of the new transmission lines.

In measure 13, PG&E addressed vegetation-related issues at the project for the term of the new license that contained generalized plan elements for management, protection, restoration and control of vegetation within the project boundary, a timeframe for development and implementation, and a proposed schedule for completion of specific monitoring and control elements.

In its original condition 25, the Forest Service specified that PG&E file a Vegetation and Invasive Weed Management Plan also developed in consultation with the Forest Service and specifically added the County Agricultural Commissioner, California Department of Food and Agriculture, potentially affected tribes and other interest parties. The plan specified by the Forest Service's original condition 25 would be developed within 1 year of license issuance.

PG&E alternative condition 25 proposed a 2-year schedule for a Vegetation and Invasive Weed Management Plan to allow consistency with Pit 3, 4, and 5 license conditions. Regarding culturally significant plant species in particular, PG&E alternative condition 25 proposed limitations to the scope of the Forest Service's original condition 25 so that it would apply to only culturally significant plant species associated with TCPs.

Forest Service modified condition 25 specifies a 1-year schedule for completion of this plan. Because a draft of the plan has been collaboratively developed by the Forest Service and PG&E, a 1-year time frame would provide adequate time for the

development of the plan to address the treatment of vegetation communities of the watershed in a consistent and comprehensive manner to ensure the maintenance of viable plant communities. Implementation of standards of success, a monitoring schedule, remediation measures for the revegetation of disturbed sites, and protection and enhancement of special status species wildlife habitat, as recommended by the Forest Service in the draft plan, would provide structure for the mitigation of effects to larger disturbed areas, including prevention of soil erosion, control of invasive weed species, support for the re-establishment of native vegetation, and protection of special status wildlife species.

Regarding access to private lands, it is up to PG&E to obtain whatever rights are necessary to carry out its license obligations. PG&E would need to coordinate with landowners if access is needed to lands outside of project boundary, as proposed in the PG&E alternative 4(e) conditions. However, if private land is located within project boundary, PG&E would need to consult with the private landowner to gain access to that land to carry out the purposes of its license. If PG&E is not able to obtain the property rights necessary to operate or carry out the terms of the license by negotiation with the private landowner, it may use the power of eminent domain to acquire those rights.

### **Riparian and Wetland Vegetation**

Inundation frequency and annual peak flows influence the distribution of riparian vegetation with inundation frequency having the greatest effect on lateral extent. Relatively infrequent annual peak flows of high magnitude (once per 20 years) that can mobilize cobble and gravel bars resulting in scouring riparian vegetation appear to occur at a similar frequency as in pre-project conditions; the most recent occurring in 1997. Annual peak flows of lesser magnitude that occur more frequently ( $\leq 10$  years) have decreased since project operations began. The decrease in magnitude of annual peak flows and a decrease in duration of inundation from flooding during the growing season as a result of project operations is increasing riparian vegetation along the lower reaches of the river. The decreased magnitude of annual peak flows is also affecting the age distribution of white alders at higher and lower elevations; mature specimens are not being replaced by younger white alder as a result of decreased flooding flows at higher and lower elevations that allow establishment of young trees.

Riparian vegetation encroaching on the channel could potentially affect the quality and coverage of terrestrial riparian and aquatic habitat along the Lower McCloud River, though the linear extent is not affected and appears to continue at the same level under project operations as it existed under pre-project conditions.

PG&E proposed minimum instream flow regimes (section 3.3.2.1.1, *Water Quantity*) that would provide additional flow volumes over an annual and seasonally distributed schedule. In addition, upward ramping of flows prior to uncontrolled spill events would return scouring flows to the stream channel, which would reduce the ability of riparian vegetation to become established along the channel. California Fish and Game recommends and the Forest Service's original condition 19 specified a minimum

instream flow regime for the Lower McCloud River in order to provide benefits for fisheries.

A total of 820.65 acres of wetland and riparian habitats were mapped within the proposed McCloud transmission line corridor and could be affected by construction activities. To protect wetland habitat, PG&E proposed to follow BMPs to avoid or minimize effects on wetland areas, including pre-construction wetland mapping and associated protection measures.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 25. The provisions specified in Forest Service modified condition 25 are similar to those specified in the Forest Service's original condition 25, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Vegetation and Invasive Weed Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3). Additionally, Forest Service modified condition 25 specifies that the plan should include botanical enhancements for specific special status wildlife species.

In the draft plan, the Forest Service has changed its recommendation to agree with the staff recommendation from the draft EIS regarding the implementation of applicable BMPs if O&M is required around riparian areas. Additionally, in the draft plan, the Forest Service recommends the implementation of botanical management actions to enhance special status species wildlife habitat, including the protection of willow and alder habitat for the willow flycatcher and riparian habitat for neotropical breeding birds (section 3.3.3.2.2, *Wildlife*).

#### *Our Analysis*

Natural riparian systems are well-adapted to the periodic inundation and scouring that flood events can produce. Under the proposed action, increased minimum flows would increase inundation periods during the growing season, restricting growth and encroachment of riparian vegetation and improving the channel width. The proposed action would not alter low frequency, high magnitude scouring floods. As a result, encroachment of riparian vegetation into the channel would be minimized and aquatic and terrestrial riparian habitat would be improved. Flows would be sufficient to control lateral expansion of riparian vegetation without necessitating manual removal that could destabilize sediments and increase erosion.

Pre-construction wetland mapping prior to the initiation of any construction, and avoidance of existing wetlands to the extent practicable, would minimize effects from construction. Any required state and federal permits would be required prior to construction and any regulatory restrictions, and required BMPs or other conditions would be implemented. Regardless, some adverse effects to wetlands are likely during the construction of the McCloud transmission line. We expect that employment of pre-construction mapping and avoidance in concert with BMPs and permit requirements would minimize effects, and effects would be short-term since no permanent disturbance

to the hydrology of the wetland systems is expected to occur as a result of construction. After completion of construction, wetland systems within the width of the construction corridor would return to pre-construction conditions over time as vegetation becomes re-established. Within the permanent corridor of the transmission line, wetland and riparian vegetation could be permanently altered as a result of continued vegetation maintenance and management. We expect that the development and implementation of the Vegetation and Invasive Weed Management Plan would also minimize effects on wetlands; elements of the plan would provide restoration guidance, pesticide and herbicide restrictions and prohibitions, integrate employee training and awareness including use of BMPs, and protect and enhance special status species wildlife habitat.

### **Noxious Weeds**

Activities associated with project O&M, recreation, and construction can cause disturbances to existing vegetation which could spread or facilitate introduction of noxious weeds in the project area or beyond. Project O&M activities with the potential to affect the distribution of noxious weeds include slide removal; road grading; vegetation management activities along transmission lines, roads, tunnels, gages, project facilities, and reservoirs; and ditch clearing. Reservoir fluctuations create disturbances in littoral habitats that make them susceptible to colonization by noxious weeds. In addition, recreation activities that move from outside of the project to recreation sites within the project area can result in noxious weeds and invasive species being introduced into the project area via recreational equipment and vehicles. Newly cleared soil from construction areas can be colonized by seeds from surrounding vegetation or seeds brought into the area by a variety of methods. In addition, seeds and portions of plants that can facilitate propagation and establishment could be dispersed by earthmoving equipment. Vehicles used to access construction sites have the potential to facilitate the spread of noxious weed species into and out of the construction sites. Construction of transmission corridors, especially the construction of the McCloud transmission line with a linear distance of about 14 miles, have the potential to affect sensitive riparian and wetland vegetation communities in the corridor with the spread of invasive noxious weeds.

Black locust prefers shoreline areas where hydrologic conditions reduce the frequency of inundation. No historical information exists to provide insight into the level of abundance of black locust in the Lower McCloud River prior to project operations. Because the decreased flows and less frequent inundation as a result of project operations has likely allowed riparian vegetation to encroach into the Lower McCloud River channel, it is possible that hydrological conditions resulting from project operations have also resulted in conditions that provide opportunity for black locust to increase. A literature review led to the conclusion that black locust seed dispersal is unlikely to be affected by the project, but that germination of seeds could be more successful due to the project-related decrease in inundation frequency. For example, there is a potential project nexus between decreases in base flow and annual peak flow and increased black locust

habitat, particularly in areas with high percent cover of coarse material downstream of Ah-Di-Na.

Specific to invasive plant species monitoring and control, the original PG&E measure 13 proposed invasive plant species monitoring and management as part of the Vegetation Management Plan development to minimize the introduction and spread of noxious weeds and to assess the success of noxious weed management activities associated with project O&M activities.

In its original condition 25, the Forest Service specified that the Vegetation and Invasive Weed Management Plan would contain several components targeting invasive species management and monitoring and would include elements to: (1) monitor area with ground disturbing activities associated with the license annually for 3 years after the completion of activities to assess the presence of any invasive weed populations that may have been introduced as a result of activities; and (2) monitor known invasive plant species populations annually for the first 3 years after license issuance to determine if noxious weed populations are expanding into any locations of existing special status or culturally significant plant populations; or if other adverse impacts are occurring to these plant populations. After annual surveys for the first 3 years, monitoring would occur once every 5 years for the term of the license. All monitoring would occur in the appropriate season when plants are conspicuous but can be coordinated with other concurrent surveys or tasks. In addition, inventory and mapping of new populations of noxious weeds would be employed to update the GIS database maintained by the Forest Service every 5 years and protocols and strategies to prevent and control the spread of known populations or introductions of new populations would be developed. Spot treatments would be allowed for detections of new, small infestations at the time of detection. The protocols and strategies to prevent and control the spread of known populations would address the following elements: (1) cleaning of construction equipment prior to entering and exiting the project area (but would not apply to vehicles used for PG&E's regular O&M activities); and (2) the use of weed-free straw, sand and gravel for restoration and construction and restoration activities, rice straw may be substituted. The invasive species management and monitoring component would include additional elements including: development of a schedule for control (containment or eradication) of populations of prioritized invasive weed species designated by resource agencies; annual monitoring of known populations for the term of the license in locations tied to project actions or effects, such as road maintenance, facilities, project O&M activity areas; construction sites to evaluate the effectiveness of revegetation and invasive weed control measures; employee awareness training on the location and identification of invasive weed species that may occur in the area and proper mechanisms for avoiding transport of weed seeds while working and notification of the Forest Service when new populations of invasive weed species are identified; and an adaptive management element to implement methods for the prevention of aquatic invasive weeds; and reasonable efforts to control the entire population unit for prioritized species that are contiguous and

extend beyond the project boundary. Consultation and coordination with the Forest Service would determine control measures.

With respect to which invasive weed species would be monitored and controlled, the Forest Service's original condition 25 specified the development of a schedule for control (containment or eradication) of all known populations of California Department of Food and Agriculture rated A, B, and Q species; California Invasive Plant Council "high" and "moderate" rated species; and selected other rated invasive species designated by resource agencies.

PG&E alternative condition 25 proposed a change to focus control on agreed-upon "high-priority" species that are deemed of significant concern to the project and considered to be controllable by current management methods. PG&E also proposed a change to the Forest Service's original condition 25 language that stated that new infestations of "A," "B," or "high" and "moderate" agency rated species should be controlled within 1 year of detection, or as soon as practicable and feasible, to focus on the agreed upon "high priority" species considered to be controllable by currently available treatment methods. PG&E alternative condition 25 proposed a list of "high priority" invasive plant species that was consistent with the Forest Service's original condition 25 list of "invasive species known to occur in the project and project-affected area." Additionally, PG&E alternative condition 25 proposed monitoring of known populations of invasive weeds within the first year after approval of the Vegetation and Invasive Weed Management Plan and every 5 years thereafter, as opposed to monitoring annually for 3 years after license issuance and every 5 years thereafter, as specified in the Forest Service's original condition 25. PG&E alternative condition 25 also proposed monitoring new populations of invasive weeds within the first year after plan approval and every 5 years thereafter, as opposed to monitoring every 5 years as specified in the Forest Service's original condition 25.

Forest Service condition 15 specifies that PG&E exclude the use of pesticides and herbicides on NFS lands unless prior written approval is received from the Forest Service. Materials used would be limited to those registered by EPA and consistent with those used by Shasta-Trinity National Forest.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 25. The provisions specified in Forest Service modified condition 25 are similar to those specified in the Forest Service's original condition 25, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Vegetation and Invasive Weed Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3). Additionally, Forest Service modified condition 25 specifies protection of revegetation source populations rather than culturally significant plant populations.

In the draft plan, the Forest Service recommends that a comprehensive survey of selected high priority and additional noxious weeds be conducted within the first year of license acceptance and every 5 years thereafter. Additionally, the Forest Service

recommends that monitoring following ground-disturbing activities would be a focused follow-up, and that invasive plant control sites would be monitored after revegetation and disturbance for 3 years following the final revegetation or control work in order to evaluate the effectiveness of revegetation and invasive weed control measures and determine if revegetation meets objectives.

Regarding pesticide and herbicide use, the Forest Service notes in the draft plan that pesticide applications are not considered a default treatment method and recommends that other reasonable and practicable methods for vegetation treatment be evaluated, based on analysis of potential environmental impacts and anticipated effectiveness, along with site characteristics, security, safety and health, and economics. The Forest Service further recommends that site-specific measures be identified and implemented to protect non-target plants and animals. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 25 and withdraws its alternative condition 25.

#### *Our Analysis*

The components for invasive species management proposed in PG&E measure 13 and PG&E alternative condition 25, and specified in the Forest Service's original condition 25, all provided guidance, methods, and protocols for treatment and management, monitoring, and other elements that are similar in structure and intent: the avoidance and control of noxious weed species within the project and project-affected area. In combination with employee awareness training and the use of BMPs prior to routine project O&M or construction activities with the potential to increase the introduction or dispersion of invasive noxious weeds, PG&E would monitor the distribution and species composition of noxious weeds within the project and project-affected area and prioritize populations for feasible management or control measures.

We expect annual monitoring for 3 years of areas that undergo ground or vegetation disturbance including management treatments would be effective in discerning the establishment of noxious weeds that are generally aggressive in pioneering new areas. As proposed in PG&E alternative condition 25, monitoring, inventory, and mapping of all areas of "high priority" noxious weed populations that remain undisturbed could be conducted at 5-year increments consistent with monitoring special status and culturally important plant populations and the 5-year interval inventory and mapping element. Implementation of this monitoring schedule would provide coordination and efficiency of monitoring schedules and multiple-element monitoring could be conducted concurrently.

In the draft Vegetation and Invasive Weed Management Plan, the Forest Service recommends details of components and monitoring schedules for inclusion in and protection of revegetation source populations, which include culturally significant plant populations not associated with TCPs. Specifically, the Forest Service recommends monitoring of selected known populations of invasive weeds annually rather than monitoring of all known populations annually for 3 years after license issuance. This recommendation in the draft plan would provide for more focused, long-term monitoring

effort on invasive weed populations of particular concern, and all populations of noxious weeds would still be monitored on a 5-year cycle, which would be sufficient to identify additional populations that may need focused monitoring and control

We expect that monitoring of known populations of noxious weeds associated with project actions and effects in conjunction with a comprehensive survey of invasive weeds within the first year of license issuance and every 5 years thereafter, as recommended by the Forest Service in the draft plan, would provide for comprehensive noxious weed management. The survey and monitoring schedule recommended by the Forest Service in the draft plan is consistent with the timeframe specified in the Forest Service's original condition 25, except that a baseline survey within the first year of license issuance would establish the status of current invasive weed populations and would place all vegetation surveys on the same schedule. Annual monitoring of known "high priority" noxious weed populations in areas tied to project actions or effects would create situational awareness of weed encroachment into locations of existing special status or culturally significant plant populations, determine if other adverse impacts are occurring to these plant populations, and facilitate prompt scheduling of treatment as necessary. The comprehensive survey of selected "high priority" and additional invasive weeds would also facilitate updates to original survey work in the Commission-approved project area of potential effects (APE) (see section 3.3.6, *Cultural Resources*, for a description of the APE). Herbicides should not be the automatic first choice for weed control, because of the potential health and environmental risks associated with their use, especially near surface water. However, many herbicides have a lower risk of unintended adverse effects than other kinds of controls, and the risks of any control method must be weighed against the adverse effects of the weed in infestation itself (Tu et al., 2001). Any integrated weed management plan should emphasize nonherbicide techniques, and allow for herbicide use, if any, only at specific sites.

### **Special Status and Special Interest Plant, Fungi and Lichen Species**

Project operations have the potential to affect documented special status plant species that occur within the project area. Special status plant species were identified along the proposed McCloud and Pit 7 afterbay transmission line corridors, along the proposed access road to Pit 7 afterbay powerhouse, and at the proposed Pit 7 afterbay powerhouse. Populations of English Peak greenbriar, northern clarkia, slender false lupine, long-fruit jewel-flower, and Butte County morning glory could be susceptible to project construction and maintenance activities along project roads. In addition, project operations that alter flow in the Lower McCloud River could affect a population of Shasta eupatorium that occurs within the high water mark of the Lower McCloud River if flow regime alterations increase flows. Water level changes as a result of project operations could affect the sole population of Shasta eupatorium within the project area.

Based on a list of culturally significant plant species developed in consultation with the Tribes, a total of 32 species of culturally significant species were located during

surveys. Survey results for culturally significant plant species results were presented directly to the Tribes as a confidential report.

The Tribes have stated that they are concerned about the effects of herbicide applications to culturally significant plant species that grow near McCloud dam and tunnels and are traditionally used by the Tribes. The Tribes are also concerned about the effects of construction of the proposed McCloud transmission line on culturally important plants and habitats; chokecherry, hazel, bear grass, and medicinal plants are gathered in the area between McCloud reservoir and the town of McCloud.

In its original condition 25, the Forest Service specified the development and implementation of a Vegetation and Invasive Weed Management Plan, which would include provisions for identification, protection, and monitoring of populations of special status plant species (including culturally significant plant species). Specifically, the Forest Service would request that PG&E develop, in consultation with the Forest Service and approved by the Forest Service, a special status plant species component that includes elements to protect and maintain well-distributed, viable populations of special status and culturally significant plant species within the project and project-affected area. The Forest Service specified that the component for special status plant species (including culturally significant plant species) of the Vegetation and Invasive Weed Management Plan would require the delineation of current locations of special status and culturally significant plants using a global positioning system. This would ensure that information on locations of special status and culturally significant plant species is shared with other managers of transmission lines that cross the project area. The component would also provide for periodic monitoring once every 5 years to assess expansion or contraction of existing special status species populations; final populations would be selected from those located in Study CR-S2 for the Pit River Tribe but not identified in association with TCPs, and a similar protocol would be suggested for the Winnemem Wintu Tribe if it requests that culturally important plant species be included in revegetation efforts. In addition, the component would include surveys once every 10 years to determine the presence of any new populations of special status species, including culturally significant plant species or newly listed special status species. Alternatively, sites requiring protection could be displayed on an operations map as areas to avoid in order to prevent effects during management activities. Annual consultation and review of the most current Forest Service list of special status species would determine if any newly listed species or un-surveyed suitable habitat could potentially occur within the project area; additional monitoring would be initiated to detect the presence of the newly listed species within the project area. Should a species be located, a monitoring plan for the species would be developed in consultation with the Forest Service within 1 year to assess the potential for project-related effects to the species.

In its original condition 25, the Forest Service specified that, in addition to the development of the Vegetation and Invasive Weed Management Plan, PG&E would prepare, for Forest Service approval, a biological evaluation of the potential effects to special status species of any proposed action to construct project features on Forest

Service lands. The evaluation would include procedures to minimize any adverse effects, meet any management plan restrictions, and monitor implementation and effectiveness of any measures taken as part the construction.

PG&E alternative condition 25 included a component for special status and culturally significant plant species proposing that monitoring would begin the first year after the Vegetation and Invasive Weed Management Plan is approved by the Commission and every 5 years thereafter for periodic monitoring; and surveys for periodic assessment and inventory as well as those implemented for newly added species would occur the first year after the Vegetation and Invasive Weed Management Plan is approved by the Commission and every 10 years thereafter. In addition, specific to culturally significant plant species, PG&E proposed to limit the scope of the Forest Service's original condition 25 by removing specific measures for culturally significant plant species from the Vegetation and Invasive Weed Management Plan and including only culturally significant plant populations associated with TCPs. Instead, PG&E alternative condition 25 proposed that PG&E would share with managers information on the locations of culturally significant plant populations so that these populations could be considered prior to and during O&M activities and would be undertaken in consultation with the Forest Service. In addition, PG&E would comply with the requirements of the HPMP and section 106 of the NHPA with regard to areas identified in the re-licensing study for cultural resources that are currently utilized by Tribes to gather plants for traditional purposes and that qualify for inclusion in the National Register as historic properties. Finally, culturally significant plant species would be used during revegetation activities where feasible.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 25. The provisions specified in Forest Service modified condition 25 are similar to those specified in the Forest Service's original condition 25, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Vegetation and Invasive Weed Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

In the draft plan, the Forest Service recommends that a baseline comprehensive survey of special status, revegetation source, and essential habitat plant populations be conducted within the first year of license acceptance and every 10 years thereafter. These surveys would determine if special status plant species have moved into the project or project-affected area, if there are any changes to revegetation source populations (which include culturally significant plant populations not associated with TCPs), and the location and size of specific habitat areas for potentially project-affected special status wildlife species. Additionally, the Forest Service recommends that monitoring surveys of known special status and essential habitat plant populations be conducted within 1 year of plan approval and every 5 years thereafter. Regarding revegetation source populations, the Forest Service recommends that an operations map accessible to field crews and

managers display these populations so they can be avoided during habitat-disturbing work, rather than monitoring surveys in years between comprehensive surveys.

In the draft plan, the Forest Service also recommends that management actions would be put into effect to protect special status and essential habitat species when triggered by specific events, such as construction or project O&M. For planned disturbance activities, pre-construction surveys for special status and essential habitat plant species would be conducted within 30 days prior to ground disturbance. Disturbances would be restricted within a 100-foot buffer of known populations and fencing would be provided for populations if disturbance occurs within 100 feet; construction would be conducted, if possible, after vegetation has gone to seed; and top soil would be salvaged to maintain the seed source. While not explicitly stated in the draft plan, the implication of instituting limits and controls on disturbances to special status plant populations is that managers would be informed of sensitive or rare species locations, as was specified in the Forest Service's original condition 25. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 25 and withdraws its alternative condition 25.

#### *Our Analysis*

Surveys for special status plant species resulted in the identification of eight special status plant species. Coordination and consultation with the Forest Service during the development of the Vegetation and Invasive Weed Management Plan would provide ample protection of species and their habitats known to occur within the project area. Elements of the Vegetation and Invasive Weed Management Plan should provide potential enhancement of existing populations and habitat by managing and minimizing encroachment of invasive noxious weeds; providing measures to ensure proper use of herbicides; training and awareness for employees on special status species, including informing managers of sensitive, culturally significant, or rare plant population locations; adaptive management; and education of the public. PG&E alternative condition 25 proposed measures consistent with the Forest Service's original condition 25, with schedule modifications such that baseline population surveys and monitoring would be conducted within 1 year of plan approval. There is no regulatory requirement to include culturally significant plant species in any long-term monitoring component for special status plant species. Pre-licensing surveys did not identify any locations of culturally significant plant populations that had been specifically identified by Tribal members prior to and during meetings, and populations of culturally significant plant species that were identified are not considered to be TCPs subject to section 106 requirements of the NHPA. PG&E alternative condition 25 proposed to limit the scope of this element to only culturally significant plant populations associated with TCPs. Gathering areas that qualify as TCPs would have management measures incorporated into a revised HPMP prepared in consultation with the Tribes, Forest Service, SHPO, and the Commission.

We expect that implementation of the provisions recommended in the draft Vegetation and Invasive Weed Management Plan would minimize and mitigate for any

project effects to special status and essential habitat plant species that may occur as a result of new construction and project O&M for the term of the license. Regarding culturally significant plant populations not associated with TCPs, a component of the plan addressing the creation of an operations map identifying these species would provide protection of these populations from ground-disturbing or vegetation management activities related to project operations and/or construction activities. In addition, baseline surveys of these populations within 1 year of plan approval and every 5 years thereafter, conducted concurrently with other vegetation monitoring, would determine the range and extent of existing culturally significant plant populations that are not associated with TCPs. Additionally, reference to the measures for culturally significant plants associated with TCPs, as identified in the HPMP, should be included in the Vegetation and Invasive Weed Management Plan. Other, more general components in the Vegetation and Invasive Weed Management Plan such as employee awareness training and specific guidance on pesticide and herbicide treatments would also protect culturally significant plant populations. Restoration plantings should consider the use of culturally significant plant species where habitat is appropriate. When additional populations of culturally significant plant species are identified during monitoring, those new populations should be assessed for applicability with section 106 requirements and provided in a revised HPMP in coordination and consultation with the Forest Service, tribal members, and California SHPO.

#### **3.3.3.2.2 Wildlife**

##### **General Wildlife**

Project O&M activities at existing project facilities and proposed new construction sites that may generate short-term disturbances to general wildlife species include noise; road grading; slide removal; vegetation trimming or clearing and other ground-disturbing activities that result in habitat modification or removal; reservoir fluctuations; removal of logs and branches from reservoirs; and spraying of herbicides. Activities related to construction of future project facilities such as the proposed McCloud and Pit 7 afterbay powerhouses or recreation facilities that result in temporary disturbance to wildlife species include noise, lighting, and human activity during all aspects of proposed construction. Activity associated with construction may also result in the mortality of non- or minimally mobile wildlife species. Any effects of project O&M or construction activities on terrestrial wildlife species that occupy habitats within the project area as resident, transient, or migratory species would be mitigated through the implementation of limited operating periods and other monitoring and mitigation measures such as relocation. Additionally, species intolerant of disturbance that are mobile enough to flee or avoid the areas of activity would leave until activity subsides. In general, the effects would be short-term and temporary and not severe enough to affect the survival of a species or population.

In the license application, PG&E proposed measure 14 to develop a Wildlife Management Plan with a primary goal to guide the management of wildlife populations

and habitat at the project for the term of the new license. PG&E measure 14 would, at a minimum, contain monitoring methodologies, pre-construction survey protocols, and avoidance and protection measures as appropriate for special status species. The Wildlife Management Plan proposed by PG&E would also include a process and schedule for reporting survey and monitoring results as well as a process for periodic plan review and revision. In addition to measure 14, PG&E proposed measure 16 for avian hazard reduction. As proposed in measure 16, PG&E would, within 3 years after license issuance, upgrade segments of the existing distribution line that do not currently meet avian transmission line standards recommended by the APLIC to prevent bird electrocutions. In addition, measure 16 would require that all new construction of transmission and distribution of powerlines meet APLIC-recommended avian transmission line standards.

In its original condition 26, the Forest Service specified that, within 1 year of license issuance, PG&E develop a Terrestrial Biological Management Plan, in consultation with the Forest Service, California Fish and Game, potentially affected tribes, and other interested parties, and approved by the Forest Service. The Terrestrial Biological Management Plan would include Forest Service special status species (Forest Service Sensitive, Survey and Manage, and Management Indicator Species) potentially affected by the project on Forest Service lands. The plan would be implemented upon approval by the Commission.

In its original condition 26, the Forest Service specified that, to the extent possible, the development of the Terrestrial Biological Management Plan should be consistent with completed biological implementation plans for the nearby Pit 3, 4, and 5 Project to provide for similar data collection protocols for species that are found within both project areas and adjacent Forest Service lands. The Terrestrial Biological Management Plan would include but not be limited to: (1) monitoring of populations and locations occupied for special status species; (2) periodic surveys throughout the term of the license within the project and project-affected area to determine the location of any additional populations; and (3) reporting every 5 years (or at species-specific frequencies identified by the Forest Service) of terrestrial survey and monitoring results including suitable habitat, populations, individuals, pairs and nest locations. Results would be compatible with Forest Service GIS. In addition, and specific to disturbance or construction activities, the Forest Service's original condition 26 specified pre- and post-construction surveys for Forest Service special status species. All surveys and monitoring would be conducted under Forest Service approved standard protocols. Post-disturbance / construction monitoring would identify whether mitigation measures are necessary. Lastly, the Forest Service's original condition 26 specified that PG&E observe limited operating periods where required, excluding emergency situations. In order to protect special status avian species, the Forest Service specified that PG&E conduct surveys for neotropical breeding birds within suitable habitat prior to disturbance activities or observe annual limited operating periods from April 1 through August 30.

In its original condition 26, the Forest Service specified that within 1 year of license issuance, PG&E file with the Commission, an avian collision and electrocution hazards plan, approved by the Forest Service in consultation with appropriate federal and state agencies, which minimizes adverse interactions between project transmission lines and avian species. All new or rebuilt power poles would conform to guidelines in *Suggested Practices for Raptor Protection – State of the Art in 1996* (APLIC, 1996) or updates of the guidelines when they are issued. Any pole involved in a bird fatality would be immediately repaired/replaced to meet the guidelines.

PG&E alternative condition 26 proposed to revise the length of time allowed to prepare a Terrestrial Biological Management Plan from within 1 year as specified by the Forest Service's original condition 26 to 2 years. PG&E asserted that providing 2 years instead of 1 year to prepare the plan would allow more careful planning and adequate schedule coordination among the various agencies and other interested parties involved in drafting a plan. PG&E stated that 1 years would provide adequate time to achieve consistency to the extent possible, with license conditions for McCloud-Pit and Pit 3, 4, and 5. To support its proposal of a 2-year time frame for preparing and implementing a Terrestrial Biological Management Plan, PG&E presented a timeline of about 9 to 16 months which would make the 1-year schedule proposed by the Forest Service infeasible. PG&E also pointed out that there is nothing to preclude completion of the Terrestrial Biological Management Plan prior to the 2-year schedule proposed.

PG&E alternative condition 26 proposed to exclude survey areas where access is unsafe (steep terrain or high water flows) or private property for which PG&E does not have specific access permission. Surveys would be conducted for disturbance/pre-construction activities and monitoring for special status species as proposed in PG&E alternative condition 26.

Avian collision and electrocution hazards are also addressed under PG&E alternative condition 26; PG&E proposed to upgrade segments of existing distribution lines that do not currently meet the APLIC standards within 3 years of license issuance and ensure that new lines would meet current APLIC standards. In addition, PG&E alternative condition 26 proposed that any pole involved in a bird fatality would first be assessed prior to repair or replacement; the pole involved in the collision or electrocution could be a pole compliant with existing APLIC standards and may need further assessment to provide additional safety modifications.

Regarding PG&E's measure to develop a Terrestrial Biological Management Plan, The Hearst Corporation expresses concern that Hearst lands surround the entire McCloud reservoir and the Forest Service's original condition 26 would require PG&E to conduct surveys on private land. The Hearst Corporation suggests that monitoring and management plans and surveys be limited to project-affected and national forest lands.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 26. The provisions specified in Forest Service modified condition 26 are similar to those specified in the Forest Service's original condition 26, except that the

Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Terrestrial Biological Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

In the draft Terrestrial Biological Management Plan (Forest Service, 2010d, Enclosure 3), the Forest Service has changed its recommendation to agree with the staff recommendation from the draft EIS regarding the upgrade of existing powerlines that are not currently in compliance with APLIC guidance, according to a 3-year schedule. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 26 and withdraws its alternative condition 26.

#### *Our Analysis*

Isolated, short-term disturbances may occur to wildlife as a result of activities associated with project O&M activities tasks and could cause mobile wildlife species to leave an area until tasks are completed. Less mobile species may, on occasion, incur direct mortality as a result of actions such as trampling and those related to vegetation management, but implementation of the Terrestrial Biological Management Plan would mitigate possible effects on these species as a result of normal O&M activities and mortality would not be beyond what a population could absorb.

Proposed new construction within the project would have a short-term minor adverse effect to wildlife species as a result of disturbance from construction noise and human activity. Short-term and long-term alterations in habitat resulting from the construction of facilities and associated structures, including transmission lines, would result in wildlife species at least temporarily leaving areas of activity and long-term habitat modifications or permanent loss of habitat. Clearing along transmission corridors would result in the loss of linear portions of existing habitat, and wildlife within the proposed transmission line routes would leave the area during activity.

Measure 14 proposed by PG&E in the license application addressed special status wildlife species-related issues at the project for the term of the new license and, as outlined above, contained generalized plan elements for monitoring and protection of special status wildlife species within the project boundary, a timeframe for development and implementation, and a proposed schedule for completion of species-specific monitoring elements.

In its original condition 26, the Forest Service specified that PG&E file a Terrestrial Biological Management Plan also developed in consultation with the Forest Service and specifically added California Fish and Game, potentially affected tribes, and other interest parties. The plan specified by the Forest Service's original condition 26 would be developed within 1 year of license issuance.

PG&E alternative condition 26 proposes revisions to specific elements of the Forest Service's original condition 26, including a 2-year schedule to develop and implement a Terrestrial Biological Management Plan after license issuance to be

consistent with original measure 14 monitoring and protection measures. Because the Forest Service and PG&E have worked collaboratively on the plan and it is substantially complete, we expect that the development and implementation of a Terrestrial Biological Management Plan could be completed within 1 year of license issuance.

PG&E alternative condition 26 proposed that within 3 years of license issuance, PG&E would upgrade segments of the existing transmission lines that are not currently compliant with APLIC guidance and construct any new transmission lines to be compliant with current APLIC standards. PG&E asserted that a plan would not be necessary if the appropriate upgrades were simply undertaken within 3 years of license issuance. In the draft Terrestrial Biological Management Plan the Forest Service recommends actions for meeting APLIC standards that are in agreement with PG&E's alternative condition 26 and the staff recommendation included in the draft EIS.

### **Special Status Wildlife Species**

The potential effects on general wildlife species from project O&M activities also apply to special status wildlife species.

In its original condition 26, the Forest Service specified that beginning the first full calendar year after license issuance PG&E would, in consultation with the Forest Service, annually review the current list of special status wildlife species (species that are Forest Service Sensitive, Survey and Manage, Management Indicator Species, or on the Shasta-Trinity National Forest Watch List) that might occur on Forest Service lands in the project or project-affected area. If it is determined that newly listed special status species may occur within the project area, PG&E would develop and implement a study plan in consultation with the Forest Service to assess the effects of project O&M on special status species.

When a species is added to one or more of the lists, the Forest Service, in consultation with PG&E, would determine if the species or unsurveyed suitable habitat for the species is likely to occur on Forest Service lands within the project or project-affected areas. If the Forest Service determines that the species is likely to occur, PG&E would develop and implement a study plan in consultation with the Forest Service to reasonably assess the effects of the project on the species. PG&E would prepare a report on the study including objectives, methods, results, recommended resource measures where appropriate, and a schedule of implementation, and would provide a draft of the final report to the Forest Service for review and approval. PG&E would file the final report, including evidence of consultation, with the Commission. Upon Commission approval, PG&E would implement the resource management measures.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 26. The provisions specified in Forest Service modified condition 26 are similar to those specified in the Forest Service's original condition 26, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Terrestrial Biological

Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3). In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 26 and withdraws its alternative condition 26.

Regarding annual consultation between PG&E and the Forest Service and other agencies, The Hearst Corporation has suggested that annual meetings also be opened to “project-affected” private landowners.

#### *Our Analysis*

Wildlife, including special status species, has most likely adapted to the routine activity surrounding projects and is disturbed only during non-routine actions. Isolated, short-term disturbances may occur to special status wildlife species as a result of activities associated with vegetation management (e.g., mowing, trimming) or maintenance tasks and could cause mobile wildlife species to leave an area until tasks are completed.

To ensure that continued O&M activities of the existing projects as well as O&M of proposed facilities (if constructed) have minimal effects on special status species potentially occurring within the project area, annual consultation with the Forest Service and other appropriate agencies would be indispensable to PG&E’s planning and implementation of normal O&M activities and for any necessary construction activities that may be required. We expect that implementation of Forest Service modified condition 26 and a Terrestrial Biological Management Plan, including annual consultation and review of the most recent listing of special status species and implementation of resource management measures should a species likely occur, would continue to provide habitat and protection within the project area.

Regarding consultations, for any PG&E action that would potentially affect the property of private landowners, PG&E would need to consult with the private landowner.

#### *Terrestrial Mollusks*

Terrestrial mollusks could be affected by changes in soil conditions, availability of large rocks or woody debris as well as canopy cover, sources of food, and water. Non-native invasive mollusk species also threaten native terrestrial mollusk species; several species of invasive mollusks were identified within the project area in association with the special status species. Project O&M activities that disturb ground or clear vegetation can cause direct mortality as a result of crushing, injury, or desiccation through exposure. Trampling in recreational areas could also result in mortality. Indirect mortality could be caused by loss or modification of habitat adjacent to project facilities or recreation areas as well as inundation or dewatering of habitat. Proposed construction could also affect special status terrestrial mollusk species directly through various activities (ground disturbance, vegetation removal) that are in the immediate vicinity of mollusk populations.

PM&E measure 14 proposed the development of monitoring methodologies, pre-construction survey protocols, avoidance, and protection measures as appropriate for

terrestrial mollusks. Pre-construction surveys would be conducted in areas of suitable habitat potentially affected by any planned construction, and a buffer distance around the construction site would be defined based on existing standards and protocols for mollusk species. Protection or relocation of species would be required when located within the footprint of construction sites.

In its original condition 26, the Forest Service specified that PG&E develop within the Terrestrial Biological Management Plan special status species component an element to address terrestrial mollusks. For terrestrial mollusks, PG&E would conduct monitoring surveys of known sites within 1 year of license issuance and every 5 years thereafter. PG&E would survey potentially suitable habitat for new populations every 10 years for the term of the license. Species to be monitored would include the Shasta sideband snail (*Monadenia troglodytes troglodytes*), Wintu sideband snail (*M. troglodytes wintu*), Shasta chaparral snail (*Trilobosis roperi*), Tehama snail (*T. tehama*), and the Shasta hesperian snail (*Vespericola shasta*) at known sites along the McCloud reservoir, Lower McCloud River, Iron Canyon reservoir and Creek, and Pit 6 and 7 reservoirs. Protection or relocation of terrestrial mollusks would occur in development sites prior to construction.

PG&E alternative condition 26 proposed that locations of monitoring sites within the project-affected area and survey protocols would be contained in a Terrestrial Biological Management Plan. PG&E proposed to monitor known populations of sensitive terrestrial mollusks beginning the first year after license issuance and once every 5 years thereafter. PG&E also proposed to survey potentially suitable habitat for new populations every 10 years for the term of the license. Monitoring proposed in PG&E alternative condition 26 would be conducted within project-affected areas within 200 feet of facilities and roads, a 16-foot-wide band surrounding reservoirs, and along both sides of the Lower McCloud River and Iron Canyon Creek. Also included would be limestone outcrops within 100 meters of riparian zones or 200 meters of project facilities. A subset of sites surveyed would be chosen for monitoring based on documented occurrences. Protection and relocation of any individuals detected within the footprint of construction activities would also occur. PG&E alternative condition 26 proposed that pre-construction surveys in areas of suitable habitat potentially affected by planned construction would be conducted to identify and protect any previously unknown populations in construction areas.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 26. The provisions specified in the Forest Service modified condition 26 are similar to those specified in the Forest Service's original condition 26, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Terrestrial Biological Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

In the draft Terrestrial Biological Management Plan, the Forest Service recommends that a survey of known special status terrestrial mollusk populations be conducted within 1 year of license acceptance, 6 years after license acceptance, and every 10 years thereafter. Additionally, the Forest Service recommends that PG&E conduct surveys for special status terrestrial mollusks within other suitable habitat within the project and project-affected areas, within 1 year of license acceptance and every 10 years thereafter. The Forest Service also recommends that PG&E conduct pre-construction surveys for special status terrestrial mollusk species, no more than 30 days prior to ground disturbance. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 26 and withdraws its alternative condition 26.

#### *Our Analysis*

Terrestrial mollusks within the project area could be adversely affected by construction activities within habitat where they occur, especially Oregon shoulderbanded snail, Shasta hesperian snail, and the Shasta chaparral snail. In its original condition 26, the Forest Service specified monitoring of known special status terrestrial mollusks every 5 years, surveys for new populations in suitable habitat every 10 years, and conducting pre-construction surveys. PG&E alternative condition 26 proposed pre-construction surveys for potential new populations of terrestrial mollusks in suitable habitat identified within the construction footprint. Protection by establishing a buffer around construction areas, or relocation of snails, would be implemented prior to the initiation of construction. In the draft Terrestrial Biological Management Plan, as compared to its original condition 26, the Forest Service recommends less frequent surveys of known populations, which would be less protective of special status terrestrial mollusks.

Surveys for known populations of special status terrestrial mollusk species, along with any required pre-construction surveys, would provide information on the existing populations of terrestrial mollusks and their overall condition, and determine if project O&M and construction activities are affecting terrestrial mollusk populations. Surveys for known populations conducted within 1 year of license issuance and every 5 years thereafter would provide a baseline status assessment of existing special status terrestrial mollusk populations and be more protective of these existing populations than the schedule recommended by the Forest Service in the draft Terrestrial Biological Management Plan. Surveys of suitable habitat within the first year of license issuance and every 10 years thereafter, and adaptation of management to include new species or populations that are detected, would ensure protection of potential future populations of special status terrestrial mollusk species within the project area for the term of the license.

#### *Amphibians and Reptiles*

There are no anticipated project effects on tailed frogs in tributaries to the Lower McCloud River. No project activities are planned near Ladybug Creek or in any other tributary to the Lower McCloud River that may harbor tailed frogs.

Shasta salamander and northwestern pond turtle could be adversely affected by normal project O&M in the vicinity of the McCloud reservoir and the Pit 7 afterbay, as well as proposed recreation construction near the Pit 6 and Pit 7 reservoirs. Ground-disturbing activities (e.g., vegetation management, LWD removal, road work, slide removal) can alter or eliminate habitat for these species. Removing or crushing limestone can also adversely affect the Shasta salamander through alteration or loss of preferred habitat. Disturbance of wet areas or seeps, particularly during the reproductive season, can also cause mortality to salamanders and turtles, their eggs, or young. Shasta salamanders and northwestern pond turtle are the only special status amphibian or reptile species identified as occurring within proposed construction sites.

Foothill yellow-legged frog individuals were found in the Lower McCloud River where suitable habitat occurs. Environmental conditions that could affect the foothill yellow-legged frog include water temperature, water depth, water velocity, substrate size, food resources availability, and canopy cover. Predation and proximity to tributaries also could affect the foothill yellow-legged frog; however, these factors are not related to project O&M. Project O&M could affect water temperature, depth, and velocity, as well as food availability. Vegetation management could potentially reduce canopy cover.

The northwestern pond turtle near the Lower McCloud River shoreline and the Pit 6 and Pit 7 reservoirs could be adversely affected by unexpected, high volume flows (such as those resulting from emergency shut-downs) that could inundate nest sites. Spills that could cause these conditions are not a part of normal operations and could be expected to occur infrequently. In addition, removal of LWD that provides underwater shelter as well as basking areas could alter suitable nesting and overwintering sites.

In measure 14, PG&E proposed specific components addressing special status amphibians and reptiles which would be developed in consultation with the Forest Service and other relevant agencies and groups. Included in the Wildlife Management Plan would be a schedule for reporting survey and monitoring results for all special status species amphibians and reptile monitoring surveys.

In its original condition 26, the Forest Service specified conditions for special status species regarding the development and implementation of a Terrestrial Biological Management Plan.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 26. The provisions specified in modified condition 26 are similar to those specified in original condition 26, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Terrestrial Biological Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

In its original condition 26, the Forest Service specified monitoring of Shasta salamander at known locations once every 5 years along the McCloud reservoir and Fenders Ferry Flat afterbay as well as surveys of suitable habitat every 10 years to

determine any new locations of the species. Estimates of population age and distribution would be included in reports summarizing monitoring surveys. PG&E alternative condition 26 proposed to eliminate the Forest Service's original condition 26 language for monitoring Shasta salamander at known locations once every 5 years stating that there is no project nexus for additional monitoring or surveying in areas that are not affected by project operations. PG&E alternative condition 26 proposed to include pre-construction surveys to protect and monitor Shasta salamanders. Pre-construction surveys following the standard protocol for Shasta salamander would be conducted in areas of suitable habitat within 180 meters of any proposed new development/expansion or ground-disturbing activity. Protection or relocation of individuals of Shasta salamanders would occur prior to any construction or ground-disturbing activities.

In the draft Terrestrial Biological Management Plan (Forest Service, 2010d, Enclosure 3), the Forest Service recommends that a survey of known Shasta salamander populations be conducted within 1 year of license acceptance, 6 years after license acceptance, and every 10 years thereafter. Additionally, the Forest Service recommends that the license conduct surveys for Shasta salamander populations within other suitable habitat within the project and project-affected areas, within 1 year of license acceptance and every 10 years thereafter. The Forest Service also recommends that PG&E conduct pre-construction surveys for Shasta salamander, no more than 30 days prior to ground disturbance within 150 meters of the disturbance area.

Forest Service modified condition 27 specifies that the northwestern pond turtle and foothill yellow-legged frog should be included in the Aquatic Biological Monitoring Plan. The Forest Service also specifies in modified condition 26, however, that the northwestern pond turtle be included in the Terrestrial Biological Management Plan. We assume that the Forest Service intended for the northwestern pond turtle be removed from the Terrestrial Biological Management Plan and placed in the Aquatic Biological Monitoring Plan. Therefore, the northwestern pond turtle is now a part of the Aquatic Biological Monitoring Plan; however, both the northwestern pond turtle and foothill yellow-legged frog are discussed below because of their original inclusion within the Terrestrial Biological Management Plan.<sup>13</sup>

*Foothill Yellow-Legged Frog* — In its original condition 26, the Forest Service specified surveys be completed once every 10 years for additional populations of foothill yellow-legged frog along the 5.4 miles of National Forest Service lands along the Lower McCloud River and along the Pit 6 and Pit 7 reservoirs and tributaries. Any individuals of foothill yellow-legged frog found in areas proposed for disturbance or construction would be protected or relocated. PG&E alternative condition 26 proposed that foothill yellow-legged frog surveys begin the first year after plan approval and every tenth year

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<sup>13</sup> Although protection measures specific to the northwestern pond turtle and foothill yellow-legged frog are discussed in section 3.3.3.2.2 *Wildlife*, these species are included in the Aquatic Biological Monitoring Plan (Forest Service, 2010, Enclosure 3).

thereafter in suitable habitat, along the tributaries to Pit 6 and Pit 7 reservoirs but excluding 5.4 miles of NFS lands and the Pit 6 and Pit 7 reservoirs. PG&E proposed that pre-construction surveys be conducted in suitable habitat at or adjacent to construction or maintenance activities for any proposed new developments or disturbance areas, as well as existing sites to be expanded or redeveloped. The survey area would include 0.8 kilometer (0.5 mile) upstream and downstream of all perennial tributaries that intersect the linear transmission line footprint.

In its comments on the draft EIS, PG&E states that it did not include surveys of NFS lands on the Lower McCloud River because water temperatures at these locations do not consistently reach the threshold to initiate foothill yellow-legged frog breeding until June, which PG&E states is likely to be too late in the season for the foothill yellow-legged frog to initiate breeding with sufficient time for larvae to metamorphose by fall.

In the draft Aquatic Biological Monitoring Plan (Forest Service, 2010d, Enclosure 3), the Forest Service recommends that surveys for new populations of foothill yellow-legged frogs in suitable habitat be conducted within 1 year of implementation of the required minimum instream flows in the Lower McCloud River and every 10 years thereafter. The Forest Service recommends these surveys be conducted within the project and project-affected areas along the Lower McCloud River and tributaries to the Pit 6 and Pit 7 reservoirs.

The Forest Service also filed a 10(a) recommendation that, within 1 year after licensing, PG&E should develop a Foothill Yellow-Legged Frog Monitoring Plan that would include the following provisions: (1) population monitoring during wet and dry seasons for an initial 5-year period; and (2) incremental population monitoring every 4 years. Under the Forest Service recommendation, PG&E would survey foothill yellow-legged frog distribution along the McCloud River from Claiborne Creek to the confluence with Shasta Lake. Monitoring data would be used to evaluate any project effects on the foothill yellow-legged frog, such as through the development of a predictive tool for use in determining breeding period initiation and termination, in order to prevent flow dynamics from adversely affecting the foothill yellow-legged frog.

PG&E submitted comments on the Forest Service 10(a) recommendation regarding foothill yellow-legged frog population monitoring and specified alternative approaches including the following: (1) submission of a Foothill Yellow-Legged Frog Monitoring Plan within 2 years for license issuance; (2) annual monitoring during the initial 5-year study period; and (3) incremental monitoring every 5 years. Foothill yellow-legged frog surveys would be conducted at selected sites and tributaries within and along the Lower McCloud River from Tuna Creek to the confluence with Shasta Lake, based on locations where foothill yellow-legged frog breeding and suitable habitat were observed during relicensing studies. Monitoring data would be used to evaluate any changes in foothill yellow-legged frog populations over the license term. The modeling component proposed by the Forest Service would be simplified such that monitoring data would be used to estimate initiation of the breeding period in future years in order to

avoid untimely uncontrollable spills or flow fluctuations that could detrimentally affect foothill yellow-legged frog recruitment.

In its November 29, 2010, filing, the Forest Service includes its 10(a) recommendation as part of the draft Aquatic Biological Monitoring Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3). The Forest Service does not include modifications to the provisions specific to its 10(a) recommendation and notes in the draft plan that, because Forest Service authority does not extend to the entire project-affected area, it is submitting the recommendation where there are no direct or indirect effects to NFS resources.

*Northwestern Pond Turtle* — In its original condition 26, the Forest Service specified monitoring of known northwestern pond turtle populations once every 5 years, and surveying suitable habitat once every 10 years to identify additional populations. Estimates of population age distribution would be included in reports summarizing survey results. Individuals located within the area of potential disturbance or construction activity would be protected or relocated.

PG&E alternative condition 26 proposed surveys for known northwestern pond turtle populations within the first year after approval of the Terrestrial Biological Management Plan and every fifth year thereafter. PG&E proposed surveys for additional populations of northwestern pond turtle in suitable habitat within the first year after approval of the Terrestrial Biological Management Plan and every tenth year thereafter. PG&E would also conduct pre-construction surveys in areas of suitable habitat that could potentially be affected by planned construction. Visual observations would estimate the number of individuals within the age classes of adults, juveniles, and young-of-the-year.

In the draft Aquatic Biological Monitoring Plan (Forest Service, 2010d, Enclosure 3), the Forest Service recommends that a survey of known northwestern pond turtle populations be conducted within 1 year of license acceptance, 6 years after license acceptance, and every 10 years thereafter. Additionally, the Forest Service recommends that PG&E conduct surveys for northwestern pond turtle populations within other suitable habitat within the project and project-affected areas, within 1 year of license acceptance and every 10 years thereafter. The Forest Service also recommends that PG&E conduct pre-construction surveys for northwestern pond turtle, no more than 30 days prior to ground disturbance.

#### *Our Analysis*

As analyzed in the draft EIS, PG&E's proposed measure 14 to develop and implement a Wildlife Management Plan would provide monitoring and protection protocols as well as survey procedures to minimize any project effects that could occur to amphibian and reptile special status species occurring in habitats (or with the potential to occur) within the project area. The Forest Service's original condition 26 specified details for monitoring and surveys for listed special status amphibian and reptile species, including pre-construction surveys for the Shasta salamander, foothill yellow-legged

frog, and northwestern pond turtle; surveys of known populations of the Shasta salamander and northwestern pond turtle every 5 years; and surveys for new populations of all three species in suitable habitat every 10 years. PG&E alternative condition 26 was similar to the Forest Service's original condition 26 but eliminated surveys for known and new populations of the Shasta salamander and proposed baseline surveys for known and new populations of the northwestern pond turtle and new populations of the foothill yellow-legged frog within the first year after approval of the Terrestrial Biological Management Plan. In comparison to the Forest Service's original condition 26, in the draft Terrestrial Biological Management Plan the Forest Service does not include pre-construction surveys for the foothill yellow-legged frog and recommends less frequent surveys of known populations of Shasta salamander and northwestern pond turtle, which would be less protective of these special status species than the measures specified in original condition 26.

Surveys for known populations of the Shasta salamander and northwestern pond turtle, along with any required pre-construction surveys, would provide information on the existing populations of these special status species and their overall condition, and minimize any potential effects to these species from project O&M and construction activities. Surveys for known populations within 1 year of license issuance and every 5 years thereafter would provide a baseline status assessment of existing populations and be more protective of these existing populations than the schedules recommended by the Forest Service in the draft Terrestrial Biological Management Plan and draft Aquatic Biological Monitoring Plan. Surveys of suitable habitat within the first year of license issuance and every 10 years thereafter, and adaptation of management to include new species or populations that are detected, would ensure protection of potential future populations of Shasta salamander, foothill yellow-legged frog, and northwestern pond turtle within the project area for the term of the license.

Specifically for the foothill yellow-legged frog, surveys along the Lower McCloud River and along the Pit 6 and Pit 7 reservoirs would not be necessary as cold water temperature in the Lower McCloud River and absence of appropriate habitat immediately surrounding the reservoirs would preclude the presence of the foothill yellow-legged frog in those areas. However, the presence of the foothill yellow-legged frog in the vicinity of the Pit 6 and Pit 7 reservoirs would be more likely if this species develops a presence in the Pit 5 reach. Pre-construction monitoring would protect foothill yellow-legged frogs within proposed disturbance activity and would be more effective at maintaining and potentially enhancing populations of the foothill yellow-legged frog in the project and project-affected area. Additionally, proposed flow regimes that include ramping prior to spill events would minimize scouring of substrates reducing the potential for scouring of egg masses of foothill yellow-legged frog from substrates.

### **Birds**

Normal project O&M activities could disturb breeding, causing nest failures as a result of nest abandonment, egg exposure to predation, and premature fledging of young

birds, and could result in complete abandonment of the breeding territory. Noise and human activity associated with the proposed construction activities within the project area could result in disturbance to birds, including raptors and special status species. Some individuals may temporarily abandon the area.

Avian transmission line structures provide perching, roosting, and nesting opportunities for raptor species, especially those that inhabit open areas or areas where natural nest sites are absent or limited. Avian mortality can occur directly through electrocution or indirectly from injuries sustained by impacting with lines. Existing project transmission lines (James B. Black, Pit 6 and Pit 7), meet or exceed the APLIC standards for protection of birds from electrocution. A distribution line associated with Pit 5 contains some poles that are not compliant with current APLIC standards.

PG&E's proposed measure 14 in the license application to develop a Wildlife Management Plan to address special status bird species that would be developed in consultation with the Forest Service and other relevant agencies and groups. Included in the Wildlife Management Plan would be a schedule for reporting survey and monitoring results for all special status bird species. Few specific details were provided and would be developed in consultation with federal and state agencies as well as other interested stakeholders.

In its original condition 26, the Forest Service specified a list of special status bird species and detailed monitoring and survey elements to be included in a Terrestrial Biological Management Plan. The Forest Service's original condition 26 specifies species-specific elements of the Terrestrial Biological Management Plan for avian special status species in regards to construction. Dependent on the existence of suitable habitat required by avian special status species within proposed construction areas including transmission lines, pre-construction surveys for listed avian species would be conducted. As an alternative to pre-construction surveys, limited operating periods specific to the breeding season for a species could be enforced. The limited operating periods specified in the Forest Service's original condition 26 for specific special status avian species were: bald eagle, January 1 to August 1; northern goshawk and peregrine falcon, February 1 to August 15; and willow flycatcher and neotropical breeding birds, April 1 to August 30.

PG&E alternative condition 26 proposed clarifications to the distance from proposed construction activity for pre-construction surveys by species: northern goshawk – within 0.5 mile; bald eagle – within 1 mile; peregrine falcon – within 1 to 3 miles; and willow flycatcher – within 200 feet of private land where access has been granted and within 300 feet of public land.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 26. The provisions specified in Forest Service modified condition 26 are similar to those specified in the Forest Service's original condition 26, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Terrestrial Biological Management Plan, included as an enclosure to the filing (Forest Service, 2010d,

Enclosure 3). Species-specific details recommended by the Forest Service in the draft Terrestrial Biological Management Plan are discussed below. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 26 and withdraws its alternative condition 26.

#### *Northern Goshawk*

In its original condition 26, the Forest Service specified surveys of known northern goshawk populations in the project or project-affected areas would occur within 0.25 mile of previously identified detection sites once per 5 years; suitable habitat would be surveyed once per 10 years to identify any additional individuals or pairs.

PG&E alternative condition 26 proposed to eliminate monitoring within 0.25 mile of previously identified detection sites once per 5 years stating that there are no known active nests in the areas affected by project operations.

In the draft Terrestrial Biological Management Plan (Forest Service, 2010d, Enclosure 3), the Forest Service recommends that the license conduct surveys for northern goshawk within other suitable habitat within the project and project-affected areas, within 1 year of license acceptance and every 10 years thereafter. Additionally, the Forest Service recommends surveys of any located nests every 10 years, beginning 5 years after nest discovery. The Forest Service also recommends that PG&E conduct pre-construction surveys for northern goshawk, no more than 30 days prior to ground disturbance within 0.5 mile of habitat, or follow a limited operating period of February 1 through August 15.

#### *Bald Eagle*

In its original condition 26, the Forest Service specified monitoring of bald eagle individuals, pairs, and nest productivity annually at McCloud reservoir, Iron Canyon reservoir, Pit 6 and Pit 7 reservoirs, and any additional locations identified during surveys or monitoring as approved by the Forest Service, including surveys in suitable habitat annually. Protective actions to minimize disturbance factors would include: buffer zones around each known nest territory; potential zoning of water surfaces in project reservoirs with respect to use and access of watercraft; coordination of PG&E and Forest Service land management activities within bald eagle nest territories such as timber harvest, mining, and woodcutting; periodic monitoring of human use patterns to discern human / bald eagle interaction and development and placement of interpretive signage at McCloud and Iron Canyon reservoirs addressing bald eagles.

PG&E alternative condition 26 proposed to ensure that annual monitoring for bald eagles would be consistent with PG&E's ongoing bald eagle monitoring program and clarifies locations of monitoring sites within the project-affected area.

In the draft Terrestrial Biological Management Plan (Forest Service, 2010d, Enclosure 3), the Forest Service recommends that a survey of known bald eagle populations be conducted annually. Additionally, the Forest Service recommends that the license conduct surveys for bald eagle populations within other suitable habitat within

the project and project-affected areas, within 1 year of license acceptance and every 10 years thereafter. The Forest Service also recommends that PG&E conduct pre-construction surveys for bald eagle, no more than 30 days prior to ground disturbance within 0.5 mile of habitat, or follow a limited operating period of February 1 through August 15. Protocol for bald eagle surveys would follow the existing protocol in the Interagency Bald Eagle Management Plan developed for the Pit 3, 4, 5 Project (Project No. 233). Forest Service modified condition 26 also recommends that additional monitoring for bald eagles would be conducted along the Lower McCloud River in the event that winter-run Chinook salmon are re-introduced to the McCloud drainage. Furthermore, in the draft Vegetation and Invasive Weed Management Plan, the Forest Service recommends the implementation of botanical management actions to improve wildlife habitat, which could include nesting habitat for bald eagles (section 3.3.3.2.1, *Vegetation*).

#### *Peregrine Falcon*

In its original condition 26, the Forest Service specified that annual monitoring of peregrine falcon individuals, pairs, and nest activity occur within 0.25 mile of known sites on Forest Service lands. In addition, the Forest Service's original condition 26 specifies monitoring once per 5 years in potentially suitable habitat.

PG&E alternative condition 26 proposed that surveys for peregrine falcon would begin the first year after Terrestrial Biological Management Plan approval and every fifth year thereafter at known nesting sites and at suitable cliff nesting habitat along Pit 6 and Pit 7 reaches of the Pit River Canyon, the McCloud River reach downstream of McCloud dam, and Iron Canyon Creek downstream of Iron Canyon reservoir to the confluence with the Pit River. Specifically excluded were survey areas where access is unsafe or private property which PG&E does not have specific permission to access to perform the survey.

In the draft Terrestrial Biological Management Plan (Forest Service, 2010d, Enclosure 3), the Forest Service recommends that a survey of known peregrine falcon populations be conducted annually. Additionally, the Forest Service recommends that the license conduct surveys for peregrine falcon populations within other suitable habitat within the project and project-affected areas, within 1 year of license acceptance and every 10 years thereafter. The Forest Service also recommends that PG&E conduct pre-construction surveys for peregrine falcon, no more than 30 days prior to ground disturbance, and follow a limited operating period of February 1 through August 15 if individuals are found. Protocol for peregrine falcon surveys would follow the University of California Santa Cruz Predatory Bird Research Group guidelines.

#### *Willow Flycatcher and Neotropical Breeding Birds*

In its original condition 26, the Forest Service specified that PG&E survey suitable habitat for willow flycatcher habitat (including dispersed campsites) once every 5 years

and that habitat for willow flycatcher be restored or enhanced within the project or the project-affected area where project activities affect willow flycatcher habitat vegetation.

PG&E alternative condition 26 proposed surveys of suitable willow flycatcher habitat beginning the first year after plan approval and every fifth year thereafter. Although there are no known willow flycatcher nesting sites within the project or project-affected areas, surveys would follow standard protocols for the species and would be conducted in contiguous suitable habitat within 300 feet (on public lands) and 200 feet (on private land where access has been granted to PG&E) from the following features: (1) project-affected mainstem river reaches (the Pit River from the James B. Black powerhouse tailrace to Shasta Lake, Iron Canyon Creek downstream of Iron Canyon dam, and the McCloud River from McCloud dam to Squaw Valley Creek); (2) project waterbodies (McCloud, Iron Canyon, Pit 6 and Pit 7 reservoirs, and Pit 7 afterbay); and (3) project-related recreation sites (e.g., campsites, including dispersed campsites; day-use areas; boat launches). PG&E alternative condition 26 also proposed to restore and enhance willow habitat where the project has affected vegetation.

Transmission lines can be a hazard to birds, especially raptors such as the bald eagle, golden eagle, and peregrine falcon. Birds touching lines can be electrocuted or badly injured if directly striking a line. Existing project transmission lines meet or exceed APLIC standards to prevent electrocution of birds with the exception of the Pit 5 distribution line that contains some poles that are not in compliance. PG&E measure 16 proposed, the Forest Service's original condition 26 specified, and Forest Service modified condition 26 specifies avian collision and electrocution hazard prevention measures (see section 3.3.3.2.2, *Wildlife, General Wildlife*).

In the draft Terrestrial Biological Management Plan (Forest Service, 2010d, Enclosure 3), the Forest Service recommends that a survey of known willow flycatcher and neotropical breeding bird populations be conducted within 1 year of license acceptance, 6 years after license acceptance, and every 10 years thereafter. Additionally, the Forest Service recommends that the license conduct surveys for willow flycatcher and neotropical breeding bird populations within other suitable habitat within the project and project-affected areas, within 1 year of license acceptance and every 10 years thereafter. The Forest Service recommends that PG&E conduct pre-construction surveys for willow flycatcher and neotropical breeding birds, no more than 30 days prior to ground disturbance within 250 feet of habitat, or follow a limited operating period of May 1 through August 1. Additionally, in the draft Vegetation and Invasive Weed Management Plan, the Forest Service recommends the implementation of botanical management actions to improve wildlife habitat, including the protection of willow and alder habitat for the willow flycatcher and riparian habitat for neotropical breeding birds (section 3.3.3.2.1, *Vegetation*).

#### *Our Analysis*

Project O&M and construction activities within the project area all have the potential to adversely affect avian special status species. Primary effects would result

from noise and activity disturbance near roosting or nesting sites and, in the case of breeding pairs, could lead to loss of a breeding season from nest abandonment, increased opportunity for nest predation, and premature fledging of young. In its original condition 26, the Forest Service specified surveys for known populations of northern goshawk every 5 years and for new populations within suitable habitat every 10 years; surveys of known populations of bald eagle and peregrine falcon and surveys for new populations within suitable habitat on an annual basis; and surveys for willow flycatcher within suitable habitat every 5 years. In comparison, PG&E alternative condition 26 proposed only pre-construction surveys for northern goshawk; surveys of known populations of peregrine falcon, and surveys for new populations within suitable habitat, within 1 year of approval of the Terrestrial Biological Management Plan and every 5 years thereafter; and surveys for willow flycatcher in suitable habitat within 1 year of plan approval and every 5 years thereafter. In the draft Terrestrial Biological Management Plan, as compared to its original condition 26, the Forest Service recommends less frequent surveys for known populations of willow flycatcher and for new populations of bald eagle, peregrine falcon, northern goshawk, and willow flycatcher, which would be less protective of these species.

Development and implementation of specific elements of the draft Terrestrial Biological Management Plan recommended by the Forest Service for special status bird species, including pre-construction surveys; limited operating periods; surveys for known populations of northern goshawk, bald eagle, and peregrine falcon would provide information on the existing populations of these species and their overall condition, and minimize any potential effects to these species from project O&M and construction activities. Specific to peregrine falcon and bald eagle nest sites within the project area, buffers for active nest sites would protect them from disturbance due to project O&M activities and could be applied to recreational activities in the vicinity of active nests. Annual surveys for known populations of bald eagle and for new populations in suitable habitat would provide a baseline status assessment of these populations and would be more protective than the schedule recommended by the Forest Service in the draft Terrestrial Biological Management Plan. Surveys for known populations of peregrine falcon within 1 year of license issuance and every 5 years thereafter would provide a baseline status assessment and provide adequate protection of existing populations. Surveys for new populations of peregrine falcon within suitable habitat within 1 year of license issuance and every 5 years thereafter would be more protective of these existing populations than the schedule recommended by the Forest Service in the draft Terrestrial Biological Management Plan. Pre-construction surveys for willow flycatcher combined with surveys for new populations in suitable habitat within 1 year of license issuance and every 5 years thereafter would provide adequate protection for this species. Additionally, a limited operating period of April 1 through August 31 would provide more protection for this species than the limited operating period of May 1 through August 1 recommended by the Forest Service in the draft Terrestrial Biological Management Plan. Additionally, a re-evaluation of the geographic survey area and protocol for bald eagle if

salmon are re-introduced above McCloud dam would provide additional protection for this species. Finally, we expect that specific standards for transmission lines developed by APLIC that are employed along proposed power lines and retrofitted on existing lines would avoid or minimize avian electrocution hazards to this species if it occurs within the project area.

## **Mammals**

### *Bats*

Current project O&M activities have the potential to affect bat species and their habitat within the project area. Special status bat species within the project area utilize project structures and facilities for day or night roosts as well as maternity sites during the breeding season. Individuals could be harmed if directly disturbed or excluded from the structures. Maintenance activities are seldom conducted at night, and would be unlikely to disturb roosting individuals. Project O&M activities that occur during the day at these locations when individuals are present could disturb individuals and cause them to leave the facility; extended maintenance activity could cause individuals to relocate. If facility openings that allow access for individuals are sealed at the wrong time, or inappropriately exclude individuals from gaining access, adverse effects to bat species including the special status species could occur, including indirect mortality and loss of roost habitat. Maternity roost habitat was observed at McCloud intake structure, James B. Black powerhouse, and Willow Creek siphon. Inappropriate exclusion of female bats from maternity sites within these facilities could result in indirect mortality. Unscreened vent pipes at campground restrooms may provide outside access to the vault underneath the restroom and subsequently allow access into the restroom if the toilet lid is open or absent. Routine maintenance of these restroom structures is unlikely to disturb roosting bats.

Roost habitat could potentially be disturbed or removed as a result of construction activity. Also, ground-disturbing construction activities could affect the entrance and egress points for bats, and could alter patterns of air flow and groundwater dynamics, potentially affecting the micro climate within the cave complex and altering the suitability of habitat for bats using the cave. Transmission line construction along the proposed route could also alter foraging habitat, because altering the vegetation structure could change the composition of prey species. Some bat species may benefit from changes in vegetation structure resulting from the construction if forest edge and open habitats are increased. Night-time construction activity in these areas could result in short-term disturbance to foraging bats; however, disturbance to foraging bats would be negligible since bats could relocate to other undisturbed foraging areas.

In its original condition 26, the Forest Service specified that PG&E conduct annual monitoring for Forest Service special status bat species (Townsend's big-eared bat, pallid bat, and western red bat) at known locations around McCloud reservoir and Pit 7 reservoir, and that PG&E conduct surveys once every 5 years in suitable habitat. All bathroom vents at existing and proposed recreational sites would be screened to

reduce bat mortality and consultation with the Forest Service would occur prior to implementing any bat-exclusion techniques. PG&E alternative condition 26 proposed monitoring at known sites and other project-related suitable habitat beginning the first year after plan approval and every fifth year thereafter. Appropriate sites for periodic monitoring would be identified in collaboration with participating agencies and would focus on Forest Service special status bat species. Survey methods could include a combination of passive acoustic, active acoustic, and capture techniques such as mist netting and harp traps. For any surveys capture methods, surveyors would have the necessary permits to handle bats.

In its original condition 26, the Forest Service specified pre-construction surveys to be conducted prior to disturbance or construction would be scheduled outside of the limited operating period from March 1 through September 30. Prior to construction or reconstruction within 1 mile of known locations, a strategy/mitigation plan for the land-based bat population at McCloud reservoir would be developed. PG&E alternative condition 26 proposed that pre-construction surveys would be conducted to assess the presence and roosting within areas of suitable habitat potentially affected by construction activity, or construction would be scheduled outside of the limited operating period during the maternity period of May 1 to August 31. PG&E would develop a strategy and mitigation plan that would include noise disturbance distances for the land-based bat population at McCloud reservoir.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 26. The provisions specified in Forest Service modified condition 26 are similar to those specified in the Forest Service's original condition 26, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Terrestrial Biological Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

In the draft Terrestrial Biological Management Plan (Forest Service, 2010d, Enclosure 3), the Forest Service recommends that a survey of known special status bat populations be conducted within 1 year of license acceptance, 6 years after license acceptance, and every 10 years thereafter. Additionally, the Forest Service recommends that the license conduct surveys for special status bats within other suitable habitat within the project and project-affected areas, within 1 year of license acceptance and every 10 years thereafter. The Forest Service also recommends that PG&E conduct pre-construction surveys for special status bat species, no more than 30 days prior to ground disturbance within 250 feet of suitable habitat, or follow a limited operating period of May 1 through August 31. Furthermore, in the draft Vegetation and Invasive Weed Management Plan, the Forest Service recommends the implementation of botanical management actions to improve wildlife habitat, which could include maternity sites for special status bats (section 3.3.3.2.1, *Vegetation*). In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 26 and withdraws its alternative condition 26.

### *Our Analysis*

Special status bat species can occur with other species of bats at day and night roost sites. Surveys for known populations of special status bat species, along with pre-construction surveys or implementation of a limited operating period, would provide information on the existing populations of special status bats (Townsend's big-eared bat, pallid bat, and western red bat) as well as other bat species and their overall condition, and minimize any potential effects to these species from project O&M and construction activities, and provide protection and conservation of roost sites. Surveys for known populations and for new populations within suitable habitat within 1 year of license issuance and every 5 years thereafter would provide a baseline status assessment of existing special status bat populations and be more protective of these existing populations than the schedule recommended by the Forest Service in the draft Terrestrial Biological Management Plan. We expect that overall, through the development and implementation of the guidance and protocols for monitoring and surveying bat habitat with project facilities and structures and project-related recreation sites, continued project operations or proposed construction would not adversely affect special status bat species within the project area.

### *Forest Carnivores*

Forest carnivores, Sierra Nevada red fox, California wolverine, American marten, and ringtail, could occur in the project area based on available habitat. Sierra Nevada red fox and California wolverine are assumed to be in the project area; American martin is likely to occur, and ringtail has been documented within 50 miles of the McCloud-Pit project.

In its original condition 26, the Forest Service did not specify forest carnivores. No other proposed mitigation and enhancement measures or alternative conditions were proposed by PG&E.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 26. The provisions specified in Forest Service modified condition 26 are similar to those specified in the Forest Service's original condition 26, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Terrestrial Biological Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

In the draft Terrestrial Biological Management Plan, the Forest Service recommends that pre-construction surveys for forest carnivores be conducted no more than 30 days prior to construction. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 26 and withdraws its alternative condition 26.

### *Our Analysis*

It is unlikely that normal project O&M activities would affect any of these species. All are mobile and would probably avoid areas of human-induced activity. This would

be especially true of active construction sites that would occur during construction of proposed project facilities. We expect that, with the implementation of pre-construction surveys for these species, there would be no adverse effects from project activities or proposed construction. Undeveloped lands within the project area would continue to provide potential habitat for these species and as a result could provide a long-term benefit to individuals that are creating new territories.

### **3.3.4 Threatened and Endangered Species**

#### **3.3.4.1 Affected Environment**

##### **Valley Elderberry Longhorn Beetle**

The VELB (*Desmocerus californicus dimorphus*) is listed as threatened under the ESA. The VELB is associated with various species of elderberry (*Sambucus* spp.) throughout the California Central Valley and foothills below 3,000 feet msl. Shasta County is within the VELB range, though no critical habitat is designated for the VELB in the county. The VELB occurs within riparian vegetation communities where it feeds exclusively on elderberry in both adult and larval stages. Adult VELBs appear to feed externally on the flowers and foliage of the elderberry. Adult females lay eggs in crevices in the bark of the host elderberry plant (FERC, 2009). After hatching, larvae spend one to 2 years feeding inside the plant. Prior to pupating, VELB larvae chew an exit hole in the elderberry trunk for the emerging adult.

Botanical surveys documented 15 populations of elderberry containing plants with stems greater than or equal to 1-inch diameter at ground level in areas surrounding the McCloud reservoir, McCloud tunnel, Iron Canyon reservoir, Iron Canyon tunnel, and Pit 7 afterbay. Most of the populations were sparse, with between one and 10 individuals. However, two populations contained between 11 and 50 individuals and one population had more than 100. No survey of identified elderberry plant stems for exit holes created by emerging VELB was conducted.

##### **California Red-Legged Frog**

The California red-legged frog (*Rana aurora draytonii*) is listed as threatened under the ESA. This species occurs at elevations ranging from sea level to 5,000 feet msl in wetlands; wet meadows; ponds and lakes; and pools in low-gradient, slow moving stream reaches, with permanent sources of deep water and riparian vegetation. Eggs are laid in ponds or backwater pools and attached to emergent vegetation. The tadpole larval stage inhabits the same area as eggs, spending most of its time in submergent vegetation or organic debris. Following metamorphosis, adults and juveniles are found in emergent and riparian vegetation, undercut banks, semi-submerged root masses, open grasslands with seeps, or springs with dense growths of woody riparian vegetation. Cattails, bulrushes, and willows are good indicator species for potential presence of the frog. Adults are typically associated with deep (greater than 0.7 meter), still or slow-moving water. Juveniles prefer open, shallow aquatic habitats with dense submergents. Potential

habitat for adult California red-legged frog may extend 1 mile from potential aquatic habitat.

Although the study area does not fall within the current distribution of the California red-legged frog, the northern extent of the current range is in proximity to the Lower Pit River. There are only six known populations of California red-legged frog in the Sierra foothills, and their current range within that area is from Butte County to El Dorado County. No California red-legged frog observations were made during amphibian surveys in the project area. Although FWS has the California red-legged frog on its species list for Shasta County, no records exist in the California Natural Heritage Database (PG&E, 2006). Results of a survey conducted as part of a transmission line separation project determined that the California red-legged frog has not been previously identified at any location in the project-affected area or in the project vicinity. In addition, PG&E determined the project area does not provide suitable habitat for the California red-legged frog based on aerial photos, aerial video, and ground reconnaissance. No designated critical habitat is located in the project area.

### **Northern Spotted Owl**

The northern spotted owl, a medium-sized nocturnal raptor that inhabits mature forest habitats, is listed as threatened under the federal ESA. Critical habitat has been designated for the species, and a final recovery plan was released in May, 2008 (FWS, 2008).

The northern spotted owl generally inhabits older forested habitats because they contain the structural characteristics required for nesting, roosting, and foraging. Specifically, the northern spotted owl requires a multi-layered, multi-species canopy with moderate to high canopy closure. Competition with the barred owl and loss, degradation, and fragmentation of habitat due to timber harvest, fuel load management (thinning), and natural disturbances (e.g., wildfires and wind storms) are identified as the primary threats to this species. To a lesser extent, linear development projects (e.g., pipelines, power lines, and roads) have been identified as potentially adversely affecting northern spotted owl habitat because of fragmentation and destruction of habitat. The northern spotted owl reproductive period extends from mid-February through September. The nesting season for northern spotted owl extends from early April to mid- to late June. In the weeks after fledging, the young are weak fliers and remain near the nest tree, and adults continue to feed the young until late September.

The survey area included reasonably accessible suitable habitat within a 1.3-mile distance (buffer) of project facilities and project-affected areas in which project operations or recreational use could significantly affect the northern spotted owl or its habitat. Areas surveyed included project water bodies (i.e., McCloud, Iron Canyon, Pit 6, and Pit 7 reservoirs, and Pit 7 afterbay); project facilities (dams and diversion structures, powerhouses, transmission and distribution lines, project roads included in the FERC project boundary, the Ah-Di-Na gage (MC-1) on the McCloud River, and the McCloud tunnel siphon at Hawkins Creek); and recreational sites (e.g., campsites, day-use areas,

boat launches). Habitat types in the survey area included Sierran mixed conifer, ponderosa pine, montane hardwood-conifer, montane hardwood, montane riparian, montane chaparral, mixed chaparral, lacustrine, and riverine. Survey elevations ranged between about 1,070 and 4,600 feet msl with gentle to very steep topography.

No northern spotted owl individuals or active nests were detected in the project area. A single female northern spotted owl of unknown reproductive status was detected just outside of the project boundary buffer in the upper Mink Creek drainage, east of Van Sicklin Butte. Three northern spotted owl activity centers were noted in the Iron Canyon reservoir watershed in 2005, but there has been no recent documented activity at that location (Forest Service, 2005, as cited in PG&E, 2006). A barred owl pair was found in the Flatwoods / Pit 6 dam survey area, west of the 1.3-mile survey buffer, in an area known as Reynolds basin (Nevares and Lindstrand, 2008c); this species is known to be expanding its range into this area of California and is known to compete for territory with the northern spotted owl, but these are not project-related effects.

### **Pacific Fisher**

In December, 2000, the West Coast population of Pacific fisher was proposed for listing under the ESA. Listing of the West Coast population segment of the Pacific fisher was determined to be “warranted but precluded by other, higher priority listing actions,” although the Pacific fisher is still considered a candidate species for federal listing. The Pacific fisher is a Forest Service sensitive species and a California Fish and Game species of special concern. Currently, only three small, isolated populations of the Pacific fisher remain: native populations in northwestern California and the southern Sierra Nevada, and a reintroduced population in the southern Oregon Cascades (Sierra Forest Legacy, 2008). The Pacific fisher dens in hollow trees, rotting logs, and rocky crevices of old growth forests. Its diet consists of small mammals, fruit, truffles, and plants. This species is primarily nocturnal, and its home range is from 50 to 150 square miles. Fishers hunt exclusively in forested habitats and generally avoid opening areas.

The Forest Service and FWS have identified the Pacific fisher as potentially occurring in the project vicinity based on tracks reported in the project vicinity in 1982, and a Pacific fisher skull found on the ridge between Fisher Creek and Bald Mountain Creek in the mid-1970s. More recently, a wildlife biologist observed a Pacific fisher crossing FR 11 on the northeast side of Iron Canyon reservoir on April 25, 2007.

A field survey based on habitat mapping was conducted to identify potential habitat for Pacific fisher within the project area. About 43 percent (15,607 acres) of the study area was found to be potentially suitable Pacific fisher habitat, though the distribution pattern and abundance of potentially suitable Pacific fisher habitat varied throughout the study area, with changes often occurring in relation to elevation, aspect, slope, or timber harvest history. Pacific fisher habitat types in the study area include Sierran mixed conifer, ponderosa pine, montane hardwood-conifer, montane hardwood, montane riparian, montane chaparral, and mixed chaparral, as classified using the CWHR

system. Survey elevations within the habitat ranged between 1,070 and 3,830 feet msl, with gentle to steep topography.

Suitable habitat for Pacific fisher occurs in the vicinity of existing and proposed project facilities, including project dams, powerhouses, and campgrounds. Connectivity of suitable habitat is fairly high in most of the project area, with less suitability and connectivity of habitat patches at the lower elevations around the Pit 6 and 7 reservoirs and transmission lines, and at the upper elevations along the proposed McCloud transmission line route (Nevares et al., 2009). PG&E's relicensing approach regarding Pacific fishers is to assume that the species is present, for at least part of the year, in potentially suitable habitat within the project area.

#### **3.3.4.2 Environmental Effects**

Federally listed species could potentially be affected by project activities, particularly construction activities that could alter habitat or disturb species.

PG&E proposes that before taking actions to construct new project features on Forest Service lands (including but not limited to proposed recreation developments) that may affect Forest Service special status species or their critical habitat, PG&E would prepare a biological evaluation of the potential effect of the action on the species or its habitat and submit it to the Forest Service for approval (measure 15). In coordination with the Commission, the Forest Service may require mitigation measures for the protection of the affected species. The biological evaluation would include procedures to: (1) minimize adverse effects on special status species; (2) ensure project-related activities meet restrictions included in site management plans for special status species; and (3) provide implementation and effectiveness monitoring of measures taken or employed to reduce effects on special status species. Additionally, at PG&E's request, the Commission appointed PG&E as the non-federal representative for informal consultation with FWS under ESA. In this capacity, PG&E proposes to consult with FWS and prepare biological assessment(s) as necessary to comply with section 7 of the ESA.

The Forest Service's original and modified condition 11 is generally consistent with PG&E's proposed measure. In its November 29, 2010, filing, the Forest Service does not include modifications to condition 11.

#### *Our Analysis*

Identification of potential effects related to new construction is integral to protection of federal listed special status species and the minimization or mitigation of unavoidable effects that could occur. The proposed measure to require the development of a biological evaluation to be submitted to the Forest Service would provide an important step in identification of potential effects as well as mechanisms for minimizing effects. In addition, federal agencies, including the Forest Service and the Commission, could require mitigative measures for protecting listed species. Both PG&E measure 15 and Forest Service condition 11 are consistent in providing the necessary guidance for

ensuring that the development of a biological evaluation would adequately identify, protect, and mitigate potential effects related to new construction within the project.

### **Valley Elderberry Longhorn Beetle**

Project O&M activities that have the potential to adversely affect VELB habitat include vegetation trimming or clearing and herbicide applications that could damage or kill the elderberry host plant for VELB. Recreational uses including camping have the potential to damage elderberry plants at Deadlun Campground, Hawkins Landing Campground, and dispersed recreation sites at Iron Canyon and McCloud reservoirs.

Measures for protection of elderberry are specified in PG&E's programmatic biological opinion (1-1-01-F-0114) and incidental take permit (FWS, 2003). This consultation outlines routine operation, maintenance, and emergency activities associated with PG&E's gas and electric facilities that may have the potential to affect elderberry plants. Avoidance, minimization, and conservation measures described in the programmatic biological assessment include:

- Provide funding for the acquisition or long-term management of up to 1,000 acres of high quality habitat adjacent to existing VELB populations in the Sacramento and San Joaquin valleys.
- Conduct elderberry surveys within a minimum of 20 feet from a project maintenance site. Flag and avoid elderberry plants found within the project footprint.
- Provide environmental training and education of personnel and contractors involved with project operation, maintenance, and emergency activities.
- Avoid use of herbicides within 20 feet of elderberry plants except for stump cut treatment of removed trees and clearing at the base of certain power poles or towers in compliance with California Public Resources Code section 4292.
- Where possible, fell trees directionally or remove in sections so as to avoid the 20-foot zone around existing elderberry plants.
- Implement erosion control measures if ground is disturbed during maintenance activities in the 20-foot zone around elderberry plants.
- Where feasible, trim elderberry plants rather than remove them.

PG&E proposed to apply these measures to routine O&M activities. In its original condition 26, the Forest Service specified that suitable habitat should be monitored once every 5 years for VELB individuals. PG&E alternative condition 26 proposes that monitoring of known elderberry populations would occur every 5 years concurrent with surveys conducted for the Vegetation and Invasive Weed Management Plan. In addition, PG&E alternative condition 26 proposes to conduct pre-construction surveys for potential VELB habitat and follow reasonable and prudent measures consistent with PG&E's *Valley Elderberry Longhorn Beetle Conservation Program* developed and approved in

the FWS-issued biological opinion (FWS, 2003). Periodic monitoring reports summarizing VELB habitat locations and annual effects on elderberry at these locations would be submitted to FWS. Avoidance, protection, or mitigation measures would follow those outlined in the VELB conservation program, and the program specifications including the terms and conditions of the 30-year take permit would be described.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 26. The provisions specified in Forest Service modified condition 26 are similar to those specified in the Forest Service's original condition 26, except that the Forest Service has removed protective measures for the VELB from the draft Terrestrial Biological Management Plan and has included these measures as part of the Vegetation and Invasive Weed Management Plan.

The Forest Service recommends that surveys for known populations of elderberry plants would occur within 1 year of plan approval and every 5 years thereafter; comprehensive surveys for all populations, including new populations, would be conducted within 1 year of plan acceptance and every 10 years thereafter; pre-construction surveys would be conducted no more than 30 days prior to ground disturbance. Additionally, in the draft Vegetation and Invasive Weed Management Plan, the Forest Service notes that the programmatic take permit for the VELB does not cover routine construction or routine recreation O&M. The Forest Service recommends that, after acceptance of a new license, PG&E consult with FWS regarding the potential effects of these activities on VELB habitat. The Forest Service recommends that, depending on the nature of the proposed new construction, a VELB protection plan similar to the one developed for Pit 3, 4, and 5 project may provide a suitable mechanism to protect VELB habitat during new construction and when performing recreation facility O&M. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 26 and withdraws its alternative condition 26.

#### *Our Analysis*

Within the project area, the VELB conservation program established and approved by FWS in its 2003 biological opinion provides adequate protection for elderberry populations. Avoidance, protection, or mitigation measures would follow those outlined in the VELB conservation program.

The Forest Service's original condition 26 specifies monitoring for VELB once every 5 years in suitable habitat; however, PG&E alternative condition 26 proposes to extend monitoring to include pre-construction monitoring and states that avoidance, protection, and mitigation measures for routine O&M of the hydroelectric project would be consistent with those outlined in the VELB conservation program already in place and approved by FWS. Furthermore, in the draft Vegetation and Invasive Weed Management Plan (Forest Service, 2010d, Enclosure 3), the Forest Service recommends that surveys for VELB habitat be conducted concurrent with monitoring and protection of botanical populations essential for wildlife habitat (3.3.3.2.1, *Vegetation*). Comprehensive surveys for all populations of elderberry plants within 1 year and every 10 years thereafter, along

with any required pre-construction surveys and monitoring of known populations within the first year of license issuance and every 5 years thereafter would provide information on the existing populations elderberry and their overall condition, and minimize any potential effects to elderberry populations within the project area from O&M activities.

Implementation of pre-construction surveys, consultation with FWS, and avoidance, protection, or mitigation measures consistent with those outlined in the VELB conservation program would minimize effects on the population of elderberry located along the proposed access road corridor from the construction of the Pit 7 afterbay powerhouse and future construction activities.

### **California Red-Legged Frog**

No potential habitat was identified within the project area using aerial photos, video, and ground reconnaissance. Project reservoirs have limited emergent vegetation for breeding, limited availability of sheltered shoreline for adults, and predatory fish species. In addition, no California red-legged frogs were observed during intensive surveys of the project area for aquatic reptiles and amphibians, including northwestern pond turtle and foothill yellow-legged frog.

No specific PG&E measure or Forest Service conditions have been developed for the California red-legged frog.

#### *Our Analysis*

Because the project area does not support a California red-legged frog population or appropriate habitat for the species, we believe that normal project O&M or proposed construction would have no effect on California red-legged frogs.

### **Northern Spotted Owl**

The northern spotted owl is known to be particularly sensitive to human disturbance and habitat alterations during its reproductive period (February 15 through September 30). Prolonged disturbance can reduce the ability of owls to detect prey, disrupt flight responses, reduce nest attentiveness, and decrease the rate of food delivery to the nest (FWS, 2008). These behavioral responses can lead to nest abandonment or failure. Although no individuals or active nests were detected within the project area, and project O&M or recreation activities are unlikely to affect this species, a majority of the project and project-affected area occurs in both suitable and designated northern spotted owl habitat.

Transmission lines can be hazardous to birds, especially raptors such as the northern spotted owl. Birds touching lines can be electrocuted or badly injured if directly striking a line. Existing project transmission lines meet or exceed APLIC standards to prevent electrocution of birds with the exception of the Pit 5 distribution line that contains some poles that are not in compliance. PG&E measure 16 proposed, the Forest Service's original condition 26 specified, and Forest Service modified condition 26 specifies avian collision and electrocution hazard prevention measures (see

section 3.3.3.2.2, *Wildlife, General Wildlife*). In its original condition 26, the Forest Service specified monitoring for northern spotted owl within 0.25 mile of suitable habitat in the project area once every 5 years. Surveys conducted once every 10 years in suitable habitat would identify new individuals, pairs, or nest sites. Lastly, surveys would be conducted prior to any disturbance activities, or PG&E could schedule construction or disturbance activities outside of the limited operating period of February 1 through July 9.

PG&E alternative condition 26 proposed to eliminate the requirement for northern spotted owl surveys within 0.25 mile of suitable habitat in the project area once every 5 years, and within suitable habitat once every 10 years. Instead, PG&E proposed pre-construction surveys in suitable habitat within 1.3 miles of proposed construction. Surveys would follow standard protocols for the species. Alternatively, PG&E could schedule construction activity for outside of the limited operating period of February 1 to July 9.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 26. The provisions specified in Forest Service modified condition 26 are similar to those specified in the Forest Service's original condition 26, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Terrestrial Biological Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

In the draft Terrestrial Biological Management Plan (Forest Service, 2010d, Enclosure 3), the Forest Service recommends that surveys for northern spotted owl be conducted as specified in the most recent FWS protocol within 0.25 mile of suitable habitat prior to construction or habitat removal, or that PG&E follow a limited operating period from February 15 through July 10. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 26 and withdraws its alternative condition 26.

#### *Our Analysis*

The northern spotted owl is not known to exist within the project area, though potential habitat does exist. We expect that pre-construction surveys as proposed by PG&E and recommended by the Forest Service would sufficiently minimize any effects from disturbance to northern spotted owl that project construction activity could cause. Alternatively, avoidance of construction activity during the limited operation period would also protect any individuals within the project area from construction activity. A limited operating period of February 1 through July 9 as proposed by PG&E and specified in the Forest Service's original condition 26 would be more protective of the northern spotted owl than the limited operating period of February 15 through July 10 recommended by the Forest Service in the draft Terrestrial Biological Management Plan. We expect that specific standards for transmission lines developed by APLIC that are employed along proposed power lines and retrofitted on existing lines would avoid or minimize avian electrocution hazards to this species if it occurs within the project area.

We believe that relicensing the existing project, continued normal O&M activities, and proposed construction of new facilities are not likely to adversely affect northern spotted owl in the project area.

### **Pacific Fisher**

The Pacific fisher's association with late successional forest habitats and its avoidance of human activity makes the species highly sensitive to anthropogenic habitat loss, degradation, and fragmentation related to forest management, development, and noise disturbance. Prolonged disturbance, forest management, and infrastructure development can affect Pacific fishers by altering normal behavior, causing displacement from preferred habitat, and decreasing reproductive success and individual health (Powell and Zielinski, 1994, and 50 CFR 17 as cited in PG&E, 2009a). Potentially suitable Pacific fisher habitat was identified throughout the project area. PG&E does not own or manage forest lands in the project area and therefore does not have an ongoing effect on the general quality and quantity of Pacific fisher habitat. Although hazard tree removal around project and recreational facilities does occur as part of project O&M, it is unlikely that fishers would roost or den in proximity to human activity, and project effects as a result of hazard tree removal are unlikely.

In its original condition 26, the Forest Service specified that the development of a Terrestrial Biological Management Plan should provide surveys be conducted once every 5 years in suitable habitat within the project and project-affected areas. PG&E alternative condition 26 proposed, for the Pacific fisher, to eliminate the requirement for surveys once every 5 years and, instead provide for pre-construction surveys in areas of suitable habitat within 0.5 mile of any planned construction. Methods for the surveys would involve passive detection systems, such as baited camera stations; however, survey methods could be developed from review of scientific literature and any available standard protocols species to fisher surveys.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 26. The provisions specified in Forest Service modified condition 26 are similar to those specified in the Forest Service's original condition 26, except that the Forest Service has removed specific details of the plan components and monitoring schedules from the 4(e) condition and placed them in the draft Terrestrial Biological Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

In the draft Vegetation and Invasive Weed Management Plan (Forest Service, 2010d, Enclosure 3), the Forest Service has changed its recommendation to agree with the staff recommendation from the draft EIS regarding the implementation of pre-construction surveys for the Pacific fisher, which would be conducted no more than 30 days prior to ground disturbance. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 26 and withdraws its alternative condition 26.

### *Our Analysis*

It is unlikely that normal project O&M activity or proposed construction would have an effect on the Pacific fisher. We expect that pre-construction surveys, as proposed by PG&E and recommended by the Forest Service in the draft Terrestrial Biological Management Plan, would provide adequate protection for Pacific fisher that may inhabit the project area based on this species' known behavior and the large area for potential occurrence within the project. As a result, relicensing of the existing project, continued normal O&M activities, and proposed construction of new facilities are not likely to adversely affect Pacific fisher in the project area.

### **3.3.5 Recreation Resources**

#### **3.3.5.1 Affected Environment**

##### **Regional Recreation Resources**

Opportunities for recreation within the region surrounding the project are plentiful. The project partially lies within and adjacent to the Shasta National Forest which provides a variety of formal and informal recreational facilities and opportunities. Much of the National Forest lands are open to the public for recreation. Regional recreational opportunities include fishing, camping, boating, hiking, scenic/wildlife viewing, hunting, and general day-uses such as picnicking and swimming (PG&E, 2008a).

Recreational resources outside of the project but within the region surrounding the project include areas that provide river-based fishing opportunities similar to those available in the Lower McCloud River, or reservoir-related activities similar to those available at McCloud and Iron Canyon reservoirs. These areas are all located in northern California, and most are located within 100 miles of the project area (PG&E, 2008a). Regional bank-fishing resources include the upper McCloud River, Fall River, Hat Creek, Burney Creek, upper and lower Sacramento River, Pit River (above the project), Klamath River, and Trinity River. Regional reservoir-based activity resources include Lake Siskiyou, Shasta Lake, Medicine Lake, Lake Shastina, Castle Lake, Iron Gate reservoir, Whiskeytown Lake, Lake Britton, Baum Lake, and Trinity Lake (PG&E, 2008a).

The project is geographically close to PG&E's Pit 3, 4, and 5 Project (FERC No. 233) with portions of the McCloud-Pit Project no more than 30 miles from the Pit 3, 4, and 5 Project (PG&E, 2008a). Thus, the regional recreational resources for the project overlap with those of the Pit 3, 4, and 5 Project. Recreational opportunities at the Pit 3, 4, and 5 Project generally occur in the area surrounding Lake Britton and within the Pit River Canyon. Lake Britton provides opportunities and facilities for camping, picnicking, boating, swimming, wildlife viewing, fishing, and hiking. Developed facilities at Lake Britton include 155 developed campsites, two developed boat launches, and three developed picnic areas (EDAW, 2001 as cited in PG&E, 2008a). The eastern section of Lake Britton provides more primitive and dispersed recreational opportunities, while the western portion of the reservoir upstream of the Pit 3 dam provides more developed recreational opportunities, such as developed campgrounds and day-use areas (FERC, 2004). The Pit River Canyon provides more undeveloped, dispersed recreational opportunities, such as trout fishing, camping, hiking, whitewater boating, and sightseeing (FERC, 2004).

Lake Siskiyou offers recreational opportunities such as boating, camping, swimming, fishing, and windsurfing. The reservoir provides more than 300 developed campsites, a boat launch, a marina, and two developed picnic areas (EDAW, 2001 as cited in PG&E, 2008a).

Shasta Lake, located in the Whiskeytown Shasta-Trinity National Recreation Area, offers recreational opportunities such as motorized (most notably houseboating)

and non-motorized boating, swimming, fishing, camping, picnicking, and hiking. Shasta Lake provides seven developed boat launches, three developed picnic areas, and more than 300 developed campsites (EDAW, 2001 as cited in PG&E, 2008a). Most of the recreation facilities are operated by the Forest Service, except for a few private marinas (PG&E 2008a).

Whiskeytown Lake, located in the Whiskeytown Shasta-Trinity National Recreation Area, offers recreational opportunities such as motorized and non-motorized boating, swimming, fishing, camping, picnicking, hiking, and sailing. Whiskeytown Lake provides three developed boat launches and four developed picnic areas (EDAW, 2001 as cited in PG&E, 2008a). Many of the recreation sites are managed by the Park Service, and day-use activities are encouraged rather than overnight use; however, there are more than 100 developed campsites along the shoreline of the reservoir (PG&E, 2008a).

Baum Lake is located near the town of Cassel on Hat Creek. All motorized boating (except electric trolling motors) is prohibited on the lake, making it open only to non-motorized boating. The primary activity at Baum Lake is fishing, similar to the non-reservoir segments of Hat Creek. A formal fishing access with a primitive boat launch is provided at the reservoir (PG&E, 2008a).

Trinity Lake is located entirely within the Whiskeytown Shasta-Trinity National Recreation Area, and most of the recreation facilities are operated by the Forest Service, except for a few private marinas (PG&E 2008a). Recreational opportunities at Trinity Lake include motorized and non-motorized boating, swimming, fishing, camping, picnicking, and hiking. There are nine developed boat launches, three developed picnic areas, and more than 400 developed campsites at the lake in addition to many primitive boat-in camping areas scattered along the shoreline (EDAW, 2001 as cited in PG&E 2008a).

Medicine Lake, located in the Modoc National Forest, provides fishing and boating opportunities. It has one improved and two unimproved launch ramps and four campgrounds suitable for tent, recreational vehicle (RV), or group camping. All boating is allowed at Medicine Lake as well as water-skiing, jet-skiing, and swimming (FishersNet, 2010). Iron Gate reservoir provides camping, boating, and fishing opportunities with developed campgrounds suitable for tents, RVs, or trailers, and improved boat launching facilities (FishersNet, 2010). Lake Shastina provides opportunities for fishing, all types of boating, water-skiing, and swimming. Lake Shastina also has a marina, tennis, golf, and a water slide (FishersNet, 2010). Fishing, camping, and hiking are available at or near Castle Lake, located mostly within Shasta-Trinity National Forest, including a trail that leads into the adjacent Castle Crags Wilderness Area and connects to the Pacific Crest National Scenic Trail (Forest Service, 2010b and 2010c).

There are a number of river-based fishing opportunities similar to those available in the Lower McCloud River located in the region surrounding the project. These include

the following: the McCloud River above McCloud reservoir which provides developed campgrounds and dispersed camping opportunities; Fall River with limited developed recreation facilities or dispersed camping opportunities; Hat Creek, which is partially located in the Lassen National Forest with many nearby recreation facilities; Burney Creek, which flows through Shasta National Forest lands and has developed recreational facilities at the McArthur-Burney Falls State Park; the Sacramento River, which provides angling opportunities, limited dispersed camping opportunities, and a developed recreation facility at Castle Crags State Park; Pit River, which provides angling opportunities with a few developed recreation facilities and dispersed camping opportunities; and the Trinity River located nearly entirely in Shasta-Trinity National Forest, which provides fishing opportunities and a number of developed recreational facilities and dispersed camping opportunities (PG&E, 2008a).

There are a number of whitewater boating opportunities in the region surrounding the project, many of which are similar to those available in the Lower McCloud River in the region surrounding the project. The Lower McCloud River below McCloud reservoir is classified as Class III-IV whitewater. The following stream and river reaches in the region are classified as Class III-IV: the McCloud River above McCloud reservoir (Fowler Camp to McCloud reservoir); Pit River (Fall River Mills to PG&E's Pit 1 powerhouse); Antelope Creek (Hogsback Road to Cove Grove Road); Canyon Creek (bridge 8.5 miles upstream of Junction City to Junction City); Coffee Creek (Coffee Creek Road to Trinity River); North Fork Feather River (Caribou to East Branch North Fork Feather River); West Branch Feather River (Whiskey Flat to Dean Road); Grindstone Creek (Grindstone Road to Road 306); Sacramento River (Box Canyon dam to Castle Crag); North Fork Salmon River (Idlewood Campground to Sawyers Bar); South Fork Trinity River (East Fork/South Fork confluence to Scott Flat Campground and Klondike Mine to Oak Flat or Hyampom Gorge); Trinity River (Tangle Blue Creek to Clair Engle Lake); Little Cow Creek (Phillips Drive to Buzzard Roost Road) (American Whitewater, 2010). Additionally, PG&E's Pit 3, 4, and 5 Project provides recreation streamflow releases, including Class III (the Pit River from Lake Britton to Pit 3 powerhouse), Class IV (the Pit River from Pit 4 dam to Pit 4 powerhouse), and Class III+(V) (the Pit River from Pit 5 dam to Pit 5 powerhouse) whitewater opportunities.

Two Forest Service developed campgrounds, Ash Camp and Ah-Di-Na, and The Nature Conservancy's McCloud River Preserve, which is used by some anglers, are located on the Lower McCloud River downstream of the project. The Lower McCloud River extends 24 river miles from McCloud dam to Shasta Lake and is considered one of the premiere trout streams in California, but only the upper 9 miles of this 24-mile reach have land-based public access.

The Pacific Crest Trail, which is not part of the project, is a national scenic trail spanning over 2,650 miles from Mexico to Canada. The trail crosses the Lower McCloud River near Ash Camp via a wooden foot bridge. The Pacific Crest Trail crosses Ah-Di Na Road (FR 38N53) about 0.5 mile upstream of Ah-Di Na campground.

## **Project Area Recreation Resources**

There are three developed recreation areas within the project boundary: Tarantula Gulch boat ramp at McCloud reservoir; and Deadlun Creek Campground and Hawkins Landing Campground and boat ramp at Iron Canyon reservoir. All of these are located within the James B. Black Development (see figures 3-2 and 3-3).

### *McCloud Reservoir*

The Tarantula Gulch boat ramp was constructed and is operated by the Forest Service (table 3-30 and figure 3-2). Tarantula Gulch boat ramp has a boat launch ramp and a developed picnic area. The single-lane concrete boat launch ramp has a loading dock with parking for 22 vehicles with trailers and a nearby overflow parking area.

PG&E states that the bottom of the boat ramp is 1 foot below the normal minimum operating reservoir level (elevation 2,634 feet) and typically provides boater access during the entire recreation season. The Forest Service reports that sediment and debris accumulate on the ramp and occasionally impede boat launching.

The majority of lands surrounding McCloud reservoir are privately owned, with NFS and PG&E-owned lands that are accessible to the public located on the southern end of the reservoir extending along FR 38N11 from near the access road to Tarantula Gulch (FR 38N81) and continuing across McCloud dam to Star City Creek. Most of the publicly accessible lands are located between FR 38N11 and the reservoir shoreline. Dispersed recreation is allowed on PG&E and NFS lands, unless otherwise designated. PG&E identified nine user-created dispersed recreation sites at lower-gradient access points accessible from FR 11 or Star City Road (FR 38N04Y) around McCloud reservoir and a dispersed campsite on an island in the reservoir. The Star City Creek area is the largest dispersed site at McCloud reservoir with space to comfortably accommodate three to five user groups at one time. The area is typically used for camping, although the site is not formally designated for such use. The Hearst Corporation is a private landowner with large property holdings that surround McCloud reservoir. When the project license was issued in 1961, the Forest Service and The Hearst Corporation were completing a land exchange to consolidate ownership in a portion of the forest and to provide for public access to McCloud reservoir. In a 1963 agreement, The Hearst Corporation donated land to the Forest Service that is currently used as the Star City day-use area. The Hearst Corporation donated about 95 acres of land around the southern shore to the Forest Service in 1969, while the terms of the donation were laid out in the 1965 MOU developed during the land exchange.

Table 3-30. Recreation Facilities at McCloud Reservoir. (Source: PG&E, 2009a and 2008b, and staff)

| <b>Site Name</b>   | <b>Facilities</b>  |
|--|--|
| Tarantula Gulch Boat Ramp (also known as the Lake McCloud Boat Launch) | Single-lane concrete boat launch ramp, a loading dock, 3 picnic tables, 4 wildlife-resistant trash receptacles, 22 parking spaces for vehicles with trailers, vault restroom with 2 unisex accessible stalls, overflow parallel parking with unmarked spaces |

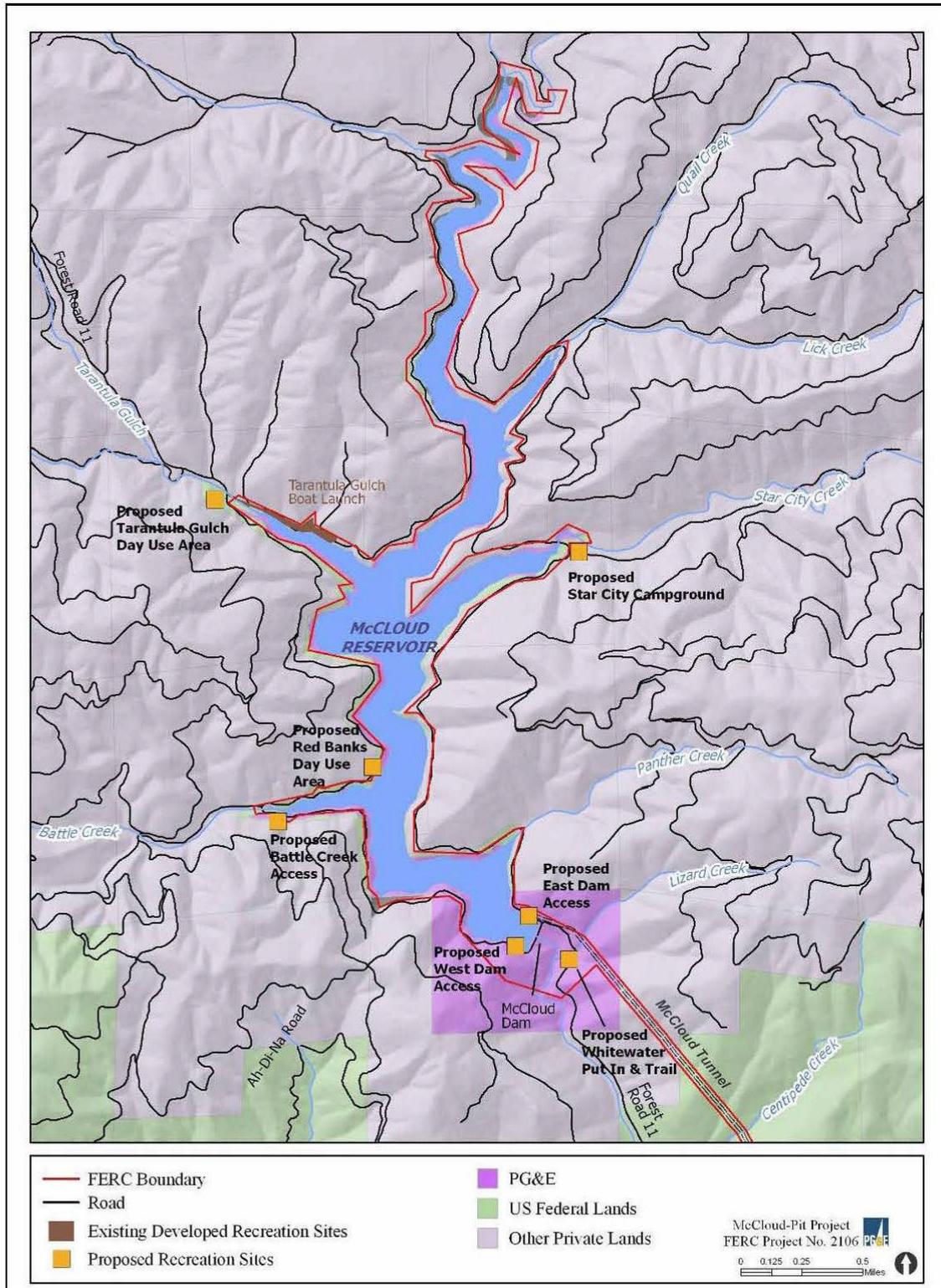


Figure 3-2. Existing and proposed recreation facilities at McCloud reservoir. (Source: PG&E, 2009a)

### *Iron Canyon Reservoir*

There are two developed recreation areas at Iron Canyon reservoir: Hawkins Landing Campground and boat ramp, owned and operated by PG&E, and Deadlun Campground, which is operated by the Forest Service (table 3-31 and figure 3-3).

Hawkins Landing Campground and boat ramp have the only boat launch ramp on Iron Canyon reservoir and provides campsites. None of the Hawkins Landing facilities are Americans with Disabilities Act (ADA) accessible and facilities in the campground are in poor condition. No formal parking is available at the boat launch and the number of vehicles that the boat launch area can accommodate depends on reservoir elevation. Normal project operations can cause the reservoir to fluctuate on a daily basis, which affects the availability of parking at the shoreline near the launch. When the reservoir is at full pool (2,664 feet), visitors park vehicles in the campground. As the reservoir elevation lowers, exposing more shoreline, visitors park along the shoreline, thereby increasing the potential number of vehicles that can park near the launch area. At the minimum operating pool elevation (2,593 feet), the end of the boat launch (2,610 feet) is out of water and visitors have difficulty launching or cannot launch boats. Since 1996, PG&E has voluntarily maintained the reservoir water surface elevation above 2,615 feet to keep the boat ramp useable during the primary recreation season from May 15 to October 15.

The Forest Service Deadlun Campground has about twice as many campsites as Hawkins Landing; however, the sites are positioned away from the shoreline at the back of the Deadlun Creek Cove, making it less appealing to visitors.

Iron Canyon reservoir is easily accessible from Big Bend, California, via FR 11 and Oak Mountain Road, and is accessible via a lengthier route from the town of McCloud (PG&E, 2008b). A section of FR 11 between McCloud reservoir and Iron Canyon reservoir is narrow, rocky, and very rough. Hawkins Landing is the first developed recreation area users pass when traveling north from the town of Big Bend, California.

The majority of lands surrounding the reservoir are PG&E-owned or NFS lands. User-created access trails (pedestrian and OHV) originate from both campgrounds and nearby areas providing dispersed shoreline access. PG&E has identified 22 dispersed recreation sites around Iron Canyon reservoir with heavily used dispersed recreation sites at the areas adjacent to Deadlun Campground and Iron Canyon reservoir spillway.

Table 3-31. Recreation facilities at Iron Canyon reservoir. (Source: PG&E, 2009a and 2008b, and staff)

| Site Name                                | Facilities   |
|--|--|
| Deadlun Campground                       | 27 campsites with fire rings and picnic tables, 3 vault restrooms with single, unisex, ADA-accessible stalls, overflow parallel parking with unmarked spaces |
| Hawkins Landing Campground and Boat Ramp | Single-lane concrete launch ramp, 11 campsites with fire rings and picnic tables, 1 working non-potable water hand pump, trash receptacle, 2 vault toilets   |

*Lower McCloud River and Hawkins Creek Crossing*

Recreation areas downstream of McCloud reservoir include the area at Hawkins Creek crossing (inside the project boundary) and the Lower McCloud River (outside the project boundary). Hawkins Creek crossing is a cleared level area where the McCloud tunnel crosses Hawkins Creek about one mile above the confluence with the Lower McCloud River. PG&E documented two dispersed recreation sites at the project near Ash Camp, a dispersed campsite on Hawkins Creek at Hawkins Creek tunnel that is accessible via the PG&E project road, and a dispersed campsite on the PG&E spoil pile area on Hawkins Creek that is just north of the Hawkins Creek tunnel (PG&E, 2008b).

The Lower McCloud River extends 24 river miles from McCloud dam to Shasta Lake, but only the upper 9 miles of this 24-mile reach have land-based public access. No project lands are located along the Lower McCloud River except for the area immediately below McCloud dam,

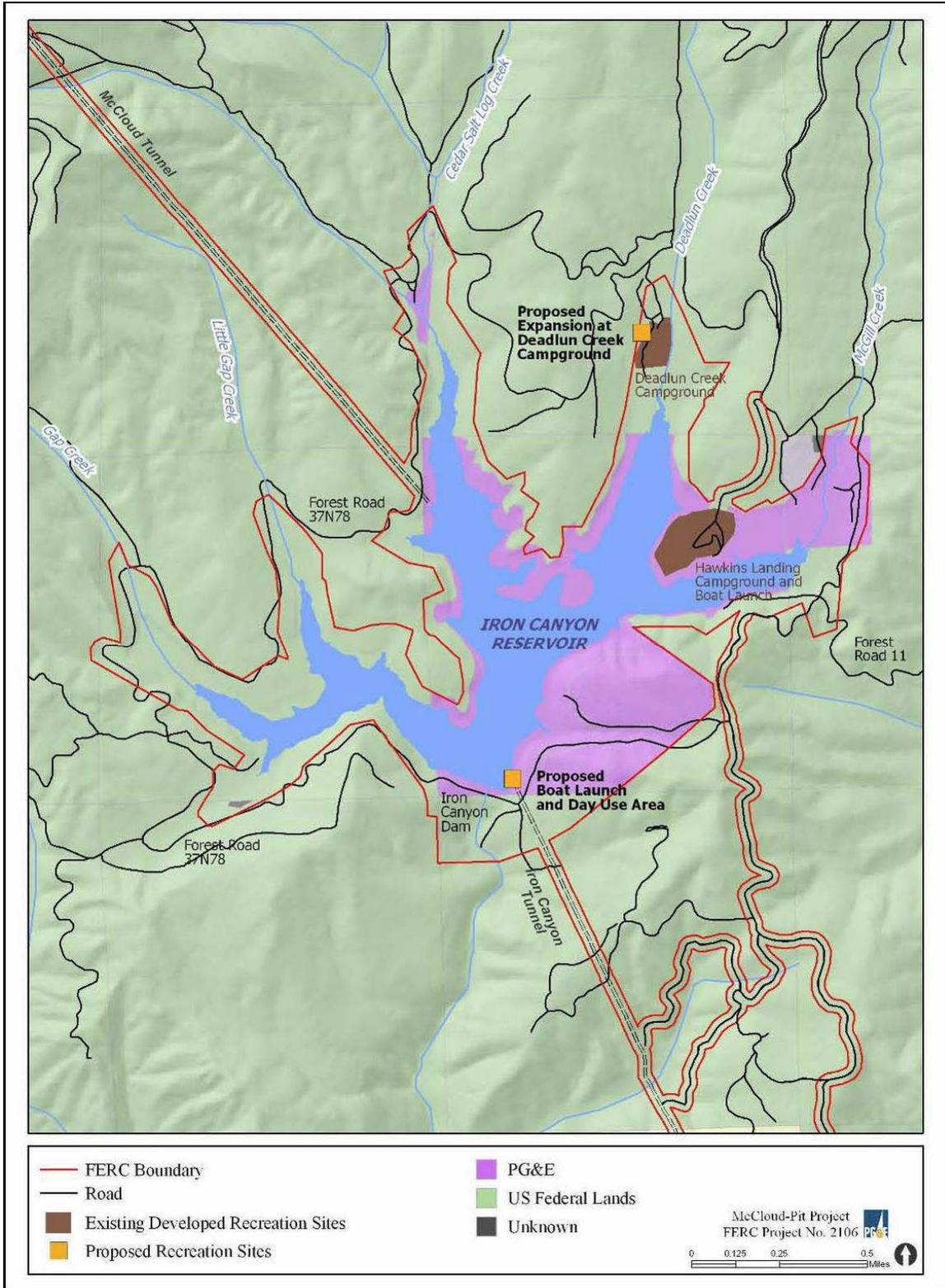


Figure 3-3. Existing and proposed recreation facilities at Iron Canyon reservoir.  
 (Source: PG&E, 2009a)

*Pit River (James B. Black Powerhouse, Pit 6 and Pit7 Reservoirs, and Pit 7 Afterbay)*

There are no developed recreation sites in the Lower Pit River; however, dispersed recreation is evident in a few locations.

User-created trails and dispersed camping can be found along the Lower Pit River across from the James B. Black powerhouse.<sup>14</sup> The powerhouse is easily accessible via Big Bend Road to the Pit 5 Road from Big Bend, California (PG&E, 2008b).

Public vehicular traffic to Pit 6 reservoir is available by a gated road about 0.5 mile from Pit 6 dam. A dispersed recreation site is located near Pit 6 dam about 0.5 mile downstream of the dam. The Pit 6 dam is easily accessible from Big Bend, California, via Big Bend Road to Cove Road to the Pit 6 Powerhouse Road. There is an angler trail to the Pit 7 reservoir (Pit 6 tailwater) that originates from the Pit 6 Powerhouse Road within sight of Pit 6 dam (PG&E, 2008b).

PG&E documented a dispersed recreation site at the base of Pit 7 dam. Public access to the Pit 7 dam is limited to foot traffic through a PG&E-maintained gate across the access road about 1.5 miles from the dam.

User-created trails and dispersed camping can be found at Fenders Flat in the area of the Pit 7 afterbay (figure 3-4). Fenders Flat is a 5- to 10-acre informal dispersed recreation area located between steep topography to the south and the Pit 7 afterbay to the north. The access road to this area is deeply rutted and only suitable for high clearance vehicles.

Shore lands within the project at the Pit 7 afterbay are administered by the Forest Service (PG&E, 2008a). Because the water level rapidly fluctuates in response to the Pit 7 powerhouse operation, public access to the Pit 7 afterbay is not allowed. A Shasta County boating ordinance prohibits swimming and boating in the afterbay due to public safety concerns (PG&E, 2006 as cited in PG&E, 2008a). For safety reasons, the afterbay is fenced and posted with warning signs to prohibit shoreline access and boating on the afterbay. Flow through the Pit 7 afterbay dam creates a dangerous hydraulic condition for fishermen accessing the site by boat from Shasta reservoir. There is a Forest Service unimproved car-top boat launch directly below the Pit 7 afterbay dam that provides boater access to the pit arm of Shasta Lake during late winter and early spring when high reservoir levels allow boat launching (PG&E, 2008a).

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<sup>14</sup> According to PG&E, a developed recreation site is planned for this location as part of PG&E's Pit 3, 4, 5 Project license implementation.

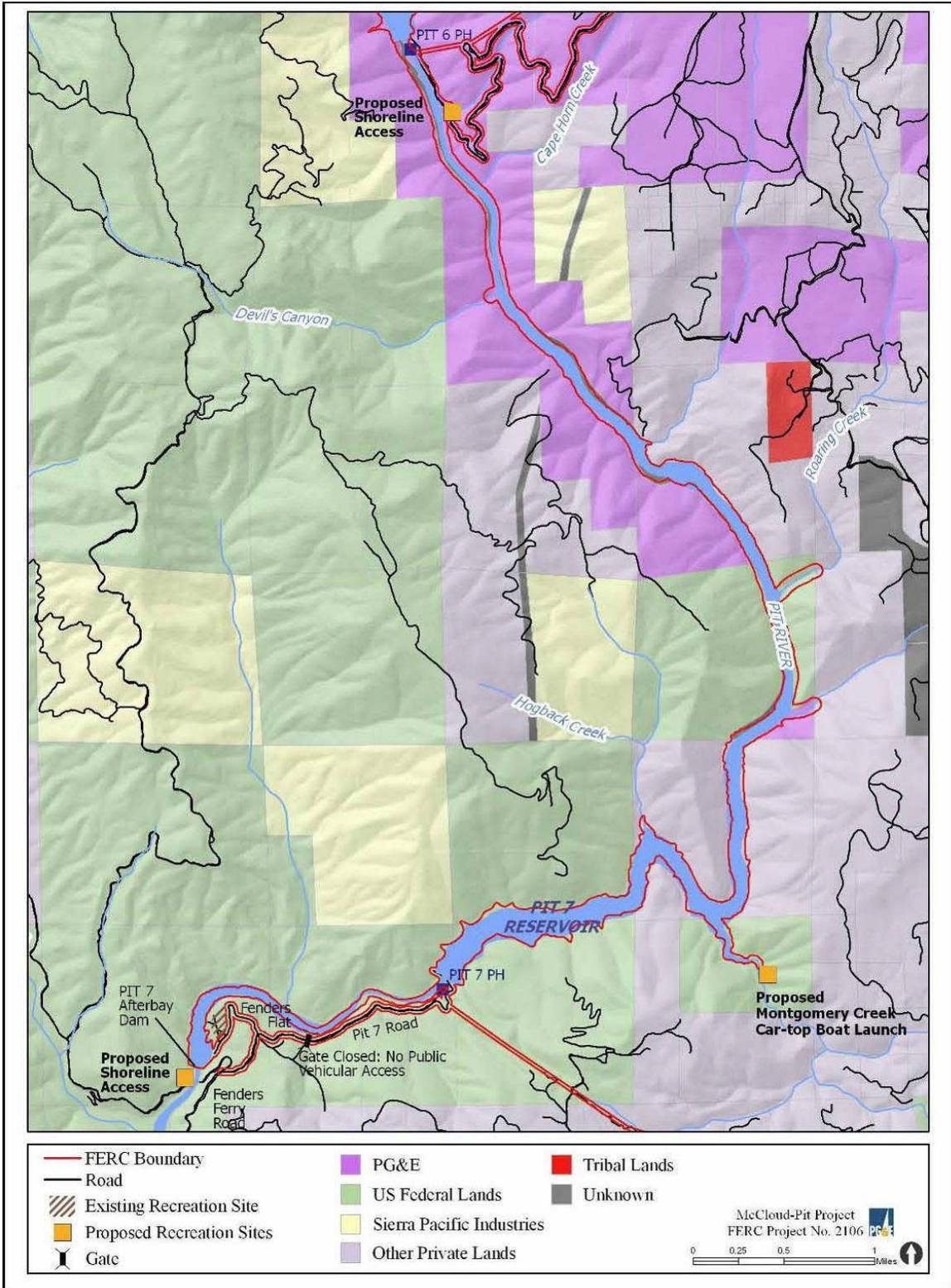


Figure 3-4. Existing and proposed recreation facilities at Pit 7 reservoir and Pit 7 afterbay dam. (Source: PG&E, 2009a)

## **Recreational Use**

PG&E collected recreational use data using direct visual observations during the 2007 and early 2008 recreation season to develop visitation estimates. Recreation use within the project boundary occurs at the three developed recreation areas, and dispersed recreation use occurs in a number of areas throughout the project boundary. For purposes of the relicensing studies, the recreation season for the project was defined to be between April 26 (or first open access after snow melt) to November 15, with the primary recreation season from May 15 to October 15.

Recreation uses at the project include camping, fishing, boating, swimming, water skiing, hiking, picnicking, sightseeing, wildlife viewing, off-road driving, and hunting. McCloud reservoir supports various recreation activities. Based on PG&E's visitor use surveys conducted during the relicensing studies, the primary activities at McCloud reservoir include angling (69 percent); water-based recreation activities (swimming, jet skiing, water skiing, wakeboarding) (18 percent); viewing scenery, wildlife, and nature (16 percent); camping (12 percent); and motorized and non-motorized boating (11 percent) (PG&E, 2008d). The primary activities at Iron Canyon reservoir include angling (80 percent); viewing scenery, wildlife, and nature (13 percent); and camping (13 percent). Visitors to the Lower McCloud River participated in fewer recreation activities, with fly fishing being the most common. The primary activities in the area near the Pit 7 afterbay include angling (55 percent), camping (18 percent), and biking (18 percent). Table 3-32 reports the primary recreation activities of visitors to the project based on PG&E's visitor use survey. Generally, visitors spend most of their time participating in these recreation activities while at the project.

Table 3-32. Primary activity by general area within the project. (Source: PG&E, 2008d, as modified by staff)

| Activities   | Percentage of Respondents |                       |                     |                |
|--|---------------------------|-----------------------|---------------------|----------------|
|  | McCloud Reservoir         | Iron Canyon Reservoir | Lower McCloud River | Pit 7 Afterbay |
| Angling  | 69                        | 80                    | 84                  | 55             |
| Camping  | 12                        | 13                    | 17                  | 18             |
| Picnicking   | 3                         | 2                     | 1                   |                |
| Wet recreation (swim, personal watercraft, water skiing, wakeboarding) | 18                        | 2                     | 2                   |                |
| Boat (any)   | 11                        | 2                     | 0                   |                |
| Viewing scenery, wildlife, nature/photography                          | 16                        | 13                    | 8                   | 9              |
| Hiking (day and backpacking)   | 3                         | 1                     | 3                   |                |
| Hunting  | 2                         | 4                     |                     |                |
| Scenic driving   |                           |                       |                     |                |
| Biking   | 3                         | 1                     | 1                   | 18             |

Note: Totals more than 100 percent due to some respondents choosing more than one primary activity.

Annual recreational use for the project was estimated at close to 33,400 visitors.<sup>15</sup> Visitors to the project predominantly live in neighboring counties or the San Francisco Bay area. Traffic counters recorded traffic volumes during the study period; however, because of the configuration of the road network and dispersed use around the project, traffic volume estimates were not the same as numbers of individual users. As such, visitor estimates based on traffic volumes resulted in visitor use estimates that were inconsistent with the number of vehicles-at-one-time (VAOT) or people-at-one-time (PAOT) reported from direct visual observations. Table 3-33 presents PG&E's estimates of existing visitor use using the observation method.

<sup>15</sup> Visitor estimates based on direct visual observation do not include non-project visitors or field study staff and is based on evidence of actual visits to project recreation areas.

Table 3-33. Project study area current use estimates by month using observation method. (Source PG&E, 2008d, as modified by staff)

| Month     | McCloud Reservoir | Iron Canyon Reservoir | Lower McCloud River <sup>a</sup> | Pit 6 Reservoir <sup>b</sup> | Pit 7 Reservoir <sup>c</sup> | Pit 7 Afterbay |
|-----------|-------------------|-----------------------|----------------------------------|------------------------------|------------------------------|----------------|
| April     | 908               | 621                   | 814                              | –                            | 8                            | 368            |
| May       | 2,620             | 932                   | 1,473                            | –                            | 8                            | 257            |
| June      | 3,862             | 648                   | 1,250                            | –                            | 8                            | 354            |
| July      | 4,324             | 499                   | 648                              | –                            | 8                            | 161            |
| August    | 4,945             | 438                   | 689                              | –                            | 8                            | 206            |
| September | 2,956             | 400                   | 525                              | –                            | 8                            | 131            |
| October   | 378               | 391                   | 1,339                            | –                            | 8                            | 271            |
| November  | 220               | 220                   | 281                              | –                            | 8                            | 199            |
| Total     | 20,212            | 4,148                 | 7,019                            | 0                            | 64                           | 1,947          |

<sup>a</sup> PG&E’s relicensing study included areas outside the project boundary in this study area, including the Ah-Di-Na Campground and Ash Camp Campground.

<sup>b</sup> Nobody was observed recreating within the Pit 6 reservoir during the relicensing study.

<sup>c</sup> Estimate based on assumption from observations of people at the sites and conversations with PG&E operators and staff familiar with the Pit 6 dam area (within Pit 7 reservoir) that indicated visitors rarely fish the Pit 6 dam tailwater.

### *McCloud Reservoir*

Visitor survey results indicate that the majority of visitors to McCloud reservoir come from Siskiyou and Shasta Counties (counties adjacent to or surrounding the project); however, other visitors from northern Central Valley counties were also represented in the survey results. PG&E's study results estimate that McCloud reservoir supported about 20,133 recreation days in 2008 (PG&E, 2008d).<sup>16</sup> Tarantula Gulch boat ramp accounted for 92 percent of the visitation to McCloud reservoir, with overall visitation of 55 percent occurring on weekdays and 44 percent occurring on weekends. Tarantula Gulch boat ramp typically is the first opportunity visitors traveling from the

<sup>16</sup> A recreation day is defined as any visit by an individual for any length of time during a 24-hour period.

town of McCloud have to stop and view the reservoir. Vehicle count data was recorded at times when project roads were covered in snow, indicating that the road to Tarantula Gulch may have been accessible at times or there was possible snowmobile use.

In addition to launching boats, the site is popular with bank anglers and day-users. Use levels are highest during the summer months. PG&E's collaborative analysis of study results with relicensing participants indicate the site is at or over capacity from April to August.<sup>17</sup> The study results show that the picnic area at the boat ramp is rarely used, indicating that recreation use at the site is primarily for reservoir access and shoreline uses. The picnic area's location away from the water, the abundance of star-thistle, and the lack of shade contribute to its undesirability for day-use. Results from user surveys conducted at the boat ramp indicate there is growing conflict between non-boating visitors using the ramp as a swimming dock and fishing platform and visitors launching and retrieving boats at the ramp.

Steep topography surrounding the reservoir limits the number and size of potential recreation sites and results in concentrated uses at a few dispersed recreation sites. For some users, these dispersed use sites provide the informal setting desired on trips to the reservoir. Direct observation counts during the peak recreation months (May through September) indicate that 12 vehicles are typically parked around the reservoir at dispersed sites at any given time during daylight hours, resulting in multiple vehicles at a number of locations. Star City Creek dispersed recreation area is the only site on McCloud reservoir that can accommodate more than three user groups comfortably, and the site consistently receives multiple user-groups throughout the recreation season. The area is typically used for camping, although the site is not formally designated for such use. Similar to Tarantula Gulch boat ramp, Star City is considered to be over capacity from May to August and it is approaching capacity in April, September, and October. Other popular dispersed areas include the parking area at the intersection of Tarantula Gulch Road and FR 11, "Red Banks area," and "Battle Creek." The base of McCloud dam receives modest amounts of recreation use from anglers and boaters putting into the Lower McCloud River.

The recreational setting associated with boating on McCloud reservoir was inventoried using the Water Recreation Opportunity Spectrum (WROS) through a collaborative process that included interested relicensing participants. The WROS is a tool to understand the type and location of six types of water-related recreation opportunities, otherwise known as WROS classes. The six WROS classes range across a spectrum of urban, suburban, rural developed, rural natural, semi-primitive, and primitive classes. Each WROS class is defined by a particular "package" of activities, setting attributes, experiences, and benefits. WROS classes of McCloud reservoir range from semi-primitive (head of reservoir, Lick Creek arm, and middle of reservoir/island) to

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<sup>17</sup> Sites were determined to be over the physical capacity of the site when 35 to 40 percent of the vehicle spaces were filled on non-holiday weekends.

rural natural (main channel north of boat ramp, at Lick Creek, and at the bridge) to rural developed (the boat launch arm, the area above the dam, and the main channel including Battle Creek arm) (PG&E, 2009a and 2008c).

### *Iron Canyon Reservoir*

Similar to McCloud reservoir, the greatest numbers of survey respondents at Iron Canyon reservoir live in Siskiyou and Shasta Counties. PG&E estimates that the Iron Canyon reservoir area supported about 4,163 recreation days in 2008 (PG&E, 2008d). Developed recreation facilities (Hawkins Landing Campground and boat ramp and Deadlun Campground) received 84 percent of the recreation use at Iron Canyon reservoir. Traffic count data recorded at the developed recreation facilities indicate that visitors use the campgrounds as their base while they explore and use dispersed areas throughout the general area. Use levels of Hawkins Landing are highest in July and August when the study results show the campground to be over capacity with slightly less use in the April to June and September to November months. PG&E's relicensing study results show Deadlun Campground is below capacity during all months except for April and May when use was approaching capacity.

The most popular water-based activities at Iron Canyon reservoir are motorized and non-motorized boating and angling. At the dispersed recreation sites around Iron Canyon reservoir, visitors typically participate in camping, driving OHVs, angling, or general shoreline-based activities.

WROS classes of Iron Canyon reservoir range from semi-primitive (Gap Creek arm, Little Gap Creek arm, Cedar Salt Log Creek arm, main body/island, Deadlun Campground arm) to rural natural (the area above the dam and the area around Hawkins boat ramp) (PG&E, 2009a and 2008c). These classifications capture the physical disturbances visible from the water as well as the social setting and potential for interaction between water and shoreline users.

### *Lower McCloud River*

Visitor survey results indicate that visitors to the Lower McCloud River originate from throughout California, with a lower percentage of respondents living in adjacent counties than those visiting McCloud or Iron Canyon reservoirs, suggesting that the Lower McCloud River has greater overall appeal. In addition, survey results indicate that visitors to the Lower McCloud River are primarily anglers and do not visit the project reservoirs, but rather focus activities and destinations along the Lower McCloud River (below McCloud dam). According to survey results, these users also frequent other regional rivers for angling (e.g., Upper Sacramento, Pit, and Trinity Rivers). Visitor survey results indicate that although boating on the river does occur, the estimated number of boating trips (both whitewater and access based) account for about five to ten trips in most years depending on the water year type.

PG&E estimates that the Lower McCloud River supported about 7,050 recreation days in 2008 (PG&E, 2008d). PG&E's relicensing study area included Hawkins Creek

Crossing (inside the project) and areas outside the project boundary, including the Ah-Di-Na Campground and Ash Camp Campground. Very few users were observed at the Hawkins Creek crossing, but it is occasionally used by anglers fishing Hawkins Creek.

*Pit River (James B. Black Powerhouse, Pit 6 and Pit 7 Reservoirs, and Pit 7 Afterbay)*

Anglers seeking access to the Pit River comprise the majority of people using the dispersed recreation sites near the James B. Black powerhouse, the base of Pit 6 and Pit 7 dams, and the Fenders Flat area. Recreational use of the dispersed recreation sites in proximity to James B. Black powerhouse and Pit 6 dam is very low. During the study period, there were no direct observations of recreational use occurring at the base of Pit 6 dam along Pit 6 Road. PG&E reports that the estimated 70 recreation days of use at this area in 2002 is likely an accurate estimate of current use considering the lack of direct observations during the 2007 and early 2008 study seasons. The use of the dispersed access area across from the James B. Black powerhouse was included in the study area for PG&E's Pit 3, 4, 5 Project license application, whereby PG&E concluded the area received modest use. PG&E estimates that the Pit 7 afterbay supported about 1,947 recreation days in 2008 (PG&E, 2008d).

The flat water boating WROS inventory for the Lower Pit River ranged from a class of rural developed on Pit 6 reservoir to rural developed (put-in below Pit 6 dam, Montgomery Creek node, and Pit 7 dam node), rural natural (private camp node and lower Pit 7 reservoir node), and semi-primitive (Pit 7 reservoir segment, Roaring Creek Cove node) on Pit 7 reservoir. The recreation setting within both reservoirs is comparable and influenced by reservoir elevations (e.g., physical setting scores were lower when shoreline was exposed within the narrow canyon). The absence of other users resulted in primitive social setting; however, the management and physical setting characteristics are more consistent with the rural developed setting. Pit 7 reservoir WROS classifications tended more toward primitive due to its length and the natural slot canyon rock formation at the confluence of Roaring Creek.

### **Angling**

The project waters provide ample angling opportunities. Survey data collected by PG&E indicate a high level of participation of project users in angling. The percentage of visitors whose primary activity included angling was highest in the Lower McCloud River (84 percent) followed by Iron Canyon reservoir (80 percent) and McCloud reservoir (69 percent). California Fish and Game classifies the 7.3-mile-long river reach of the Lower McCloud River immediately downstream of McCloud dam as a wild trout area (California Fish and Game, 2004 as cited in PG&E, 2009a).

The quality of angling along the Lower McCloud River (below McCloud dam) depends on the quantity of flow within the river. PG&E investigated flow relationships for both angling and boating opportunities (boating opportunities are discussed below under the section titled *Whitewater Boating*). Diversions from the project result in a

consistent base flow, and decrease the number of high-flow spill events and the number of days of spill during various types of water years. PG&E's study results indicate that 210 to 375 cfs as measured at the Ah-Di-Na gage (gage MC-1) is optimal for wading anglers, with the acceptable range from 200 to 475 cfs. Anglers who were not calibrated to the gage indicated that the existing summer base flows at Ah-Di-Na of about 160 to 200 cfs provided the best conditions for fishing.<sup>18</sup> Study results indicate that typical base flows of 200 cfs at Ah-Di-Na (about 330 cfs or more at Shasta Lake) provide high quality conditions for wading anglers. Based on boater surveys the acceptable flow range for access boating (fishing and camping) is 200-500 cfs.

### **Whitewater Boating**

As discussed previously under the section titled *Angling*, PG&E investigated flow relationships for both angling and boating opportunities on the Lower McCloud River. Additionally, PG&E and American Whitewater assessed potential boating opportunities on Iron Canyon Creek below the Iron Canyon dam and determined that much of this 4.3-mile reach does not appear to be boatable because it is too steep (PG&E, 2009c). Although boats can access the downstream end of the river from Pit 6 reservoir, this flatwater segment would be of little interest to whitewater boaters, and American Whitewater did not recommend further investigation of the reach.

The quality of boating along the Lower McCloud River depends on the quantity of flow within the river. Project operations affect the number of days when boatable flows exist in the Lower McCloud River. Overall, review of hydrological data under past project operations indicate that between 1974 and 2006, flows suitable for boating opportunities (180 to 3,000 cfs as measured at Ah-Di-Na gage [MC-1]) were available in about 40 percent of the years (13 of 33) with an average of 32 days with flows in the whitewater range (500 to 3,000 cfs as measured at Ah-Di-Na gage)(16 of those days in the standard whitewater range [700 to 1,500 cfs as measured at Ah-Di-Na gage]).

Optimal boating flows can be characterized by the type of boating experience (e.g., access-based or whitewater), by the type of boat (e.g., kayak or raft) and the type of experience (e.g., access-based, technical, standard, or big water). Study results indicate that typical base flows of 200 cfs at Ah-Di-Na (about 330 cfs or more at Shasta Lake) appear to provide improved boat-based access over the 160 cfs experienced during the summer of 2007 (minimum flow required during a dry year). The upper segment of the river from the base of McCloud dam to Ah-Di-Na Campground is steeper and more constricted, requiring a different set of flow conditions for a given boating experience than the lower segment from Ah-Di-Na to Shasta Lake.

Acceptable flow ranges for various whitewater experiences were developed from responses to a flow-acceptability survey conducted by PG&E that was administered to a study boater panel. The standard flow range for whitewater boating for both kayaks

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<sup>18</sup> Flow information has only been on-line since 2009.

and rafts on the upper segment of the McCloud River from the base of McCloud dam to Ah-Di-Na Campground is between 700 and about 1,000 cfs depending on the boat type (optimal 800 cfs for both boat types) and between about 600 and 1,500 cfs depending on the boat type on the lower segment of the McCloud River from Ah-Di-Na to Shasta Lake (optimal between 800 and 900 cfs depending on the boat type).

Compared to other rivers, study survey respondents rated the Lower McCloud River between “excellent” and “among the very best” (the two highest ratings on the five-point scale used) with its length of run, up to 24 river miles, fine scenery, solitude, excellent water clarity, remote and undeveloped character, and high quality Class III and IV whitewater as outstanding features. On the negative side, the trip is logistically challenging and the lack of public land for stopping to rest or camp adds additional challenges.

There are no formal put-in sites for whitewater boating access at the project or on the Lower McCloud River. Current whitewater boat trips on the McCloud River generally originate at the base of McCloud dam, Ash Camp, or Ah-Di-Na Campground and end at the McCloud Arm Bridge on Shasta Lake. The Forest Service McCloud bridge developed campground at Shasta Lake is where boaters end their trips.

### **3.3.5.2 Environmental Effects**

#### **Fish Stocking**

One of the primary recreational activities associated with the project includes angling. California Fish and Game currently stocks the Pit and upper McCloud Rivers to improve the recreational fishery. PG&E originally proposed to continue funding California Fish and Game for the stocking of up to 38,800 pounds of trout and 500,000 kokanee per fiscal year (July 1 through June 30) in the drainages of the Pit and McCloud Rivers below the uppermost project development thereon and in Shasta Lake. PG&E proposed that its cost would not exceed the then-prevailing statewide average cost to California Fish and Game for the production and distribution of catchable trout and fingerling kokanee. Following consultation with California Fish and Game and FWS, PG&E proposed to share the stocking costs equally with California Fish and Game, provided that its share of costs does not exceed \$5,000 during any period of three consecutive years, and provide the Commission with an annual report containing an evaluation of study findings on the stocking program.

California Fish and Game recommends in its 10(j) recommendation 14 that beginning in the first calendar year after license issuance PG&E reimburse California Fish and Game for stocking of up to 60,000 pounds of trout annually within the McCloud-Pit Project boundary and that costs would be assessed at the standard rate for catchable-sized hatchery grown trout in the year of stocking. California Fish and Game recommends that PG&E, if requested by California Fish and Game, pay \$5,000 annually for monitoring and evaluation of the fish stocking program or for mitigation of sturgeon reintroduction into Shasta Lake. California Fish and Game states that the demand for

angling is estimated to increase from 10,010 recreation days in 2008 to 24,403 recreation days by 2050 on McCloud reservoir and from 2,515 recreation days in 2008 to 6,130 recreation days by 2050 on Iron Canyon reservoir.<sup>19</sup> California Fish and Game further states that the current fish stocking agreement would not be adequate to meet the current and future demands. Additionally, California Fish and Game states that the numerous proposed recreation facility upgrades and construction of new recreation facilities would result in increased angling pressure at the project and a portion of the stocked fish could be allocated to Pit 7 reservoir, which is not currently stocked by California Fish and Game. California Fish and Game also comments that it does not intend to stock kokanee since it has not stocked kokanee into Shasta Lake since 1970.

In its response to 10(j) recommendations filed by California Fish and Game, PG&E states that it agrees with California Fish and Game's fish stocking 10(j) recommendation, as written.

#### *Our Analysis*

Angling is one of the most popular activities associated with the project, and stocking catchable trout would help ensure that the recreational fishery is maintained for the term of the new license. Based on recreation studies completed during the relicensing process, the demand for angling at the project is projected to increase over the term of a new license and the numerous proposed recreation facility upgrades and construction of new recreation facilities has the potential to result in increased angling pressure at the project. Existing stocking levels may not be sufficient to meet estimated future demand for angling for the term of a new license. The proposed kokanee stocking would not be beneficial since California Fish and Game does not intend to stock kokanee.

In 1942, the construction of Shasta dam isolated a population of white sturgeon; however, the population was self-sustaining in the Pit River arm of Shasta Lake, until experiencing a decline in the 1970s and 80s. California Fish and Game began an experimental sturgeon planting program early in 1988 to evaluate stocking as a means of restoring the sturgeon fishery; however, the program was discontinued later that year due to disease problems in the rearing facilities.<sup>20</sup> California Fish and Game states that 1.8 percent of the planted sturgeon were caught or observed from 13 months to 13 years after stocking, indicating that low natural recruitment may be the cause of the sturgeon population decline.<sup>21</sup> California Fish and Game further suggests that the construction of Pit 6 and 7 dams in the early 1960's, which eliminated access to 16 miles of stream likely utilized by white sturgeon during spawning, likely caused the decline. There is no

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<sup>19</sup> Technical Memorandum 30: Regional Recreation Demand Assessment (RL-S1).

<sup>20</sup> Licensee's Pre-Application Document.

<sup>21</sup> California Department of Fish and Game. 10(j) Recommendations for the McCloud-Pit Hydroelectric Project. January 28, 2010.

conclusive evidence, however, that the loss of riverine habitat or any project-related effects are directly correlated to the low recruitment of white sturgeon. In December 2010, California Fish and Game provided additional documentation to the Commission concerning the recommendation that PG&E fund fish stocking efforts of wild white sturgeon in the Pit River arm of Shasta Lake. Although the documentation provided information on the historical distribution and catches of white sturgeon, and additional details on the proposed stocking program, there was no evidence that stocking white sturgeon would be sustainable.

Increasing the number of fish stocked at the project would help meet the estimated future demand for angling at the project. Furthermore, annual monitoring and evaluation of the fish stocking program would provide the means for coordinated development to allow for the flexibility to increase or decrease stocking numbers over the term of a new license in order to meet future demand for angling.

### **Recreation Flows**

To enhance whitewater boating opportunities downstream of the project, PG&E proposed to provide, beginning no later than the first full calendar year after license issuance, a recreation flow event from McCloud dam (gage MC-7) if a spill flow event of at least 300 cfs has not occurred for seven consecutive days during the period of April 1 through October 31 at any time in the previous 3 calendar years. PG&E defined a recreation flow event as a minimum flow release of 300 cfs from McCloud dam as measured at MC-7 (McCloud dam), for 11 consecutive days during the period between May 15 and June 15. The proposed flows would be equal to or greater than the flows that are required in the current project license (section 3.3.2, *Aquatic Resources*).

As discussed in detail in section 3.3.2, *Aquatic Resources*, the Forest Service specified PG&E release mean daily flows of at least 175 cfs year-round from the McCloud dam such that the mean daily flow at USGS gage MC-1 at Ah-Di-Na is at least 200 cfs. These flows would be augmented during the period February 15 through June 30 according to the flow rule. The Forest Service stated that in terms of boating access, the current flow regime allows flows to drop below 200 cfs in some months. Forest Service further stated that its proposed flow regime would provide more days of boating access than what currently exist, especially in drier years. Although the Forest Service's proposed flow regime is not significantly different than the current flow regime, it would provide a few more whitewater boating days in wetter years.

PG&E alternative condition 19 is consistent with the Forest Service's original condition 19, part 1, subpart b and proposes to remove the recreation flow event from its original proposal due to lack of support from stakeholders as expressed in the August 27, 2009 project meeting with relicensing participants.<sup>22</sup>

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<sup>22</sup> PG&E's submittal of alternative conditions filed on March 3, 2010.

American Whitewater recommends the release of elevated flows in April and May to provide whitewater boating opportunities in addition to ecological benefits. At McCloud dam, American Whitewater recommends peak flows of 600 cfs during April and ramping down through May in wet and above normal years, at least 400 cfs during the month of April in below normal water years, and flows of 300 cfs ramping down to 200 cfs base flows by the opening day of trout season in dry and critically dry years.

California Trout, Trout Unlimited, and McCloud River Club support the Forest Service's proposed minimum baseflow of 200 cfs at Ah-Di-Na (MC-1) but recommend that summer base flows at Ah-Di-Na be the higher of (1) 200 cfs, or (2) the historic average summer (i.e., July and August) base flows during normal years under the existing license (about 210 to 220 cfs). They also recommend the number of available angling days be increased in late April and May.

The Anglers Committee, California Salmon and Steelhead Association, California Fisheries, and Water Unlimited support the existing daily flow requirements for the Lower McCloud River below McCloud dam and recommend that the Commission prohibit recreational boating in the Lower McCloud River below McCloud dam. They state that the Lower McCloud River below McCloud dam was set aside by the State of California as Wild Trout Waters to provide high quality trout fishing for California licensed anglers and that recreational boating adversely affects anglers and trout fishing on the Lower McCloud River. They recommend that whitewater boating only occur during spilling flows in the Lower McCloud River.

The McCloud River Club states that any significant increase in flows on the Lower McCloud River during the early fishing season could harm trout populations and the ability of anglers to safely fish during the spring. Furthermore, California Salmon and Steelhead Association and Anglers Committee comment that the proposed increased flows below PG&E's McCloud dam in the Lower McCloud River could have negative effects to disabled California licensed anglers that fish the river with respect to increased flows and higher velocity (effects of flows to wading anglers).

California Trout, Trout Unlimited, Northern California Council, Federation of Fly Fishers, and McCloud RiverKeepers comments that minimum and maximum flows from McCloud dam should be established for the protection of the habitat and fishery first and foremost with protection of the rights of the fishing community as the second priority. The Fly Shop also supports the protection and enhancement of rainbow and brown trout, and the overall river system health in the Lower McCloud River and recommends flow management that enhances and protects the extraordinary recreational fishing experience, including the ability to wade.

California Sportfishing Protection Alliance supports putting the aquatic needs of the McCloud River first but also seeks a balancing of measures to reasonably accommodate recreational interests, particularly angling. California Sportfishing Protection Alliance comments that reasonable accommodation consistent with aquatic values also must be made for whitewater boating interests and that it does not oppose all

whitewater boating in the Lower McCloud River downstream of the project. Both Friends of the River and American Whitewater comment that they advocate positions consistent with the protection, enhancement, and restoration of aquatic species and their habitat, and also positions consistent with protection and enhancement of recreational opportunities in the McCloud River and its tributaries.

To support restoration of anadromous salmonids and the fish passage pilot study (RPA of the OCAP BiOp), the Winnemem Wintu Tribe recommends that the minimum flow increase to 300 cfs by 2013; and increase further by 2015 to 600 cfs in July and 400 cfs in August (table 3-28). During critically dry years, the Tribe also recommends that flows during September be increased to 400 cfs beginning in 2015. These flow recommendations are consistent with the upper range of flows proposed by NMFS for these months when listed anadromous species are present and affected by the project, as discussed in detail in table 3-22, section 3.3.2, *Aquatic Resources*.

As discussed in detail in section 3.3.2, *Aquatic Resources*, the Forest Service included modifications to condition 19 in its November 29, 2010, filing with the Commission. The provisions specified in Forest Service modified condition 19 part 1, subpart b related to minimum streamflow requirements in the McCloud River below McCloud dam are similar to those specified in the Forest Service's original condition 19 part 1, subpart b, but the differences in the modified condition make it more consistent with the California Trout, Trout Unlimited, and McCloud River Club recommendation which is similar to the streamflows recommended by staff in the draft EIS. The Forest Service specifies PG&E release mean daily flows of at least 175 cfs year round from McCloud dam such that the mean daily flow at gage USGS gage MC-1 at Ah-Di-Na is at least 200 cfs. These flows would be augmented during the period from February 15 through August 31 according to the specified flow rule. In its November 24, 2010, filing, PG&E objects to Forest Service modified condition 19 part 1, subpart b.

#### *Our Analysis*

As discussed in section 3.3.5.1, *Affected Environment*, the quality of angling and boating along the Lower McCloud River depends on the quantity of flow within the river. We have used available issues of DWR Bulletin 120 from 1994-2006 to determine the runoff percentage for each semimonthly period described in the various flow recommendations and applied the associated seasonal flow increases and decreases and event downramping to the flows recorded at gage MC-1 (Ah-Di-Na). We then compared the daily flows to the recreational ranges presented in the license application from TM-24 for boating and TM-58 for fishing:

- Standard, technical, and acceptable whitewater boating: 500-1,500 cfs
- Acceptable for wading anglers: 200-475 cfs
- Optimal for wading anglers: 210-374 cfs

Acceptable flow ranges for various whitewater experiences developed from a flow-acceptability survey conducted by PG&E found that the standard flow range for whitewater boating for both kayaks and rafts from the base of McCloud dam to Ah-Di-Na Campground was between 700 and about 1,000 cfs depending on the boat type (optimal 800 cfs for both boat types) and between 600 and 1,500 cfs depending on the boat type from Ah-Di-Na to Shasta Lake (optimal between 800 and 900 cfs depending on the boat type). Technical whitewater boating conditions would exist between 500 cfs and 700 cfs from the base of McCloud dam to Ah-Di-Na Campground. Flows greater than 1,500 cfs are considered “big water” suitable only for expert paddlers.

The number of days gained or lost from April through October under each flow recommendation compared to the current license (no-action alternative) is presented in tables 3-34 (whitewater boating), 3-35 (optimal fishing), and 3-36 (acceptable fishing).

Table 3-34. Change in Number of Whitewater Boating Days (500-1,500 cfs) for Alternative Flow Recommendations Compared to No-action Alternative. (Source: Staff)

| Water Year | Days Under No-action Alternative | Change in Number of Days Compared to Current Conditions (No-action Alternative) |                                 |              |                           |                     |                      |      |       |
|------------|----------------------------------|---|---------------------------------|--------------|---------------------------|---------------------|----------------------|------|-------|
|            |                                  | FS Cond. 19 (modified 3/1/10)/PG&E Alt. Cond. 19                                | FS Cond. 19 (modified 12/29/10) | Cal Trout/TU | Cali-fornia Fish and Game | American Whitewater | McCloud RiverKeepers | NMFS | Wintu |
| 1994       | 0                                | 0   | 0                               | 0            | 0                         | 0                   | 0                    | 31   | 31    |
| 1995       | 13                               | 2   | 2                               | 18           | 2                         | 5                   | 0                    | 0    | 31    |
| 1996       | 4                                | 2   | 2                               | 7            | 2                         | 6                   | 0                    | 0    | 31    |
| 1997       | 0                                | 0   | 0                               | 0            | 0                         | 0                   | 0                    | 0    | 31    |
| 1998       | 73                               | -1  | -1                              | 0            | -1                        | 0                   | 0                    | 0    | 31    |
| 1999       | 20                               | 1   | 1                               | 4            | 2                         | 0                   | 0                    | 0    | 31    |
| 2000       | 10                               | 0   | 0                               | 3            | 0                         | 0                   | 0                    | 0    | 31    |
| 2001       | 0                                | 0   | 0                               | 0            | 0                         | 0                   | 0                    | 0    | 31    |
| 2002       | 0                                | 0   | 0                               | 0            | 0                         | 0                   | 0                    | 0    | 31    |
| 2003       | 0                                | 0   | 0                               | 0            | 0                         | 0                   | 0                    | 0    | 31    |
| 2004       | 0                                | 0   | 0                               | 0            | 0                         | 0                   | 0                    | 0    | 31    |
| 2005       | 10                               | 3   | 3                               | 5            | 3                         | 0                   | 0                    | 0    | 31    |
| 2006       | 20                               | 0   | 0                               | 0            | 0                         | 0                   | 0                    | 0    | 31    |

Table 3-35. Change in Number of Optimal Fishing Days (210-375 cfs) for Alternative Flow Recommendations Compared to No-action Alternative. (Source: Staff)

| Water Year | Days Under No-action Alternative | Change in Number of Days Compared to Current Conditions (No-action Alternative) |                                 |              |                           |                     |                      |      |       |
|------------|----------------------------------|---|---------------------------------|--------------|---------------------------|---------------------|----------------------|------|-------|
|            |                                  | FS Cond. 19 (modified 3/1/10)/PG&E Alt. Cond. 19                                | FS Cond. 19 (modified 12/29/10) | Cal Trout/TU | Cali-fornia Fish and Game | American Whitewater | McCloud RiverKeepers | NMFS | Wintu |
| 1994       | 31                               | -31   | -31                             | -31          | -31                       | -2                  | -31                  | -31  | 91    |
| 1995       | 153                              | -144  | -82                             | -144         | -144                      | -137                | -77                  | -112 | -22   |
| 1996       | 137                              | -135  | -135                            | -128         | -131                      | -103                | -73                  | -105 | 7     |
| 1997       | 156                              | -156  | -156                            | -156         | -156                      | -127                | -95                  | -125 | -4    |
| 1998       | 132                              | -119  | -64                             | -122         | -121                      | -117                | -55                  | -95  | -62   |
| 1999       | 177                              | -138  | -76                             | -140         | -139                      | -141                | -93                  | -127 | -58   |
| 2000       | 190                              | -164  | -102                            | -178         | -164                      | -166                | -121                 | -150 | -51   |
| 2001       | 39                               | -39   | -39                             | -39          | -37                       | -10                 | -39                  | -8   | 83    |
| 2002       | 154                              | -154  | -92                             | -154         | -140                      | -149                | -154                 | -123 | -32   |
| 2003       | 183                              | -174  | -112                            | -173         | -166                      | -178                | -167                 | -144 | -63   |
| 2004       | 203                              | -181  | -119                            | -178         | -174                      | -174                | -130                 | -167 | -51   |
| 2005       | 174                              | -163  | -101                            | -155         | -143                      | -159                | -142                 | -133 | -68   |
| 2006       | 137                              | -132  | -70                             | -132         | -132                      | -132                | -70                  | -101 | -62   |

Table 3-36. Change in Number of Acceptable Fishing Days (200-475 cfs) for Flow Alternative Recommendations Compared to No-action Alternative. (Source: Staff)

| <b>Change in Number of Days Compared to Current Conditions (No-action Alternative)</b> |   |  |  |                     |                                 |                            |                             |             |              |
|--|---|--|--|---------------------|---------------------------------|----------------------------|-----------------------------|-------------|--------------|
| <b>Water Year</b>  | <b>Days Under No-action Alternative</b> | <b>FS Cond. 19 (modified 3/1/10)/ PG&amp;E Alt. Cond. 19</b> | <b>FS Cond. 19 (modified 12/29/10)</b> | <b>Cal Trout/TU</b> | <b>California Fish and Game</b> | <b>American Whitewater</b> | <b>McCloud RiverKeepers</b> | <b>NMFS</b> | <b>Wintu</b> |
| 1994   | 31                                      | 183  | 183                                    | 183                 | 183                             | 183                        | -31                         | 152         | 152          |
| 1995   | 158                                     | 36   | 36                                     | 20                  | 36                              | 32                         | 31                          | 9           | 8            |
| 1996   | 173                                     | 32   | 32                                     | 27                  | 32                              | 28                         | -10                         | 5           | 4            |
| 1997   | 178                                     | 36   | 36                                     | 36                  | 36                              | 36                         | -9                          | 6           | 5            |
| 1998   | 140                                     | 0  | 0                                      | -1                  | -1                              | 0                          | 0                           | -30         | -31          |
| 1999   | 193                                     | -1   | -1                                     | -4                  | -2                              | 0                          | -12                         | -30         | -31          |
| 2000   | 198                                     | 6  | 6                                      | 3                   | 6                               | 5                          | -19                         | -25         | -26          |
| 2001   | 68                                      | 146  | 146                                    | 146                 | 146                             | 146                        | -68                         | 116         | 115          |
| 2002   | 190                                     | 24   | 24                                     | 24                  | 24                              | 24                         | -190                        | -6          | -7           |
| 2003   | 199                                     | 15   | 15                                     | 15                  | 15                              | 15                         | -181                        | -15         | -16          |
| 2004   | 208                                     | 6  | 6                                      | 6                   | 6                               | 6                          | -27                         | -24         | -25          |
| 2005   | 201                                     | -1   | -1                                     | -3                  | -1                              | 1                          | -165                        | -29         | -30          |
| 2006   | 139                                     | 0  | 0                                      | 0                   | 0                               | 0                          | 0                           | -30         | -31          |

During the 13-year period that we analyzed (1994-2006), under the existing license the number of whitewater boating days was 0 in 6 years and 20 or fewer in 6 of the 7 remaining years (table 3-34). The flow scenarios proposed by California Fish and Game and PG&E and specified by the Forest Service's modified condition 19 would have had no effect on the number of days available to whitewater boaters in 8 years and a change of 1 to 3 days in the other 5 years. The California Trout, Trout Unlimited, and McCloud River Club recommendation would have increased the number of days by 3 to 7 during 4 years with no change during 8 years. Higher flows recommended by the Winnemem Wintu Tribe to support listed salmonids would have added 31 days each year. Flow recommendations from American Whitewater, McCloud RiverKeepers, and NMFS would have had no effect in most years.

As indicated in table 3-21, the actual flows at Ah-Di-Na except during the driest years were greater than 215 cfs and would have been considered optimal. In below normal years and normal years, flows consistently averaged in the range that is optimal for wading anglers (i.e., 210-375 cfs) from April through October. In wet years, flows were in the range that is optimal for wading anglers from June through October. In wet years, flows averaged in the range that is acceptable for technical whitewater boating (i.e., 500-700 cfs) from April through May. Since the McCloud River is closed to fishing from November 16 to the last Saturday in April, flows during this period would have no impact on anglers.

Because the low end of the range for optimal conditions for wading anglers is 210 cfs, whereas the minimum base flow in most recommendations is 200 cfs, all of the recommended flow scenarios would result in a significant decrease in optimal fishing days compared to the existing license (table 3-35). The Forest Service's modified condition 19 would generally have resulted in a smaller number of lost optimal days than the recommendations by PG&E, California Trout, Trout Unlimited, and McCloud River Club, California Fish and Game, American Whitewater, and NMFS. In contrast, the number of acceptable days for wading anglers would generally have increased during most of the 13-year period of analysis under all flow proposals (table 3-36), and there were no significant differences in the number of days gained among the recommendations from PG&E, California Trout, Trout Unlimited, and McCloud River Club, California Fish and Game, and American Whitewater, and the Forest Service's modified condition. During 4 years, the number of days would have been unchanged or decreased by 1 or 2 days; the number of days would have increased by 6 to 36 days during 7 years. During 1994 and 2001, the number of acceptable fishing days would have increased by more than 100.

### **Recreational Access to Lower McCloud River Flows**

Except for the area immediately below McCloud dam, no project lands are located along the Lower McCloud River. NFS lands along the Lower McCloud River below McCloud dam, specifically at Ash Camp, Ah-Di-Na Campground, and the river corridor between these facilities, currently provide the only public access to both boaters and

anglers on the 24-mile stretch of the Lower McCloud River from McCloud dam to Shasta Lake. Ash Camp and Ah-Di-Na Campground are within the 4.5 miles of publicly accessible NFS lands along the Lower McCloud River. The remainder of the land located along the Lower McCloud River, except for The Nature Conservancy's McCloud River Preserve which is used by some anglers, is privately owned. In addition to the base of McCloud dam, Ash Camp and Ah-Di-Na Campground are the origin of whitewater boat trips on the Lower McCloud River but there is no public take-out below Ah-Di-Na Campground for boaters until Shasta Lake.

Numerous comments filed and raised at the public meetings on the draft EIS were related to the inability of recreationists to access the Lower McCloud River during the early spring. The higher minimum streamflows, under the staff recommendation, that would be appropriate for whitewater boating would occur during the early spring months when the roads to Ah-Di-Na Campground and Ash Camp are generally inaccessible due to snow. As discussed in section 3.3.2, *Aquatic Resources*, and section 3.3.5.2, *Environmental Effects, Recreation Flows*, the recommended flows would likely result in flows below McCloud dam that are suitable for technical whitewater boating. Numerous commenters state that the roads to Ash Camp and Ah-Di-Na Campground are inaccessible due to snow during the early spring when the instream flows would be appropriate for whitewater boating. A number of commenters recommend that PG&E be responsible for snow plowing the road to provide access to the Lower McCloud River flows.

In their comments on the draft EIS, the Forest Service, California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers recommend that road access is open and available so that recreationists can access the project-released minimum instream flows, especially in late spring, to participate in boating or fishing activities. In their comments on the draft EIS, American Whitewater and Friends of the River recommend that road access be provided to Ah-Di-Nah whenever boating flows are available and that PG&E be required to provide snow removal when flows are above 300 cfs at the Ah-Di-Nah gage. Additionally, numerous individuals comment that recreational access to the Lower McCloud River in the winter/spring due to snow could be improved. PG&E disagrees with suggestions that it should be required to plow snow to provide vehicular access to Ah-Di-Na Campground for whitewater boating access.

#### *Our Analysis*

Public access to the Lower McCloud River is challenging because except for the area immediately below McCloud dam, no project lands are located along the Lower McCloud River. As discussed in section 3.3.5.2, *Environmental Effects, Lower McCloud River Recreation Facilities*, PG&E proposes to provide an access area at the base of McCloud dam to increase public access to the Lower McCloud River. NFS lands along the Lower McCloud River below McCloud dam, specifically at Ash Camp, Ah-Di-Na Campground, and the river corridor between these facilities, currently provide the only

public access to both boaters and anglers on the 24-mile stretch of the Lower McCloud River from McCloud dam to Shasta Lake.

Numerous comments filed and raised at the public meetings on the draft EIS were related to the inability of recreationists to access the Lower McCloud River during the early spring. The higher minimum streamflows, under the staff recommendation, that would be appropriate for whitewater boating would occur during the early spring months when the roads to Ah-Di-Na Campground Ash Camp are generally inaccessible due to snow. A number of commenters recommend that PG&E be responsible for snow plowing the road to provide access to the Lower McCloud River flows.

Ash Camp (FR U38N11Y) and Ah-Di-Na (FR 38N53) roads are non-project roads that do not meet the Commission's criteria for project roads used primarily for project purposes. Therefore, these roads are not included in the list of project roads (see table 3-41 in section 3.3.7.2, *Environmental Effects, Land Use Resources, Project Boundary*) that PG&E is responsible for maintaining under the project license.

### **Recreation Management Plan**

#### *Development of Recreation Management Plan*

In order to ensure a quality experience for recreation users over the term of the license, PG&E proposed to develop a Recreation Development and Management Plan (Recreation Plan) in consultation with the Forest Service, California Fish and Game, California Water Board, and other interested parties within 2 years of license issuance. The Recreation Plan would include the following: upgrading existing recreation facilities and constructing new recreation facilities in accordance with Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG) and with the ADA; public use of one, year-round campground; streamflow dissemination for the Lower McCloud River; a Project Sign Plan; an Interpretive and Education Plan; periodic recreation monitoring and reporting; O&M of project recreation facilities; project-wide patrol of areas including but not limited to Hawkins Creek crossing, Iron Canyon reservoir shoreline dispersed use sites, and McCloud reservoir shoreline access points; and annual coordination with the Forest Service.

In its original condition 30, the Forest Service specified that PG&E develop and implement a Recreation Plan, to be approved by the Forest Service within 2 years of license issuance, to address recreation resource needs associated with the project in consultation with the Forest Service, California Fish and Game, California Water Board, and other interested parties. The plan would include annual maintenance, operation, reconstruction, survey and monitoring, water surface management, and project patrol of existing recreation facilities and use at the project. PG&E alternative condition 30 is consistent with the Forest Service's original condition 30; however, it does not include final approval of the Recreation Plan by the Forest Service. Additionally, PG&E alternative condition 30 proposes that all new project recreation facilities constructed under the Recreation Plan would be included within the project boundary and that all

existing recreation facilities that are reconstructed under the Recreation Plan would be included within the project boundary after reconstruction.

In its November 29, 2010, filing with the Commission, the Forest Service included modifications to condition 30. The Forest Service has modified condition 30 to include consultation with Native American representatives on the development of the Recreation Plan and consultation with the conditioning agencies.<sup>23</sup> Additionally, Forest Service modified condition 30 specifies that new and reconstructed project facilities on NFS lands would be included in the project boundary prior to ground disturbance (see section 3.3.7.2, *Environmental Effects, Land Use Resources, Project Boundary*).

In its November 24, 2010, filing, PG&E objects to Forest Service modified condition 30 but does not specify the components with which it disagrees.

#### *Recreation Facility Design Standards*

PG&E proposed to completely reconstruct all project recreation facilities within 25 years of license issuance so that all project recreational facilities would be reconstructed once during the term of the license. PG&E proposed to use Forest Service design standards and to obtain Forest Service approval on final designs and prior to construction for any facilities located on NFS lands before submitting for Commission approval. As part of this approval, the Forest Service may require adjustments to facility locations and final plans to preclude or mitigate impacts and ensure that the project is compatible with on-the-ground conditions.

In its original condition 30, part 2, the Forest Service specified that all new and reconstructed project recreation facilities located on PG&E's lands would be designed to meet applicable ADA and Architectural Barriers Act (ABA) standards and FSORAG and Forest Service Trail Accessibility Guidelines (FSTAGs) as currently written at the time of project design. The Forest Service further specified that all project facilities would be designed to be consistent with the recreation opportunity spectrum (ROS) class and VQO where they are located. All existing project and project-related recreation facilities would be reconstructed within 3 years of license issuance and new facilities would be constructed within 3 or 5 years of license issuance, as specified. Lastly, Forest Service specified that all project and project-related recreation facilities and infrastructure would be reconstructed at mid-license or 25 years, whichever is greater.

California Fisheries and Water Unlimited also recommend that the Commission enforce ADA standards and provide accommodations for disabled persons at all associated project campgrounds and recreational public facilities, especially at McCloud reservoir.

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<sup>23</sup> Conditioning agencies are defined in the Forest Service Draft Project Implementation Plan as “typically Forest Service, state water resources control board, NOAA, and occasionally others.”

PG&E alternative condition 30 is consistent with the Forest Service's original condition 30, except that it proposes to construct new and reconstruct existing recreation facilities within 5 years of approval of the Recreation Plan. In its reply to comments on the draft EIS, PG&E comments that its proposal to construct and reconstruct recreation facilities within 5 years of approval of the Recreation Plan is appropriate due to the significant design work needed for the proposed enhancements.

In its modified condition 30, the Forest Service does not specify that new and reconstructed facilities on PG&E lands meet ADA and ABA standards nor does it specify a schedule for construction/reconstruction of project recreation facilities, as previously specified in condition 30.

In its November 29, 2010 filing with the Commission, the Forest Service included a draft Recreation Development and Management Plan as an enclosure (Forest Service, 2010d, Enclosure 3) with the modified 4(e) conditions. In this draft plan the Forest Service recommends construction of new project facilities within 3 years and the reconstruction of existing recreation facilities within 5 years of license acceptance; all recreation facilities be replaced in-kind or with an upgraded facility within 20 years of construction/reconstruction; specific guidelines and standards should be followed for the construction and reconstruction of recreation facilities on NFS lands (consistent with the Forest Service's original condition 30); and Forest Service approval for the development of conceptual designs and the development of construction supporting design reports of each project recreation facility prior to approval of the Recreation Plan.

In its November 24, 2010, filing, PG&E objects to Forest Service modified condition 30 but does not specify the components with which it disagrees.

#### *Our Analysis*

PG&E's proposed Recreation Plan would provide the means to develop and implement the proposed recreation measures in a consistent and coordinated manner. Although recreation facilities would be constructed or reconstructed shortly after license issuance, recreation facilities and infrastructure could become degraded over the term of the license; however, all facilities may not need to be reconstructed near mid-license term as proposed by PG&E in its alternative condition 30 or recommended by the Forest Service in the draft Recreation Development and Management Plan. A reevaluation of the facilities for degradation by PG&E at mid-license term or within 25 years of license issuance, whichever is greater, would ensure that the recreation facilities would continue to provide safe, reliable public access to recreational opportunities and the project and address growing recreational demand over the term of the new license.

Consultation with the Forest Service would help to ensure that the measures being developed and implemented would be consistent with the management goals and objectives of the Shasta-Trinity National Forest. Consultation with Native American representatives and conditioning agencies (which would include the Forest Service, California Water Board, and NMFS), as specified in Forest Service modified

condition 30, and American Whitewater and Friends of the River, as requested in their comments on the draft EIS, during the development of the Recreation Plan would better inform the development and components of the Recreation Plan. Although Forest Service modified condition 30 does not specify consultation with California Fish and Game, consultation with California Fish and Game, as proposed by PG&E, during the development of the Recreation Plan would also better inform the development of the Recreation Plan. Further, improving access for the disabled at the project would be consistent with the Commission's policy on recreation facilities at licensed projects under which licensees are expected to consider the needs of the disabled in the design and construction of such facilities.<sup>24</sup>

In the draft Recreation Development and Management Plan, the Forest Service recommends new recreation facilities be constructed within 3 years of license acceptance and that existing facilities be reconstructed within 5 years of license acceptance. This schedule limits the time between PG&E filing the final Recreation Plan for Commission review and approval (within 2 years of license issuance) and constructing new recreation facilities. Completion of construction could be difficult given the significant design work and requirement of final Commission approval.

The Forest Service also specifies in modified condition 30 that new and reconstructed project recreation facilities on NFS lands would be brought into the project boundary prior to ground disturbance. As discussed in section 3.3.7.2, *Environmental Effects, Land Use Resources, Project Boundary*, it would be appropriate for all existing project recreation sites and facilities to be brought into the project boundary at license issuance. Since construction plans for new recreation facilities could change, it would be appropriate to bring new facilities into the project boundary once construction is completed to ensure that each facility is included in the project boundary in its entirety. The following sections describe the components of the Recreation Plan proposed by PG&E and specified by the Forest Service in original condition 30 and include our assessment of the potential effects of each component on recreational resources at the McCloud-Pit Project.

### **McCloud Reservoir Recreation Facilities**

- Tarantula Gulch Boat Ramp and Day-Use Area: reconstruct the Tarantula Gulch boat ramp to California Boating standards: provide a boarding dock, and extend the launch ramp to 3 feet (vertical) below the minimum operating pool elevation: provide day-use facilities (restroom, paved parking, trash receptacles/removal, tables, and pedestrian trail access) with potable water at Tarantula Gulch boat ramp (between the ramp and the intersection with FR 11).

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<sup>24</sup> See 18 CFR § 2.7 (2010).

- Red Banks: provide day-use facility that includes restroom, paved parking, trash receptacles/removal, tables, and pedestrian trail access.
- McCloud Shoreline Access Points: provide access points (paved parking and shoreline access trail) at Battle Creek, West dam, and East dam.
- Star City Campground and Day-Use Area: develop a campground with walk-in sites (estimate six sites), paved parking, vault restroom, potable water, tables, fire rings/grills, trash receptacles/removal, and host site; provide day-use facilities (restroom, paved parking, trash receptacles/removal, tables, and pedestrian trail access) including shoreline access for hand launching boats and potable water.
- Floating Dock or Pier and Trail: conduct a feasibility study to find a suitable location for a floating dock or pier and trail (away from Tarantula Gulch boat launch) for day-use activities, such as fishing and swimming; design and construct this facility if a suitable location is identified.

In its original condition 30, the Forest Service also specified that PG&E rehabilitate existing facilities at McCloud reservoir and improve access. We summarize the differences between the rehabilitation measures specified in the Forest Service's original condition 30 and those in proposed by PG&E below.

- Tarantula Gulch Boat Ramp and Day-Use Area: reconstruct existing boat ramp to two-lane ramp with boarding dock, sidewalk, and a minimum of a 4-foot draft clearance below minimum pool to California Boating standards; redesign existing parking lot and day-use area to include 30-40 total parking spaces, develop paved parking area and turnaround, and designate parking spaces for vehicles; provide lighting in the parking area that is visible from the courtesy dock; and provide snow removal on the access road (from junction with 38N11) and parking area between April 1 and December 1, when access to the junction is available.
- Tarantula Gulch Inlet: provide paved parking for a minimum of five vehicles, up to three picnic tables with pedestal grills, vault toilet, animal-resistant trash receptacles, and a pedestrian access trail to the high water line.
- Red Banks: provide paved parking for a minimum of five vehicles, up to three picnic tables with pedestal grills, vault toilet, animal-resistant trash receptacles, and a pedestrian access trail to the high water line. PG&E would ensure legal access from roadway to reservoir day-use areas.
- McCloud shoreline access points: include paved parking for three vehicles and an access trail to the shoreline at three reservoir access points at Battle Creek and on each side of McCloud dam; install picnic tables where space allows; PG&E would ensure legal access from roadway to reservoir access areas.

- Star City Campground and Day-Use Area: develop a campground with two-vault accessible restroom facility and potable water source; up to 10 campsites (including a host site) with a site post, picnic table, animal-resistant food locker, and campfire ring at each campsite; day-use area near the shoreline with a designated swim/beach area, dock, car-top boat access, single-vault toilet, and up to five sites each with a table, pedestal grill, and animal-resistant trash containers.
- Floating Dock or Pier and Trail: develop a fishing/swimming platform to accommodate a fluctuating water level at one of the four proposed day-use areas or at another designated recreation day-use location around the McCloud reservoir.

PG&E alternative condition 30 is generally consistent with the Forest Service's original condition 30; however, PG&E proposes to exclude language related to the acquisition of rights at Red Banks day-use site and the McCloud shoreline access points. PG&E proposes to cooperate with private landowners to acquire rights of public access by any means necessary, but not including by condemnation pursuant to section 21 of the FPA or any other law, for the purpose of public recreational day-use. At Tarantula Gulch boat ramp, PG&E does not propose lighting and snow plowing or a specific number of parking spaces, as specified by the Forest Service, but does propose that the boat ramp be extended to an elevation of at least 3 vertical feet below minimum pool and that the boat ramp remain one lane. Additionally, PG&E comments that initial site investigations have identified site constraints that affect the feasibility of constructing some recreation facilities. PG&E proposes to first conduct a site evaluation within 2 years of license issuance to determine if constructing a fishing/swimming platform at McCloud reservoir is feasible and then constructing the facility if a suitable location is found.

The Hearst Corporation expresses concerns over the proposed expansion of overnight camping at McCloud reservoir and unknown details that would be included in the Recreation Plan. Further, The Hearst Corporation strongly opposes the allowance for open campfires (including those within a fire ring) at McCloud reservoir since it is in a very high fire risk assessment area and public use is concentrated during the dry summer months and would pose great risk to persons and property on Hearst lands.

In its comments on the draft EIS, The Hearst Corporation continues to support a day-use only recreation site at Star City Creek. The Hearst Corporation comments that the 1969 grant deed to the Forest Service from The Hearst Corporation provides that the lands would not be used for the "construction of campsites, cabins, or any overnight accommodations." Additionally, The Hearst Corporation recommends a campground operating season for any campground developed that limits the operating season to April 1 through September 30. Additionally, The Hearst Corporation disagrees that fire rings would reduce the threat of wildfires but supports supervised cooking grills and recommends proper signage, information, and enforcement to prevent the use of open campfires.

In its reply to comments on the draft EIS, PG&E comments that it is working with the Forest Service and The Hearst Corporation to gain the necessary approvals and rights to develop a campground at Star City because this is the only site on McCloud reservoir suitable for a campground and that it is not reasonable to consider developing a campground at Tarantula Gulch boat ramp. PG&E disagrees with specifying 30-40 parking spaces for Tarantula Gulch boat ramp and comments that preliminary site designs show that at most only about 20 vehicles with trailers and 5 single vehicles can be accommodated at the boat ramp. Further, PG&E disagrees with a requirement to plow snow at the Tarantula Gulch boat launch and the road leading to the ramp and because it does not need winter access for project purposes and notes that the study results do not demonstrate a need for this measure.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 30. The modified condition specifies if PG&E cannot acquire the rights for overnight public recreation use at Star City, PG&E should construct a campground on NFS lands near Tarantula Gulch boat ramp. Additionally, the Forest Service has removed specific details from the 4(e) condition and placed them in the draft Recreation Development and Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

In the draft Recreation Development and Management Plan the Forest Service is now recommending, as specified in the Forest Service's original condition 30, lighting and the establishment of a schedule for snow plowing at Tarantula Gulch boat ramp. Forest Service modified condition 30 does not specify, nor does the draft Recreation Development and Management Plan recommend, a specific number of parking spaces at Tarantula Gulch boat ramp, extension of the boat ramp to a 4-foot draft clearance below minimum pool, or construction of a day-use site at the boat ramp. In the draft Recreation Development and Management Plan, the Forest Service recommends specific amenities for the individual recreation facilities that are otherwise generally consistent with the Forest Service's original condition 30; however, the Forest Service does recommend that a floating dock be constructed at the Tarantula Gulch inlet day-use area. Forest Service modified condition 30 does not specify the construction of a floating dock even though the Forest Service's original condition 30 specified that the dock be located at one of the proposed day-use sites.

In its November 24, 2010, filing, PG&E objects to Forest Service modified condition 30 but does not specify the components with which it disagrees.

#### *Our Analysis*

PG&E's proposed rehabilitation measures for the recreation facilities at McCloud reservoir would provide the means for future rehabilitation and replacement (as needed) of existing recreational facilities within the project. The facility rehabilitation measures would provide for enhanced access to project facilities and amenities and help ensure that these access sites would continue to provide adequate facilities to meet current and future recreational demand at the projects.

Constructing the proposed day-use area and reconstructing the boat ramp at Tarantula Gulch would help relieve overcrowding and reduce user conflicts at McCloud reservoir. However, PG&E states that initial site investigations have identified site constraints that may affect the feasibility of constructing some recreation facilities specified by the Forest Service. Forest Service modified condition 30 specifies that PG&E reconstruct the Tarantula Gulch boat ramp to provide two lanes to further reduce crowding at the ramp but does not specify a minimum of a 4-foot draft clearance below minimal pool level or a specific number of parking spaces, as was specified in the Forest Service's original condition 30. PG&E states steep slopes constrain design options for providing an additional lane at the boat ramp. Additionally, although PG&E agrees with increasing parking capacity at the boat ramp to the extent possible, PG&E states that an initial site assessment determined that only a few parking spaces could be added due to site constraints. Currently, the bottom of the boat ramp is 1 foot below the normal minimum operating reservoir level (elevation 2,634 feet) and typically provides boater access during the entire recreation season. PG&E states reconstructing the ramp with the toe of the ramp extending to an elevation not less than three vertical feet below minimum pool would extend the season for launching boats.

Demand for boating access coupled with crowding issues at McCloud reservoir demonstrates the need for improved recreational boating access at the project. Constructing additional proposed day-use areas at Red Banks and the Tarantula Gulch inlet and access sites at Battle Creek and both sides of McCloud dam would help relieve overcrowding and reduce user conflicts at Tarantula Gulch boat ramp by providing recreation users with other access areas to McCloud reservoir. Moreover, constructing a floating fishing/swimming platform at one of the proposed day-use areas would potentially alleviate overcrowding and user conflicts even further.

In its original condition 30, the Forest Service specified that PG&E provide lighting and snow plowing at the Tarantula Gulch boat ramp to provide safety for anglers fishing early or late in the day and to improve access at the ramp from April 1 through December. In the draft Recreation Development and Management Plan, the Forest Service recommends lighting at Tarantula Gulch boat ramp and the establishment of a schedule for snowplowing at the boat ramp. The Forest Service pointed to the relicensing recreation survey that indicated 10 percent of visitors use the reservoir in winter and noted several comments requesting the need for a longer use season. PG&E states California Boating standards do not require lighting. Lighting would improve safety at the boat ramp and allow anglers to fish longer during the recreation season; however, there is little evidence to support recreation use during the shoulder and winter months to justify snow plowing at the ramp during the shoulder months when PG&E does not need access to the boat ramp for project purposes.

Constructing additional proposed day-use areas at Red Banks and the Tarantula Gulch inlet and access sites at Battle Creek and both sides of McCloud dam would help relieve overcrowding and reduce user conflicts at Tarantula Gulch boat ramp by providing recreation users with other access areas to McCloud reservoir. Moreover,

constructing a floating fishing/swimming platform at one of the proposed day-use areas would potentially alleviate overcrowding and user conflicts even further.

Forest Service modified condition 30 specifies and PG&E alternative condition 30 proposes to develop an overnight campground and develop a day-use area at Star City. However, The Hearst Corporation continues to support a day-use recreation site at Star City Creek. Forest Service modified condition 30 specifies that if the deed for Star City is not modified, it would support a day-use only site at Star City and require the placement of an overnight facility at the Tarantula Gulch Boat Ramp instead. There are no existing campgrounds at McCloud reservoir to meet existing or projected demand for overnight use; however, regular dispersed camping is occurring at Star City. PG&E's suitability assessment shows the only potential site to accommodate camping at the reservoir is at Star City. Providing a formal campground and day-use area at this location would help manage the already existing use and reduce negative impacts on natural resources by eliminating erosion and soil compaction from user-created trails and vehicles and by providing for proper sanitation disposal and trash removal. However, if PG&E is unable to secure the use of the land at the Star City Creek site, a plan for a similar recreation area that provides camping at McCloud reservoir would be necessary to meet existing and projected demand for overnight use at the reservoir.

The Hearst Corporation recommends a campground operating season for any campground and expresses concerns about wildfires and the use of fire rings. The proposed Recreation Plan, which would be developed in consultation with Forest Service and others and approved by the Commission, would include an annual schedule and standard protocols for opening and closing recreation facilities and the final details for the specific amenities (such as fire rings or grills) for each recreation facility, including the Star City campground. The development and implementation of a Fire Prevention and Response Plan, as discussed in section 3.3.7, *Land Use and Aesthetics*, would improve planning, management, and coordination of wildfire protection and prevention measures, as well as lead to a reduction in the occurrence and suppression of wildfires in the project area, minimizing damage to natural resources. Additionally, the proposed Project Sign and Interpretive/Education Plan would include safety signage and additional information to reduce the threat of wildfires. Fire rings would be included at each developed campsite and the use of fire rings would reduce the threat of wildland fire at Star City. Fire risk and management is further discussed in the Fire and Fuels Plan, which we discuss in section 3.3.7, *Land Use and Aesthetics*.

#### **Lower McCloud River Recreation Facilities**

- Base of McCloud dam: provide a whitewater put-in base of McCloud dam, parking, vault restroom, trash receptacle/removal, and shoreline pedestrian access trail on river left to the pool below the spillway.

The Forest Service's original condition 30 also specified PG&E rehabilitate existing facilities at the Lower McCloud River and improve access. We summarize the

differences between rehabilitation measures specified in the Forest Service's original condition 30 and those proposed in PG&E's alternative condition 30, below.

- Base of McCloud Dam: construct and maintain a day-use site that includes access road, paved parking for a minimum of three vehicles, vault toilet, animal-resistant trash receptacle, signing, and trail to accommodate both fishing and boating access from the base of McCloud dam to a point past the instream flow valve release to the splash pool below the spillway
- Lower McCloud River Trail/Ash Camp Campground Trail: upgrade, relocate where needed, and improve tread and drainage of existing user-created streamside river access trail along opposite side of river from Ash Camp Campground that begins at Ash Camp bridge/PCT junction and travels downstream to Ah-Di-Na.
- Ash Camp and Ah-Di-Na Campground: agreement with PG&E outside the license to reconstruction, operation, and maintenance of Ash Camp and Ah-Di-Na Campground.

PG&E alternative condition 30 is generally consistent with the Forest Service's original condition 30; however, PG&E alternative condition 30 does not propose to upgrade and maintain the Lower McCloud river trail or to reconstruct, operate and maintain Ash Camp and Ah-Di-Na Campground.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 30. Forest Service modified condition 30 specifies that if the site at the base of McCloud dam is infeasible for the day-use site, then PG&E would construct facilities at Ash Camp and include the campground in the project boundary or enter into a settlement agreement with the Forest Service for non-project facilities. Forest Service modified condition 30 does not, however, include specifications for PG&E to reconstruct, operate, and maintain the Lower McCloud River Trail. Moreover, specific details of the recreation facility enhancements for the McCloud dam day-use area were not included in the modified 4(e) condition but incorporated into the draft Recreation Development and Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

In its November 24, 2010, filing, PG&E objects to Forest Service modified condition 30 but does not specify the components with which it disagrees.

On December 14, 2010, the Forest Service filed with the Commission a settlement agreement between PG&E and the Forest Service for non-project recreation facilities (specifically, Ash Camp, Ah-Di-Na Campground, and the Lower McCloud River Trail) and roads in the Shasta-Trinity National Forest.

#### *Our Analysis*

Constructing a day-use site and designing an access trail to accommodate both fishing and boating access at the base of McCloud dam for the Lower McCloud River

would facilitate the use of the area by anglers and boaters. Although improving the trail along the Lower McCloud River from Ash Camp Campground at the Ash Camp bridge/PCT junction to Ah-Di-Na Campground would improve access, the trail is outside the existing project boundary. Moreover, both Ash Camp and Ah-Di-Na Campground are non-project facilities outside the project boundary that are not currently being used for project purposes. In its original condition 30, the Forest Service specified that, should an agreement not be reached outside of the license, mitigation at Ash Camp and Ah-Di-Na Campground would be included in the final 4(e) conditions. The settlement agreement between PG&E and the Forest Service filed with the Commission on December 14, 2010, addresses responsibilities for Ash Camp, Ah-Di-Na Campground, and the Lower McCloud River Trail and roads that are outside of the project boundary. As a result, the Forest Service did not include specific mitigation measures for either the Ash Camp or the Ah-Di-Na Campgrounds in its modified 4(e) conditions.

### **Iron Canyon Reservoir Recreation Facilities**

- Hawkins Landing Campground: reconstruct Hawkins Landing Campground with the existing capacity (10 sites and a host site) and provide potable water; reconstruct or resurface the access road to allow all-season use and provide a host at the campground during the recreation season.
- Hawkins Landing Boat Ramp: retain concrete ramp surface and replace or repair the surfacing that connects to the concrete ramp.
- Deadlun Campground: reconstruct Deadlun Campground and increase capacity by about 10 sites to provide about 37 sites and a host site; provide potable water and a shoreline access trail.
- Iron Canyon Dam Boat Ramp: construct a new boat launch at the east end of Iron Canyon dam that meets California Boating standards and provide a vault restroom, picnic tables, potable water, and trash receptacles/removal.
- Shoreline Access Areas: conduct a site evaluation to provide three paved parking areas along FR 37N78 each with a capacity of up to three vehicle parking spaces and a pedestrian shoreline access trail and to design and construct these facilities.

The Forest Service's original condition 30 also specified that PG&E rehabilitate existing facilities at Iron Canyon reservoir and improve access. We summarize the differences between rehabilitation measures specified in the Forest Service's original condition 30 and those proposed in PG&E alternative condition 30, below.

- Hawkins Landing Campground: reconstruct Hawkins Landing Campground to provide for a minimum of 10 single and double camp sites; include entrance gate with signing, surfaced loop road, parking spurs, site posts, picnic tables, animal-resistant food boxes and trash receptacles, fire rings, vault restrooms, potable water, camp host and host site, and a developed trail from the

campground to the adjacent boat ramp and shoreline for pedestrian fishing access.

- Hawkins Landing Boat Ramp: reconstruct the Hawkins Landing boat ramp surface (length and width, but not grade) to meet California Boating standard for single lane to be operable a minimum of 155 days during the recreation season (April 27 – November 15); provide surfaced, striped parking lot above high water level for a minimum of 10 vehicles (minimum five with trailers), including a single-vault toilet, animal-resistant trash receptacle, and informational sign board.
- Deadlun Campground: re-locate the Deadlun campground to one or two Forest Service approved location(s) along the Iron Canyon reservoir shoreline; provide a mix of single and group campsites; provide a host, entrance gate, surfaced loop road, parking spurs, site posts, picnic tables, animal-resistant food lockers, fire rings, two two-vault restrooms, animal-resistant trash receptacle, and potable water; develop a trail from the campground(s) to the high water line of the reservoir shoreline for pedestrian-only access.
- Iron Canyon Dam Boat Ramp: construct a new single-lane boat ramp to California Boating standards with boarding dock functional at 90 percent of operational lake levels (ramp design and placement should include option for two lanes if needed at mid-license facility review); provide parking for a minimum of 15 vehicles (5 single vehicles and 10 vehicles with trailers); a single-vault toilet at the parking area; potable water, picnic tables, and trash receptacles; security lighting visible from the dock; and snow removal during shoulder seasons (March/April through December) at parking area when Oak Mountain access road and Iron Canyon boat ramp surface are passable.
- Shoreline Access Areas: provide a minimum of three day-use parking areas around Iron Canyon reservoir with paved parking for up to three vehicles each, and pedestrian-only access to shoreline.

PG&E alternative condition 30 for Hawkins Landing Campground is generally consistent with the Forest Service's original condition 30; however, it does not propose that Hawkins Landing boat ramp be operable a minimum number of 155 days, if possible, during the recreation season nor does it include that the Iron Canyon dam boat ramp be operational at 90 percent of operational lake levels. Additionally, PG&E proposes to, within 2 years of license issuance, conduct a site assessment to determine if there is one or more suitable sites to relocate the existing Deadlun Campground along the Iron Canyon reservoir shoreline and to determine the locations for the shoreline access areas. If agreement can be reached on alternate location(s) to relocate the campground and determine feasible access areas, PG&E would construct a new campground and the access areas. If suitable location(s) do not exist for the campground, PG&E maintains that it would reconstruct Deadlun Campground as proposed. Finally, PG&E alternative condition 30 does not propose the lighting specification at Iron Canyon dam boat ramp,

and PG&E proposes to revise the snow removal specification to specify that when project operations require snow removal from Oak Mountain Road, snow also would be removed from the access road to the boat ramp, parking area, and boat ramp.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 30. The provisions specified in Forest Service modified condition 30 are generally similar to those specified in the Forest Service's original condition 30, except Forest Service specifies that PG&E reconstruct Deadlun Campground to provide double and triple campsites and construct a new campground for single unit sites at Gap Creek site.

The Forest Service does not specify functionality of the Iron Canyon dam and Hawkins Landing boat ramps or specific details related to the individual recreation facilities in the final modified condition. The Forest Service incorporated specific details into the draft Recreation Development and Management Plan, included as an enclosure to the its filing (Forest Service, 2010, Enclosure 3).

In the draft Recreation Development and Management Plan, the Forest Service recommends, lighting at all times when the Iron Canyon dam boat ramp is snow-free and the establishment of a schedule for snow plowing at Iron Canyon dam boat ramp. Although Forest Service modified condition 30 does not specify the new Iron Canyon dam boat ramp be functional at 90 percent of operational lake levels, it does recommend specific amenities for individual recreation facilities at Iron Canyon that are otherwise generally consistent with the Forest Service's original condition 30.

In its November 24, 2010, filing, PG&E objects to Forest Service modified condition 30 but does not specify the components with which it disagrees.

#### *Our Analysis*

Reconstructing Hawkins Landing boat ramp and campground and providing additional parking and restroom facilities would enhance recreational opportunities at Iron Canyon reservoir and ensure that the project recreation facilities meet current and future demand over the term of a new license. PG&E states the new proposed boat ramp near Iron Canyon dam would be usable at minimum operating pool (2,593 feet) and it is not cost effective to modify Hawkins Landing boat ramp to extend the recreation season. PG&E further states that it has voluntarily operated Iron Canyon reservoir at or above elevation 2,615 feet to ensure that visitors could use the only existing boat ramp, Hawkins Landing, during the primary recreation season from May 15 to October 15. Although providing as many usable recreation days as possible at Hawkins Landing boat ramp would improve boating access at Iron Canyon reservoir, the Forest Service's specification in its original condition 30 for the Hawkins Landing boat ramp to be usable for a certain number of days could be difficult for PG&E to accomplish as a license condition. The Forest Service does not specify the number of days Hawkins Landing boat ramp should be operable in its modified 4(e) condition. Constructing a second boat ramp to be usable at minimum operating pool (2,593 feet) at Iron Canyon reservoir would

help to alleviate overcrowding of Hawkins Landing boat ramp by providing public boating access to Iron Canyon reservoir during the entire recreation season.

Reconstructing or re-locating Deadlun Campground would also enhance recreational opportunities at Iron Canyon reservoir by improving camping opportunities at the reservoir. Because dispersed camping generally occurs along the main body of Iron Canyon reservoir and the campground is currently located in a creek off the main body of the reservoir, relocating Deadlun Campground to a more desirable location, providing access to the reservoir from its current location, and improved facility conditions would likely increase the use of this facility. Forest Service modified condition 30 specifies that PG&E provide about the same minimum number of sites for overnight camping at Iron Canyon as originally specified but that PG&E reconstruct Deadlun Campground as a group camp site and construct a new campground at Gap Creek to provide single unit sites. The Gap Creek site would be located along the main body of the reservoir in a more desirable location. Although PG&E originally proposed to reconstruct Deadlun Campground, its alternative condition 30 proposes to conduct a site assessment to determine if there are one or more suitable sites to relocate the existing Deadlun Campground along the Iron Canyon reservoir shoreline. If a suitable location does not exist, PG&E proposes to reconstruct the campground in its current location with access to the reservoir. Reconstruction of Deadlun Campground as a group campground at its existing location and constructing a new campground at Gap Creek on the main body of Iron Canyon reservoir would provide more camping opportunities at the reservoir while improving facility conditions and increasing capacity at the campground. Further, providing formal access to Iron Canyon reservoir shoreline from Deadlun Campground would likely increase the use of this facility.

Constructing the proposed shoreline access areas would provide developed access areas along the shoreline to help alleviate some of the dispersed recreation use occurring along the reservoir shoreline. The Forest Service has not provided suggested locations or evidence that the sites are feasible; therefore, conducting a site assessment as proposed by PG&E would be appropriate to determine the locations for the three shoreline access areas.

In its original condition 30, the Forest Service specified that PG&E provide lighting and snow removal during March or April through December at Iron Canyon dam boat ramp to provide safety for anglers fishing early or late in the day. PG&E comments that California Boating standards do not require lighting. However, lighting would allow anglers to fish longer during the recreation season and increase safety at the boat ramp.

Additionally, PG&E's proposal to remove snow from Oak Mountain Road, the access road to the boat ramp, parking area, and boat ramp when project operations require it would also allow access to the boat ramp with minimal additional cost. The Forest Service now recommends lighting when the boat ramp is snow-free and the establishment of a schedule for snow plowing at Iron Canyon dam boat ramp as a part of its draft

Recreation Development and Management Plan enclosed with the modified 4(e) conditions.

### **Pit 6 and 7 Reservoir Recreation Facilities**

- **Shoreline Access Trail:** evaluate the feasibility (site suitability and public safety) of providing a pedestrian shoreline access trail at the upper end of Pit 7 reservoir, downstream of Pit 6 powerhouse tailrace, to provide access for angling and pedestrian shoreline access.
- **Montgomery Creek Boat Put-in:** conduct a feasibility assessment for providing a hand-launch boat put-in where Montgomery Creek enters Pit 7 reservoir, with paved parking, vault restroom, tables, trash receptacles/removal and pedestrian shoreline access trail. Boating would be restricted near project infrastructure for public safety reasons by installing buoy lines at the upper and lower ends of the Pit 7 reservoir.

In its original condition 30, the Forest Service specified that PG&E construct new facilities at Pit 6 and 7 reservoirs and improve access. We summarize the differences between rehabilitation measures specified in the Forest Service's original condition 30 and those proposed in PG&E alternative condition 30, below.

- **Pit 6 Shoreline Trail:** develop a shoreline trail if capacity or demand (based on 6-year recreation use monitoring) indicates increased use of the reservoir for fishing or boating.
- **Shoreline Access Trail:** construct one trailhead with parking for a minimum of three vehicles and develop a river access trail along one side of Pit 7 reservoir for pedestrian fishing and hand-launch boating access. The Forest Service specifies that the access point and trailheads would be located at the upper (Pit 6 dam access road) end of reservoir.
- **Montgomery Creek Boat Put-in:** conduct a feasibility assessment for providing a hand-launch boat put-in where Montgomery Creek enters Pit 7 reservoir with paved parking, vault restroom, tables, animal-resistant trash receptacles and pedestrian access trail on public lands. Boating would be restricted from project infrastructure for public safety reasons by installing buoy lines or other safety devices at the upper and lower ends of the reservoir. If Montgomery Creek is not feasible, PG&E would construct a second trailhead with parking for a minimum of three vehicles and develop a river access trail along one side of the reservoir for pedestrian fishing, and hand-launch boat access from the lower end of Pit 7 reservoir.

PG&E's alternative condition 30 does not include the Pit 6 shoreline trail specified by the Forest Service's original condition 30. PG&E also does not include a provision for constructing a second trailhead and a hand-carry boat launch at the lower end of Pit 7 reservoir if Montgomery Creek is not feasible. On the other hand, PG&E does propose to

conduct a site evaluation within 2 years of license issuance that considers the suitability and public safety of a pedestrian shoreline access trail at the upper end of the reservoir, downstream of Pit 6 powerhouse tailrace. PG&E proposes to consult with the Forest Service and, if a suitable location is determined, construct the trail and parking area at the upper end of Pit 7 reservoir. Consistent with the Forest Service's original condition 30, PG&E proposes to conduct a feasibility assessment and construct, if feasible, a hand-launch boat put-in where Montgomery Creek enters Pit 7 reservoir.

In its comments on the draft EIS and its reply to comments on the draft EIS, PG&E comments that no safe access points were identified during a field review at Pit 6 reservoir. Two potential access points were identified in the upper end of Pit 7 reservoir: one just downstream of Pit 6 dam and the second located several miles downstream. PG&E indicates it has thoroughly investigated all potential options and determined that it is not feasible to provide safe and secure public access to Pit 7 reservoir near the dam. In addition to issues associated with public vehicular access to the top of the dam, PG&E notes that an ordinance prohibits boating within 500 feet of the dam and the reservoir elevation can be 35 feet below the high water mark, which would require boaters to scale the dam. PG&E comments that an old construction access road suggested by the Forest Service has a grade that exceeds 20 percent and there are no options for lessening the grade because of the steep topography. Moreover, the access road to the top of the dam is only one lane wide and steep, and there is no place for the public to park along the road or at the top of the dam.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 30. Forest Service modified condition 30 does not specify a shoreline trail or any other recreation facility at Pit 6 reservoir. Additionally, Forest Service modified condition 30 specifies that PG&E would develop two surfaced parking areas with reservoir access trails at the upper end of Pit 7 reservoir, located about 1 mile apart below Pit 6 dam, instead of one as specified in the Forest Service's original condition 30. Although Forest Service modified condition 30 specifies the development of a parking area with a walkway to a put-in/take-out on lower Pit 7 reservoir or Montgomery Creek, it does not specify that a feasibility assessment be conducted, as was specified in the Forest Service's original condition 30. The Forest Service also removed specific details of the recreation facility enhancements for Pit 6 and 7 reservoirs from the 4(e) condition and placed them into the draft Recreation Development and Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

The Forest Service recommendation for the upper end of Pit 7 reservoir in the draft Recreation Development and Management Plan is inconsistent with modified condition 30. The Forest Service recommends three parking areas and pedestrian trails to the reservoir shoreline at the upper end of Pit 7 reservoir with two of these within 1 mile of Pit 6 dam in the draft plan instead of two, as specified in the modified condition. The other recreation facilities and amenities included in the draft Recreation Development and Management Plan for Pit 6 and 7 reservoirs are generally consistent with the Forest Service's original condition 30.

In its November 24, 2010, filing, PG&E objects to Forest Service modified condition 30 but does not specify the components with which it disagrees.

#### *Our Analysis*

Providing access to the river near Pit 6 & 7 reservoirs based on the results of future recreation use monitoring would improve recreational access at the project over the term of the license. This measure could be considered in the future if the recreation use data collected every 6 years shows it is warranted. Alternatively, constructing the proposed river access trail at the upper end of Pit 7 reservoir and the proposed Montgomery Creek hand-carry boat launch near the lower end of Pit 7 reservoir would enhance access to Pit 7 reservoir for pedestrian fishing and hand-launch boating. The Forest Service has not provided any justification for the additional access area at the upper end of Pit 7 reservoir specified in its modified condition 30 and this additional access area does not seem to be warranted at this time. However, the final Recreation Plan should be consistent with the license order.

PG&E has expressed concern for public safety if boating access is provided at the upper and lower portions of Pit 7 reservoir due to riverine high flows from the Pit 6 powerhouse and riverine conditions at low reservoir levels (fast flowing water) that could prevent boaters from returning upstream to exit the reservoir. PG&E further indicates it has thoroughly investigated all potential options and determined that it is not feasible to provide safe and secure public access to Pit 7 reservoir near the dam. The Forest Service's specification for a boat put-in/take-out on the lower end of Pit 7 reservoir or at Montgomery Creek would still improve access to Pit 7 reservoir for pedestrian fishing and hand-carry boating. However, due to public safety, launching boats in the lower end of Pit 7 reservoir still remains a concern.

#### **Pit 7 Afterbay Recreation Facilities**

- Fenders Flat Day-Use Area: provide a day-use site at Fenders Flat with a capacity of about five; provide parking, vault restroom, tables, fire grills, and trash receptacles/removal; and coordinate with the Forest Service to develop and implement a plan to revegetate disturbed areas and prevent vehicle access beyond the access road and parking area.
- Fenders Flat Boat Launch: grade and maintain FR 35N66 from its intersection with FR 37N78 to the car-top boat launch and provide a vault restroom near the car-top boat launch.
- Pit 7 Afterbay Public Access: continue to prohibit public access to Pit 7 afterbay water surface and shoreline by maintaining fencing, signage and patrols.
- Pedestrian Access in Vicinity of Pit 7 Afterbay Powerhouse: if the Pit 7 afterbay powerhouse is constructed, provide a paved parking area for two to three vehicles at the end of the powerhouse access road or along Fenders Ferry

Road and provide a vault restroom, trash receptacle/removal, and pedestrian access to the shoreline between the powerhouse and Fenders Ferry Bridge.

In its original condition 30, the Forest Service specified that PG&E rehabilitate the existing Forest Service (non-project) facility at Pit 7 afterbay and improve access. We summarize the differences between rehabilitation measures specified in the Forest Service's original condition 30 and those proposed in PG&E alternative condition 30, below.

- Fenders Flat Day-Use Area: reconstruct day-use site below the Pit 7 afterbay at Fenders Flat with single-vault toilet, animal-resistant trash receptacles, picnic tables, pedestal grills (not campfire rings) and designated surfaced parking area for a minimum of five vehicles without trailers.
- Fenders Flat Boat Launch: reconstruct the car-top boat launch with improved grooved concrete surfacing and minimum one-lane width (would not meet all of California Boating standards) and provide revegetation, in consultation with the Forest Service, and prevent vehicle access beyond the access road and parking area.
- Pedestrian Access in Vicinity of Pit 7 Afterbay Powerhouse: construct a surfaced parking area and river access trail on the opposite river bank from Fenders Flat day-use area with a vault toilet and trash receptacles if additional generation is developed at the Pit 7 afterbay.

PG&E alternative condition 30 for the Fenders Flat day-use area is consistent with the Forest Service's original condition 30, although PG&E proposes the boat launch reconstruction near Fenders Flat be separate from the day-use area. PG&E also notes that the Pit 7 afterbay powerhouse parking area would accommodate two to three vehicles and be located at the end of the powerhouse access road or along Fenders Ferry Road and subject to public safety and homeland security needs. PG&E states that it proposes to allow public vehicular access on the proposed project access road to the powerhouse; however, if the location of access does not ensure public safety near project infrastructure and address homeland security needs, PG&E would locate the parking area along Fenders Ferry Road.

In its comments on the draft EIS, the Forest Service suggests that PG&E and the Commission consider removal of the afterbay dam and construction of an alternative structure to attenuate the flow to improve the safety of the project and allow for water-based access, including angling and boating at the Fenders Flat site. The Forest Service notes that anglers regularly cut the fence to gain access to the afterbay. Additionally, in their comments on the draft EIS, California Trout, Trout Unlimited, Northern California Council, Federation of Fly Fishers, American Whitewater, and Friends of the River recommend the possible removal of the Pit 7 afterbay as a way to ameliorate the safety concerns.

In its reply to comments on the draft EIS, PG&E states that Pit 7 afterbay is a necessary public safety feature of the project because it serves to attenuate the water flow from Pit 7 dam and powerhouse before entering Shasta Lake. PG&E states that removing the afterbay dam would increase the hazard to recreational users in the area from flow fluctuations from Pit 7 dam, or alternatively would require reoperation of the Pit River system as a run-of-the-river operation because Pit 7 reservoir does not provide sufficient storage to re-regulate all of the flow from peaking operations upstream. PG&E states that it has taken reasonable measures to address the safety issue with fencing, signage, and a boating buoy/barrier; however, recreational users are still trespassing at the afterbay dam.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 30. The provisions specified in Forest Service modified condition 30 for Pit 7 afterbay are similar to those specified in the Forest Service's original condition 30. Forest Service modified condition 30 specifies PG&E investigate known safety and public access issues at the Pit 7 afterbay dam (with or without the proposed new hydroelectric generation facility at the Pit 7 afterbay dam), develop alternatives to address safety, and implement a solution after consultation with the Forest Service, other conditioning agencies, and approval by the Forest Service and the Commission. Forest Service modified condition 30 does not specify the construction of day-use area in the vicinity of the proposed Pit 7 afterbay powerhouse as specified in condition 30.

The Forest Service also removed specific details of the recreation facility enhancements from the 4(e) condition and placed them in the draft Recreation Development and Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3). The other recreation facilities and amenities included in the draft Recreation Development and Management Plan for Pit 7 afterbay area are generally consistent with the Forest Service's original condition 30.

In its November 24, 2010, filing, PG&E objects to Forest Service modified condition 30 but does not specify the components with which it disagrees.

#### *Our Analysis*

Reconstructing Fenders Flat day-use area and providing, if the Pit 7 afterbay powerhouse is constructed, access near the proposed Pit 7 afterbay powerhouse with parking at the end of the powerhouse access road or along Fenders Ferry Road, subject to public safety and homeland security needs, would enhance recreational opportunities in the vicinity of the afterbay by formalizing this existing dispersed recreation area. Coordinating with the Forest Service to develop and implement a plan to revegetate disturbed areas and prevent vehicle access beyond the access road and parking area would further help to reduce resource damage. Moreover, reconstructing Fenders Flat car-top boat launch would improve access to the Pit River below the afterbay and provide boater access to the Pit arm of Shasta Lake during late winter and early spring when high lake levels allow boat launching. Although not specified by Forest Service modified condition 30, providing shoreline access to the Pit River near the proposed Pit 7 afterbay powerhouse, if the powerhouse is constructed, would provide a formal shoreline access

area for anglers in the vicinity of the Pit 7 afterbay that could help discourage trespass at the Pit 7 afterbay dam where safety is an issue.

PG&E originally proposed to grade and maintain FR 35N66 from its intersection with FR 35N78 to the car-top boat launch, although this was not included in Forest Service modified condition 30 or PG&E alternative condition 30. This measure would be addressed, along with all project roads, in the Road and Transportation Facilities Management Plan proposed by PG&E that is further discussed in section 3.3.7.2, *Environmental Effects, Land Use Resources, Road and Transportation Facilities Management Plan*.

Public access to the Pit 7 afterbay and dam is currently restricted by PG&E because the water level in the afterbay rapidly fluctuates in response to the Pit 7 powerhouse operation which makes it unsafe for recreation use. Both fencing and warning signs have been posted to prohibit shoreline access and boating access. Additionally, a Shasta County boating ordinance prohibits swimming and boating in the afterbay due to public safety concerns. PG&E's proposal to continue to prohibit public access by maintaining fencing, signage, and patrols to Pit 7 afterbay water surface would help ensure public safety at the project. In addition, PG&E proposes to construct the Pit 7 afterbay dam powerhouse which could help address the safety issues, because the current stream power would be attenuated by the powerhouse. Furthermore, Forest Service modified condition 30 specifies that PG&E investigate known safety and public access issues at the Pit 7 afterbay dam (with or without the proposed new hydroelectric generation facility at the Pit 7 afterbay dam), develop alternatives to address safety, and implement a solution after consultation and approval. California Trout, Trout Unlimited, Northern California Council, Federation of Fly Fishers, American Whitewater, and Friends of the River recommend the possible removal of the Pit 7 afterbay as a way to ameliorate the safety concerns. Safety at Pit 7 afterbay is a dam safety issue and not a relicensing issue analyzed in this EIS. The Commission's Division of Dam Safety and Inspections has been working with PG&E on ways to address this problem, and we have forwarded the information filed by interested parties in this proceeding that are relevant to the issue of safety at Pit 7 afterbay to the Division of Dam Safety.

### **Recreation Facility Operation and Maintenance**

PG&E proposes to develop an O&M component of the Recreation Plan, including fee collection, for all existing and newly constructed project recreation facilities and existing Forest Service recreation facilities within the project area (Tarantula Gulch boat ramp and Deadlun Campground) after they are reconstructed.

In its original condition 30, part 1, subpart a, the Forest Service specified that PG&E develop and implement an O&M component as a part of the Recreation Plan for all project and project-associated recreation facilities (i.e., all facilities identified in the Forest Service's original condition 30). The O&M component should include: annual schedule and standard protocols for opening and closing recreation facilities; water testing protocols for potable water sources; routine maintenance items; annual review and

meeting; a percentage of fee retention by Forest Service if used onsite; and maintenance of shaded fuel breaks around project recreation facilities (addressed in the Fire and Fuels Management Plan discussed in section 3.3.7.2, *Environmental Effects*). The O&M component would include all existing project recreation facilities, existing Forest Service-owned project-affected recreation facilities identified in the Forest Service's original condition 30, and new project recreation facilities. Finally, discussions of any needed actions would be conducted at the annual consultation meeting.

PG&E alternative condition 30, part 1, subpart a is consistent with the Forest Service's original condition 30, part 1, subpart a; however, PG&E proposes to become responsible for O&M of existing Forest Service-owned project-affected recreation facilities (Deadlun Campground and Tarantula Gulch boat ramp) after they have been reconstructed.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 30. The provisions specified in Forest Service modified condition 30 related to O&M are similar to those specified in the Forest Service's original condition 30, part 1, subpart a. Forest Service modified condition 30 additionally specifies that existing health and safety conditions at some of the project recreation facilities are the result of previous O&M practices and that PG&E would not be held responsible for the conditions of the existing project recreation facilities until they are reconstructed.

The Forest Service has removed specific details of the Recreation Plan components related to O&M from the 4(e) condition and placed them in the draft Recreation Development and Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3). In the draft Recreation Facilities and Management Plan (Forest Service, 2010d, Enclosure 3), the Forest Service recommends that O&M measures developed and appended to the Recreation Plan would be implemented within 2 years of license acceptance and include the O&M of approved dispersed recreation sites, ROS class, protocols, and reservoir surface management.

In its November 24, 2010 filing, PG&E objects to Forest Service modified condition 30 but does not indicate the components with which it disagrees.

#### *Our Analysis*

O&M associated with the project's recreation facilities help to ensure that these facilities and associated public recreational access are provided over the term of the license. Development of an O&M component as a part of the Recreation Plan in consultation with the Forest Service would help to address PG&E and Forest Service responsibilities. Submittal of a final Recreation Plan to the Commission for review and approval after consultation with the Forest Service, agencies, and other interested parties would help to ensure that the proposed O&M measures are consistent with the terms and conditions of a new license.

PG&E is responsible for the management, operations, and routine maintenance of all recreation facilities within the project boundary and would be responsible for existing

recreation facilities upon license issuance and new recreation facilities upon construction. We recognize that Deadlun Campground and Tarantula Gulch boat ramp are existing Forest Service facilities located inside the project boundary that are in need of reconstruction, but delaying PG&E's O&M responsibility for these facilities until they are reconstructed is inappropriate. PG&E states that both the Deadlun Campground and Tarantula Gulch boat ramp have documented health and safety issues as a result of Forest Service construction, operation, and maintenance and that, if PG&E were held responsible for O&M upon license issuance, this would result in PG&E immediately being held in non-compliance with the new license. Since both Deadlun Campground and Tarantula Gulch boat ramp are currently serving a project purpose and located inside the project boundary, PG&E would be responsible for these facilities upon issuance of a new license. However, we recognize that PG&E would be assuming responsibility for the facilities as they currently exist.

### **Dispersed Use and OHV Use**

PG&E proposes as a part of its Recreation Plan to assess and implement closures of existing and future user-created roads leading to the shorelines of McCloud and Iron Canyon reservoirs, in coordination with the Forest Service. The objective would be to prohibit vehicle access at the McCloud reservoir between the shoreline and the two roads along the reservoir (FR 38N11 and 38N04Y) between Tarantula Gulch and Star City Creek and at Iron Canyon reservoir between FR 37N78 and the shoreline. This would not include closure to developed recreation facilities.

In its original condition 30, part 2, the Forest Service specified that PG&E evaluate road closures, trail closures, and dispersed use around Iron Canyon reservoir. The Forest Service specified that this evaluation be consistent with the Shasta-Trinity Travel Management Plan and the HPMP.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 30. Forest Service modified condition 30 removes the evaluation of road closures, trail closures, and dispersed use around Iron Canyon reservoir from the 4(e) condition.

In the draft Recreation Development and Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3); however, the Forest Service recommends that the final plan identify current dispersed recreation sites inside the project boundary and access routes that would be closed.

In its November 24, 2010 filing, PG&E objects to Forest Service modified condition 30 but does not indicate the components with which it disagrees.

### *Our Analysis*

Measures to block vehicle access and discourage OHV use at the project would benefit environmental resources by reducing intense recreational use at degraded areas. However, all concerns associated with dispersed use would not be eliminated by blocking vehicle access and discouraging OHV use. Although not included in the Forest Service

modified condition 30, assessment and evaluation of road closures, trail closures, and dispersed use, in coordination with the Forest Service, would provide information to allow PG&E to determine if additional visitor management controls are needed. PG&E identified several areas around the reservoirs and project facilities where visitors leave trash and cause resource damage due to dispersed use. Although not included in Forest Service modified condition 30 and PG&E alternative condition 30, McCloud reservoir was identified as an area where resource damage from user-created roads and dispersed use was occurring during the relicensing studies. Including McCloud reservoir in the evaluation would address areas identified at both reservoirs where dispersed use causes resource damage. Prohibiting vehicle access and OHV use between the roads and reservoir shorelines would help reduce this resource damage and improve the aesthetic quality of the area for visitors to the project.

### **Recreation Monitoring**

PG&E proposes to conduct recreation monitoring, including visitor surveys and use estimates, concurrent with preparing information for the FERC Recreation Form 80 reporting (every 6 years). Additionally, PG&E proposes to include Hawkins Creek crossing in the recreation monitoring program.

The Forest Service's original condition 30, part 1, subpart b, is generally consistent with PG&E's proposal for recreation monitoring but specified that PG&E also provide a copy of the report to the Forest Service for approval before being submitted to the Commission. The recreation monitoring should include: annual use data collection at facilities where fees or passes are issued or required for inclusion in the 6-year report; conduct a recreational resource survey, with prior approval by the Forest Service, and evaluation of resource impacts from developed and dispersed use; a summary of the most current regional and statewide recreation trends based on available surveys and reports; and consultation with the Forest Service, appropriate agencies, and interested parties to review and adjust project-wide recreation management objectives, if needed.

PG&E proposes in its alternative condition that recreation and survey monitoring components be collected for project-related recreation facilities and project lands and waters in PG&E alternative condition 30, which is generally consistent with the Forest Service's original condition 30. PG&E states that revisions are necessary to the Forest Service's original condition 30 to appropriately define the applicability to project-related recreation.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 30. The provisions specified in Forest Service modified condition 30 related to recreation monitoring are similar to those specified in the Forest Service's original condition 30, part 1, subpart b, except that the Forest Service has removed specific details of the recreation survey and monitoring component from the 4(e) condition and placed them in the draft Recreation Development and Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

In the draft Recreation Facilities and Management Plan (Forest Service, 2010d, Enclosure 3), the Forest Service recommends that the survey and monitoring report include the following: utilization of data collected at facilities where fees or passes are issued or required, occupancy of project facilities and dispersed use sites over the entire recreation season; use numbers and use patterns on water and land; recreational opportunity satisfaction; kinds and sizes of vehicles; user preferences; evaluation of resource impacts from developed and dispersed use; current regional and statewide recreation trends; updated mandates; condition of facilities; and summary of any temporary facility closures.

In its November 24, 2010, filing, PG&E objects to Forest Service modified condition 30 but does not indicate the components with which it disagrees.

### *Our Analysis*

Recreation use at the project is expected to exceed the rate of population growth over the next 50 years. The level and type of recreation use and recreation user preferences could change over the term of a new license. Based on PG&E's visitor use surveys conducted during the relicensing studies, angling is expected to increase at project facilities over the next 40 years by about 107 percent, water-based recreation activities (including swimming and boating) by about 229 percent, camping by about 182 percent, and scenery, wildlife, and nature viewing by about 168 percent. Periodic monitoring of recreation use, surveying of user preferences, assessment of facility capacity and recreation demand, and inventorying areas used for dispersed recreation can help to determine if the project's recreation facilities meet demand and provide adequate public recreation access to the project over the term of the license. The inclusion of visitor use fees and capacity information, including both parking and campsite capacity at the project facilities, would help assess changes in recreational use and capacity at these facilities. The proposed report would provide the means to summarize and assess the survey information and monitor other recreational management provisions, such as OHV and dispersed use and water surface elevation management. Reporting the recreation monitoring results concurrent with the Commission's recreation Form 80 schedule would ensure that the Commission is updated on recreation use at the project.

### **Project Patrol**

PG&E proposes to provide project-wide patrol of areas including but not limited to Hawkins Creek crossing, Iron Canyon reservoir shoreline dispersed use sites, and McCloud reservoir shoreline access points. This would include trash removal twice a year, reporting observed resource damage to Forest Service, and emergency response at the project. PG&E proposes to prepare a Project Patrol Plan in consultation with the Forest Service to be filed with the Commission within 1 year after license issuance. At a minimum, the plan would include routine and regular physical inspections of affected lands, project facilities, and other structures, including NFS lands within the project area or affected by project facilities, for purposes of resource protection. The plan also would include a description of reporting responsibilities, including observed violations of law

and communications with law enforcement agencies, as well as required documentation of inspections. Additionally, PG&E proposes to provide a campground host at several project campgrounds to also serve as a point person for enforcing campground rules and reporting vandalism.

In its original condition 30, part 1, subpart c, the Forest Service specified that PG&E develop and implement a project patrol component as a part of the Recreation Plan for project and project-affected NFS lands. The Forest Service specified that PG&E coordinate annually with agencies and other interested parties to review patrol information and plan adjustments, if needed, for the next season. Specifically, PG&E would employ a seasonal part-time (April-November) project patrol person or, alternatively, provide funding to an appropriate federal, state, or local agency for the same, whose duties would include, but not be limited to: monitoring and encouraging compliance with fire safety regulations, closures, and rules associated with camping, parking, and trail use; installing signs; dispersing project-related information to the public including appropriate OHV use, campfire safety, leave no trace; patrolling dispersed use areas within one-quarter mile of all project and project-affected waterways (e.g., Hawkins Creek crossing, Lower McCloud River); watching for and reporting looting/vandalism of cultural sites or other resource damage and illegal activities; cooperating with law enforcement agencies; performing minor maintenance of project recreation facilities; other duties related to public safety and protection of project-affected resources; and documenting activities, key resource issues, and public concerns in an annual report provided at least 30 days prior to the annual consultation meeting. The Forest Service also specified a campground host be provided at several project campgrounds to serve a similar patrol purpose. The Hearst Corporation supports the concept of a host or patrol person enforcing the conditions of recreational use and the issuance of a Forest Service “Forest Order” allowing for enforcement action.

PG&E alternative condition 30 is generally consistent with the Forest Service’s original condition 30; however, PG&E does not propose the patrol of dispersed public use areas within one-quarter of a mile of the Lower McCloud River nor the distribution of OHV use information. PG&E comments that revisions are necessary to appropriately define the applicability to project-related recreation and to eliminate ambiguous and open-ended terminology that could inadvertently result in non-compliance.

In their comments on the draft EIS, the Pit River Tribe and The Hearst Corporation recommend project patrols to encourage compliance and improve safety.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 30. Forest Service modified condition 30 specifies that PG&E would develop a separate Project Patrol Plan and that the duties of the project patrol would be implemented on a year-round basis. The Forest Service includes specific details of these duties as recommendations in the draft Project Patrol Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

The duties of the project patrol recommended in the draft Project Patrol Plan are generally consistent, although more comprehensive, than those specified by the Forest Service in its original condition 30. In the draft Project Patrol Plan (Forest Service, 2010d, Enclosure 3), the Forest Service recommends that the primary responsibilities of the project patrol would include: providing project information to project visitors; identifying and recording violations or project related federal, state, or local laws and fire laws; providing trash pick-up and small repairs; recording and reporting any significant damages to project facilities, project protection, mitigation, and enhancement measures, project lands, and NFS lands affected by the project; identifying and reporting potential threats to public safety; maintaining a daily patrol log; providing timely communication with PG&E, Forest Service, law enforcement, and emergency response agencies; limited boat patrols for monitoring recreational use areas that are not accessible by land; and documenting activities, specific hazards or damage, repairs, and significant or repetitive problems an annual report provided by January 15 of the following year.

In its November 24, 2010, filing, PG&E objects to Forest Service modified condition 30 but does not indicate the components with which it disagrees.

#### *Our Analysis*

Project patrol measures would help encourage visitors, including anglers, campground users, and boaters, to comply with regulations and project rules. A projected increase in the number of visitors over the term of the new license would likely increase the need for public services, including law enforcement and fire protection, which are provided by the Shasta County Sheriff's office. More visible law enforcement like a project patrol person or a campground host would help reduce conflicts between recreation users and improve visitor safety by providing an authoritative presence to encourage compliance with navigational laws. Additional project patrol at the more remote areas of the project would improve management of environmental resources by increasing visitor contact with enforcement agencies and help to educate visitors about appropriate and restricted uses.

However, within the project area, public safety and law enforcement duties are the responsibility of the Shasta County Sheriff's office, the California Highway Patrol, and federal agencies on federal lands. All existing project lands are within the jurisdiction of the Shasta County Sheriff. PG&E pays property taxes to Shasta County, which are partially used to fund law enforcement. Further, Forest Service law enforcement personnel from the Shasta-McCloud and National Recreation Area units of the Shasta-Trinity National Forest are responsible for enforcing regulations related to the management of Forest Service lands and resources. The Commission has no way of ensuring that the hiring of a patrol person or campground host paid for by PG&E (in this case staffing or funding a seasonal or year-round employee), would accomplish a project purpose or ameliorate a project effect. However, the Commission can enforce specific measurable actions, such as O&M measures, including maintenance of project lands and project recreation facilities to address fire safety and vandalism, and other associated

potential effects of dispersed recreation use within the project boundary. Under the Informational Sign Plan, PG&E proposes to post signs about acceptable and prohibited recreation uses, and have proposed new measures that would increase public education to help improve visitor compliance with project rules and regulations. While improved implementation of Forest Service and Shasta County standards and guidelines regarding recreational use would be beneficial, enforcement of those regulations would be outside the jurisdiction and responsibility of PG&E.

### **Reservoir Water Surface and Shoreline Management**

PG&E proposed to clean debris from the McCloud reservoir boat ramp annually by April 1, weather permitting, and as needed throughout the recreation season. Additionally, PG&E proposed to develop a surface water and shoreline management plan for McCloud reservoir that included installing 5-mph signs on the bridge that spans the northern end of the reservoir, LWD removal from the reservoir, points of public access to the shoreline, and boating speeds. PG&E also proposed to remove lightweight debris from the Iron Canyon reservoir surface annually or as needed.

In its original condition 30, part 1, subpart d, the Forest Service specified that PG&E develop and implement a reservoir water surface management component that addresses monitoring and management of recreation user safety, trespass on private lands by project users, and Shasta County code compliance by project users on each reservoir surface (i.e., McCloud, Iron Canyon, Pit 6, and Pit 7 reservoirs). The reservoir water surface management component would include the following: developing protocols for preventing/removing unapproved buoy courses, approved use of docks, and measures to prevent trespass on private lands; submitting requests to the Shasta County Boating Unit of the Sheriff's office for establishment of a 5-mph restriction on McCloud reservoir upstream from the McCloud Bridge, in consultation with the Forest Service; establishment of a buoy line near Huckleberry Creek on McCloud reservoir to prevent fishing boats from traveling upstream from November 15 to the last Saturday in April each year (submission would be in cooperation with California Fish and Game and the private landowner); annual surface sweeps prior to the start of the recreation season of McCloud and Iron Canyon reservoirs and boat ramps to collect logs and debris from the lake surface with smaller debris and trash removed from NFS lands; monitoring boat use during the recreation season on McCloud and Iron Canyon reservoirs every 6 years (coinciding with the Commission's recreation Form 80); reassessing any needed water surface management mitigations every 6 years; and evaluating the need for a speed restriction on Iron Canyon, Pit 6, and Pit 7 reservoirs on a 6-year interval.

PG&E alternative condition 30 proposes to develop measures prevent unauthorized access to project lands and waters where necessary to protect public safety, instead of on private lands. PG&E also proposes to conduct the surface sweeps to collect logs and debris from the surface of McCloud and Iron Canyon reservoirs and boat ramps once every 5 years or as needed instead of annually. Finally, PG&E proposes to include monitoring data on boat use on McCloud and Iron Canyon reservoirs in a report filed

with the Forest Service, interested agencies, and the Commission concurrent to the Form 80 schedule.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 30. The provisions specified in Forest Service modified condition 30 related to reservoir water surface management are similar to those specified in the Forest Service's condition 30, part 1, subpart d; however, the Forest Service has removed the specific details of the reservoir surface water management measures from the 4(e) condition and has not included them in the draft Recreation Development and Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

In the draft Recreation Development and Management Plan (Forest Service, 2010d, Enclosure 3), the Forest Service recommends reservoir surface management measures including woody debris capture on McCloud reservoir; approved use of docks and buoys; measures to discourage trespass onto private lands; speed restrictions; buoy lines and buoy courses; and fishing closures or seasonal limits. The Forest Service recommendations included in the draft Recreation Plan related to reservoir water surface management do not provide the details that were contained in the Forest Service's original condition 30, part 1, subpart d.

In its November 24, 2010, filing, PG&E objects to Forest Service modified condition 30 but does not indicate the components with which it disagrees.

#### *Our Analysis*

Developing protocols for preventing/removing unapproved buoy courses and approved use of docks would help prevent boating hazards and improve public recreational safety at the project reservoirs. Surface sweeps of McCloud and Iron Canyon reservoirs and boat ramps would collect and remove surface debris to reduce boating hazards and ensure that the boat ramps are not blocked by debris. PG&E alternative condition 30 proposes surface sweeps of McCloud and Iron Canyon reservoirs and boat ramps once every 5 years or as needed instead of annually as originally proposed by PG&E and specified in the Forest Service's original condition 30. The Forest Service commented that winter storm debris on the reservoir surfaces accumulates at access points and boat ramps. The annual sweeps originally proposed by PG&E and in the Forest Service's original condition 30 would ensure that winter storm debris that could accumulate annually is collected and removed prior to the recreation season. As discussed in section 3.3.1.2, *Environmental Effects, Large Woody Debris*, Forest Service modified condition 21 specifies the development of an LWD Plan that would provide a procedure for the capture and removal of woody debris from the surface of McCloud reservoir. In the draft LWD Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3), the Forest Service recommends the capture of LWD on the surface of McCloud reservoir annually in spring.

The Forest Service's original condition 30 specified and PG&E alternative condition 30 propose that PG&E, in cooperation with the Forest Service, would submit a

request to the Shasta County Boating Unit of the Sheriff's office for the establishment of a 5-mph restriction on McCloud reservoir upstream from the McCloud bridge and a buoy line to be installed near Huckleberry Creek. Although speeding on the reservoirs has been identified as an issue by project users, enforcement of speed restrictions is not the responsibility of the Commission. The Shasta County Boating Unit of the Sheriff's office is responsible for boating safety enforcement on all waterways within Shasta County, including the project reservoirs. PG&E is subject to local laws and ordinances as they pertain to reservoir speed limits.

The Forest Service specifies measures to discourage trespass on adjacent private lands to protect public safety. Preventing trespass on private lands outside the project boundary is outside the Commission's authority; it is the responsibility of private landowners to clearly mark their property if trespassing is problematic. However, measures to prevent unauthorized access to project lands and waters where necessary to protect the public would ensure public safety at the project and help address the issue of trespassing at the project, especially at Pit 7 afterbay where public access is prohibited.

Recreation use at the project is expected to exceed the rate of population growth over the next 50 years. Monitoring boat use, as recommended in the draft Recreation Development and Management Plan, included as an enclosure to the Forest Service November 29, 2010 filing, and specified in the Forest Service's original condition 30, would help to identify excessive use and potential user conflicts on project reservoirs and this information could be used to examine existing use and develop mitigation measures if use is excessive or creating conflict among reservoir-based recreation users. Including a boat monitoring and reporting protocol as a part of monitoring efforts concurrent with the Commission's recreation Form 80 schedule would ensure project facilities, including reservoirs, are meeting recreation demand over the term of the license.

### **Project Signage and Interpretative Information**

PG&E proposed to develop and implement a Project Sign Plan specific to directional and facility signs for the project and project recreation facilities, but not to include traffic and road signs. In addition, PG&E proposed to develop and implement an Interpretive and Education Plan that would be specific to interpretation and education about the project.

In its original condition 31, the Forest Service specified that PG&E develop and implement a Sign Plan which includes directional, traffic, and road and safety signs, with the addition of an interpretive and educational component. The plan would include the types of informational signs to be developed, the design and content of each sign, and the locations where the signs would be placed. The interpretive and educational component of the Project Sign Plan would include the design, delivery methods, a schedule for implementation as well as a website with public information to include information about project recreation facilities such as directions, seasonal fees, streamflow information, seasonal reservoir levels, fish stocking, and scheduled work that would change flows or reservoir levels or affect access to recreational facilities. Informational kiosks containing

fee and regulation information, seasonal and safety information, and project maps would also be placed at all developed recreation facilities.

PG&E alternative condition 31 is consistent with the Forest Service's original condition 31; however, PG&E proposed that the most efficient and effective means of providing project recreation information to the public would be to post it on the Forest Service's website instead of posting the information on a website hosted by PG&E. Furthermore, PG&E stated it would not provide specific information, such as real-time reservoir levels that could be used by competitors, to the public as part of the project recreation information. PG&E viewed this confidential business information to be proprietary in nature.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 31. Although not specified in the Forest Service's original condition 31, Forest Service modified condition 31 specifies that a draft Sign and Interpretive/Education Management Plan be developed within 2 years of license acceptance and include a sign inventory. Additionally, Forest Service specifies that the plan would apply to all non-traffic signs.

The Forest Service removed specific details of the Sign Plan components from the original 4(e) condition and placed them in the draft Sign and Interpretive/Education Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3) within the project. The components recommended in the Forest Service's draft Sign and Interpretive/Education Management Plan are generally consistent, although more comprehensive, than those specified in the Forest Service's original condition 31. According to the draft Sign and Interpretive/Education Management Plan road and traffic signs associated with roads external to recreation facilities would be included in the Road and Transportation Facility Management Plan. Interpretive and educational panels are included in the draft Sign Plan as a means of implementing the information and education component.

In the draft Sign and Interpretive/Education Management Plan, the Forest Service recommends the following: updating the relicensing sign inventory conducted in 2007 and development of specific sign standards and design; specific protocols for installing, maintaining, and monitoring project-related signs including repairing or replacing existing signs based on the sign inventory, installing new sign and interpretive/education displays, updating the sign inventory within six months of final sign installation; and specific measures for the interpretive and educational component, including design, delivery methods, a schedule for implementation as well as a website with public information to include information about project recreation facilities such as directions, seasonal fees, streamflow information, seasonal reservoir levels, fish stocking, and scheduled work that would change flows or reservoir levels or affect access to recreational facilities.

### *Our Analysis*

The project currently does not have a coordinated and systematic process for the development of signage and interpretative information associated with the project. Development and implementation of a Project Sign Plan with associated interpretive and educational measures for the McCloud-Pit Project would provide the means for coordinated and systematic development of signage and interpretative information associated with the project. The Project Sign Plan would also provide the means to ensure that signage within the project is maintained and conforms to the Forest Service standards on lands that are visible from NFS lands. Development of the final Sign Plan within 2 years of license issuance, as specified in Forest Service modified condition 31 and proposed by PG&E, would be appropriate given that the final plan would include an update to the relicensing sign inventory conducted in 2007 and development of standards and designs for signs. Updating the relicensing sign inventory conducted in 2007 would ensure that the final Sign Plan is based on the most recent status of signs throughout the project. Furthermore, providing interpretive and education panels, or informational kiosks, as recommended by the Forest Service in the draft Sign Plan, at the project would also improve recreation access and safety by providing visitors with maps of the area and safety information at each developed recreation site.

Developing a public website to host recreation information on the project would provide a source for visitors to locate recreation information about the project. However, we note that the Commission does not require that proprietary or confidential business information be made available to the public. Although the Forest Service is the main recreation provider in the area and the source that visitors commonly use to locate recreation information, the Commission only has authority over its licensees and cannot require the Forest Service to post project information on its website.

### **Provision of Streamflow Information**

PG&E proposes to provide the following information to the public via the internet as a part of the Recreation Plan: real-time water flow data (hourly average) for the Lower McCloud River using gage data from gage MC-1 (gage at Ah-Di-Na), forecasts of known events that would affect water flow (e.g., powerhouse outage) on the Lower McCloud River, information about typical drawdown patterns for McCloud and Iron Canyon reservoirs, and information during the recreation season on current reservoir elevations in relation to the use of project boat launches.

In its original condition 19, part 3, the Forest Service specified that PG&E operate and maintain existing gages for the purpose of determining the river stage and minimum streamflow on the Lower McCloud River below McCloud dam, Pit River below the Pit 7 dam, and Iron Canyon Creek below the Iron Canyon dam, consistent with all requirements of the Commission and under the supervision of USGS. The Forest Service specified that PG&E measure and document all instream flow releases to be made available to the public and post real-time flow data at MC-1 on the CDEC or its successor's website. Flow data collected by PG&E from the stream gages would be

reviewed by PG&E's hydrographers as part of its QA/QC protocol and made available to USGS in annual hydrology summary reports that USGS could post within its electronic database that can be accessed via the internet. Forest Service original condition 31 also specified that PG&E develop and implement a public website with the above information as a part of the Project Sign Plan.

PG&E alternative condition 31 is consistent with the Forest Service's original condition 31; however, PG&E proposed to provide the information to the Forest Service for posting on the Forest Service website. PG&E commented that providing public information through the Forest Service website would be more efficient and effective because the Forest Service is the main recreation provider in the area.

In its November 29, 2010, filing, the Forest Service includes modifications to conditions 19 and 31. The provisions specified in Forest Service modified condition 19, part 2 related to streamflow measurement are the same as those specified in the Forest Service's original condition 19, part 3, as discussed above. The Forest Service removed the specific details related to the Project Sign Plan from the 4(e) condition, including developing and implementing a public web site with streamflow information and reservoir levels, and placed them in the draft Sign and Interpretive/Education Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

With the exception of recommending that streamflow information from both USGS gage MC-7 (gage at McCloud dam) and gage MC-1 (gage at Ah-Di-Na Campground) be posted on the project web site, the Forest Service recommendations in the draft Sign Plan for the information to be posted on the web site remain unchanged from the specifications for the web site included in the Forest Service's original condition 31.

In its November 24, 2010, filing, PG&E accepts modified condition 31 and withdraws its alternative condition 31.

#### *Our Analysis*

Accurate and timely streamflow information and information about the usability of the project boat launches can assist recreationists in planning water-related visits to the project. If this information is not easily accessible to the public, recreationists may not be able to take full advantage of recreation opportunities and may not be appropriately prepared for streamflow conditions which could lead to public safety issues.

PG&E's proposal and the Forest Service's specification in modified condition 19, part 2 to provide accurate and timely streamflow information at gage MC-1 to the public via the internet would provide the means for the public to gain information regarding streamflow and reservoir levels for specified stream reaches and reservoirs at the project. As discussed in section 3.3.2.2, *Environmental Effects, Flow Monitoring and Determination of Water Year Type*, the continued O&M of gage MC-7 and gage MC-1 would help to ensure that these gages remain functional to monitor flow compliance and

ensure that flow data for the Lower McCloud River continues to be available to the general public. Providing accurate and timely streamflow information at gage MC-7, in addition to gage MC-1, to the public via the internet would provide the public with additional streamflow information for the Lower McCloud River. This information could then be used by the public to determine if recreation opportunities and desired flow ranges for angling, boating, and other recreation activities would be available. This would allow the public to take better advantage of opportunities for recreation use at the project and in the Lower McCloud River. Although visitors commonly use the CDEC or Forest Service's website to locate water-based recreation information, the Commission only has authority over its licensees and cannot require the CDEC or the Forest Service to post project information on its website.

### **3.3.6 Cultural Resources**

#### **3.3.6.1 Affected Environment**

##### **Section 106 of the National Historic Preservation Act**

Section 106 of the NHPA as amended requires the Commission to take into account the effects of licensing a hydropower project on any historic properties and allow the Advisory Council on Historic Preservation (Advisory Council) a reasonable opportunity to comment if any adverse effects to historic properties are identified within the hydropower project's APE.

Historic properties are defined as any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. In this document, we also use the term "cultural resources" to include properties that have not been evaluated for eligibility for listing in the National Register. In most cases, cultural resources less than 50 years old are not considered eligible for the National Register. Cultural resources need enough internal contextual integrity to be considered historic properties. For example, dilapidated structures or heavily disturbed archaeological sites may not have enough contextual integrity to be considered eligible. TCPs are a type of historic property that are eligible for the National Register because of their association with cultural practices or beliefs of a living community that: (1) are rooted in that community's history; or (2) are important in maintaining the continuing cultural identity of the community (Parker and King, 1998).

Section 106 also requires that the Commission seek concurrence with California SHPO on any finding involving effects or no effects on historic properties and allow the Advisory Council an opportunity to comment. If TCPs have been identified, section 106 also requires that the Commission consult with interested Native American tribes that might attach religious or cultural significance to such properties.

If existing or potential adverse effects have been identified on historic properties, the applicant needs to develop a HPMP to seek to avoid, reduce, or mitigate the effects. Potential effects that may be associated with a hydroelectric project include any project-related effects associated with the day-to-day O&M of the project after issuance of a new license. During development of the HPMP, the applicant should consult with the Commission, Advisory Council, California SHPO, Indian tribes, and Forest Service. In most cases, the HPMP would be implemented by execution of a PA that would be signed by the Commission, Advisory Council (if it chooses to participate), California SHPO, and other consulting parties.

##### **Area of Potential Effects**

Pursuant to section 106, the Commission must take into account whether any historic property could be affected by the issuance of a proposed new license within a project's APE. The APE is determined in consultation with the California SHPO and is defined as the geographic area or areas within which an undertaking may directly or

indirectly cause alterations in the character or use of historic properties, if any such properties exist. In this case, the APE for the McCloud-Pit Project includes lands within the project boundary, as delineated in the current Commission license, plus lands outside the project boundary where project operations may affect the character or use of historic properties or TCPs.

The APE for the proposed project has been defined by the Commission as the land within the proposed project boundary (project area), and encompasses the following (PG&E, 2009d):

- 100 feet from either side of the banks of the McCloud River, downstream from McCloud dam to the confluence of Squaw Valley Creek (McCloud River Expanded APE);<sup>25</sup>
- Public land between the perimeter road around McCloud reservoir and the water surface from Tarantula Gulch, crossing McCloud dam, to Star City Creek;
- The area between the perimeter road around Iron Canyon reservoir and the water surface; and
- And the area contiguous with tunnel spoil areas having a reasonable potential to contain archaeological materials based on topography and site conditions.

The proposed project area above project tunnels is excluded from the APE as there are no surface activities anticipated in this area. In addition, lands on the west side of the McCloud River, upstream from the Tarantula Gulch boat launch, and lands associated with Fenders Flat at the Pit 7 afterbay, are also included in the APE (PG&E, 2009d).

Also encompassed within the APE are all lands affected by the construction of the proposed powerhouse at the Pit 7 afterbay and McCloud dams. These areas include (PG&E, 2009d):

- A 200-foot buffer around the proposed powerhouse site at the base of McCloud dam;
- A 200-foot corridor centered on the proposed McCloud and Pit 7 afterbay transmission line routes;
- A 200-foot buffer around the proposed Pit 7 afterbay powerhouse and substation on the west side of the Pit 7 afterbay dam weir;
- A 200-foot corridor centered on the proposed location of the access road between FR 34N17 and the proposed Pit 7 afterbay powerhouse site; and

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<sup>25</sup> Survey access to the APE on private lands along the McCloud River downstream of The Nature Conservancy lands was not granted.

- An area on the west side of the Pit River arm of Shasta Lake extending from the high-water mark upslope to the proposed access road corridor between the Pit 7 afterbay dam and FR 34N17.

Preliminary study results from RL-S6, *Traffic Study and Road Condition Inventory*, indicated that uses related to the proposed project are “sufficient to establish a clear nexus with the Project or other Project-related activities,” and have the potential to create impacts to historic properties; thus, a portion of the road near Blue Jay Creek on NFS lands is also included in the APE. Similarly, lands located outside of the Commission-defined project boundary that was identified in TM-16, *Data Summary for Developed and Dispersed Recreation*, are included in the APE as well (PG&E, 2009d).

### **Cultural History Overview**

The study area is located in the southern-most extension of the larger Cascade Range, within what is described as the Cascade Range Geomorphic Province (PG&E, 2009d; Harden, 1998 as cited by PG&E, 2009d; Schoenherr, 1992 as cited by PG&E, 2009d). The majority of the Cascade range is typified by rolling, forested terrain, with the dominant ecology in lower elevations consisting of yellow pine forest, while higher elevations are represented by Mount Lassen and Mount Shasta, two of the regions highest volcanic peaks. Mount Lassen measures 10,457 feet in height and sits amid an active volcanic region that includes hot springs, cinder cones, calderas, lava tubes, and fumaroles. Mount Shasta is a large stratovolcano, 14,162 feet in height, and is located about 80 miles north of Mount Lassen (PG&E, 2009d; Harden, 1998 as cited by PG&E, 2009d). Although the Cascade Range has been volcanically active for about 36 million years, most volcanoes in the range are between two and 5 million years old (PG&E, 2009d; Harden, 1998 as cited by PG&E, 2009d; Schoenherr, 1992 as cited by PG&E, 2009d).

The Pit River and the McCloud River are the two main waterways that drain the northern California Cascade Range, both of which feed into Shasta Lake. Several creeks, including Hat Creek, Burney Creek, and Clark Creek run into the Pit River. Several waterfalls line the Upper McCloud River, north of McCloud reservoir, while the Lower McCloud River flows through a deep, narrow canyon after leaving the reservoir (PG&E, 2009d). Human occupation of the area began as small, scattered sites serving a hunter-gatherer culture, eventually evolving into a subsistence economy as technology progressed (PG&E, 2009d).

The cultural chronology of Shasta County proposed by Clewett and Sundahl identified a four-part chronological sequence of human occupation stretching back 8,000 years (PG&E, 2009d; Clewett and Sundahl, 1982, 1983 as cited by PG&E, 2009d). Evidence of human occupation in Shasta County prior to 8,000 years ago is minimal, consisting of a few isolated fluted projectile points and crude metavolcanic tools typically dating from circa 12,000-10,000 BP. The argument has been made that these tools represent a late Pleistocene/early Holocene occupation, as they were found on Pleistocene terraces; however, no stratified, undisputed Paleoindian site has been identified within

Shasta County (PG&E, 2009d; Brott and Dotta, 1978 as cited by PG&E, 2009d; Dillon, 1994 as cited by PG&E, 2009d).

Clewett and Sundahl termed the earliest period of occupation the Early Archaic (6000-3000 BC) period, which is characterized by wide-stemmed projectile points and ground stone implements, leading some scholars to assert cultural affiliation with the Borax Lake area in southeastern California (PG&E 2009a; Moratto, 1984 as cited by PG&E, 2009d). Early Archaic settlements appear to have been small and scattered in foothills and along waterways, with ground stone assemblages that suggest a heavy reliance on seeds and nuts with supplemental additions of mammals and fish. Few faunal assemblages from the period have been analyzed, however, and it has been suggested that the “correspondence between wide-stem points and elk distributions in other parts of California” indicate a reliance on elk as a food source during this period (PG&E, 2009d; Kowta, 1984 as cited by PG&E, 2009d).

The Middle Archaic, spanning 3000-500 BC, is characterized by a more diversified tool kit, encompassing medium to large corner and side-notched projectile points. Though the use of ground stone tools continues during this period, their use does decrease. Settlements are believed to have been similar in type and location to those of the Early Archaic period, with the addition of a systematic use of upland zones. A large-scale, mid-Holocene, warming trend, characteristic of the western United States at this time, may have spurred this shift in subsistence and settlement patterns (PG&E, 2009d; Kowta, 1984 as cited by PG&E, 2009d).

During the Transitional Period (500 BC-AD500), considerable changes occurred in assemblage structure, subsistence, and settlement patterns. A multitude of corner notched projectile points, as well as the appearance of mortars and pestles, typify assemblages of the period. The addition of acorns as a dietary staple during this period is assumed due to the appearance of the mortar and pestle, and may signal a shift from a more mobile society to a diversified subsistence economy. The labor-intensive process required for the consumption of acorns and the eventual development of an acorn-based economy may have prompted the creation of a sociopolitical ranking system (PG&E, 2009d; Basgall, 1987 as cited by PG&E, 2009d).

The Shasta Complex (AD 500-AD 1850) represents the final phase of Clewett and Sundahl’s chronology. The introduction of the bow and arrow along with various small, Gunther Barbed, Desert Side-notched, and Cottonwood Triangular projectile point types characterized the assemblage of this phase. Settlements remained near streams and rivers and included semi-subterranean dwellings. Subsistence activities concentrated on acorn gathering, hunting, and fishing.

Sundahl subdivided the Shasta Complex into three temporal phases using variations in artifact attributes (PG&E, 2009d; Sundahl, 1982 as cited by PG&E, 2009d). All three phases, 1250-750 BP, 750-350 BP, and 450-100 BP, are characterized by Gunther Barbed projectile points, winged drills, bi-pointed fish gorges, bone gaming pieces, incised bone pendants, and spire-looped Olivella and glycymeris beads. The

assemblage of the second phase, 750-350 BP, lacks winged drills, but includes a contracting-stem variant of the Gunther Barbed projectile point, the Desert Side-notched projectile point, large drills manufactured of basalt or chert, sandstone arrowshaft polishers, and Haliotis pendants. The third phase, 450-100 BP, includes Desert Side-notched points, hafted drills, incised pebbles, biconically-drilled pebble pendants, incised charmstones, and clam shell disc beads (PG&E, 2009d; Clewet and Sundahl, 1982 as cited by PG&E, 2009d; Moratto, 1984 as cited by PG&E, 2009d; Sundahl, 1982 as cited by PG&E, 2009d). Some scholars have identified the appearance of Shasta Complex artifacts and sites as representative of a new group of peoples into the region (PG&E, 2009d; Sundahl, 1982 as cited by PG&E, 2009d). Two of the most representative sites in Shasta County from this period are located north of Redding along the Sacramento River (PG&E, 2009d; Moratto, 1984 as cited by PG&E, 2009d; Treganza and Heicksen, 1960, as cited by PG&E 2009a).

At the time of European-American contact in the region, the Pit River and the Wintu Native American groups were living in the area that is now Shasta, Siskiyou, and adjacent counties. Along with the Shasta and Yana groups, these were the descendants of Native American peoples who had settled in the region earlier. The Pit River group inhabited an area south from Goose Lake along the western side of the Warner Mountains, to just south of Eagle Lake; to the west, the Pit River territory included land north of Mount Lassen, and north to the eastern side of Mount Shasta. Many of the main Pit River villages were located along both the northern and southern banks of the Pit River, as well as along Pit River tributaries. West of the Pit River territory was Wintu territory, encompassing parts of what is now Trinity, Shasta, Siskiyou, and Tehama Counties. Wintu territory was crossed by various waterways, including the Sacramento, Trinity, and McCloud Rivers, as well as Cottonwood, Hayfork, and Stillwater Creeks. Both the Pit River and the Wintu groups were hunter-gathers, relying on acorn and pine nuts (buckeyes were also important to the Wintu), deer, waterfowl, and numerous species of fish. Salmon were a particularly important resource, for which the Wintu constructed salmon houses across the river from which they could spear the fish (PG&E, 2009d).

The Pit River and Wintu were both comprised of several smaller groups. The Pit River people were also called the Achumawi, spoke a Hokan-derived language, and included the Hewisedawi, Kosalektwi, Astariwawi, Hammawi, Atwamsini, Aporige, Atuge, Ajumawi, Ilmawi, Itsatawi, and Madesiwi. The Wintu spoke a Penutian language related to the Nomlaki language, included the Nomtipom, Winnemem, Dawpom, ?elpom, λ'abalpom, Nomsuus, Dawnom, Norelmaq, and Waymaq. Family was the dominant social unit in Shasta, Pit River, Wintu, and Yana societies. The family was largely self-sufficient, fulfilling economic process through a gender-based division of labor, with women gathering plant foods and men hunting, fishing, and making tools. Social organization was based on tribelets, consisting of “one or more household groups that included immediate family members... and any associated relatives... living together in a village or community” (PG&E, 2009d; Kroeber, 1925 as cited by PG&E, 2009d).

The first recorded expeditions by Euro-Americans into the area are credited to traders with the Hudson Bay Company between 1826 and 1833. At this time the Native American population in the area was large and culturally varied. Diseases introduced by these first explorers, however, decimated the Native populations. Nearly 40 percent of the Pit River Tribe and almost 75 percent of the Wintu people had fallen to epidemic by 1833 (PG&E, 2009d; Loofbourow, 2009 as cited by PG&E, 2009d). The Native American population suffered more losses during the 1840s and 1850s, with the massacre of Wuntus and Yanas by American military under the leadership of John C. Fremont, and the “friendship feast,” in which white settlers served Wintu guests poisoned food (PG&E, 2009d).

The discovery of gold at Sutter’s mill in 1848 brought a rush of miners and settlers into California. Gradually, Native American lands were lost to white claims. Shasta County, established in 1850, became the “Gateway to the Northern Gold Rush” (PG&E, 2009d; Smith, 1996 as cited by PG&E, 2009d). Star City Creek, located along the northern banks of Grizzly Peak and flowing into McCloud reservoir, was especially productive. As Shasta County drew more and more prospectors, streams and creeks relied upon by Native American groups became increasingly polluted from mining operations, causing numerous violent incidents between the miners and Native groups. In response, the American military established Fort Cook near the Fall River in 1857 (PG&E, 2009d; Shasta Historical Society, 2003 as cited by PG&E, 2009d).

As gold mining diminished, many prospectors turned their hand to small-scale ranching and timber operations. Nineteenth century land grants drew more settlers to the area. Between 1899 and 1920, several families and individuals homesteaded the area that later became the Iron Canyon reservoir. Fenders Ferry, another early American settlement in the vicinity of the Pit 7 dam, is thought to have acquired its name from the Fender brothers, who established a ferry near Potem Creek in 1860 (PG&E, 2009d; Durham, 1998 as cited by PG&E, 2009d). Many settlers allowed their livestock to graze on plants vital to the Native American diet, further fueling tension and violence between the two groups. Despite resistance, most Native Americans in the area had been relocated to various reservations by the late nineteenth century. Many of the Pit River people were moved to the Round Valley Reservation east of Redding and the Nome Lackee Reservation in Tehama County. The Wintu were taken to reservations on the Mendocino coast. Eventually, Pit River and McCloud River Natives did return to their traditional lands (PG&E, 2009d).

By the late 1870s, logging had become a major industry in the region. McCloud Flats, east of the town of McCloud, was a particularly valuable timber area (PG&E, 2009d; Zanger, 1992 as cited by PG&E, 2009d). By the 1890s, copper mining had replaced gold mining, especially along the copper-zinc belt in the west-central portion of Shasta County. Smelting facilities were constructed in the area around Iron Mountain, the first being at Keswick. Copper production in the area was effectively ended by a court order in 1919 mandating the closure of smelting plants, which were producing toxic

fume detrimental to livestock and crops (PG&E, 2009d; Smith, 1996 as cited by PG&E, 2009d).

The McCloud River had developed a reputation for exceptional fishing as early as the 1870s. The McCloud River Association was formed in 1900, organizing recreation fishing on the river (PG&E, 2009d; Guilford-Kardell, 1994 as cited by PG&E, 2009d). The association originally had 20 members, each of whom paid an annual fee of \$1,000.00 for fishing privileges. The association officially became the McCloud River Club in 1902 or 1903 (PG&E, 2009d; Cranfield, 1984 as cited by PG&E, 2009d). Phoebe Appleton Hearst, mother of William Randolph Hearst, began development at the Wynton Castle estate in the first decade of the 1900s. The “wynton” name was a derivation of the word “wintu” associated with the Winnemem Wintu. In 1929, the Wynoon Castle was built (which later burned down). William Randolph Hearst used the estate as a hideaway from his more well-known San Simeon estate on the coast. Today the Hearst private estate consists of 67,000 acres containing a number of built structures (including a village) which surrounds the McCloud reservoir and is adjacent and includes some project lands. Presently, the Wynton Castle estate is managed by The Hearst Corporation.

The topography of the area lent itself to the development of hydroelectric power facilities beginning in the last decade of the nineteenth century. The first recorded use of hydroelectric power in Shasta County occurred at Gladstone Mine in 1894. The Northern California Power Company, which had originally been established as the Keswick Electric Company to supply power to the Keswick Smelter, took over electrical operations of the Gladstone Mine sometime around 1900 (PG&E, 2009d; Smith, 1996 as cited by PG&E, 2009d). PG&E purchased the water rights of the Mount Shasta Power Company in 1917, and in 1919 purchased the Northern California Power Company. The construction of the Pit River facility spanned from 1921 to 1966, and was the single largest construction project in PG&E’s history (PG&E, 2009d).

### **Previous Cultural Resource Investigations**

In preparation for the pre-application document, PG&E conducted an archival record search between June 23 and 27, 2005 at the California State University (CSU), Chico, Northeast Information Center to identify previous investigations in the vicinity of the project APE, as well as previously recorded cultural resources in the area. The Northeast Information Center houses all cultural resources data for Shasta and Siskiyou Counties. Data reviewed includes site records, base maps containing site and survey locations, letter reports, survey reports, site testing and evaluation reports, National Register listings, California Register listings, California Historical Landmark listings, and California Points of Historic Interest. Additional sources of information consulted include the Shasta-Trinity National Forest, the Shasta County Historical society in Redding, the Shasta County Public Library in Redding, and the special collections of the Meriam Library, CSU, Chico (PG&E, 2006).

In addition, PG&E consulted the California Native American Heritage Commission concerning documented areas of tribal significance in the project APE. Tribal groups with ties to or interest in the project area were also contacted concerning sensitive cultural resources within the project APE. Subsequent meetings were held with the Tribes (PG&E, 2006).

There have been 49 previous investigations conducted in and around the project APE, ranging in date from the early 1960s to 2004. These studies were conducted to identify cultural resources prior to the sale or transfer of timber or land, timber harvests, or project-specific ground-disturbing activities. About 40 percent of the total APE for the project had been investigated previously; however, many of the existing site records and survey efforts are more than 10 years in age and are not considered to be in adherence with current professional standards (PG&E, 2006).

Albion Environmental, Inc, was contracted to conduct archaeological fieldwork as outlined in Study Description CR-S1. Archaeological surveys were conducted during September, October, and November 2007, and during January, April, May, and July 2008. The surveys were designed to examine locations that had not been recently examined, that had been surveyed but with an unknown survey strategy, or that had been surveyed with a survey strategy that was not undertaken according to current professional standards. In addition to the archaeological survey crew, representatives of the Pit River Tribe and of the Winnemem Wintu Tribe were invited to participate in the field work as official Native American monitors and observers. Only the Pit River Tribe provided monitors (PG&E, 2009d).

In areas where it was safe to survey, crew members traversed parallel transects spaced 15 to 20 meters apart. In areas where 75 percent or more of the ground cover was obscured by vegetation, or the terrain exhibited a slope greater than 49 percent, transects were expanded to 20 to 40 meters apart. Areas of the project APE that were inaccessible because of steep terrain, extremely dense foliage, or unsafe conditions were bypassed (PG&E, 2009d).

Surveys of both McCloud and Iron Canyon reservoirs were undertaken when the reservoirs were at low levels so that potentially submerged resources could be identified; however, neither reservoir was at the lowest historic levels during the 2007 field season. Restricted access to privately owned land along the McCloud reservoir necessitated initial survey of the reservoir by helicopter, during which potentially sensitive areas within the project APE were identified on a topographic map. These areas were then accessed by boat and surveyed using the methods described above. Pit 6 and Pit 7 were also accessed by boat (PG&E, 2009d).

A preliminary inspection of the McCloud transmission line route was undertaken on July 21, 2008. This inspection did not constitute a formal archaeological survey, which will be undertaken after the final transmission line route and type have been determined. An additional survey of NFS lands was undertaken on April 30, 2009. At the request of the Pit River Tribe, a two-day field visit was hosted by PG&E to identify

areas of tribal concern located at the Pit 6 and Pit 7 reservoirs. Access to McCloud River Club lands was denied, and consequently were not field surveyed (PG&E, 2009d).

## **Identified Resources**

### *Archaeological and Historic Era Resources*

A total of 87 archaeological and historic-era resources were identified within the APE for the proposed project. Of these total 87 sites, 11 were identified on lands that were inaccessible during field survey (table 3-37) and 18 were not relocated during archaeological field survey (table 3-38). The remaining 55 resources, which include 30 archaeological sites, 22 isolated finds (artifacts unassociated with an archaeological site), and three historic structures, were physically located during archaeological field survey (table 3-39).

Comprising these 55 resources are 33 sites (nine newly identified, 24 previously recorded) and 22 isolated finds. The nine newly identified sites consist of eight prehistoric archaeological sites and one historic-era site. The 24 previously recorded sites consist of 21 prehistoric archaeological sites and three sites containing both prehistoric and historic components. Isolated finds include three historic structural features and 19 prehistoric resources (PG&E, 2009d).

None of the 22 isolated finds (defined as less than five artifacts per square meter) are considered eligible for listing on the National Register. Of the 33 archaeological and historic-era resources, three are eligible for listing and six have been recommended potentially eligible. The eligibility of the remaining 24 archaeological and historic-era resources is unknown; therefore, these resources would be treated as eligible for listing on the National Register until such time that any previous evaluation of these resources is identified, or until these resources are formally evaluated eligible (PG&E, 2009d). The 33 archaeological and historic-era resources, along with National Register eligibility, are identified in table 3-39.

A preliminary inspection of the proposed McCloud transmission line corridor, as described in the supplement submitted by PG&E on October 17, 2007, was conducted as part of archaeological field survey. The inspection consisted of viewing the proposed route of the transmission line by vehicle from FR 11, and noting areas that may potentially be archaeologically sensitive. Formal archaeological survey will be conducted upon final determination of the final corridor route (PG&E, 2009d).

Table 3-37. Archaeological and historic-era resources located on McCloud River Club lands within the McCloud River Expanded APE. (Source: PG&E, 2009d; Berryman, 1999)

| <b>Resource Number</b>   | <b>Description<sup>a</sup></b>   | <b>National Register Eligibility</b> | <b>National Register Integrity</b> |
|--------------------------|--|--------------------------------------|------------------------------------|
| P-45-003188              | Lithic scatter, fire-cracked rock, house pits, projectile points, and historic components      | Unknown                              | Unknown                            |
| P-45-003189              | Footbridge   | Unknown                              | Unknown                            |
| CA-SHA-3190              | Lithic scatter, midden deposit, fire-cracked rock, house pits, projectile points, manos        | Unknown                              | Unknown                            |
| P-45-003191              | Lithic scatter, midden deposit, house pits   | Unknown                              | Unknown                            |
| P-45-003192              | Lithic scatter, house pits   | Unknown                              | Unknown                            |
| P-45-003193              | Lithic scatter, projectile points, and historic components                                     | Unknown                              | Unknown                            |
| P-45-003194 <sup>b</sup> | Lithic scatter, midden deposit, fire-cracked rock, and historic components (village: “Haupom”) | Unknown                              | Unknown                            |
| P-45-003195              | Lithic scatter, midden deposit, house pits   | Unknown                              | Unknown                            |
| P-45-003196              | Pasture, fence, and prehistoric components   | Unknown                              | Unknown                            |
| P-45-003197              | Footbridge   | Unknown                              | Unknown                            |
| P-45-003198              | Lithic scatter, midden deposit, and historic components  | Unknown                              | Unknown                            |
| P-45-003199              | McCloud River Club Resort  | Unknown                              | Unknown                            |
| P-45-003202              | Lithic scatter, midden deposit, fire-cracked rock, house pits (village “Sulanharas”)           | Unknown                              | Unknown                            |
| P-45-003205              | Lithic scatter, midden deposit, projectile point   | Unknown                              | Unknown                            |

<sup>a</sup> Resource descriptions are taken from Berryman, 1999.

<sup>b</sup> Partially located on Shasta-Trinity National Forest lands; Shasta-Trinity National Forest portion identified as ALB-12/FS 05-04-61-601.

Table 3-38. Previously recorded archaeological and historic-era resources that were not relocated during Archaeological field survey. (Source: PG&E, 2009d)

| <b>Project Location</b> | <b>Resource Number</b>      | <b>Description</b>  | <b>National Register Status</b> | <b>National Register Integrity</b> |
|-------------------------|-----------------------------|---|---------------------------------|------------------------------------|
| Pit 7 Reservoir         | CA-SHA-143 <sup>e</sup>     | House pit, obsidian points  | Unknown                         | Unknown                            |
| Pit 7 Reservoir         | CA-SHA-144 <sup>a</sup>     | House pits  | Unknown                         | Unknown                            |
| Pit 7 Reservoir         | CA-SHA-145 <sup>d</sup>     | Projectile points, mano   | Unknown                         | Unknown                            |
| Pit 7 Reservoir         | CA-SHA-147 <sup>a</sup>     | House pits, midden, shell   | Unknown                         | Unknown                            |
| Pit 6 Reservoir         | CA-SHA-147/247 <sup>e</sup> | Midden, shell   | Unknown                         | Unknown                            |
| Fenders Flat            | CA-SHA-150 <sup>a</sup>     | Obsidian flakes, shell, small stemmed point   | Unknown                         | Unknown                            |
| Fenders Flat            | CA-SHA-151 <sup>a</sup>     | Obsidian, shell   | Unknown                         | Unknown                            |
| Pit 7 Reservoir         | CA-SHA-152 <sup>b</sup>     | House pits, midden, shell   | Unknown                         | Unknown                            |
| Pit 7 Reservoir         | CA-SHA-153 <sup>b</sup>     | Obsidian flakes, shell  | Unknown                         | Unknown                            |
| Pit 6 Reservoir         | CA-SHA-248 <sup>e</sup>     | Obsidian flakes, shell  | Unknown                         | Unknown                            |
| McCloud River           | CA-SHA-969 <sup>f</sup>     | Depressions, obsidian flakes, scrapers, cores, projectile points, bowl mortar, midden | Unknown                         | Unknown                            |
| McCloud Reservoir       | ICI320-1 <sup>c</sup>       | Percussion flake, possible house pit  | Unknown                         | Unknown                            |
| McCloud Reservoir       | ICI320-2 <sup>c</sup>       | Percussion flakes, projectile points, midden  | Unknown                         | Unknown                            |
| McCloud Reservoir       | ICI230-3 <sup>c</sup>       | Percussion flakes, projectile points  | Unknown                         | Unknown                            |

| <b>Project Location</b> | <b>Resource Number</b> | <b>Description</b>                    | <b>National Register Status</b> | <b>National Register Integrity</b> |
|-------------------------|------------------------|---------------------------------------|---------------------------------|------------------------------------|
| McCloud Reservoir       | ICI230-4 <sup>c</sup>  | Percussion flakes                     | Unknown                         | Unknown                            |
| McCloud Reservoir       | ICI230-5 <sup>c</sup>  | Percussion flakes                     | Unknown                         | Unknown                            |
| McCloud Reservoir       | ICI230-6 <sup>c</sup>  | Percussion flakes, superficial midden | Unknown                         | Unknown                            |
| McCloud Reservoir       | ICI230-7 <sup>c</sup>  | Percussion flakes                     | Unknown                         | Unknown                            |

- <sup>a</sup> Recorded by Baumhoff et al. (1955)
- <sup>b</sup> Recorded by Baumhoff and Bennyhoff (1955)
- <sup>c</sup> Recorded by Clemmer (1963)
- <sup>d</sup> Recorded by Flint et al. (1955)
- <sup>e</sup> Recorded by Heicksen (1962)
- <sup>f</sup> Recorded by Henn (1977)

Table 3-39. Documented archaeological and historic-era resources located within the APE. (Source: PG&E, 2009d)

| <b>Project Location</b>              | <b>Resource Number</b>     | <b>Type <sup>a</sup></b> | <b>Description</b>  | <b>National Register Status</b> | <b>National Register Integrity <sub>b</sub></b> |
|--------------------------------------|----------------------------|--------------------------|---|---------------------------------|---|
| Iron Canyon Reservoir <sup>c</sup>   | ALB-3<br>(FS-05-14-58-424) | P                        | Native American site; lithic scatter                                | Unknown                         | Low   |
| Iron Canyon Reservoir <sup>c</sup>   | ALB-4<br>(FS 05-14-58-425) | P                        | Native American site; lithic scatter                                | Unknown                         | Moderate  |
| McCloud Reservoir <sup>d</sup>       | ALB-5                      | P                        | Native American site; lithic scatter                                | Unknown                         | Low   |
| Pit 6 Transmission Line <sup>c</sup> | ALB-6H                     | H                        | Historic trash scatter with associated pit and milled board feature | Unknown                         | Low   |
| Pit 7 Transmission Line <sup>c</sup> | ALB-7                      | P                        | Native American site; lithic scatter                                | Unknown                         | Low   |
| McCloud River <sup>d</sup>           | ALB-8<br>(FS 05-14-61-598) | P                        | Native American site; lithic scatter                                | Unknown                         | High  |
| McCloud River <sup>d</sup>           | ALB-9<br>(FS 05-14-61-599) | P                        | Native American site; lithic scatter                                | Unknown                         | High  |
| McCloud River <sup>d</sup>           | ALB-10                     | P                        | Native American site; obsidian flakes and Gunther projectile point  | Unknown                         | High  |

| <b>Project Location</b>                              | <b>Resource Number</b>                       | <b>Type <sup>a</sup></b> | <b>Description</b>   | <b>National Register Status</b> | <b>National Register Integrity <sup>b</sup></b> |
|--|--|--------------------------|--|---------------------------------|---|
| McCloud River <sup>d</sup>                           | ALB-11<br>(FS 05-14-61-597)                  | P                        | Native American site; lithic scatter   | Unknown                         | Low   |
| McCloud River <sup>d</sup>                           | ALB-12*<br>(FS 05-14-61-601;<br>P-45-003194) | P/H                      | Prehistoric site with historic component; lithic scatter, ground stone fragment, midden          | Unknown                         | Moderate  |
| McCloud River <sup>d</sup>                           | ALB-13*<br>(FS 05-14-61-600)                 | P                        | Prehistoric site with historic component; lithic scatter, ground stone fragment, midden          | Unknown                         | Moderate  |
| Pit River <sup>c</sup><br>( <i>Pit 7 Reservoir</i> ) | CH-SHA-243                                   | P                        | Native American site; lithic scatter   | Unknown                         | High  |
| Pit River <sup>c</sup><br>( <i>Pit 7 Reservoir</i> ) | CH-SHA-244                                   | P                        | Native American site; lithic scatter   | Unknown                         | High  |
| Pit River <sup>c</sup>                               | CA-SHA-246                                   | P                        | Native American site; lithic scatter   | Recommended                     | Moderate  |
| Pit River <sup>c</sup><br>( <i>Pit 6 Reservoir</i> ) | CA-SHA-249                                   | P                        | Native American site; possible pit house features, obsidian flakes, basalt ground stone fragment | Recommended                     | Moderate  |

| <b>Project Location</b>            | <b>Resource Number</b>          | <b>Type <sup>a</sup></b> | <b>Description</b>  | <b>National Register Status</b> | <b>National Register Integrity <sub>b</sub></b> |
|------------------------------------|---------------------------------|--------------------------|---|---------------------------------|---|
| Pit River <sup>c</sup>             | CA-SHA-252                      | P                        | Native American site; possible pit house features, ground stone artifacts; previously excavated by M.H. Heicksen (1962) | Eligible                        | High  |
| Iron Canyon Reservoir <sup>c</sup> | CA-SHA-498<br>(FS 05-14-58-42)  | P                        | Native American site  | Unknown                         | Low   |
| McCloud River <sup>d</sup>         | CA-SHA-622<br>(FS 05-14-61-185) | P                        | Native American site; lithic scatter, midden  | Unknown                         | High  |
| McCloud River <sup>d</sup>         | CH-SHA-623<br>(FS 05-14-61-168) | P                        | Native American site; lithic scatter, possible pit house features   | Recommended                     | Low   |
| McCloud River <sup>d</sup>         | CA-SHA-624<br>(FS 05-14-61-187) | P                        | Native American site; lithic scatter, possible pit house features   | Recommended                     | High  |
| Iron Canyon Reservoir <sup>c</sup> | CA-SHA-664<br>(FS 05-14-58-53)  | P                        | Native American site; lithic scatter, modern fire ring  | Unknown                         | Low   |
| Iron Canyon Reservoir <sup>c</sup> | CA-SHA-665<br>(FS 05-14-58-54)  | P                        | Native American site; lithic scatter, possible modern rock circle feature   | Unknown                         | Moderate  |
| Iron Canyon Reservoir <sup>c</sup> | CA-SHA-666<br>(FS 05-14-58-55)  | P                        | Native American site; lithic scatter  | Unknown                         | Low   |

| <b>Project Location</b>            | <b>Resource Number</b>                     | <b>Type <sup>a</sup></b> | <b>Description</b>   | <b>National Register Status</b> | <b>National Register Integrity <sub>b</sub></b> |
|------------------------------------|--|--------------------------|--|---------------------------------|---|
| Iron Canyon Reservoir <sup>c</sup> | CA-SHA-667/H<br>(FS 05-14-58-56;<br>ALB-1) | P/H                      | Native American site (archaeological and historic); obsidian scatter mixed with historic ceramic, bottle fragments, and metal piping; apple tree and walnut tree present on site | Unknown                         | Low   |
| Iron Canyon Reservoir <sup>c</sup> | CA-SHA-668<br>(FS 05-14-58-57;<br>ALB-2)   | P                        | Native American site; lithic scatter   | Unknown                         | Low   |
| McCloud River <sup>d</sup>         | CA-SHA-686/H<br>(FS 05-14-61-08)           | P                        | Large Native American site; extensive lithic scatter, midden   | Eligible                        | Low - Moderate                                  |
| McCloud River <sup>d</sup>         | CA-SHA-687<br>(FS 05-14-61-32)             | P                        | Large Native American site; lithic scatter, midden   | Eligible                        | Low   |
| McCloud River <sup>d</sup>         | CA-SHA-688<br>(FS 05-14-61-33)             | P                        | Native American site; rock shelter, obsidian lithic debitage   | Recommended                     | High  |
| Iron Canyon Reservoir <sup>c</sup> | CA-SHA-1623<br>(FS 05-14-58-228)           | P                        | Native American site; lithic scatter   | Unknown                         | High  |
| McCloud River <sup>d</sup>         | CA-SHA-1657<br>(FS 05-14-61-301)           | P                        | Native American site; lithic scatter, basalt chopper, midden   | Unknown                         | Moderate  |

| <b>Project Location</b>            | <b>Resource Number</b>           | <b>Type <sup>a</sup></b> | <b>Description</b>  | <b>National Register Status</b> | <b>National Register Integrity <sub>b</sub></b> |
|------------------------------------|----------------------------------|--------------------------|---|---------------------------------|---|
| McCloud River <sup>d</sup>         | CA-SHA-1658<br>(FS 05-14-61-302) | P                        | Native American site; possible house pit features, obsidian lithic debitage | Recommended                     | High  |
| McCloud River <sup>d</sup>         | CA-SHA-1659<br>(FS 05-14-61-303) | P                        | Native American site; lithic scatter  | Unknown                         | Low   |
| Iron Canyon Reservoir <sup>c</sup> | CA-SHA-2109<br>(FS 05-14-58-365) | P                        | Native American site; lithic scatter, ground stone fragment                 | Unknown                         | Low   |

\* Previously recorded but no State Trinomial Number assigned

<sup>a</sup> P = prehistoric, H = historic

<sup>b</sup> Low = extensive impacts to resource, Moderate = limited impacts to resource, High = almost no impacts to resource

<sup>c</sup> Within FERC project boundary

<sup>d</sup> Outside of FERC project boundary, in McCloud River Expanded APE

### *Historic Buildings and Structures*

Only three historic structures were identified within the APE, all three of which are located in the McCloud River expanded APE on McCloud River Club lands (table 3-37). These resources include two footbridges (P-45-003189, P-45-003197) and the McCloud River Club Resort (P-45-003199). Survey access to lands owned by the McCloud River Club located within the APE was not granted, nor is National Register-eligibility for these resources known; therefore, PG&E proposes to treat these resources as eligible until such time that any previous evaluation of these resources is identified, or until these resources are evaluated for listing on the National Register.

### *Traditional Cultural and Religious Sites Inventory and Impact Study*

Two Native American communities, the Pit River Tribe and the Winnemem Wintu Tribe, have formally requested to participate in the relicensing project. The Pit River Tribe is a federally recognized tribe. The Winnemem Wintu Tribe has petitioned for federal recognition. Other Native American communities in the vicinity either have not requested to participate in the project, or have only asked to be kept apprised of project progress. The Pit River Tribe expressed interest in the Iron Canyon and Pit River areas of the APE. The Winnemem Wintu Tribe expressed interest in the McCloud reservoir and McCloud River areas of the APE.

The Pit River and Winnemem Wintu tribes have requested separate TCP investigations, as is outlined in Study Description CR-S2, *Traditional Cultural Properties*, (PG&E, 2009e), from which two separate reports addressing the study results for each tribe will be produced. In addition, both tribes requested formal agreements outlining the conduct of the TCP studies. PG&E entered into an MOU with each tribe, recognizing the sensitivity of the resources under study, and the historical and cultural events that have affected the tribes. The MOUs also recognize the importance of identifying TCPs within the APE and incorporating the management of these resources into the overall management plan for the proposed project. Full details of Study Description CR-S2 and the MOUs for each tribe are available in the HPMP (PG&E, 2009e). So far only the Pit River Tribe TCP study has been completed (PG&E 2009f). At this time, there continues to be an impasse between PG&E and the Winnemem Wintu on completion of the draft TCP report due to what particular contractors have access to review and comment on the draft TCP report.<sup>26</sup>

The Pit River TCP study resulted in the identification of a total of 158 resources, of which 22 were considered sacred sites, 16 resource procurement locations, 14

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<sup>26</sup> See letter from Mark Franco, Winnemem Wintu Tribe, dated July 5, 2009; letter from Steve Nevares, PG&E, dated July 30, 2009; letter from Steve Nevares, PG&E, dated April 23, 2010, and letter from Stephen Volker, Attorney for Winnemem Wintu Tribe, dated May 25, 2010.

habitation sites, two battle sites, 11 multiple use locations, and 78 place names (PG&E 2009f). Of these 158 resource sites, 31 are located within the project's APE, consisting of 15 place names, 4 habitation sites, 7 resource procurement locations, 2 trails, and 3 sacred sites. Of these 31 resources, four are considered as eligible for listing in the National Register as TCPs, while 9 are considered as potentially eligible TCPs (currently undetermined), while the remaining 18 are considered ineligible for listing in the National Register as TCPs.

### **3.3.6.2 Environmental Effects**

#### *Project-Related Effects on Cultural Resources*

Project-related effects to cultural resources within the project's APE are likely to occur from project O&M, use and maintenance of project roads (including associated drainage ditches), recreation, vandalism, and modifications or repairs to project facilities. Project-related adverse effects to cultural resources considered eligible for the National Register (i.e. historic properties) would require PG&E to resolve such effects, in consultation with the California SHPO, and with other parties depending on the nature and location of the affected historic property.

#### Project Operations

The project operates both as a peaking system and a load-following system, using the available water supply after satisfying minimum instream flow requirements that results in regular fluctuation in reservoir levels. Regular fluctuation in reservoir levels created by project operations can result in the erosion of archaeological sites by either deflating or washing away cultural deposits. Thus, project-related erosion along the shorelines of the McCloud, Iron Canyon, Pit 6, and Pit 7 reservoirs may affect archaeological sites situated on the shoreline or presently inundated by the reservoirs. Archaeological sites situated along the shoreline in the reaches below the reservoirs can also be affected by erosion in a similar manner.

#### Road Maintenance and Use

The maintenance of project roads may affect archaeological sites located adjacent to them or buried beneath them. Ditches excavated for roadway drainage may also affect archaeological sites. Depending on the condition of native soil roads, season, and vehicle type, vehicular traffic may damage archaeological sites, as well. Increased public accessibility to archaeological sites by roads may also increase the vulnerability of those resources.

#### Recreation

The project vicinity is a popular area for recreational activities including hiking, fishing, camping, picnicking, swimming, boating, hunting, and OHV use. There are four developed recreational areas within the project APE, the use of which has the potential to affect archaeological sites. These recreational areas include the following:

- McCloud reservoir boat ramp, also called the Tarantula Gulch boat launch, at McCloud reservoir;
- Deadlun campground;
- Hawkins Landing campground and Boat ramp at Iron Canyon reservoir; and
- Fenders Flat unimproved boat ramp at Pit 7 afterbay dam.

The Ash Camp campground and the Ah-Di-Na campground are located outside of the project boundary, but are partially located within the McCloud River expanded APE. Both campgrounds are Forest Service recreation developments that predate the project, and are connected by the Pacific Crest National Scenic Trail as it parallels the McCloud River. Dispersed recreational use also occurs in this area. Other areas where dispersed recreational use occurs are located within the project's APE. User-created roads leading from improved roads to the shoreline can be found in many areas.

### Vandalism

Collection of artifacts or the intentional disturbance of cultural materials by unauthorized persons (from people accessing roads and recreational sites within the FERC project boundary) can adversely affect archaeological sites and associated TCPs. Archaeological sites that contain human remains and burials are particularly susceptible to vandalism and looting.

### Vegetation Management

Project-related vegetation management around project-related hydroelectric features may include spraying, burning, and mechanical removal. All of these activities have the potential to adversely affect or destroy areas currently utilized by the Pit River Tribe and Winnemem Wintu Tribe to gather culturally significant plant species.

### Proposed Project

PG&E proposes to construct a new powerhouse at the base of McCloud dam and a powerhouse at Pit 7 afterbay dam, along with associated transmission facilities. In addition, PG&E proposes the creation of new recreational facilities at McCloud dam, Battle Creek, East and West McCloud dams, Red Banks, Star City, Tarantula Gulch, at the intersection of Tarantula Gulch access road and FR 11, a floating dock on McCloud reservoir with an associated trail, Iron Canyon, Deadlun, Campground, Hawkins Landing Campground, three areas along FR 37N38, Iron Canyon dam, Montgomery Creek, the upper end of Pit & reservoir, Fenders Flat, and Pit 7 powerhouse.

Future project-related effects to cultural resources within the project's APE that are likely to occur under these proposed project facilities would be nearly identical to those generated under the existing project in regard to project O&M, use and maintenance of project roads (including associated drainage ditches), recreation, vandalism, and repairs to project facilities. The addition of new recreational facilities would increase and exacerbate potential effects related to inadvertent destruction of

archaeological sites, unauthorized collection of artifacts, and vandalism. Finally, ground-disturbing activities involving the construction phases associated with the new proposed facilities would have the potential to directly or indirectly affect archaeological sites and TCPs.

### *Archaeological Resources*

PG&E identified project-related effects for 14 out of the 55 archaeological sites located and evaluated during field survey. During archival research, 14 additional resources were identified on McCloud River Club lands; however, these sites were not relocated during field survey due to lack of access, and were consequently not evaluated for project-related effects. Project effects for these resources are unknown, and therefore PG&E has not proposed management for these resources.

Site-specific project-related effects for the identified 14 archaeological sites are listed in table 3-40. Eight of these sites are being affected by a combination of erosion, dispersed recreational use, and vandalism; and a ninth site is being affected by these three effects in addition to road maintenance use. Another site is being affected by erosion alone. Another site is being affected by dispersed recreational use and vandalism. The three remaining sites could potentially be affected by vegetation management or new construction activities.

PG&E-proposed management for archaeological sites that may be affected by erosion, road maintenance and use, dispersed recreational use, or vandalism includes blocking vehicular access to these sites, posting restrictive signage, closing of user-created roads, and conducting annual monitoring of erosion. In addition, PG&E proposes notifying transmission managers and educating employees about sites that may be affected by vegetation management or new transmission line construction. PG&E currently implements an employee environmental and sensitivity training program and proposes to continue this program. PG&E also proposes public education of the cultural significance of the area, as well as use restriction for the protection of resources, through interpretive signage, brochures, or other similarly appropriate media. Appropriate representatives from the Pit River Tribe, the Winnemem Wintu Tribe, and the Forest Service will be asked to participate in the creation of interpretive materials.

### *Historic Buildings and Structures*

PG&E has identified only three historic structures within the APE, all of which are located on McCloud River Club lands. As access to these lands was not available for field survey, National Register-eligibility, as well as project-related effects on these resources, is unknown; therefore, no management procedures for these resources are proposed by PG&E. The existing project facilities were constructed in 1965, and PG&E has proposed that when the project facilities reach 50 years of age (in 2015) they will be evaluated for National Register eligibility.

### *Traditional Cultural Properties*

Upon completion of the Winnemem Wintu TCP report, and in combination with existing the Pit River TCP report (completed in September 2009), PG&E proposes that it would add an amendment to its HPMP that would address what management measures it would incorporate to protect identified TCPs.

Populations of culturally significant plants were also identified in Study Description BR-S2, *Special-Status and Special-Interest Plant, Lichen, and Fungi Species* (PG&E, 2009d). The Pit River TCP report also contains names and location information of significant plant types important to the Pit River Tribe. PG&E proposes to add an amendment to the HPMP to manage and protect these ethnobotanical resources.

### *Our Analysis*

#### *Archaeological Resources and National Register-eligibility*

Archaeological sites along the shorelines of the project reservoirs (as well those presently inundated) are subject to project-related effects due to erosion from fluctuation in the water level, as well as accidental disturbance from recreational use and vandalism. Project-related road maintenance and use, vegetation management, and recreation all have the potential to affect these sites through direct or indirect effects. Of the archaeological sites identified by PG&E as being subject to project-related effects, one is pending consultation concerning National Register-eligibility, while the eligibility of the remaining 13 is listed as undetermined. In additional information requests, dated May 26, 2009, and August 14, 2009, the Commission expressed the need for National Register determinations to be presented in the HPMP. These National Register-eligibility determinations remain outstanding, but are necessary for compliance with section 106. Requiring PG&E to make these determinations for the 14 archaeological sites that are being affected by the project, in consultation with the California SHPO, would ensure that these 14 archaeological sites are protected.

#### *Historic Buildings and Structures*

No project facilities are over 50 years of age; therefore, PG&E did not evaluate them for National Register-eligibility. Instead, PG&E proposes to evaluate the existing project facilities when they reach 50 years of age. Waiting until existing project facilities reach 50 years of age would allow for appropriate evaluation of the structures under the NHPA and any project effects could then be determined based on the facilities eligibility for the National Register.

Project-related effects on the historic structures located on McCloud River Club lands cannot be determined until access is granted by the landowner. Until such a time, nothing can be done to evaluate or protect these sites.

### *Traditional Cultural Properties*

At this time, only the TCP report for the Pit River Tribe has been completed. Upon review of the TCP report, we conclude that there is enough information to

determine that four resources (three sacred areas and one resource procurement gathering site) within the project's APE can be considered as National Register-eligible TCPs, and that nine other resources (namely resource procurement gathering fishing sites and several other habitation areas and a trail) are potentially eligible TCPs. Other important gathering areas involving culturally important plants to the Native Americans have also been identified by the Pit River Tribe and they should be recognized as significant locations and protected by PG&E.<sup>27</sup> PG&E proposes to include measures for the protection of culturally-sensitive plants in the Vegetation Management Plan, which is discussed in greater detail in section 3.3.3, *Terrestrial Resources*.

Providing an amendment to the HPMP, as proposed by PG&E, on the types of management measures to incorporate for the protection of TCPs, both those important to the Pit River Tribe and Winnemem Wintu Tribe, would allow any TCP sites to be protected once they have been identified.

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<sup>27</sup> Although many significant plant collecting areas may not qualify as National Register-eligible TCPs, they still need to be protected by other statutes such as NEPA and several executive orders protecting sacred Native American areas. Along with section 106, the Commission needs to insure that PG&E takes steps to protect such resources under a new license.

Table 3-40. Site-specific potential effects for archaeological and historic-era resources. (Source: PG&E, 2010b)

| Resource Number                           | Location              | Potential Effects <sup>a</sup> |   |   |   |   |   | PG&E Proposed Management  |
|---|-----------------------|--------------------------------|---|---|---|---|---|---|
|   |                       | 1                              | 2 | 3 | 4 | 5 | 6 |   |
| ALB-5<br>CA-SHA-4548                      | McCloud Reservoir     | X                              |   | X | X |   |   | Site will be evaluated for National Register eligibility within 1 year, and treatment measures will be developed and implemented within 2 years |
| ALB-3<br>(FS 05-14-58-424)                | Iron Canyon Reservoir | X                              | X | X | X |   |   | Site will be evaluated for National Register eligibility within 1 year, and treatment measures will be developed and implemented within 2 years |
| ABL-4<br>CA-SHA-4547<br>(FS 05-14-58-425) | Iron Canyon Reservoir | X                              |   | X | X |   |   | Site will be evaluated for National Register eligibility within 1 year, and treatment measures will be developed and implemented within 2 years |
| CA-SHA-498<br>(FS 05-14-58-42)            | Iron Canyon Reservoir | X                              |   | X | X |   |   | Site will be evaluated for National Register eligibility within 1 year, and treatment measures will be developed and implemented within 2 years |
| CA-SHA-664<br>(FS 05-14-58-53)            | Iron Canyon Reservoir | X                              |   | X | X |   |   | Site will be evaluated for National Register eligibility within 1 year, and treatment measures will be developed and implemented within 2 years |
| CA-SHA-665<br>(FS 05-14-58-54)            | Iron Canyon Reservoir |                                |   | X | X |   |   | Block vehicular access (with Shasta-Trinity National Forest approval); post restrictive signage   |

| Resource Number                            | Location                | Potential Effects <sup>a</sup> |   |   |   |   |   | PG&E Proposed Management  |
|--|-------------------------|--------------------------------|---|---|---|---|---|---|
|  |                         | 1                              | 2 | 3 | 4 | 5 | 6 |   |
| CA-SHA-666<br>(FS 05-14-58-55)             | Iron Canyon Reservoir   | X                              |   | X | X |   |   | Site will be evaluated for National Register eligibility within 1 year, and treatment measures will be developed and implemented within 2 years                 |
| CA-SHA-667/H<br>(ALB-1;<br>FS 05-14-58-56) | Iron Canyon Reservoir   | X                              |   | X | X |   |   | Site will be evaluated for National Register eligibility within 1 year, and treatment measures will be developed and implemented within 2 years                 |
| CA-SHA-668<br>(ALB-2;<br>FA 05-14-58-57)   | Iron Canyon Reservoir   | X                              |   | X | X |   |   | Site will be evaluated for National Register eligibility within 1 year, and treatment measures will be developed and implemented within 2 years                 |
| CA-SHA-1623<br>(FS 05-14-58-228)           | Iron Canyon Reservoir   |                                |   | X | X |   |   | Post restrictive signage (with Shasta-Trinity National Forest approval)   |
| CA-SHA-2109<br>(FS 05-14-58-365)           | Iron Canyon Reservoir   | X                              |   | X | X |   |   | Site will be evaluated for National Register eligibility within 1 year, and treatment measures will be developed and implemented within 2 years                 |
| CA-SHA-252                                 | Pit River               | X                              |   |   |   |   |   | Site will be evaluated for National Register eligibility within 1 year, and treatment measures will be developed and implemented within the same period of time |
| ALB-6H<br>CA-SHA-2193H                     | Pit 6 Transmission Line |                                |   |   |   | X | X | Site will be evaluated for National Register eligibility within 1 year, and treatment measures will be developed and implemented within 2 years                 |

| Resource Number        | Location                   | Potential Effects <sup>a</sup> |   |   |   |   |   | PG&E Proposed Management  |
|------------------------|----------------------------|--------------------------------|---|---|---|---|---|---|
|                        |                            | 1                              | 2 | 3 | 4 | 5 | 6 |   |
| ALB-7<br>(CA-SHA-4549) | Pit 7 Transmission<br>Line |                                |   |   |   | X | X | Site will be evaluated for National Register eligibility within 1 year, and treatment measures will be developed and implemented within 2 years |

<sup>a</sup>

|                                 |                          |
|---------------------------------|--------------------------|
| 1. Project Operations (Erosion) | 4. Vandalism             |
| 2. Road Maintenance and Use     | 5. Vegetation Management |
| 3. Dispersed Recreational Use   | 6. New Construction      |

### *Cultural Resource Management*

PG&E prepared and filed a draft HPMP (dated July 2009) with its license application. Preparation of the HPMP was undertaken by PG&E in anticipation of a PA to be executed between the Commission and the California SHPO, and with other concurring parties, for the management of historic properties that may be affected by a new license for the project. The HPMP is designed to avoid, reduce, or mitigate (i.e., resolve) existing or potential project-related adverse effects to historic properties within the project's APE for the term of a new license.

Although the HPMP does not include site-specific measures for TCPs, some or all of the following procedures for archaeological and historic era sites may also be applicable to the management of TCPs. Currently included in the HPMP are procedures for:

- Continued adherence to federal and state laws and regulations, as well regular communication with other agencies, the Pit River Tribe, and the Winnemem Wintu Tribe regarding the management of historic properties associated with project APEs;
- General treatment measures for O&M (including road maintenance), and the management of ethnobotanical resources;
- Avoidance, monitoring, stabilization, data recovery, curation, and other treatment measures pertaining to historic properties as well as accidental discovery of archaeological sites or human remains;
- The use of qualified Tribal Cultural Monitors during archaeological surveys, site testing, and data recovery, non-emergency construction and maintenance activities requiring ground disturbance that would create a reasonable effect to historic properties, and during long-term historic properties monitoring;
- Site-specific treatment of known archaeological and historic-era properties;
- Signage, including interpretive and display signs, as well as regulatory and warning signs;
- Closure of user-created roads to minimize or prevent artifact collection;
- Public interpretation and education of cultural resource values;
- Continuation of the cultural resource employee education program; and
- Implementation of cost-effective protection measures for historic properties in consideration of project needs, public interests, and other resource areas.
- Other protocols and procedures are also provided in the HPMP involving educating the public and PG&E staff on protecting cultural resources, inadvertent discoveries, emergency situations, curation of recovered cultural materials, activities that do not require California SHPO involvement, future

project studies, and project patrolling, monitoring of cultural resources, and general consultation.

In its original condition 34, the Forest Service specified that within 1 year of license issuance, PG&E file with the Commission an HPMP that is approved by the Forest Service. According to the Forest Service's original condition 34, the HPMP should include:

Complete integration of CR-S1 and CR-S2 study results (including the currently incomplete CR-S2 TCP study for the Winnemem Wintu Tribe), detailed site monitoring and schedule, National Register determinations of eligibility for sites periodically inundated by reservoir fluctuations in Iron Canyon reservoir, expected and potential effects of current or proposed project operation effects on historic properties including specific detailed mitigation for those effects, and a study/evaluation of whether there is compelling evidence for a historic archaeological and ethnographic district on the Lower McCloud River within the project's expanded APE.

In response to Forest Service condition 34, PG&E alternative condition 34 proposed that PG&E would file a final HPMP within 1 year of license issuance and that the HPMP would include (*italics represent PG&E's added modifications to the Forest Service's original condition 34*):

Complete integration of the CR-S1 and CR-S2 study results (*if the CR-S2 TCP study is not complete when the HPMP is finalized, the HPMP will be revised or amended if necessary to reflect the results of the CR-S2 when it is completed*) and detailed site monitoring and schedule. *The HPMP shall call for National Register determinations of eligibility for sites periodically inundated by reservoir fluctuations in Iron Canyon reservoir where erosion and/or siltation have been found to potentially affect sites, and where consultation with the Commission, California SHPO, Forest Service, and tribes have determined that evaluation (which may include test excavations) is appropriate. The HPMP shall also contain a discussion of the expected and potential effects of current or proposed project operations on historic properties, including specific detailed mitigation measures for effects that have been determined by the California SHPO to be adverse. If adverse effects to sites will not be known until after the HPMP has been approved by the Commission, the HPMP shall instead contain a process for determining appropriate mitigation in the future in consultation with the SHPO, Commission, Forest Service, and Tribes. Additionally the final HPMP shall discuss whether there is compelling evidence for a historic archaeological and ethnographic district on the Lower McCloud River within the project expanded APE.*

The Forest Service's original condition 34 and PG&E alternative condition 34 are very similar in regards to actions to be taken to protect cultural resources in the event of ground-disturbing activities, or prior to such activities, or as a result of project operations:

Upon discovery of cultural resources on Forest Service lands that PG&E shall immediately cease work in the affected area and shall then notify the Forest Service and shall not resume work on ground disturbing activities until it receives written approval from the Forest Service. If deemed necessary the Forest Service may require PG&E to perform recovery excavations and preservation of the discovered cultural resource—if it is an archaeological site--and associated artifacts at PG&E's expense through provisions of an Archaeological Resources Protection Act permit issued by the Forest Service. PG&E shall implement the Plan upon approval by the Commission.

The one distinction between the Forest Service's and PG&E's discovery clause is that the Forest Service specified that PG&E account for any paleontological resources that may be discovered on Forest Service lands. PG&E alternative condition 34 disputed this by proposing that paleontological resources are not cultural and are not subject to section 106 compliance and, as a result, should not be addressed in the HPMP.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 34.<sup>28</sup> The provisions specified in Forest Service modified condition 34 are similar to those specified in the Forest Service's original condition 34, except that the Forest Service requests further revision of the HPMP. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition 34 and withdraws its alternative condition 34.

#### *Our Analysis*

The Commission directed PG&E to revise and finalize its HPMP, which PG&E filed on October 26, 2010. Overall, the final HPMP filed by PG&E contains a number of measures to manage and protect historic properties in a timely manner. The avoidance strategies, public and employee training proposals, signage plans, transportation plans, monitoring, and consultation proposals are all measures that would ensure cultural resources and historic properties within the project's APE are protected and maintained throughout the term of any license issued for the project.

Under our direction, PG&E's final HPMP proposes to complete National Register eligibility determinations on cultural resources that are determined to be adversely affected by the project within 1 year of license issuance, and to develop and implement treatment measures for National Register-eligible cultural resources being adversely affected by the project within 2 years of license issuance. PG&E's final HPMP also provides measures for handling newly discovered paleontological resources on Forest

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<sup>28</sup> On January 28, 2011, the Forest Service filed a revised version of modified condition 34, noting that the modified conditions filed on November 29, 2010, inadvertently contained an earlier version of condition 34. The revised modified condition 34 contains minor changes in the numbered paragraphs 4 and 5, and these revisions are included in appendix E.

Service lands, and reporting such discoveries to the Forest Service. As PG&E recognizes in its final HPMP, there may be other aspects or investigations identified by the Forest Service that may need to be addressed, and a provision for adopting these additional measures has also been provided by PG&E in its final HPMP. As stated above, amendments to the final HPMP are expected to be made when the final results of the associated TCP studies have been made, and other cultural resource-related investigations warranted by the Forest Service (or with any of the other involved parties) can also be made as amendments to the HPMP. Thus, amendments to the final HPMP can appropriately address additional items that may need to be examined as expressed in the Forest Service's modified condition 34.

Prior to license issuance, the Commission would execute a final PA with the California SHPO. The PA would require PG&E to implement the HPMP upon license issuance. The final PA would also allow for the final HPMP to be amended and provides a dispute resolution process. Execution of the PA and implementation of the HPMP would ensure that adverse effects of the project on cultural resources would be appropriately resolved. We analyze the costs of measures proposed or recommended for cultural resources in section 4.0, *Developmental Analysis*, and make our final recommendations in section 5.0, *Staff's Conclusions*.

### **3.3.7 Land Use and Aesthetic Resources**

#### **3.3.7.1 Affected Environment**

##### **Land Use Resources**

The existing project features are entirely located in Shasta County near the communities of McCloud, Hillcrest, Big Bend, and Montgomery Creek. The proposed McCloud transmission line route is partially located within Siskiyou County. The existing project boundary, which includes portions of the McCloud River and Pit River watersheds, encompasses 3,707.6 acres of land. Of the lands within the project boundary, 1,239.4 acres are owned by PG&E, 1,651.4 acres are federally owned lands administered by the Forest Service, and the remaining 816.8 acres are privately owned (PG&E, 2009a).

The project boundary around McCloud reservoir is described by a metes and bounds survey that generally follows a contour line about 200 feet above the high water line of the reservoir. The project boundary also encompasses: (1) McCloud dam, spillway and outlet; (2) the project road to the base of the dam; (3) the project road between McCloud dam and Star City Creek; (4) the existing Tarantula Gulch day-use area and boat launch; and (5) all proposed recreation developments at McCloud reservoir. A 100-foot-wide corridor for McCloud tunnel extends southeast for about 7.2 miles between McCloud and Iron Canyon reservoirs. Where the tunnel crosses Hawkins Creek, there is also a 100-foot-wide corridor for the project access road that is about 0.25 mile long (PG&E, 2009b).

The project boundary around Iron Canyon reservoir also is described by a metes and bounds survey and generally follows a contour line about 100 to 200 feet above the high water line of the reservoir, and in some places extends beyond this distance to include the existing recreation facilities. The project boundary also encompasses: (1) Iron Canyon dam, spillway, and outlet; (2) stream gage MC-10 (including the project access road); (3) the existing Hawkins Landing day-use area and boat launch (including a 40-foot-wide corridor for the access road); (4) the existing Deadlun Campground; and (5) areas where recreation developments at Iron Canyon reservoir are proposed. A 100-foot-wide corridor for Iron Canyon tunnel extends from near the dam to about 2.9 miles south where the tunnel joins James B. Black penstock. There is a 300-foot-wide corridor along the 1,194-foot-long James B. Black penstock that enters James B. Black powerhouse. At James B. Black powerhouse, the project boundary encompasses the: (1) powerhouse; (2) switchyard; (3) 0.5-mile-long Black Tap transmission line from James B. Black powerhouse to Pit 5 switchyard; and (4) beginning of the 40-foot-wide corridor for the 12-kV distribution line that extends to Iron Canyon reservoir. Oak Mountain Road (FR 37N34), a project road between Pit 5 bridge and FR 38N11, has a 100-foot-wide corridor with a few 66-foot-wide segments (PG&E, 2009b).

Downstream of James B. Black powerhouse, the project boundary encompasses Pit 6 reservoir. The boundary is described by a metes and bounds survey that generally follows a contour 100 to 200 feet above the high water line of the reservoir. At the

downstream end of the reservoir, the project boundary widens to include the Pit 6 dam, powerhouse, and switchyard. The 100-foot-wide corridor for the Pit 6 transmission line begins at Pit 6 switchyard and extends about 3.3 miles to the east where it terminates at a non-project transmission line. Pit 6 Road, a project road, has a 100-foot-wide corridor and extends from the powerhouse to Big Bend Road. Downstream of Pit 6 dam, the project boundary encompasses Pit 7 reservoir, Pit 7 dam, Pit 7 powerhouse, Pit 7 afterbay dam, and Pit 7 afterbay. The boundary is described by a metes and bound survey that generally follows a contour 100 to 200 feet above the high water line of the impoundments. At its most downstream point, the project boundary crosses the Pit River just upstream of Fenders Ferry Bridge and widens to include the recreation area at Fenders Flat. The 100-foot-wide corridor for the Pit 7 transmission line begins at Pit 7 switchyard and extends about 3.5 miles to the east where it terminates at a non-project transmission line. Pit 7 Road, a project road, has a 100-foot-wide corridor and extends from Pit 7 powerhouse to Fenders Ferry Road (PG&E, 2009b).

The proposed McCloud powerhouse would be constructed within the existing project boundary at McCloud dam. Beginning at the proposed powerhouse at the base of the dam, PG&E proposes to construct the McCloud transmission line within a 25-foot-wide corridor that follows the right-of-way of FR 38N11 north to State Highway 89 where it travels east then north, ending at the Pacific Power and Light switchyard in the town of McCloud. The transmission line corridor is about 14 miles long. The proposed Pit 7 afterbay powerhouse would be constructed within the existing project boundary at Pit 7 afterbay dam. A new project road would be constructed just west of Fenders Ferry Bridge within a proposed 40-foot-wide corridor. Beginning at the dam, PG&E proposes to construct Pit 7 afterbay transmission line within a 40-foot-wide corridor that crosses the Pit River near Fenders Flat recreation site and then generally follows Pit 7 Road to Pit 7 switchyard. The proposed project boundary includes the area necessary for proposed recreation development associated with the generation addition (PG&E, 2009b).

No large-scale industrial or commercial developments are located in the project vicinity. PG&E's land use in the project area primarily consists of structures and activities associated with its hydroelectric facilities. The Commission's standard land use article (license article 56) regulates land use activities within the project boundary. Land management planning documents that pertain to land use activities in the area surrounding the project include the Shasta County general plan (County of Shasta, 2005, as cited in PG&E, 2009a); the Shasta-Trinity National Forest Land and Resource Management Plan, as amended (Shasta-Trinity National Forest, 1995 as cited in PG&E, 2009a); and the McCloud River Coordinated Resource Management Plan (Bollibokka Land Company et al., 2001 as cited in PG&E, 2009a). For the proposed McCloud transmission line, land use activities would be reviewed for consistency with the Siskiyou County general plan (County of Siskiyou, 1993, 1980 as cited in PG&E, 2009a). In addition, Shasta County boating ordinances prohibit: (1) boating within 500 feet of project dams, (2) operating a motorboat at a speed in excess of 5 miles per hour upstream

from the road bridge at the north end of the McCloud River arm of McCloud reservoir, and (3) swimming within 200 feet of any boat launching ramp or dock open to the public. Summaries of each of these plans are provided below.

### **Shasta County General Plan and Zoning Ordinance**

Shasta County regulates private land uses in accordance with the Shasta County general plan (adopted in 1984) and the Shasta County Zoning Ordinance (title 17 of the Shasta County Code, as amended through July 2003). The Shasta County general plan is a tool to guide long-term development planning decisions for public and privately owned lands in Shasta County. The plan is delineated into three core subject areas: public safety, resources, and community development. A majority of the privately owned lands in the project vicinity are designated “Timberland.” A few small parcels designated as “Natural Resource-Open Space” are scattered around the project area with private lands adjacent to Iron Canyon reservoir being the most notable. Regarding the timberland designation, the Shasta County general plan notes the following:

While the Shasta County general plan provides the overall development goals for the County, title 17 of the Shasta County Code defines the various zoning districts within the County, as well as identifying the primary and permitted uses within each zoning district. The County has not yet adopted a zoning map for the areas in the project vicinity. They are considered “Unclassified” and are part of the Special Zone District.

### **Shasta Trinity National Forest Land and Resource Management Plan**

The project area lies within the Shasta-McCloud Management Unit of the Shasta-Trinity National Forest. Land use policies and standards for this national forest are guided by Shasta-Trinity National Forest’s Land and Resource Management Plan (Shasta-Trinity National Forest, 1995 as cited in PG&E, 2009a). The Land and Resource Management Plan contains details regarding Late Successional Reserves (LSRs) that are based on the “Record of Decision on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl” (ROD). The LSRs are intended to provide old-growth forest habitat for populations of species that depend on late successional forests and conserve late-successional species diversity. NFS lands near Iron Canyon reservoir are designated as LSR. NFS lands near the Pit River are designated as “Limited Roaded Motorized Recreation.” A small area adjacent to the northwestern portion of the upper Pit 6 reservoir is designated as “Threatened Species – Eagles” (PG&E, 2009a).

### **The McCloud River Coordinated Resource Management Plan**

On July 23, 1991, the Shasta-Trinity National Forest, Bollibokka Land Company, Crane Mills, McCloud Fly Fishing Club, Sierra Pacific Industries, California Fish and Game, The Hearst Corporation, The Nature Conservancy, California Trout, and PG&E adopted the McCloud River Coordinated Resource Management Plan (Bollibokka Land Company et al., 2001 as cited in PG&E, 2009a). The McCloud River Coordinated Resource Management Plan is intended to provide the same level of protection of the

McCloud River's fisheries, geology, scenery, cultural and historic values as designation under the Wild and Scenic Rivers Act. Like the Wild and Scenic Rivers Act, the Coordinated Resource Management Plan aims to safeguard the river's unique resources, while also recognizing the potential for appropriate use and development. The plan outlines specific ecological, economic, social, and cultural considerations that must be factored into land use and development decisions through coordinated planning efforts. With respect to project operations, the plan states:

The operation of McCloud reservoir dam has direct influence on the McCloud River Basin. Any changes in the operation of the dam will be a subject for study by the Coordinated Resource Management Plan coordinating group.

Should the Coordinated Resource Management Plan fail to protect the river's resources, the Forest Service may seek formal designation of the river as a wild and scenic river.

Current land use activities are consistent with the existing plans and ordinances for the project area. Issues identified by neighboring landowners were related to recreation use effects on private lands, including public trespassing, privacy, and risks associated with wildland fire, and natural resource protection (PG&E, 2009a).

### **Public Safety and Law Enforcement**

The Shasta County Sheriff and the Forest Service are responsible for public safety and law enforcement on lands in the project area. All existing project lands are within the jurisdiction of the Shasta County Sheriff. Forest Service law enforcement personnel from the Shasta-McCloud and National Recreation Area units of the Shasta-Trinity National Forest are responsible for enforcing regulations related to the management of Forest Service lands and resources. Forest Service personnel do not have jurisdiction on the water surface of the project reservoirs.

### **Project Roads**

Within the project vicinity, 21 road segments, about 54 miles, are used by PG&E or recreationists to access project facilities or project recreation opportunities. Based on the results of traffic count records, 14 of the 21 road segments are either project roads (defined by the Commission as roads used primarily for project purposes) or roads used to access project recreation areas (table 3-41). The majority of these segments are gravel- or dirt-surfaced roads. The other six roads are paved with asphalt, concrete, or bituminous surfaces, or they contain portions of both paved and unpaved segments. A road condition inventory performed on these sections indicates that most of the roads are maintained to the maintenance level definition for vehicular travel (PG&E, 2009a).<sup>29</sup>

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<sup>29</sup> In a study plan determination letter dated October 3, 2008, the Commission determined, based on information contained in Technical Memo 22, submitted as part of the license application, that FR 38N11 (Hawkins Creek Road segments 1 and 2) does not meet the Commission's criteria for project roads used primarily for project purposes.

In general, PG&E maintains project-related roads in accordance with easements and use agreements between PG&E, Forest Service, or the private land owner. Road surfaces were qualitatively characterized using good, fair, and poor ratings to describe the overall condition for vehicular travel. These condition assessments also considered the Forest Service management objective for the particular segment. Of the 14 segments in table 3-41, eight were in fair condition, three were in poor condition, one was in fair/poor condition, and two were characterized as having multiple conditions depending on the segment. None of the roads were impassable for normal passenger vehicles; however, fewer of these types of vehicles were observed except on the paved roads surrounding McCloud reservoir and Iron Canyon reservoir. Road segments designated as being in poor condition exhibited generally passable conditions; however, localized damage to the road, such as a series of potholes or washboard conditions, warranted the poor rating. Vehicles can access project reservoirs or features for most of the year, but road closures due to snow periodically preclude access during the winter months. However, PG&E maintains Oak Mountain Road so that it is free of snow to access project facilities at Iron Canyon dam (PG&E, 2009a).

Table 3-41. Project roads.

| <b>Road Number</b> | <b>Name</b>              | <b>Start</b> | <b>End</b>                | <b>Length (mi)</b> | <b>Maintenance Responsibility</b> | <b>Surface Type</b>               | <b>Comments</b>  |
|--------------------|--------------------------|--------------|---------------------------|--------------------|-----------------------------------|-----------------------------------|--|
| 38N81              | Brown Trout              | 38N11        | Boat Ramp                 | 0.3                | Shared                            | Asphalt<br>Concrete               | Tarantula Gulch-road access to boat ramp recreation site   |
| 38N04Y             | Star City                | 38N11        | Bridge                    | 2.5                | Shared                            | Native                            | Access to intake; access for recreation on shoreline   |
| U38N11X            | McCloud Dam Road         | 38N11        | Base of McCloud Dam       | 0.25               | PG&E                              | Native                            | Road to base of McCloud dam  |
| 37N78              | Iron Canyon Loop         | 38N11        | Iron Canyon Dam           | 0.7<br>(estimated) | Forest Service                    | Bituminous<br>Aggregate<br>Native | Road around Iron Canyon reservoir-access to Iron Canyon dam and structures, recreational access to shoreline areas |
| 37N27Y             | Deadlun Creek Campground | 37N78        | Campground                | 0.34               | Forest Service                    | Native                            | Access to campground – project recreation feature  |
| 37N66Y             | Hawkins Landing Road     | 38N11        | Hawkins Boat Ramp         | 0.56               | PG&E                              | Native                            | Access to campground and boat ramp – project recreation feature  |
| 37N78A             | MC-10 Gage Road          | 37N78        | Low Level Outlet and Gage | 0.28               | PG&E                              | Native                            | Road to MC-10 stream gage  |

| <b>Road Number</b> | <b>Name</b>            | <b>Start</b>             | <b>End</b>               | <b>Length (mi)</b> | <b>Maintenance Responsibility</b> | <b>Surface Type</b> | <b>Comments</b>                     |
|--------------------|------------------------|--------------------------|--------------------------|--------------------|-----------------------------------|---------------------|-------------------------------------|
| 37N34              | Oak Mountain Road      | 38N11                    | Pit 5 Bridge             | 7.71               | PG&E                              | Native              | Access to pipeline, 12-kV powerline |
| 37N93              | Ridge Iron Canyon Road | Junction with 37N93A & C | Oak Mountain Road        | 0.3                | PG&E                              | Native              | To pipeline off Oak Mountain Road   |
| 37N93A             | Ridge Road             | 37N93                    | Pipeline                 | 0.6                | PG&E                              | Native              | Off Oak Mountain Road               |
| 37N33C             | Willow Siphon          | 37N93                    | Pipeline                 | 0.5                | PG&E                              | Native              | Off Oak Mountain Road               |
| Pit 6 PH           | Pit 6 Powerhouse Road  | Cove Road                | Pit 6 Powerhouse         | 6.0                | PG&E                              | Asphalt Concrete    | Road to Pit 6 Powerhouse            |
| 35N23              | Pit 7 Powerhouse Road  | 34N17                    | Pit 7 Dam and Powerhouse | 1.79               | PG&E                              | Asphalt Concrete    | Road to Pit 7 Dam and Powerhouse    |
| 35N66              | Fenders Flat           | 35N23                    | Afterbay Dam             | 0.57               | PG&E                              | Native              | Road to Pit 7 Afterbay              |

Recreational OHV use is an activity that occurs within the project area, and although it is not concentrated on project roads, the activity results in road and resource damage not typically identified as part of traditional road inventories. OHV use is concentrated at Iron Canyon reservoir resulting in dispersed shoreline access, as well as concentrated uses within and adjacent to the Hawkins Landing and Deadlun campgrounds. OHV use is also popular with visitors to Fenders Flat near the Pit 7 afterbay. Multiple user-created OHV roads exist in these areas, including roads from campsites to the Iron Canyon reservoir shoreline, roads along the shoreline, and roads from FR 35N66 to project lands near the Pit 7 afterbay, which are not open to public use (PG&E, 2009a).

### **Fire Events and Existing Wildland Fire Prevention Measures**

The project is situated in a fairly remote and sparsely populated area of the state, which has vast natural forest resources prone to dramatic fire events with the potential (under certain conditions) for tremendous amounts of destruction. Fire suppression is a shared responsibility between the Forest Service, state of California, and the county. Fire stations and fire suppression equipment is generally housed near populated areas with concentrations of fire-fighting equipment in Redding, McCloud, Burney, and Big Bend, all located at a considerable distance from the project area with notably long travel times. Between 1960 and 2007, four wildland fires either occurred or spread to within 1 mile of the project area, but no fires were reported within the project boundary and these fires did not threaten any project structures (PG&E, 2009a).

The measures taken by PG&E to reduce fire risk at project features under the existing license include actively maintaining vegetation in proximity to project features (e.g., transmission lines) and keeping hand tools (e.g., shovels, mattocks, McLeods) available to suppress fires. Certain laws and regulations<sup>30</sup> also prescribe how PG&E must manage vegetation associated with the project transmission lines.

In addition to existing license requirements, the Forest Service-issued special use permits for the construction of the road and campground at Hawkins Landing and Deadlun areas require PG&E to keep tools for fire suppression onsite or readily available, including shovels, picks, pulaskis, McLeods, and mattocks. In addition to the tools, equipment and vehicles will have spark arrestors to prevent the unintended ignition of fires due to sparks from work requirements (PG&E, 2009a).

### **Aesthetic Resources**

#### *Area around McCloud Reservoir*

McCloud reservoir is located in Northern California situated within the forested mountain terrain of the western slope of the Cascade Range just south of Mount Shasta.

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<sup>30</sup> These laws and regulations include Public Resource Code sections 4292 and 4293, General Order 95 Rule 35, and NERC standard FAC-003-1.

The landscape character consists of evergreen forested mountain slopes in a remote, scenic setting. The visual character of the area around McCloud reservoir consists of a narrow, winding reservoir surrounded by steep forested hillsides. FR 11, a paved road, traverses the shoreline of the southern half of the reservoir, providing the public with views dominated by the blue water of the reservoir and surrounding evergreen forest. The northern end of the reservoir is private land with no public road access. FR 11 sits on a bank cut out of the steep hill slopes and follows the contours around the shoreline. Vegetation and topography often obstruct views of the reservoir. Conversely, the public can view the project area from the reservoir surface. The natural landscape dominates the views throughout the area, with human-made facilities limited to the earth-filled McCloud dam, the Tarantula Gulch boat ramp recreation area, the McCloud tunnel intake, and public and private roads. Minimum flow releases to the Lower McCloud River are made at the base of McCloud dam from a Howell-Bunger valve that sprays water about 100 feet away from the outlet into a pool at the base of McCloud dam, where it enters the river. The visual resources associated with the area around McCloud reservoir are captured in photographs from key observation points (KOPs) and presented in volume III, TM-57, *Aesthetic Resources Assessment* (PG&E, 2009a).

#### *Area around Iron Canyon Reservoir*

Iron Canyon reservoir is situated at the confluence of five small creek tributaries, creating a relatively shallow, five-fingered-shaped reservoir with waters extending into the narrow coves created by the stream channels. Dense evergreen forests, which cover the surrounding hill slopes, obscure most views of the reservoir from nearby roads; however, some open views of the water occur. Below the high-water mark, slopes are moderate and characterized by exposed (unvegetated or sparsely vegetated) soils, as expected with a storage reservoir. Open landscape-scale views are provided at both developed and dispersed recreation areas located around the perimeter of the reservoir, from the dam, and from the water surface. The visual resources of the area around Iron Canyon reservoir are captured in photographs of KOPs and presented in volume III, TM-57, *Aesthetic Resources Assessment* (PG&E, 2009a).

#### *Pit River (James B. Black Powerhouse, Pit 6 and Pit 7 Reservoirs, and Pit 7 Afterbay)*

James B. Black powerhouse is located on the north bank of the Pit River less than 3 miles downstream from the town of Big Bend, California. Views of the powerhouse are possible from points along the Pit River in proximity to the powerhouse, as well as from a small portion of Oak Mountain Road, a Forest Service road that provides access between Iron Canyon reservoir, the Pit River and James B. Black powerhouse. Vegetation and topography screen views of the powerhouse from any considerable distance. Transmission lines leaving the powerhouse and the penstock that supplies water to the powerhouse are visible from nearby locations.

Pit 6 reservoir is long, narrow, and confined within the walls of the Pit River Canyon, which is at most 500 feet wide. Views of the reservoir are limited to locations

along the top of Pit 6 dam. The reservoir can only be accessed by foot from the dam, or potentially by boat from the Pit River, but to protect the public, PG&E discourages such boat access. Dense tree cover and steep topography preclude views of the reservoir from other locations, and the lack of public access limits viewing opportunities. The Pit 6 dam and powerhouse are visible from points along the last mile or so of Pit 6 Road as it descends into the Pit River Canyon.

Pit 7 reservoir is similar to Pit 6 reservoir in that it is long, narrow, and confined within the walls of the Pit River Canyon with dense vegetation and steep topography obscuring the reservoir from view. Views of Pit 7 reservoir from publicly accessible land are very limited and only available from the Pit 6 Road and the area around Pit 6 dam or along the section of Pit 7 Road that is open to foot travel beyond a locked gate. The Pit 7 afterbay, the most visible water feature within the Pit River portion of the project, is visible from Fenders Ferry Road (FR 34N17) where it crosses the Pit River arm of Shasta Lake and from the car-top boat launch area at Fenders Ferry. Uplands surrounding the river are heavily forested with evergreen oak woodland and pine vegetation. From the bridge, the rock-filled afterbay dam is visible in the mid-ground of the landscape. Flows from Pit 7 reservoir are regulated with the V-notch weir in Pit 7 afterbay dam. Water flowing out of the afterbay appears riverine as water flows through the weir when Shasta Lake levels are low. When Shasta Lake is at full pool, the reservoir overtops the dam, changing the character of the area to one of flat water as opposed to a flowing river. Security fencing, signs, and safety chains that warn visitors about the danger associated with the Pit 7 afterbay dam are visible.

Photos of visual resources associated with components of the project infrastructure located in the Pit River drainage, including James B. Black powerhouse, Pit 6 reservoir, Pit 7 reservoir, and Pit 7 afterbay, are captured in photographs of KOPs and presented in volume III, TM-57 (PG&E, 2009a).

#### *Forest Service Visual Quality Objectives*

The Shasta-Trinity National Forest Land and Resource Management Plan (Shasta-Trinity National Forest, 1995 as cited in PG&E, 2009a) provides preferred VQOs for lands within the Shasta-Trinity National Forest boundary. VQOs for project lands within the Shasta-Trinity National Forest are currently classified as either Retention or Partial Retention. Retention VQOs promote landscapes that, when viewed by the public, have an intact natural or natural-looking character. Human-made alterations to these landscapes should not create changes in form, color, or texture from those naturally occurring in the viewshed. Partial Retention VQOs allow for more alteration of the landscape, but new forms, colors, or textures added to the landscape should be dominated and subdued by the natural character of the area (PG&E, 2009a). Table 3-42 summarizes the VQO designations by general project area.

Although it may be more appropriate, the Shasta-Trinity National Forest Land and Resource Management Plan does not currently classify the area around the project facilities as Modification. Modification refers to landscapes where the valued landscape

characters “appear moderately altered.” Deviations begin to dominate the valued landscape character being viewed, but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes or architectural styles outside the landscape being viewed. The Shasta-Trinity National Forest is scheduled to revise the Land and Resource Management Plan, at which time the Scenery Management System (SMS) would likely be used in scenery analysis and evaluation and the project area may be reclassified.

Table 3-42. Summary of Shasta-Trinity National Forest VQO classifications and guidelines for NFS lands within the project area or influenced by project operations. (Source: PG&E, 2009a)

| <b>National Forest System Lands Surrounding</b> | <b>VQO Designation</b>  |
|---|---|
| McCloud reservoir                               | Retention   |
| Spoil piles and tunnel crossing                 | Partial Retention   |
| Iron Canyon reservoir                           | Retention   |
| James B. Black penstock                         | Retention and Partial Retention for the Willow Creek siphon and surge chamber |
| Pit 6 and Pit 7 reservoirs                      | Retention   |
| Pit 7 afterbay                                  | Retention   |

### **3.3.7.2 Environmental Effects**

#### **Land Use Resources**

##### *Road and Transportation Facilities Management Plan*

Some of the roads used by PG&E to access project facilities are Forest Service roads or roads owned by The Hearst Corporation. While some of these roads are used primarily for project purposes, others are not. Roads in the project vicinity may be used by the Forest Service for land management or by the public for recreation unrelated to the project.

PG&E proposed to prepare a Road and Transportation Facilities Management Plan for the 14 road segments listed in table 3-41 within 1 year of license issuance. The plan would include, among other things, a road inventory and condition assessment, maps, a discussion of soil protection and erosion control measures, and a traffic safety plan. The plan would incorporate Forest Service standards for design, construction, operation, and maintenance and would be approved by the Forest Service. Upon Commission approval, PG&E would implement the plan and actions specified therein.

In its original condition 29, the Forest Service specified that PG&E file with the Commission, within 1 year of license issuance, a Road and Transportation Facility Management Plan, approved by the Forest Service, for protection and maintenance of project and project-affected roads that are on or affect NFS lands. The Forest Service specified that two additional road segments, not covered by PG&E's proposed measure, be included in the plan: FR 38N11 (Hawkins Creek segment 1) and FR 37N78 (Iron Canyon Loop Road). The Forest Service specified that the plan should address: planning and inventory; operation, maintenance, and road-associated debris (including road spoil piles); construction and reconstruction; monitoring; general road use; and road use by government. PG&E should take appropriate measures to meet Forest Service maintenance level, traffic service level, and road management objectives (RMOs). PG&E should consult with the Forest Service and other affected parties in the development of this plan. Upon Commission approval, PG&E should implement the plan and actions specified therein.

In its original condition 29, the Forest Service also specified that PG&E develop an MOU with the Forest Service and other affected parties to address shared road management responsibilities (e.g., costs, public safety needs, resource protection, and erosion control mitigations). Upon Commission approval, PG&E should implement the MOU.

PG&E alternative condition 29 proposes revisions to subheadings to remove ambiguous wording that could lead to differences of opinion as to which roads are covered by the Forest Service's original condition 29. PG&E alternative condition 29 proposes clarifications to which road segments would be covered by the plan and which road segments would be included in a separate MOU with the Forest Service. PG&E disagrees with the Forest Service's designation of FR 38N11 (segment 1) and FR 37N78 (Iron Canyon Loop Road) as project roads for which PG&E would be responsible under the license. PG&E's alternative revises the extent of FR 38N11 based on an understanding that its responsibility for shared maintenance of FR 38N11 terminates on the west side of Kosk Creek Bridge.

PG&E alternative condition 29 clarifies the road reconstruction implementation schedule. PG&E alternative condition 29 also removes references to bridges and tunnel spoil piles because none of these features associated with the project are located on NFS lands or could directly affect NFS lands.

The Hearst Corporation owns certain roads within the project area and has existing construction and easement agreements with PG&E and the Forest Service for maintenance and use of these roads. While The Hearst Corporation supports the idea of an MOU, it does not support the Forest Service's proposed expansion of the project boundary.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 29. The provisions specified in Forest Service modified condition 29 are similar to those specified in the Forest Service's original condition 29, except that the

Forest Service has removed specific details from the 4(e) condition and placed them in the draft Road and Transportation Facility Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3). Additionally, in modified condition 29, the Forest Service continues to identify FR 38N11 (Hawkins Creek Road segment 1) and FR 37N78 (Iron Canyon Road) as project roads. The Forest Service reiterates its concern with the use of the PG&E traffic study, specifically, the reliance on visual observations rather than data collected by electronic road traffic counters, to characterize the use of these two road segments for project purposes as incidental.

In the draft Road and Transportation Facility Management Plan, (Forest Service, 2010d, Enclosure 3), the Forest Service recommends specific requirements and clarifies the intent of modified condition 29. With the exception of the removal of a discussion of the MOU, the minimum components of the plan remain unchanged as compared to the Forest Service's original condition 29.

On December 14, 2010, the Forest Service filed with the Commission a settlement agreement between PG&E and the Forest Service for non-project recreation facilities and roads in the Shasta-Trinity National Forest.

#### *Our Analysis*

PG&E is responsible for the maintenance of all project roads within the project boundary (table 3-41). Consistent with the Commission's October 3, 2008, study plan determination letter and based on information contained in Technical Memorandum 22, submitted as part of PG&E's license application, FR 38N11 (Hawkins Creek Road segments 1 and 2) do not meet the Commission's criteria for project roads used primarily for project purposes. Due to the unreliability of the electronic road traffic counters used during the traffic study, the Commission previously advised PG&E to use only the direct visual observation estimates when discussing road and recreational use at the project. Recreation visitor questionnaire data showed that the majority of users of Hawkins Creek Road visit non-project related locations for angling in the Lower McCloud River, with the primary destinations including Ash Camp, Ah-Di-Na, and The McCloud River Preserve. Questionnaire data also indicates that a majority of users (river anglers) visit other similar regional destinations and do not fish in project reservoirs.

As shown in table 3-41, a 0.7-mile section of FR 37N78 (Iron Canyon Loop Road) from FR 38N11 (Hawkins Creek Road) to Iron Canyon dam does meet the Commission's criteria for project roads and is currently within the project boundary. The entire length of FR 37N78 (Iron Canyon Road) is not currently necessary to access project infrastructure and study data show that there are very few visitors using Iron Canyon Loop Road to access the dispersed sites along the shoreline.

As discussed later in this section, should PG&E construct any new recreation sites and facilities along Iron Canyon Road, the recreation sites and facilities, to include any roads necessary for project purposes, should also be included in the project boundary. A Road and Transportation Facilities Management Plan would establish a forum for

coordination of road maintenance activities among PG&E, the Forest Service, and other affected parties, such as The Hearst Corporation. A plan would help to clarify and memorialize PG&E's road management responsibilities within the project boundary. Specifically, the plan would address planning, operations, maintenance, construction and reconstruction, monitoring, and road use. The development and implementation of a Road and Transportation Facilities Management Plan would improve road management and ensure public access to project lands and waters and the adequate protection of natural and environmental resources in the project area.

There are road spoil piles along roads on NFS lands that may be within the project boundary. The details about who is responsible for correcting problems created by these spoil piles (e.g., removal) should be included in the proposed Road and Transportation Facilities Management Plan to be prepared in consultation with the Forest Service and filed with the Commission for approval.

The settlement agreement between PG&E and the Forest Service resolves certain issues and responsibilities for roads that are outside of the project boundary. The settlement agreement addresses shared road (non-project) management responsibilities; specifically, proportionate road share costs, public safety needs, resource protection, and erosion control mitigations.

#### *Fire Prevention and Response Plan*

Steep topography, heavy vegetation, land use, and limited access make the project area susceptible to wildfires. Continued project operations and existing facilities (e.g., transmission lines, generators, and construction equipment), and increased recreational use over the term of the new license may also contribute to fire danger in the project area. Fire fighting near the project is challenging and there exists the potential for small fires to grow into large and very destructive fires. Additional fires in the project area may, among other things, affect public safety, property, aesthetics, and air quality. The threat and potential damage from wildfires in the project area would remain an issue under a new project license.

PG&E proposed to prepare a Fire Prevention and Response Plan in consultation with the Forest Service, California Department of Forestry and Fire Protection, and Big Bend Volunteer Fire Department within 1 year of license issuance. At a minimum the plan would address fuels treatment/vegetation management; fire prevention and control; emergency response preparedness; and reporting requirements. Additionally, the plan would ensure that fire prevention measures meet water quality BMPs. Upon Commission approval, PG&E would implement the plan.

In its original condition 33, the Forest Service specified that PG&E develop a Fire and Fuels Plan in consultation with the Forest Service and appropriate state and local fire agencies and file the plan with the Commission within 1 year of license issuance. The specified components of this plan would include fuels treatment; fire prevention and response; emergency response preparedness; and reporting. Additionally, the Forest

Service specified that PG&E would cooperate fully with the Forest Service on all fire investigations and would produce upon request all materials and witnesses not subject to the attorney-client or attorney work product privileges, over which PG&E has control, related to the fire and its investigation.

In its original condition 33, the Forest Service also specified that PG&E would preserve all physical evidence, and give custody to the Forest Service of all physical evidence requested. Similarly, the Forest Service would provide PG&E with reasonable access to the physical evidence and documents PG&E needs to defend any and all claims, which may arise from a fire resulting from project operations, to the extent such access is not precluded by ongoing criminal or civil litigation.

PG&E alternative condition 33 proposed a few minor revisions intended to improve comprehension, but no material changes to the Forest Service's original condition 33.

In its November 29, 2010, filing, the Forest Service includes modifications to condition 33. The provisions specified in Forest Service modified condition 33 are similar to those specified in the Forest Service's original condition 33, except the Forest Service has removed specific details of the plan components from the 4(e) condition and placed them in the draft Fire and Fuels Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3).

In the draft Fire and Fuels Management Plan (Forest Service, 2010d, Enclosure 3), the Forest Service recommends specific requirements and clarifies the intent of modified condition 33. With the exception of the addition of a discussion of post-fire activities, the minimum components of the plan, as discussed above, remain unchanged as compared to the Forest Service's original condition 33. This additional component would require PG&E to coordinate post-fire mitigations with the Forest Service following a fire on project-affected NFS lands. Potential mitigations could include timber salvage or hazard tree removal; the opening and closing of roads; slope stabilization and erosion reduction; and construction/reconstruction plans for any project-affected facility (including recreation sites) damaged by the fire. In its November 24, 2010, filing, PG&E accepts modified condition 33 and withdraws its alternative condition 33.

#### *Our Analysis*

The development and implementation of a Fire Prevention and Response Plan in consultation with the Forest Service, the California Department of Forestry and Fire Protection, the Big Bend Volunteer Fire Department, and others, as appropriate, that incorporates both the measures proposed by PG&E and specified by the Forest Service would improve planning, management, and coordination of wildfire protection and prevention measures, as well as lead to a reduction in the occurrence and suppression of wildfires in the project area, minimizing damage to natural resources. The addition of post-fire mitigations in the modified condition would help to further protect resources and

restore, if necessary, any project-affected facility damaged by the fire. The plan should be filed with the Commission for approval within 1 year of license issuance.

#### *Timber Removal*

Project activities, such as danger tree removal; post-fire (or other natural hazard) mitigation; construction/reconstruction of recreation facilities; and O&M activities around project facilities and along transmission line corridors in compliance with local, state, and federal regulations, may require PG&E to remove merchantable timber from NFS lands within the project boundary. Depending upon the situation, timber removal could be routine maintenance or in response to an emergency situation, and the removal could be limited or extensive.

In modified condition 25, discussed in section 3.3.3.2.1, *Vegetation*, the Forest Service specifies that PG&E develop a Vegetation and Invasive Weed Management Plan, which would, among other things, include a timber removal process and protocols and, more specifically, a hazard tree removal process. In its November 24, 2010, filing, PG&E accepts Forest Service modified condition and withdraws its alternative condition 25.

#### *Our Analysis*

The development of a Vegetation and Invasive Weed Management Plan and established and well-defined timber removal protocols would help to avoid inadvertent and unauthorized timber cutting on NFS lands within the project boundary, while providing for public safety and resource protection.

PG&E has not proposed any timber removal from NFS lands within the project boundary. However, if PG&E proposes to remove timber from NFS lands within the project boundary, the activity must be permitted by the Forest Service in accordance with all applicable plans and protocols. Prior notice of timber removal on NFS lands within the project boundary must also be given to the Commission.

#### *Hazardous Substance Management Plan*

In its original condition 28, the Forest Service specified that PG&E would file, for Commission approval, a plan approved by the Forest Service for oil and hazardous substances storage and spill prevention and cleanup. The plan would be filed within 1 year of license issuance, and at least 60 days before the initiation of any activities that the Forest Service determines to be of a land-disturbing nature on NFS lands. At a minimum, the plan would require PG&E to:

- Maintain in the project area, a cache of spill cleanup equipment suitable to contain any spill from the project;
- Periodically inform the Forest Service of the location of the spill cleanup equipment on NFS lands and the location, type, and quantity of oil and hazardous substances stored in the project area; and

- Inform the Forest Service immediately of the nature, time, date, location, and action taken for any spill on or affecting NFS lands.

PG&E alternative condition 28 proposed to provide the Forest Service copies of PG&E's existing spill prevention, control, and countermeasures plans and hazardous materials business plans for the project.

In its November 29, 2010, filing, the Forest Service removes condition 28. In its November 24, 2010, filing, PG&E withdraws its alternative condition 28.

#### *Our Analysis*

The potential for PG&E to spill hazardous materials within the project boundary and to impact area resources exists. PG&E is responsible for such spills and would be required to identify acceptable prevention and mitigation measures. To meet the regulatory requirements for handling, storage, and emergency response related to hazardous materials, PG&E has spill prevention, control, and countermeasures plans and hazardous materials business plans in place. The geographical scope of the plans should include the entire project area. Although no longer required by condition 28, the provision of the existing Spill Prevention, Control, and Countermeasures Plan and Hazardous Materials Business Plan to the Commission (for approval), with copies to the Forest Service and the Central Valley Regional Water Board, within 30 days of license issuance and the continued implementation of these plans would ensure that spills of hazardous substances are promptly contained and cleaned up to avoid/minimize the potential extent of adverse environmental effects.

#### *Project Boundary*

While the proposed McCloud powerhouse and Pit 7 afterbay dam would be constructed within the existing project boundary at McCloud dam and Pit 7 afterbay dam, respectively, the proposed new transmission line corridors associated with the new powerhouses and certain proposed new recreation facilities would be constructed outside of the existing project boundary. PG&E proposes to include the existing access road to Hawkins Landing Campground and boat ramp, the Fenders Flat recreation site (both are existing project recreation facilities), and lands necessary for the proposed generation additions within the project boundary. PG&E also proposes to include all new project recreation facilities and any existing reconstructed facilities within the project boundary after construction.

The Forest Service recommended under 10(a) that the following project-related facilities, not currently included within the project boundary, be added to the project boundary. Specific sites include:

- Segment 1 of FR 38N11 (Hawkins Creek Road);
- FR 37N78 around Iron Canyon reservoir;

- The area between the McCloud reservoir high waterline (elevation 2,680 feet msl) and the outside right-of-way of FR 38N11 (Hawkins Creek, segment 1), and FR 38N04Y (Star City Road); and
- All new project recreational facilities.

The Hearst Corporation does not support the proposed expansion of the project boundary to the outside edge of the road system.

In its November 29, 2010, filing, the Forest Service continues to specify FR 38N11 (Hawkins Creek Road segment 1) and FR 37N78 (Iron Canyon Road) as project roads. The Forest Service also recommends that project boundary adjustments be made at the point when the Recreation Development and Management Plan is approved by the Commission to ensure that the development of any new recreation facility is appropriately within the Commission's jurisdiction. As discussed in section 3.3.5.2, *Environmental Effects, Lower McCloud River Recreation Facilities*, in modified condition 30 the Forest Service specifies that new and reconstructed project recreation facilities on NFS lands would be included in the project boundary prior to ground disturbance.

#### *Our Analysis*

As discussed previously, the Commission has determined that FR 38N11 (Hawkins Creek Road segments 1 and 2) does not meet the Commission's criteria for project roads used primarily for project purposes and should not be included in the project boundary. Although the entire length of FR 37N78 (Iron Canyon Loop Road) is not necessary to access project infrastructure, a 0.7-mile (estimated) section of FR 37N78 from FR 38N11 (Hawkins Creek Road) to Iron Canyon dam is necessary to access project infrastructure (i.e., the dam) and therefore meets the Commission's criteria for project roads and is included within the existing project boundary. Additionally, Oak Mountain Road (FR 37N34), a designated project road, provides access to other project infrastructure at Iron Canyon reservoir; therefore, the entire length of FR 37N78 (Iron Canyon Loop Road) is not necessary for access to project infrastructure. As discussed below, should PG&E construct any new recreation sites and facilities along Iron Canyon Road, the recreation sites and facilities, to include any roads necessary for project purposes, should also be included in the project boundary.

Since the Commission will have responsibility to ensure compliance at the project's existing and proposed recreation areas, these areas must be included within the project boundary and be within the Commission's jurisdiction. By requiring PG&E to include all project recreation sites (existing and proposed) within the project boundary, the Commission would have the authority to ensure that PG&E maintains adequate and safe public access to project lands and waters for recreational purposes.

In section 2.3, *Staff Alternative*, we propose to modify the Forest Service's recommendation to require PG&E to include all existing (at license issuance) project roads and recreation sites and facilities within the project boundary and to file a revised

exhibit G within 1 year of license issuance. Under any new license issued for the project, PG&E also would be required to file a revised exhibit G with the Commission subsequent to completing construction of new project generating and transmission facilities or recreation sites and facilities, which would include any roads necessary for project purposes that should also be included within the project boundary. The staff-proposed modification would not require PG&E to include FR 38N11 (Hawkins Creek Road segment 1) and FR 37N78 (Iron Canyon Loop Road), with the exception of a 0.7-mile segment, already within the project boundary. Staff's proposal to require PG&E to include all new recreation sites and facilities within the project boundary and to file a revised exhibit G would include the area between McCloud reservoir and FR 38N11 and FR 38N04Y (Star City Road) to include only the outermost limits of any new recreation site (i.e., only the area serving project purposes) if PG&E constructs new recreational facilities in this area.

## **Aesthetic Resources**

### *Visual Quality Management Plan*

In its original condition 32, the Forest Service specified that PG&E develop, for Forest Service approval and filing with the Commission, procedures or a timeline to ensure implementation of certain mitigation measures to provide for visual quality of project and project-related NFS lands. These mitigation measures would include, but not be limited to, painting or reconstructing project facilities with natural looking materials and colors, planting vegetation to screen project facilities; maintaining reservoir elevations during the peak recreation season; developing an education plan and providing interpretive information; and disposing of debris piles.

PG&E alternative condition 32 proposed to define the applicability of the Forest Service's original condition 32 to existing and proposed project facilities (i.e., generation additions) and clarified certain terminology. PG&E alternative condition 32 also identified an apparent inconsistency between the assigned VQO and the appearance of the area, including existing project facilities. The Forest Service assigned VQOs to the project area after the existing project facilities were constructed. Further, PG&E alternative condition 32 removed text from the Forest Service's original condition 32 that requires modification of existing project facilities for visual quality purposes because studies conducted during relicensing did not identify any needed modifications. PG&E alternative condition 32 appropriately proposed provisions for visual screening, painting, and other necessary mitigation measures for any new project facilities. PG&E alternative condition 32 also reflected PG&E's willingness to apply mitigation measures to attempt to meet VQOs when existing project facilities are modified. Finally, PG&E alternative condition 32 limited future mitigation to any new spoil or debris piles created by the project (i.e., mitigation for existing piles would not be required).

In its November 29, 2010, filing, the Forest Service includes modifications to condition 32. Modified condition 32 specifies the development of tasks and a timeline to assure implementation of specific mitigation measures to improve the visual quality of

project and project-affected NFS lands. The provisions specified in Forest Service modified condition 32 are similar to those specified in the Forest Service's original condition 32, except that the Forest Service includes a draft document as an enclosure to the filing (Forest Service, 2010d, Enclosure 3), which identifies specific visual mitigations to reduce project and project-related visual effects through the use of selected materials, surface treatments, paint color, vegetative visual screening, and facility design. Additionally, modified condition 32 also adds a monitoring component. Within the first year of the license, PG&E and the Forest Service would develop KOPs for monitoring any changes in visual quality as a result of project implementation during the license term.

In the draft Visual Quality Management document (Forest Service, 2010d, Enclosure 3), the Forest Service recommends that PG&E and the Forest Service meet, in the field, within the first year of the license to develop a list of specific mitigations that blend existing project facilities (VQO Modification) with the natural surroundings (VQO Retention and Partial Retention). However, facilities in good repair would only have mitigations applied as maintenance is needed. The draft document also discusses the incorporation of visual quality considerations into the reconstruction of existing facilities and construction of new facilities. In its November 24, 2010 filing, PG&E accepts modified condition 32 and withdraws its alternative condition 32.

#### *Our Analysis*

In the draft EIS, we proposed to modify the Forest Service's recommendation to require PG&E to develop a Visual Quality Management Plan, in consultation with the Forest Service and others, as appropriate, to protect the visual quality of lands in the project area within 1 year of license issuance. The plan would address the impact of any proposed project facilities or modifications to existing facilities, including but not limited to generating facilities, recreation sites and facilities, and spoil piles, on the aesthetics in the project area.

In lieu of a management plan, PG&E and the Forest Service have agreed to specific mitigations that would be implemented within established timeframes to meet Forest Service VQOs in the project area. Using a tasks and timeline approach is a reasonable alternative to a management plan. The mitigations contemplated by both PG&E and the Forest Service, such as visual screening, painting, providing interpretive information, and maintaining reservoir water levels during the peak recreation season would collectively reduce project visual effects and improve visual quality in the project area. Developing a description of specific mitigation measures and an associated timeline in consultation with the Forest Service that would be filed with the Commission, would further ensure that appropriate measures were completed in timely manner.

### **3.4 NO-ACTION ALTERNATIVE**

Under the no-action alternative, the project would continue to operate as it has in the past. None of PG&E's proposed measures or the resource agencies' recommendations and mandatory conditions would be required, and the existing trout populations would not be enhanced as a result of increased minimum flows. The continued operation of the existing McCloud-Pit facilities would continue to be of importance to water supply, recreation, generation of renewable energy, and minimization of atmospheric pollutants. The continued operation of the existing facilities under the no-action alternative would, on average, result in the annual generation of 1,542.2 GWh of clean energy.

## **4.0 DEVELOPMENTAL ANALYSIS**

In this section, we estimate the economic benefits of how the McCloud-Pit facilities now operate, the cost of various environmental measures, and the effects of these measures on project operation under a new license. We also analyze PG&E's proposal to install new units at the project.

### **4.1 POWER AND ECONOMIC BENEFITS OF THE PROJECTS**

#### **4.1.1 Economic Assumptions**

Under its approach to evaluating the economics of hydropower projects, as articulated in Mead Corporation, Publishing Paper Division (72 FERC ¶61,027, July 13, 1995) (Mead), the Commission employs an analysis that uses current costs to compare the costs of the project and likely alternative power with no consideration for potential future inflation, escalation, or deflation beyond the license issuance date. The Commission's economic analysis provides a general estimate of the potential power benefits and costs of a project and reasonable alternatives to project-generated power. The estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license.

For our economic analysis of PG&E's proposed project and the alternatives, we used the assumptions, values, and sources shown in table 4-1.

Table 4-1. Staff assumptions for economic analysis of the McCloud-Pit Project.  
(Source: Staff)

| <b>Assumption</b>  | <b>Value</b> | <b>Source</b> |
|--|--------------|---------------|
| Base year for costs and benefits                                       | 2009         | PG&E, 2009a   |
| Peak/Off-peak energy value<br>(mills/kilowatt hour [kWh]) <sup>a</sup> | 87.5         | PG&E, 2009a   |
| Dependable capacity value (\$/kW-year) <sup>a</sup>                    | 0            | PG&E, 2009a   |
| Period of analysis   | 30 years     | Staff         |
| Term of financing  | 20 years     | Staff         |
| Federal and state tax rate   | 40.75%       | PG&E, 2009a   |
| 2009 to 2010 inflation for most final<br>license applications costs    | 0%           | Staff         |
| Insurance rate   | 1.2%         | PG&E, 2009a   |
| Discount rate  | 8.8%         | PG&E, 2009a   |
| Interest rate  | 8.8%         | PG&E, 2009a   |

<sup>a</sup> Based on exhibit D of the application, we assumed the energy values reflect a capacity component.

#### **4.1.2 Current Annual Costs and Future Capital Costs under the No-Action Alternative**

Total annualized cost for the no-action alternative for the McCloud-Pit Project amounts to \$23,102,000 as table 4-2 shows.

Table 4-2. Summary of current annual costs and future costs under the no-action alternative for the McCloud-Pit Project. (Source: PG&E, 2009a, staff)

| <b>Cost</b>                                | <b>Capital and One-Time Cost</b> | <b>Annual Cost, Including O&amp;M</b> | <b>Total Annualized Cost</b> |
|--|----------------------------------|---------------------------------------|------------------------------|
| Total original net investment <sup>a</sup> | \$44,700,000                     |                                       | \$7,667,000                  |
| Total relicensing cost <sup>a</sup>        | \$26,400,000                     |                                       | \$4,528,000                  |
| Subtotal                                   | \$71,100,000                     |                                       | \$12,195,000                 |
| O&M including insurance                    |                                  | \$4,853,000                           | \$4,853,000                  |
| Taxes and fees                             |                                  | \$1,674,000                           | \$1,674,000                  |
| Commission fees                            |                                  | \$880,000                             | \$880,000                    |
| Future capital additions <sup>a</sup>      |                                  | \$3,500,000                           | \$3,500,000                  |
| Subtotal annual costs                      |                                  | \$10,907,000                          | \$10,907,000                 |
| <b>Total</b>                               | <b>\$71,100,000</b>              |                                       | <b>\$23,102,000</b>          |

<sup>a</sup> PG&E (2009a) exhibit D, page D-3, table D.4.3–1

## 4.2 COMPARISON OF ALTERNATIVES

Table 4-3 compares the power values, annual costs, and net benefits of the no-action alternative, PG&E's proposed action, the staff alternative, and the staff alternative with mandatory conditions. In section 5, *Staff's Conclusions*, we discuss our reasons for recommending the staff alternative, and explain why we conclude the environmental benefits are worth the cost increases and benefit reductions.

Table 4-3. Summary of annual net benefits for the no-action alternative, proposed action, staff alternative, and staff alternative with mandatory conditions for the McCloud-Pit Project. (Source: Staff)

|  | <b>No Action</b> | <b>PG&amp;E's<br/>Proposed<br/>Action</b> | <b>Staff<br/>Alternative</b> | <b>Staff<br/>Alternative<br/>With<br/>Mandatory<br/>Conditions</b> |
|--|------------------|---|------------------------------|--|
| Annual power value (\$) <sup>a</sup>   | \$134,943,000    | \$133,376,000                             | \$131,443,000                | \$131,443,000  |
| Annual power value (\$/MWh)  | \$87.50          | \$87.50                                   | \$87.50                      | \$87.50  |
| Annualized cost of plant and current environmental measures (\$)   | \$23,102,000     | \$23,102,000                              | \$23,102,000                 | \$23,102,000   |
| Annualized cost of new environmental measures (including energy losses contained in the power values above) (\$) | \$0              | \$11,756,000                              | \$14,349,000                 | \$14,964,000   |
| Annualized cost of new environmental measures (excluding energy losses contained in the power values above) (\$) | \$0              | \$10,189,000                              | \$10,849,000                 | \$11,464,000   |
| Annual cost (\$)   | \$23,102,000     | \$33,291,000                              | \$33,951,000                 | \$34,566,000   |
| Annual cost (\$/MWh)   | \$14.98          | \$21.84                                   | \$22.60                      | \$23.01  |
| Annual net benefit (\$)  | \$111,841,000    | \$100,085,000                             | \$97,492,000                 | \$96,877,000   |
| Annual net benefit (\$/MWh)  | \$72.52          | \$65.66                                   | \$64.90                      | \$64.49  |

<sup>a</sup>Developmental analysis is based on an average energy value published by the California Public Utilities Commission.

#### **4.2.1 No-Action Alternative**

PG&E provided an estimate of average annual output of the project under the no-action alternative (current conditions) of 1,542.2 GWh, which would provide an annual power benefit of \$134,943,000. Subtracting the current cost of \$23,102,000 (see table 4-2) yields an annual net benefit of \$111,841,000.

#### **4.2.2 PG&E's Proposed Action**

The measures that PG&E proposes, summarized in table 4-4, increase the annualized cost from \$23,102,000 to \$33,291,000 relative to the no-action alternative. PG&E proposes some operational changes which would reduce annual generation by 17.9 GWh, resulting in an annual power benefit of \$133,376,000 and an annual net benefit of \$100,085,000. This equals an overall reduction in annual net benefit of \$11,756,000 relative to the no-action alternative. The decrease in net benefit from \$72.52/MWh under the no-action alternative to \$65.66/MWh for the proposed action represents a decrease of 9.5 percent.

#### **4.2.3 Staff Alternative**

The measures included in the staff alternative, summarized in table 4-4, would increase annualized cost from \$23,102,000 to \$33,951,000 relative to the no-action alternative. Operational changes would reduce annual generation from 1,542,200 MWh to 1,502,200 MWh. The staff alternative would provide an annual power benefit of \$131,443,000 and an annual net benefit of \$97,492,000. This represents an overall reduction in annual net benefit of \$14,349,000 relative to the no-action alternative. The decrease in net benefit from \$72.52/MWh under the no-action alternative to \$64.90/MWh for the staff alternative represents a decrease of 10.5 percent.

#### **4.2.4 Staff Alternative with Mandatory Conditions**

The measures included in the staff alternative with mandatory conditions, summarized in table 4-4, would increase annualized cost from \$23,102,000 to \$34,566,000 relative to the no-action alternative. Operational changes would reduce annual generation from 1,542,200 MWh to 1,502,200 MWh. The staff alternative with mandatory conditions would provide an annual power benefit of \$131,443,000 and an annual net benefit of \$96,877,000. This represents an overall reduction in annual net benefit of \$14,964,000 relative to the no-action alternative. The decrease in net benefit from \$72.52/MWh under the no-action alternative to \$64.49/MWh for the staff alternative with mandatory conditions represents a decrease of 11.1 percent.

## **4.3 COST OF ENVIRONMENTAL MEASURES**

### **4.3.1 Cost of Environmental Measures for the McCloud-Pit Project**

PG&E provided costs for environmental measures in current dollars. Costs are taken from the final license application filed in 2009, and the PG&E reply comments on comments, recommendations, terms, and conditions (PG&E, 2010a). Table 4-4 summarizes the capital and O&M costs by major resource area. Proposed environmental measures that are directly associated with the proposed powerhouses at McCloud dam and Pit 7 afterbay are included separately in table 4-5. Changes in power benefits are addressed in section 4.2, *Comparison of Alternatives*.

Appendix C includes capital and O&M costs for individual measures proposed by PG&E and included in terms, conditions, and recommendations received from agencies and other interested parties.

Table 4-4. Summary of annualized costs by resource area for measures included in the proposed action, staff alternative, and staff alternative with mandatory conditions for the McCloud-Pit Project.<sup>a</sup> (Source: Staff)

| Resource Area                     | PG&E's Proposed Action  |                     |  | Staff Alternative       |                     |  | Staff Alternative with Mandatory Conditions |                     |  |
|-----------------------------------|-------------------------|---------------------|--|-------------------------|---------------------|--|---|---------------------|--|
|                                   | Annualized Capital Cost | Annualized O&M Cost | Total Annualized Cost (excluding energy) | Annualized Capital Cost | Annualized O&M Cost | Total Annualized Cost (excluding energy) | Annualized Capital Cost                     | Annualized O&M Cost | Total Annualized Cost (excluding energy) |
| General                           | \$0                     | \$90,000            | \$90,000                                 | \$0                     | \$90,000            | \$90,000                                 | \$0   | \$90,000            | \$90,000                                 |
| Geology and soils                 | \$219,000               | \$115,000           | \$334,000                                | \$223,000               | \$190,000           | \$413,000                                | \$223,000                                   | \$190,000           | \$413,000                                |
| Aquatic resources                 | \$24,000                | \$70,000            | \$94,000                                 | \$168,000               | \$356,000           | \$524,000                                | \$168,000                                   | \$358,000           | \$526,000                                |
| Terrestrial resources             | \$116,000               | \$562,000           | \$678,000                                | \$110,000               | \$495,000           | \$605,000                                | \$110,000                                   | \$495,000           | \$605,000                                |
| Threatened and endangered species | \$0                     | \$0                 | \$0                                      | \$0                     | \$0                 | \$0                                      | \$0   | \$0                 | \$0                                      |
| Recreation resources              | \$3,432,000             | \$1,060,000         | \$4,492,000                              | \$3,860,000             | \$1,098,000         | \$4,958,000                              | \$3,885,000                                 | \$1,423,000         | \$5,308,000                              |
| Cultural resources                | \$84,000                | \$200,000           | \$284,000                                | \$84,000                | \$200,000           | \$284,000                                | \$84,000                                    | \$200,000           | \$284,000                                |
| Land use and aesthetic resources  | \$2,952,000             | \$1,265,000         | \$4,217,000                              | \$2,973,000             | \$1,002,000         | \$3,975,000                              | \$2,973,000                                 | \$1,265,000         | \$4,238,000                              |
| Total                             | \$6,827,000             | \$3,362,000         | \$10,189,000                             | \$7,418,000             | \$3,431,000         | \$10,849,000                             | \$7,443,000                                 | \$4,021,000         | \$11,464,000                             |

<sup>a</sup> This summary does not include mitigation measures that are directly associated with the construction of a proposed powerhouse.

Table 4-5. Summary of annualized costs by resource area for measures directly associated with construction of proposed powerhouses under the proposed action, staff alternative, and staff alternative with mandatory conditions for the McCloud-Pit Project. (Source: Staff)

| Resource Area                     | PG&E's Proposed Action  |                     |  | Staff Alternative       |                     |  | Staff Alternative with Mandatory Conditions |                     |  |
|-----------------------------------|-------------------------|---------------------|--|-------------------------|---------------------|--|---|---------------------|--|
|                                   | Annualized Capital Cost | Annualized O&M Cost | Total Annualized Cost (excluding energy) | Annualized Capital Cost | Annualized O&M Cost | Total Annualized Cost (excluding energy) | Annualized Capital Cost                     | Annualized O&M Cost | Total Annualized Cost (excluding energy) |
| General                           | \$31,000                | \$17,000            | \$48,000                                 | \$31,000                | \$17,000            | \$48,000                                 | \$31,000                                    | \$17,000            | \$48,000                                 |
| Geology and soils                 | \$0                     | \$0                 | \$0                                      | \$0                     | \$0                 | \$0                                      | \$0   | \$0                 | \$0                                      |
| Aquatic resources                 | \$0                     | \$0                 | \$0                                      | \$0                     | \$0                 | \$0                                      | \$0   | \$0                 | \$0                                      |
| Terrestrial resources             | \$59,000                | \$287,000           | \$346,000                                | \$59,000                | \$287,000           | \$346,000                                | \$59,000                                    | \$287,000           | \$346,000                                |
| Threatened and endangered species | \$0                     | \$0                 | \$0                                      | \$0                     | \$0                 | \$0                                      | \$0   | \$0                 | \$0                                      |
| Recreation resources              | \$27,000                | \$11,000            | \$38,000                                 | \$27,000                | \$11,000            | \$38,000                                 | \$27,000                                    | \$11,000            | \$38,000                                 |
| Cultural resources                | \$0                     | \$0                 | \$0                                      | \$0                     | \$0                 | \$0                                      | \$0   | \$0                 | \$0                                      |
| Land use and aesthetic resources  | \$0                     | \$0                 | \$0                                      | \$0                     | \$0                 | \$0                                      | \$0   | \$0                 | \$0                                      |
| Total                             | \$117,000               | \$315,000           | \$432,000                                | \$117,000               | \$315,000           | \$432,000                                | \$117,000                                   | \$315,000           | \$432,000                                |

### 4.3.2 Effect of Environmental Measures on Energy Generation

Several measures proposed by PG&E or included in the terms and conditions filed by the agencies and other parties would affect energy generation. For the McCloud-Pit Project, increased minimum flows proposed for the McCloud River reaches are the only measures that would have a substantive effect on energy generation. Estimates of the power benefits under PG&E's proposed action, the staff alternative (which includes Forest Service condition 19 flows), and the staff alternative with mandatory conditions are shown in table 4-6.

Table 4-6. Summary of the effect of environmental measures on energy for the no-action alternative, proposed action, staff alternative, and staff alternative with mandatory conditions for the McCloud-Pit Project. (Source: Staff)

|   | No Action     | PG&E's Proposed Action | Staff Alternative | Staff Alternative With Mandatory Conditions |
|---|---------------|------------------------|-------------------|---|
| Total power (MWh)                                   | 1,542,200     | 1,524,300              | 1,502,200         | 1,502,200                                   |
| Total power value (\$)                              | \$134,943,000 | \$133,376,000          | \$131,443,000     | \$131,443,000                               |
| Power lost relative to no action (MWh)              | 0             | 17,900                 | 40,000            | 40,000                                      |
| Reduction in power value relative to no action (\$) | \$0           | \$1,566,000            | \$3,500,000       | \$3,500,000                                 |

### 4.4 COMPARISON OF ALTERNATIVES FOR PG&E'S PROPOSED POWERHOUSES

To develop the hydro potential from higher instream flows required in a new license, PG&E proposes to install new powerhouses at both the Pit 7 afterbay and the McCloud dam. For the Pit 7 afterbay, PG&E estimates a 5-MW powerhouse would produce 25 GWh annually and a 10-MW powerhouse would produce 50 GWh annually. For the McCloud dam, installing a 5-MW powerhouse would produce 30 GWh annually and installing an 8-MW powerhouse would produce 40 GWh annually. In the license application, PG&E says it will determine the final size of the units and their hydraulic capacities based on instream flow requirements of the new project license. In table 4-7, we compare our estimates of the power values, annual costs, and net benefits of the powerhouse alternatives PG&E presents in the license application.

Table 4-7. Summary of annual net benefits for the proposed powerhouses of the McCloud-Pit Project. (Source: Staff)

|  | <b>Pit 7 Afterbay<br/>5 MW</b> | <b>Pit 7 Afterbay<br/>10 MW</b> | <b>McCloud<br/>Dam<br/>5 MW</b> | <b>McCloud<br/>Dam<br/>8 MW</b> |
|--|--------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Annual power value (\$)                                  | \$2,188,000                    | \$4,410,000                     | \$2,625,000                     | \$3,500,000                     |
| Annual power value (\$/MWh)                              | \$87.50                        | \$87.50                         | \$87.50                         | \$87.50                         |
| Annualized cost of plant and environmental measures (\$) | \$12,278,000                   | \$17,671,000                    | \$6,792,000                     | \$8,999,000                     |
| Annual cost (\$/MWh)                                     | \$491.12                       | \$350.62                        | \$226.41                        | \$224.96                        |
| Annual net benefit (\$)                                  | (\$10,090,000)                 | (\$13,261,000)                  | (\$4,167,000)                   | (\$5,499,000)                   |
| Annual net benefit (\$/MWh)                              | (\$403.62)                     | (\$263.12)                      | (\$138.91)                      | (\$137.46)                      |

As table 4-7 shows, the four alternatives that PG&E is considering would have initial annual costs that far exceed the current power value. Although Commission staff do not explicitly account for the effects inflation may have on the future cost of electricity, the fact that hydropower generation is relatively insensitive to inflation compared to fossil-fueled generators is an important economic consideration for power producers and the consumers they serve. PG&E must also consider whether these hydro proposals would qualify as part of its state requirement to develop renewable resources. Based on the Commission's policy under the Mead decision, it is the applicant who must decide whether to accept any license and the financial risk that entails.

## 5.0 STAFF'S CONCLUSIONS

### 5.1 COMPARISON OF EFFECTS OF PROPOSED ACTION AND ALTERNATIVES

In this section, we compare the developmental and non-developmental effects of PG&E's proposal, PG&E's proposal as modified by staff (staff alternative), and the no-action alternative.

We estimate the annual net benefits of operating and maintaining the McCloud-Pit Project under the three alternatives identified above. Our analysis shows that the annual net benefit would be \$100,085,000 for the proposed action; \$97,492,000 for the staff alternative; and \$111,841,000 for the no-action alternative.

We summarize the environmental effects of the different alternatives in table 5-1.

Table 5-1. Comparison of alternatives for the McCloud-Pit Hydroelectric Project.  
(Source: Staff)

| <b>Resource</b>          | <b>No-Action Alternative</b>  | <b>Proposed Action</b>  | <b>Staff Alternative</b> |
|--------------------------|---|---|--------------------------|
| <b>Generation</b>        | 1,542.2 GWh   | 1,524.3 GWh   | 1,502.2 GWh              |
| <b>Geology and Soils</b> | Continued removal of LWD behind McCloud dam   | Prepare an LWD Management Plan to facilitate the placing of LWD downstream of McCloud dam | Same as proposed action  |
|                          | Continue to maintain roadways and implement BMPs to reduce sediment input to project waters | Implement Erosion and Sediment Monitoring and Control Plan to minimize erosion            | Same as proposed action  |

| <b>Resource</b>          | <b>No-Action Alternative</b>                         | <b>Proposed Action</b>   | <b>Staff Alternative</b>  |
|--------------------------|--|--|---|
|                          |  | Monitor gravel and coarse sediment that could benefit downstream aquatic habitat | The proposed action plus implement a Gravel and Coarse Sediment Management Plan to add 150 to 600 tonnes of gravel and coarse sediment, from Star City Creek or other potential sites, to the Lower McCloud River periodically for protection of geology and soil resources |
| <b>Aquatic Resources</b> | Provide existing minimum flows in all stream reaches | Higher minimum instream flows below McCloud and Iron Canyon dams                 | Higher minimum instream flows below McCloud and Iron Canyon dams consistent with a more natural spring hydrograph   |

| Resource | No-Action Alternative | Proposed Action   | Staff Alternative  |
|----------|-----------------------|---|--|
|          |                       | No ramping rates for seasonal minimum flow changes, but upramping at 100 cfs per hour prior to uncontrollable spills at McCloud dam | Upramping at 100 cfs per hour prior to uncontrollable spills at McCloud dam<br>Downramping at 150 cfs each 48 hours at McCloud dam during spills controllable by valve<br>Maximum upramping during controllable spills at 200 cfs each 24 hours at McCloud dam<br>Upramping and downramping related to testing of the flow valve at Iron Canyon dam in 20-cfs increments |
|          |                       | Move streamflow measurements for McCloud dam from gage MC-1 to MC-7   | Measure streamflow compliance at two compliance points (MC-7 and MC-1)   |
|          |                       | No Aquatic Biological Monitoring Plan   | Implement an Aquatic Biological Monitoring Plan  |
|          |                       | Implement water quality monitoring plan   | Same as proposed action  |
|          |                       |   | File annual reports on the reintroduction and status of listed salmonids in the project area.  |

| <b>Resource</b>              | <b>No-Action Alternative</b>   | <b>Proposed Action</b>  | <b>Staff Alternative</b>   |
|------------------------------|--|---|--|
| <b>Terrestrial Resources</b> | Continue to implement vegetation management programs around project facilities | <p>Implement Vegetation Management Plan to guide restoration using native plants and manage invasive plants</p> <p>Implement BMPs to protect wetlands during construction of McCloud transmission line</p> <p>Use native vegetation during restoration of areas disturbed by project-related activities</p> | Implement a Vegetation Management Plan as proposed under Forest Service condition 25 with modifications to include provision of information to managers regarding sensitive species, protection of culturally significant plant populations, provisions for the use of herbicides and pesticides, and implementation of BMPs to protect wetlands                                 |
|                              | Monitor bald eagle territories   | Implement Wildlife Management Plan  | <p>Implement a Terrestrial Biological Management Plan as proposed under Forest Service condition 26 with modifications to include monitoring schedules and limited operating periods</p> <p>Prepare biological evaluations for special status species and biological assessments for threatened and endangered species prior to new construction within the project boundary</p> |

| <b>Resource</b>                          | <b>No-Action Alternative</b>   | <b>Proposed Action</b>  | <b>Staff Alternative</b>   |
|--|--|---|--|
|  |  | Implement APLIC standards for transmission lines to minimize avian collision and electrocution hazards  | Same as proposed action  |
| <b>Threatened and Endangered Species</b> | Implement VELB Conservation Program  | Same as no-action plus conduct pre-construction surveys for Pacific fisher and to minimize effects on northern spotted owl  | Same as proposed action  |
| <b>Recreation Resources</b>              | Fund California Fish and Game trout stocking program                             | Continue funding to California Fish and Game for stocking trout annually and to evaluate fish stocking program  | Stock 60,000 pounds of trout annually at the project and develop and implement a fish stocking plan to evaluate stocking success at the project                            |
|  | Continue to operate and maintain existing recreational facilities at the project | Develop and implement Recreation Development and Management Plan to include rehabilitation and upgrades to existing recreation facilities, reservoir water surface management, recreation monitoring, and a Signage and Education Plan, providing streamflow information to the public via the internet | Same as proposed action but include posting of streamflow data at MC-7 on the internet in addition to MC-1, consultation with American Whitewater and Friends of the River |

| <b>Resource</b> | <b>No-Action Alternative</b> | <b>Proposed Action</b>   | <b>Staff Alternative</b>   |
|-----------------|------------------------------|--|--|
|                 |                              | Construct new day-use area, reconstruct and extend existing boat ramp, and add parking at Tarantula Gulch  | Same as proposed action but add lighting at Tarantula Gulch boat ramp  |
|                 |                              | Provide a formal day-use area and campground at McCloud reservoir at Star City   | Same as proposed action  |
|                 |                              | Conduct a feasibility study to find a suitable location for a floating dock or pier and trail at McCloud reservoir and construct if feasible   | Same as proposed action  |
|                 |                              | Construct day-use areas at McCloud reservoir at Red Banks and Tarantula Gulch inlet  | Same as proposed action  |
|                 |                              | Construct three access points to McCloud reservoir at Battle Creek and on each side of McCloud dam   | Same as proposed action  |
|                 |                              | At McCloud and Iron Canyon reservoirs, assess and implement closures of user-created roads leading to the shoreline of McCloud and Iron Canyon reservoirs, in coordination with the Forest Service | Same as proposed action with inclusion of trails and dispersed use sites in the assessment and closures; expand to include area inside project boundary at both McCloud and Iron Canyon reservoirs |

| <b>Resource</b> | <b>No-Action Alternative</b> | <b>Proposed Action</b>  | <b>Staff Alternative</b>  |
|-----------------|------------------------------|---|---|
|                 |                              | Construct a day-use site and access trail along the Lower McCloud River, at the base of McCloud dam                                 | Same as proposed action   |
|                 |                              | Reconstruct Hawkins Landing boat ramp and campground and provide additional parking, restroom facilities                            | Same as proposed action   |
|                 |                              | Conduct a site evaluation and provide three paved parking areas along FR37N78 with shoreline access points to Iron Canyon reservoir | Same as proposed action   |
|                 |                              | Construct new boat ramp and shoreline access at Iron Canyon reservoir   | Same as proposed action with the inclusion of adding lighting at the boat ramp  |
|                 |                              | Relocate (if feasible) or reconstruct Deadlun Campground if a suitable location is found  | Reconstruct Deadlun Campground to provide double and triple sites and construct new campground at Gap Creek for single unit campsites |
|                 |                              | Remove snow at Iron Canyon dam boat ramp and access road when project operations require snow removal from Oak Mountain Road        | Same as proposed action   |

| <b>Resource</b> | <b>No-Action Alternative</b> | <b>Proposed Action</b>   | <b>Staff Alternative</b>  |
|-----------------|------------------------------|--|---|
|                 |                              | Evaluate the feasibility of constructing a pedestrian shoreline access trail at the upper end of Pit 7 reservoir, downstream of Pit 6 powerhouse tailrace, and construct if suitable location found              | Construct the shoreline access trail  |
|                 |                              | Conduct feasibility assessment for providing boat put-in or boat hand- launch at Montgomery Creek, near the lower end of Pit 7 reservoir, if not feasible construct a fishing access trail with boat hand-launch | Conduct a site evaluation to determine the location of a pedestrian shoreline access trail at the lower end of Pit 7 reservoir with paved parking and construct this facility |
|                 |                              | Reconstruct Fenders Flat day-use area (above Pit 7 afterbay dam) and boat ramp   | Same as proposed action   |

| <b>Resource</b>                | <b>No-Action Alternative</b>                                     | <b>Proposed Action</b>  | <b>Staff Alternative</b>   |
|--------------------------------|--|---|--|
|                                |  | If the Pit 7 afterbay powerhouse is constructed, provide access near the proposed Pit 7 afterbay powerhouse, and provide parking at the end of the powerhouse access road or along Fenders Ferry Road | Same as proposed action  |
|                                |  | Develop and implement Project Patrol Plan to provide project patrols  | No requirement for Project Patrol Plan, patrols, or funding for law enforcement position                               |
| <b>Cultural Resources</b>      |  | Implement a final HPMP  | Implement the final HPMP upon license issuance   |
|                                | Continue employee environmental training and sensitivity program | Continue employee environmental training and sensitivity program as part of the HPMP  | Same as proposed action  |
|                                |  | Provide program to educate public about cultural significance of area (with assistance from Pit River Tribe, Winnemem Wintu Tribe, and Forest Service)  | Same as proposed action  |
| <b>Land Use and Aesthetics</b> | Continue to maintain all project roads and facilities            | Develop and implement a Road and Transportation Facility Management Plan for project roads  | Same as proposed action plus revise project boundary to include all project roads and existing recreational facilities |

| <b>Resource</b> | <b>No-Action Alternative</b>  | <b>Proposed Action</b>  | <b>Staff Alternative</b>   |
|-----------------|---|---|--|
|                 |   | Execute a separate MOU with the Forest Service for areas with shared responsibility         | Outside of licensing proceeding  |
|                 | Continue to implement the Spill Prevention, Control, and Countermeasures Plan and the Hazardous Materials Business Plan | Same as no-action   | Same as no-action, but file existing Spill Prevention, Control, and Countermeasures Plan and Hazardous Materials Business Plan with the Commission |
|                 |   | Identify specific visual quality mitigation measures and develop an implementation schedule | Same as proposed action  |
|                 |   | Develop and implement a Fire Response Plan  | Same as proposed action  |

Under the no-action alternative, environmental conditions would remain the same and no enhancement of environmental resources would occur.

## **5.2 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE**

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife; the protection of recreation opportunities; and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for relicensing the McCloud-Pit Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency and public comments filed on this project and our review of the environmental and economic effects of the proposed action, the staff alternative, and no action, we recommend the staff alternative as the preferred alternative for the McCloud-Pit Project.

We recommend this alternative because: (1) issuing a new license would allow PG&E to continue operating the project as a beneficial, dependable source of water and electric energy; (2) the project, with a total installed capacity of 368 MW may eliminate the need for an equivalent amount of fossil fuel-produced energy, which helps conserve these non-renewable resources and limits atmospheric pollution; (3) our recommended environmental measures would protect water quality and quantity, enhance fish and wildlife resources, protect cultural resources, and improve public use of the project's recreational facilities and resources; and (4) the public benefit of these measures would exceed those of the other alternatives. Although we did not adopt all of the Forest Service's 4(e) conditions, or adopted them with modifications, we recognize that the Commission must include these conditions in their entirety, without modification in any license it may issue, due to their mandatory nature.

In the staff alternative, we include the following environmental measures proposed by PG&E, based on our analyses included in sections 3.0, *Environmental Analysis*, and 4.0, *Developmental Analysis*. In some cases, we modified or supplemented PG&E's proposed measures and these modifications are indicated in *italic* text.

### **Geology and Soils**

- Prepare an LWD Management Plan.
- Prepare an Erosion and Sediment Monitoring and Control Plan.

### **Aquatic Resources**

- Continue to implement the current minimum flow release schedule for the Pit 7 afterbay reach.
- Implement upramping rates of no more than 100 cfs per hour prior to the start of an uncontrolled spill event at McCloud dam.
- Develop and implement a water quality monitoring plan.

### **Recreation Resources**

- Develop and *implement* a Recreation Development and Management Plan that would include: location, conceptual designs, and schedules for upgrading existing recreation facilities and constructing new recreation facilities, *including the reevaluation of the facilities for degradation at mid-license term or 25 years, whichever is greater*; plans using the Forest Service design standards (including applicable standards for providing access to users with disabilities); and details regarding O&M activities at *all recreation facilities*

*including existing and new project recreation facilities. The plan also should incorporate the following components:*

- A Project Sign Plan that includes an interpretive and education component;
  - Monitoring, visitor surveys, and use estimation with report concurrent with the recreation Form 80 reporting. This measure also should include details addressing collection of annual use data at facilities where passes/fees are collected; consultation with the Forest Service on the survey methods for the Recreational Resource Survey; and consultation every 6 years (concurrent with the recreation Form 80) with the Forest Service, appropriate agencies, and interested parties to review and adjust project-wide recreation management objective, if needed; and
  - A water surface management plan to manage reservoir use at McCloud reservoir. This plan component would include installing speed limit signs in the northern end of the reservoir, LWD removal from the reservoir, points of public access to the shoreline, and boating speeds. This measure would also include details addressing monitoring and management of recreation user safety, including developing protocols for all project reservoirs for preventing/removing unapproved buoy courses, approved use of docks, and measures to prevent unauthorized access to project lands and waters; *annual* surface sweeps of McCloud and Iron Canyon reservoirs and boat ramps to remove logs and other debris; *monitoring boat use on McCloud and Iron Canyon reservoirs every 6 years coinciding with the recreation Form 80 schedule*; and reassessing water surface management mitigations every 6 years.
- Provide real-time streamflow (gages MC-1 and MC-7) and drawdown information to the public *via PG&E's website* on the internet.
  - At McCloud and Iron Canyon reservoirs, assess and implement closures of user-created roads, *trails, and dispersed use sites* leading to the shoreline of McCloud and Iron Canyon reservoirs, in coordination with the Forest Service.

#### McCloud Reservoir

- Within 5 years of Commission approval of the Recreation Plan, reconstruct the Tarantula Gulch boat ramp to California Boating standards with one lane ramp, provide a boarding dock, and extend the launch ramp to 3 feet (vertical) below the minimum operating pool elevation, including redesigning the parking lot to maximize parking spaces and a day-use area.
- Within 5 years of Commission approval of the Recreation Plan, provide access points (paved parking and shoreline access trail) at Battle Creek, West dam, and East dam.

- Within 5 years of Commission approval of the Recreation Plan, provide day-use areas at Red Banks and the intersection of Tarantula Gulch access road and FR 11.
- Within 5 years of Commission approval of the Recreation Plan, develop a formal campground and day-use area at Star City with walk-in sites (estimate six sites), paved parking, vault restroom, potable water, tables, fire rings/grills, trash receptacles/removal, and host site.
- Conduct a feasibility study to find a suitable location for a floating dock or pier and trail at McCloud reservoir and construct the facilities if feasible.

#### Lower McCloud River

- Within 5 years of Commission approval of the Recreation Plan, provide a *day-use facility* at the base of McCloud dam and provide parking, vault restroom, trash receptacle/removal, and shoreline pedestrian access trail on river left to the pool below the spillway. *This measure is modified to recommend that the trail accommodate fishing and boating access and to include an access road.*

#### Iron Canyon Reservoir

- Within 5 years of Commission approval of the Recreation Plan, reconstruct Hawkins Landing Campground to the Forest Service standards and provide potable water and reconstruct or resurface the access road to allow all-season use.
- Within 5 years of Commission approval of the Recreation Plan, retain concrete ramp surface at Hawkins Landing Boat Launch and replace or repair the surfacing that connects to the concrete ramp. *This measure is modified to include specifications for reconstruction of boat ramp surface (length and width, but not grade) to meet California Boating standards for one lane, and for construction of a parking area.*
- Within 5 years of Commission approval of the Recreation Plan, reconstruct Deadlun Campground to the Forest Service standards and increase capacity by about 10 sites to provide about 37 sites and provide potable water a shoreline access trail. *This measure is modified to specify that the campground be reconstructed to accommodate double and triple campsites.*
- Within 5 years of Commission approval of the Recreation Plan, construct a new boat launch at the east end of Iron Canyon dam that meets California Boating standards and provide vault restroom, picnic tables, potable water, and trash receptacles/removal. *This measure is modified to recommend that the boat ramp be operable at minimum operating pool, and that snow be removed from the parking area and ramp when project operations require snow removal from Oak Mountain Road.*

- Conduct a site evaluation to determine the location of three paved parking areas along FR 37N78, each with a capacity of up to three vehicle parking spaces and a pedestrian shoreline access trail. *This measure is modified to specify that once three suitable locations are identified, design and construct these project facilities.*
- Allow public use of at least one campground year-round. *This measure is modified to specify that a schedule for implementation would be included in the Recreation Plan.*

#### Pit 7 Reservoir

- Conduct a site evaluation to determine the location of a pedestrian shoreline access trail at the upper end of Pit 7 reservoir, downstream of Pit 6 powerhouse tailrace. *This measure is modified to include consultation with the Forest Service, and once a suitable location is found, constructing this facility within 5 years of Commission approval of the Recreation Plan. The facility would include a trailhead, parking for up to three vehicles, and hand-launch boating access.*

#### Pit 7 Afterbay

- Within 2 years of Commission approval of the Recreation Plan, grade and maintain FR 35N66 from its intersection with FR 37N78 to the car-top boat launch. Provide a vault restroom near the car-top boat launch.
- Continue to prohibit public access to Pit 7 afterbay water surface and shoreline by maintaining fencing, signage, and patrols.
- If the Pit 7 afterbay powerhouse is constructed, provide a paved parking area for two to three vehicles at the end of the powerhouse access road or along Fenders Ferry Road and provide a vault restroom, trash receptacle/removal, and pedestrian access to the shoreline between the powerhouse and Fenders Ferry Bridge. *This measure is modified to condition the day-use area on public safety and homeland security needs.*
- Within 5 years of Commission approval of the Recreation Plan, provide a day-use site at Fenders Flat with a capacity of five sites, parking, vault restroom, tables, fire grills, and trash receptacles/removal, and coordinate with the Forest Service to develop and implement a plan to revegetate disturbed areas and prevent vehicle access beyond the access road and parking area.

#### **Land Use and Aesthetic Resources**

- Develop, file, and implement, within 1 year of license issuance, a Road and Transportation Facilities Management Plan for all project roads.
- Develop, file, and implement, within 1 year of license issuance, a Fire Prevention and Response Plan.

- Include all existing project roads and recreation sites within the project boundary and file a revised exhibit G with the Commission within 1 year of license issuance.
- Develop, file, and implement, within 1 year of license issuance, visual quality management tasks and a timeline.

**Additional Measures Identified by Staff**

In addition to PG&E’s proposed measures listed above (and modified as indicated), the staff alternative also includes the following additional measures identified by staff based on agency, tribal, and non-governmental organization specifications, recommendations, and our analysis.

**Geology and Soils**

- Within 12 months of license issuance, develop and implement a Gravel and Coarse Sediment Management Plan in consultation with agencies and approved by the Forest Service. Employ an adaptive management approach to monitoring with Bald Mountain Creek confluence serving as the downstream terminus for the monitoring program, and augment gravel and coarse sediment periodically. Evaluate Star City Creek as a primary source of gravel, and evaluate other potential alternate local sites, such as Tarantula Gulch delta in the development of the Coarse Sediment Management Plan.

**Aquatic Resources**

- Within 90 days of license issuance, release mean daily flows of at least 175 cfs year round from the McCloud dam (as measured at MC-7) such that the mean daily flow at Ah-Di-Na (MC-1) is at least 200 cfs. Augment flows during the period February 15 through August 31 as follows:

| Month          | Lower McCloud River Flows (cfs) by Water Year <sup>a</sup> |                          |
|----------------|--|--------------------------|
| February 15-29 | 0-75% RO <sup>b</sup>                                      | No flow change           |
|                | 76-89% RO <sup>b</sup>                                     | No flow change           |
|                | 90-99% RO <sup>b</sup>                                     | Increase flow by 75 cfs  |
|                | 100-119% RO <sup>b</sup>                                   | Increase flow by 125 cfs |
|                | ≥120% RO <sup>b</sup>                                      | Increase flow by 175 cfs |
| March 1-15     | 0-75% RO <sup>b</sup>                                      | No flow change           |
|                | 76-89% RO <sup>b</sup>                                     | Increase flow by 50 cfs  |
|                | 90-99% RO <sup>b</sup>                                     | Increase flow by 50 cfs  |
|                | 100-119% RO <sup>b</sup>                                   | Increase flow by 100 cfs |
|                | ≥120% RO <sup>b</sup>                                      | Increase flow by 150 cfs |

| Month  | Lower McCloud River Flows (cfs) by Water Year <sup>a</sup> |                          |
|--|--|--------------------------|
| March 16-31  | 0-75% RO <sup>c</sup>                                      | No flow change           |
|  | 76-89% RO <sup>c</sup>                                     | No flow change           |
|  | 90-99% RO <sup>c</sup>                                     | Increase flow by 50 cfs  |
|  | 100-119% RO <sup>c</sup>                                   | Increase flow by 50 cfs  |
|  | ≥120% RO <sup>c</sup>                                      | Increase flow by 150 cfs |
| April 1-15   | 0-75% RO <sup>c</sup>                                      | No flow change           |
|  | 76-89% RO <sup>c</sup>                                     | No flow change           |
|  | 90-99% RO <sup>c</sup>                                     | No flow change           |
|  | 100-119% RO <sup>c</sup>                                   | Increase flow by 50 cfs  |
|  | ≥120% RO <sup>c</sup>                                      | Increase flow by 50 cfs  |
| <p><b>If the release from McCloud dam (MC-7) on April 15 is equal to or greater than 200 cfs:</b><br/> On each Friday after April 15, decrease the flow by 50 cfs per week until the flow reaches 200 cfs, then maintain 200 cfs release at McCloud dam (MC-7) through June 30<br/> July 1 through August 31: release 175 cfs at MC-7, but maintain at least 215 cfs at Ah-Di-Na (MC-1)<br/> Beginning September 1: Release 175 cfs at MC-7, but maintain at least 200 cfs at Ah-Di-Na (MC-1)</p> <p><b>If the release from McCloud dam (MC-7) on April 15 is less than 200 cfs:</b><br/> Beginning April 16: Release 175 cfs at MC-7, but maintain at least 200 cfs at Ah-Di-Na (MC-1).</p> |  |                          |

<sup>a</sup> Using most recent California Department of Water Resources Sacramento Valley Water Year Type Index forecast

<sup>b</sup> February 1 runoff percentage from DWR Bulletin 120 for McCloud River above Shasta Lake

<sup>c</sup> March 1 runoff percentage from DWR Bulletin 120 for McCloud River above Shasta Lake.

- Implement a minimum flow release schedule for the Iron Canyon dam reach, as follows:

| <b>Release from Iron Canyon Dam (cfs) by Water Year-type</b> |                  |                     |  |
|--|------------------|---------------------|--|
| <b>Month</b>   | <b>Wet</b>       | <b>Above Normal</b> | <b>Below Normal, Dry, Critically Dry</b> |
| October  | 10               | 7                   | 7  |
| November   | 10               | 7                   | 7  |
| December   | 15               | 10                  | 7  |
| January  | 15               | 10                  | 7  |
| February   | 15               | 10                  | 7  |
| March  | >20 <sup>a</sup> | 15                  | 10                                       |
| April  | >20 <sup>a</sup> | 15                  | 10                                       |
| May  | 15               | 10                  | 7  |
| June   | 15               | 10                  | 7  |
| July   | 10               | 7                   | 7  |
| August   | 10               | 7                   | 7  |
| September  | 10               | 7                   | 7  |

<sup>a</sup> In March and April of wet water years, the flow control valve on Iron Canyon dam shall be fully opened. Mean daily flow shall be at least 20 cfs during this period.

- Downramp all spill events controllable at McCloud dam by valve operation at a maximum rate of 150 cfs per 48 hour until the prescribed minimum instream flow value is reached and upramp operational controllable spills at McCloud dam at a maximum rate of 200 cfs per 24-hour period.
- Determine water year type based on the forecast of unimpaired runoff of the McCloud River above Shasta Lake as provided by DWR Bulletin 120 or its successor.
- Operate, maintain, and modify (if necessary) gages needed to determine river stage and minimum streamflow; measure and document all instream flow releases in publicly available formats.
- Develop and implement an Aquatic Biological Monitoring Plan, as specified by Forest Service condition 27, for fish, benthic macroinvertebrates, special status aquatic mollusks, other special status species, and invasive aquatic species, with the inclusion of monitoring schedules specific to each component of the plan. The special status species section of the Aquatic Biological

Monitoring Plan also should incorporate a monitoring plan for northwestern pond turtles and foothill yellow-legged frogs. The number of sites, site locations, sampling methods, and data protocols should be consistent with relicensing studies.

- File an annual report on the reintroduction and status of listed anadromous species in the project area. The report should detail the steps that have been taken in the reintroduction, a status of the findings and actions of the Interagency Fish Passage Steering Committee, and should include the comments of NMFS.

### **Terrestrial Resources and Threatened and Endangered Species**

- Implement a Vegetation and Invasive Weed Management Plan, as specified by Forest Service condition 25, with modifications to include provision of information to managers regarding sensitive species, protection of culturally significant plant populations, provisions for the use of herbicides and pesticides, and implementation of BMPs to minimize effects on wetlands.
- Implement a Terrestrial Biological Management Plan, as specified by Forest Service condition 26, with the inclusion of species-specific monitoring modifications and limited operating periods. Prepare biological evaluations for special status species and biological assessments for threatened and endangered species prior to construction.

### **Recreation Resources**

- Stock 60,000 pounds of trout annually at the project, develop (for Commission approval) and implement a fish stocking plan in consultation with California Fish and Game within 1 year of license issuance, and evaluate and monitor the amount of fish to be stocked every 6 years.
- Provide lighting at both the Tarantula Gulch and Iron Canyon boat launches.
- Conduct a site evaluation to determine the location of a pedestrian shoreline access trail at the lower end of Pit 7 reservoir, with paved parking. Once a suitable location is found, construct this facility within 5 years of Commission approval of the Recreation Plan.

### **Cultural Resources**

- Implement the final HPMP (PG&E, 2010b) upon license issuance.

### **Land Use and Aesthetic Resources**

- File copies of the existing Spill Prevention, Control, and Countermeasures Plan and Hazardous Materials Business Plan with the Commission and provide copies to the Forest Service and the Central Valley Regional Water Board within 30 days of license issuance and continue to implement these plans.

### 5.2.1 Discussion of Key Issues

The following paragraphs describe the basis for staff-recommended measures as well as for not recommending measures recommended by other entities. Under each major issue, we discuss our recommendations for the McCloud-Pit Project.

#### **Geology and Soils**

##### *Large Woody Debris*

LWD in the project streams functions primarily as: (1) aquatic habitat along the channel margins; (2) riparian habitat where it rafts up onto surfaces above the low-flow channel; and (3) in rare cases, as aquatic habitat where wood is retained in the active portion of side channels. As LWD breaks apart and decays, it may also increase the supply of organic material to the river channel, benefiting benthic macroinvertebrates and other components of the aquatic food web.

In Iron Canyon Creek, LWD is abundant and project operations appear to have little or no effect on LWD supply. In the Lower McCloud River, however, the large channel width, high stream power, and normally low amount of LWD that passes the McCloud dam limit the availability of downstream LWD. PG&E proposes to prepare an LWD Management Plan after consultation with the Forest Service. The plan would provide an operating procedure to facilitate the placing of woody debris downstream of McCloud dam. The plan would specify size criteria, placement and storage sites, volume and frequency of placement, and monitoring procedures.

Forest Service condition 21 is consistent with PG&E's proposal except that it specifies that monitoring procedures included in the plan should assess mobilization of LWD from the augmentation site.

We recommend PG&E's proposal and the Forest Service's condition 21 to prepare an LWD Management Plan. Monitoring procedures included in the plan would assess mobilization of LWD from the augmentation site. This specific monitoring procedure would provide information necessary to assess the location, timing, and quantity of LWD appropriate to achieve the stated objectives. We estimate that the annualized cost of this plan would be \$214,000. Because LWD contributes to productive aquatic ecosystems, is an important component in the formation of complex aquatic habitat units and channel maintenance, and increasing the amount of LWD in downstream reaches could provide a substantial benefit to fish habitat and aquatic habitat in general at a reasonable cost, we recommend adopting this measure.

##### *Erosion and Sediment Control*

Fine sediment from reduction of seasonal high flow events, surface erosion, increased overland flow, and mass wasting as a result of project operations can adversely affect environmental resources through increased turbidity and degraded spawning substrate. In order to manage existing erosion and reduce future erosion and sediment delivery to stream channels, PG&E proposes to prepare an Erosion and Sediment

Monitoring and Control Plan within 1 year after license issuance. The plan would guide management of erosion and sediment control during the term of the new license and would include the following elements:

- Methods for ongoing inventory of project-related erosion and sedimentation;
- A schedule for periodic monitoring;
- An inventory of erosion sites identified by periodic monitoring;
- Criteria for treating erosion sites;
- Protocols for emergency erosion and sediment control; and
- A process and schedule for reporting monitoring results, including periodic plan review and revision.

Initial priority would be placed on the 56 sites identified during pre-filing studies, ranked as having high erosion potential. Sites would be monitored for 5 years to assess erosion activity and associated causes. Annual monitoring reports would include a Forest Service-compatible database of erosion sites and detailed site-specific erosion and sediment control measures where necessary and appropriate.

Forest Service condition 22 supports PG&E's proposal and specifies that the plan should provide direction for managing erosion and controlling sediment during the term of the new license. Furthermore, Forest Service condition 22 specifies that during planning, and before any new construction or non-routine maintenance projects with the potential for causing erosion or stream sedimentation on or affecting Forest Service lands, PG&E should develop site-specific erosion control plans. The plans would include measures to control erosion, stream sedimentation, dust, and soil mass movement.

We recommend PG&E's proposal and Forest Service condition 22 for erosion and sediment control. We estimate that the cost of this plan would be \$120,000. Because the plan would help determine and develop the success of effective erosion and sediment control procedures, and would protect aquatic habitat, we consider this cost warranted.

#### *Gravel and Coarse Sediment*

As a result of project operations and the resultant trapped sediment behind McCloud dam, the reach from about 5 to 8 kilometers downstream of McCloud dam is the reach most likely to exhibit degraded habitat through coarsening of the bed surface and reduction in the frequency and quantity of mobile sediment deposits. Project operations could result in long-term adverse impacts on aquatic substrate habitat. PG&E did not propose to augment gravel and coarse sediment in the Lower McCloud River.

Forest Service modified condition 23 specifies that PG&E should develop and implement a Gravel and Coarse Sediment Management Plan within 1 year of license acceptance, after consultation with the Forest Service, conditioning agencies, and other interested parties, and with approval of the Commission and the Forest Service. The plan would require the periodic addition of 150 to 600 tonnes of gravel and coarse sediment to

the Lower McCloud River, with inputs below the McCloud dam spillway. The Forest Service specifies that PG&E consider using sorted gravel and coarse sediment from deposits in McCloud reservoir as the source of material for the plan. The plan would also include a monitoring component for the Lower McCloud River.

California Fish and Game's 10(j) recommendation 2 recommends that PG&E prepare a Gravel and Sediment Management Plan requiring the annual addition of 150 tonnes of gravel and sediment to the McCloud River, between the dam spillway and the confluence with Hawkins Creek. California Fish and Game also recommends that PG&E consider using the Star City Creek inlet as a material source. As part of the long-term monitoring component of this plan, California Fish and Game's recommendation incorporates amphibians as an indicator species for assessing ecosystem health.

PG&E alternative condition 23 proposed to revise the time to develop the Gravel and Coarse Sediment Management Plan to 2 years, which PG&E stated would allow for receipt of license articles from the Commission and collaborative plan development, and proposes that gravel and coarse sediment introductions occur periodically rather than annually. PG&E proposed that the source of the coarse sediment be the delta deposit at the head of the Star City Creek arm of McCloud reservoir, where the coarse sediment could be excavated "in the dry" and not dredged. PG&E recommended that the monitoring component of the plan cover the Lower McCloud River between McCloud dam and Ladybug Creek rather than Bald Mountain Creek, located about 1.5 miles downstream of Ladybug Creek, as originally specified by the Forest Service.

Given the adverse impacts with regard to gravel and coarse sediment noted above, we recommend Forest Service modified condition 23, under which PG&E would develop and implement a Gravel and Coarse Sediment Management Plan, and monitoring and adaptive management of gravel and coarse sediment augmentation. Periodic gravel augmentation would provide a more flexible mechanism for determining the volume and frequency of coarse sediment introduction necessary to maintain aquatic habitat, given that high spill flows capable of mobilizing sediment occur in about 4 out of 10 years. To provide more options and greater flexibility in implementing the gravel and coarse sediment program, we also recommend that alternative sources of material be evaluated, to identify the volume, physical and chemical characteristics, logistics for collection and transport of material, and range of costs. While we recommend that Star City Creek be evaluated as a primary source of gravel, we concur with the Forest Service that PG&E should also evaluate other potential alternate local sites, such as Tarantula Gulch delta in the development of the Coarse Sediment Management Plan. We also concur with the Forest Service's withdrawal of condition 24, which required PG&E to prepare a reservoir dredging plan. Reservoir dredging would be unnecessary under Forest Service modified condition 23, which specifies the sources of coarse gravel would be collected in dry areas above the waterline. Additionally, reservoir dredging is costly and poses the threat for additional environmental risks. We find, therefore, that the costs and risks outweigh any potential environmental benefit, and we do not recommend a dredging plan. Because the Forest Service and PG&E have worked collaboratively on the draft Coarse Sediment

Management Plan and it is substantially complete, we expect that 1 year would be adequate time to finalize the plan.

As previously indicated, we recommend PG&E employ an adaptive management approach with monitoring for augmenting gravel and coarse sediments in the Lower McCloud River as specified by the Forest Service. The monitoring plan would provide data on progress of the augmentation program and improvements in the gravel substrate through the reach downstream of the McCloud dam. These data would form the scientific basis for judgments on the success of the program and adjustments to the source of material, as well as its timing and placement, which may be necessary to support the fish and invertebrate community utilizing this reach. We also recommend that Bald Mountain Creek confluence serve as the downstream terminus for the monitoring program. Although studies indicate the presence of suitable amounts of gravel and coarse sediment in the reach between Ladybug Creek and Bald Mountain Creek, we note that this reach could serve as an important comparative baseline for determining the success of the proposed augmentation program. Finally, we note that foothill yellow-legged frog is the only amphibian species in the project area that could benefit from the gravel augmentation program. However, studies indicate that no foothill yellow-legged frogs are present in the proposed augmentation reach, and furthermore, the species is excluded from the reach due to cold water temperatures. Because amphibians are not effective for assessments of sediment augmentation plan success in the proposed augmentation reach, we do not recommend that PG&E include such assessments in its monitoring plan.

We consider the development of a Gravel and Coarse Sediment Management Plan specified by Forest Service condition 23 to represent an effective approach for improving instream aquatic habitat. We estimate that California Fish and Game's plan would have an annualized cost of \$75,000, and the Forest Service plan would have an annualized cost of \$79,000. Given the benefits of implementing Forest Service condition 23 as described above, we consider this cost to be warranted.

## **Aquatic Resources**

### *Instream Flows*

Flow regulation at McCloud and Iron Canyon dams and diversion of water to the project powerhouses affect both habitat for aquatic biota and recreational opportunities in downstream reaches. These reaches include Iron Canyon Creek below Iron Canyon dam (4.6-mile bypassed reach), the Pit River below Pit 7 dam, and the Lower McCloud River below McCloud dam (24-mile bypassed reach). As we discussed in section 3.3.2, *Aquatic Resources*, many participants, including PG&E, recommend raising minimum flows in these affected reaches, and we analyzed these recommended flow regimes in section 3.3.2.2, *Environmental Effects*. In section 4.1, *Power and Economic Benefits of the Projects*, we show how the proposed and recommended minimum flows decrease the project's power generation. Here we consider both the cost of raising instream flows and how the recommended minimum flows affect other competing flow uses, including aquatic habitat and recreational resources, such as angling and boating, and we then make

our final minimum flow recommendations for each reach, including the Lower McCloud River.

PG&E proposed minimum flow regimes for each of its project reaches to protect aquatic resources. For the reaches below McCloud and Iron Canyon dams, the minimum flows would vary by month and water year type (tables 3-22 and 3-23). For the Pit River below Pit 7 dam, the minimum flow would be the same year-round (150 cfs) whenever the water surface elevation at Shasta Lake is below 1,055 feet msl. To determine appropriate flows for aquatic and terrestrial biota, PG&E used both incremental flow methods and resource studies. In all cases, PG&E's proposed flows are equal to or greater than the flows required in the current project license and would provide more trout habitat in most months.

As we discuss in section 3.3.2.2, *Environmental Effects*, several participants recommended alternatives to PG&E's minimum flow regime proposals for the project's reaches. Forest Service modified condition 19 specifies seasonal flow regimes for each reach (tables 3-22, 3-23, and 3-24). PG&E alternative condition 19 proposes a minimum flow regime that differs slightly from the flow regime proposed in its license application for the Lower McCloud River and Iron Canyon Creek (tables 3-22 and 3-23). California Trout, Trout Unlimited, and McCloud River Club (table 3-25);<sup>31</sup> McCloud RiverKeepers (table 3-26); American Whitewater (table 3-27); and the Winnemem Wintu Tribe (table 3-28) also recommend minimum flows for the Lower McCloud River that are equal to or greater than the flows required in the current project license and would provide more trout habitat in most months.

#### Iron Canyon Creek Below Iron Canyon Dam

Because of the steep canyons and private property restrictions, angling pressure on Iron Canyon Creek is less than on the McCloud River and the project reservoirs. PG&E now releases a year-round minimum flow of 3 cfs to the 4.6-mile Iron Canyon Creek reach. We note that surveys of Iron Canyon Creek found a self-sustaining rainbow trout population in good condition. However, the results of the PHABSIM model show that increasing the minimum instream flow during all months would likely benefit resident rainbow trout by increasing the usable habitat for juvenile and adult life stages. Except for some small differences (two cfs) during dry water years, PG&E's minimum flow regime for this reach and the minimum flow regimes filed by both the Forest Service and California Fish and Game are very similar. PG&E alternative condition 19 proposes a minimum flow regime that is identical to the Forest Service flow regime. All proposals would set minimum flows in the creek so that the monthly minimum flows vary seasonally to mimic natural hydrologic conditions.

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<sup>31</sup> As Trout Unlimited and McCloud River Club filed minimum flow recommendations identical to California Trout's recommendation, and as recent filings have been filed jointly, we now refer to it as the California Trout recommendation.

To enhance trout populations in Iron Canyon Creek, we recommend the PG&E alternative condition and Forest Service modified condition 19 minimum flow regime. Raising the minimum flows in this manner would reduce the project's average annual generation, at a cost of about \$727,000 annually. While raising the minimum flow in this reach would enhance conditions for the rainbow trout population, we acknowledge the loss in generation due to the increased flows but conclude that the enhancement justifies this cost. In the draft EIS, we recommended that PG&E file a plan to enhance angling access to Iron Canyon Creek in order to provide additional public benefit as a result of this aquatic enhancement. In its September 27, 2010, letter, PG&E indicated that access to Iron Canyon Creek currently exists via a road that accesses the gaging station near the upstream end of the creek. Additionally, PG&E noted that much of Iron Canyon Creek has exceedingly difficult terrain for access. Due to these circumstances, we no longer recommend that PG&E file a plan to enhance angling access to Iron Canyon Creek.

#### Pit River Below Pit 7 Dam

PG&E proposes, the Forest Service specifies, and California Fish and Game recommends a continuation of the 150-cfs minimum flow in the Pit River below Pit 7 dam. Current project flows provide for a range of aquatic flow-habitat transitioning from the riverine upstream conditions to broad, shallow lacustrine habitat near the afterbay dam. This habitat supports a diverse fish assemblage, dominated by native hardhead and Sacramento suckers. Furthermore, the fish populations in the reach have a recurrent seasonal exchange with the fish community in the Pit River arm of Shasta Lake. Continuation of this minimum flow will ensure adequate flow-habitat in the reach, while also ensuring continuity with the Pit River arm of Shasta Lake even when the water surface elevation of Shasta Lake is below 1,055 feet msl. The proposed minimum flow of 150 cfs, consistent with current project operation, would not alter the project's average annual generation and would protect aquatic habitat and fish populations; therefore, we recommend a minimum flow of 150 cfs in the Pit River below Pit 7 dam.

#### Lower McCloud River Below McCloud Dam

PG&E proposed a minimum flow regime for the Lower McCloud River reach that results in a low flow season from May to November of 150 cfs, and a high flow season of 200 to 220 cfs from December to April. In condition 19, the Forest Service specified a higher minimum baseflow (175 cfs) for the Lower McCloud River than was originally proposed by PG&E, and a minimum flow regime that varies by month and water year type. The Forest Service flow regime would create a spring pulse flow condition which more closely reflects a natural hydrograph. PG&E's alternative condition 19 baseflows are 25 cfs higher (175 cfs) than its proposed baseflows. PG&E's alternative also incorporates a minimum flow regime that varies by month and water year type.

Commenters on the draft EIS indicated that under the existing license, flows at Ah-Di-Na (MC-1) were commonly greater than the minimum 200 cfs originally specified by the Forest Service. Therefore, in its November 29, 2010, filing, the Forest Service modified condition 19 to specify that, during normal and above normal water years (when

flows at the McCloud dam greater than or equal to 200 cfs on 15 April) flows at Ah-Di-Na (MC-1) should be at least 215 cfs through July and August, then decreased to 200 cfs in September. This modification would ensure that flows in the Lower McCloud River downstream of Ah-Di-Na are more representative of the historical summer base flows. Similar to our draft EIS recommendation, Forest Service modified condition 19 also would reduce the March 16 flow increase from 100 cfs to 50 cfs during normal to wet years, thereby reducing both the rate of increase and peak magnitude in those years. In its November 29, 2010, letter, California Trout indicated concurrence with the flows specified by Forest Service modified condition 19. Although PG&E indicated at the November 17, 2010 section 10(j) meeting that it was close to agreement with the Forest Service on a flow regime, PG&E has not indicated that it concurs with the flow regime specified in Forest Service modified condition 19.

California Fish and Game's recommended baseflows (200 cfs), to be measured at a single compliance point located at McCloud dam (gage MC-7), are slightly higher than flows specified by Forest Service modified condition 19. American Whitewater's recommended alternative baseflows (200 cfs) also are slightly higher than the Forest Service's modified condition 19 flows. In addition to its recommended baseflow, American Whitewater added seasonal peak flows for whitewater boating. Due to angler safety concerns, McCloud RiverKeepers' proposed alternative flows were substantially lower (100 cfs) than the Forest Service and PG&E flows, with flows varying by month from 160 to 210 cfs (table 3-26).

The Lower McCloud River's trout fishery is highly regarded in terms of aesthetics and biological productivity;<sup>32</sup> however, this fishery can be enhanced even further. The results of aquatic flow-habitat studies generally predicted that increasing minimum instream base flows from the current 40-50 cfs to between 175 and 200 cfs in summer and fall would provide the greatest abundance and highest habitat values for resident trout species. While PG&E and the Forest Service agree on a baseflow of 175 cfs at gage MC-7, California Fish and Game determined that PG&E should implement a baseflow of 200 cfs. Modeling results indicated a negligible difference in the amount of aquatic habitat available with a 200-cfs baseflow, as compared to a 175-cfs baseflow. For this reason, coupled with the loss of generation associated with a 200-cfs flow, we do not recommend the California Fish and Game minimum flow regime.

Most flow recommendations from licensing participants are designed to create a seasonal hydrograph that is more typical of natural patterns for the Lower McCloud River by increasing flows from the minimum baseflow during late winter and early spring,

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<sup>32</sup> California Fish and Game designates the Lower McCloud River a "Wild Trout Water," defined as: "aesthetically pleasing and environmentally productive streams ... managed exclusively for wild trout, where the trout populations are managed with appropriate regulations to be largely unaffected by the angling process." This designation is similar to the "blue ribbon" designation used in other states.

followed by decreasing flows through late spring, and returning to the baseflow through the summer and fall. Specifically, the Forest Service specifies and PG&E recommends increasing flow twice a month beginning in mid-February, depending on the relative rate of runoff in a given year, as determined by the water year (as described in DWR Bulletin 120), reaching a peak of 500 cfs in normal water years. Studies predict that maximal trout spawning occurs between 300 and 400 cfs. Under the current license, the flow regime does not provide for these high late winter-spring flows that mimic the natural hydrograph.

California Trout's original minimum flow recommendations (table 3-25) differed slightly from the Forest Service and PG&E flow regime, although it too attempted to mimic the natural hydrograph in the spring. Under California Trout's flow regime, flows would decrease at a faster rate after April 15 during normal to wet years (table 3-25). As compared to the flow regime specified in Forest Service modified condition 19 and PG&E's alternative condition 19, these slight changes in the rate decrease in spring flows are not likely to have a significant effect on available habitat for various trout life stages, and would still provide some benefits to spawning rainbow trout.

The McCloud RiverKeepers recommends that minimum flows at McCloud dam be established at 100 cfs year-round and that minimum flows at Ah-Di-Na (gage MC-1) vary by month from 160 to 210 cfs in normal years and from 160 to 180 cfs in dry years (table 3-26). While this recommendation would increase minimum flows compared to the current license, it would not create a more natural seasonally varying flow regime as offered by the other recommendations. Seasonal variation in flow typical of most streams in lower mountain and foothill landscapes helps create diverse aquatic habitat, promotes ecological diversity, and benefits wild and native species that have adapted to seasonally variable conditions. Because the McCloud RiverKeepers' recommended minimum flow regime does not include this seasonal variability, we do not recommend it.

In its license application, PG&E proposes to provide a recreation flow event from McCloud dam if a natural spill flow event of at least 300 cfs for 7 consecutive days during the period of April 1 through October 31 has not occurred at any time in the previous three calendar years. PG&E defines a recreation flow event as a minimum flow release of 300 cfs from McCloud dam for 11 consecutive days during the period between May 15 and June 15. In its alternative condition 19, however, PG&E does not propose to provide a recreation flow event because of lack of support from stakeholders. In contrast, while the Forest Service does not specify flows specifically for recreational boating, it comments that its specified flow regime would provide more boating days than currently exist, especially in drier years, and that, in terms of whitewater boating, the flow regime is not significantly different from the current flow regime. Further, the Forest Service also notes that a few more whitewater boating days actually would be provided in wetter years under its flow regime.

As noted earlier, American Whitewater recommends the release of elevated flows in April and May to provide whitewater boating opportunities, in addition to ecological

benefits. In wet and above normal water years, American Whitewater recommends peak flows of 600 cfs through April and a ramping down of flows through May. In below normal water years, American Whitewater recommends flows of at least 400 cfs during the month of April. In dry and critically dry years, American Whitewater recommends flows of 300 cfs ramping down to 200 cfs baseflows by the opening day of trout season.

As discussed in section 3.3.5.2, *Environmental Effects, Recreation Flows*, acceptable flow ranges for various whitewater experiences were developed from a flow-acceptability survey conducted by PG&E for the relicensing proceeding. The survey found that the standard flow range for whitewater boating for both kayaks and rafts from the base of McCloud dam to Ah-Di-Na Campground was between 700 and about 1,000 cfs, depending on the boat type (optimal 800 cfs for both boat types). From Ah-Di-Na to Shasta Lake, the standard flow range is between 600 and 1,500 cfs, depending on the boat type (optimal between 800 and 900 cfs depending on the boat type). From the base of McCloud dam to Ah-Di-Na Campground, technical whitewater boating conditions would exist between 500 cfs and 700 cfs. Flows greater than 1,500 cfs are considered “big water” and are suitable only for expert paddlers.

As also discussed in detail in section 3.3.5.2, *Environmental Effects, Recreation Flows*, during the 13-year period we analyzed under the existing license (1994-2006), the number of whitewater boating days was 0 in 6 years and 20 or fewer days in 6 of the 7 remaining years. The flow scenarios proposed by California Fish and Game and PG&E, and specified by Forest Service modified condition 19, would have had no effect on the number of days available to whitewater boaters in 8 of the years and would have increased the available days from 1 to 3 days during the other 5 years. The California Trout recommendation would have increased the number of days from 3 to 7 during four years and have had no effect on the number of days during 9 years.

In comparison to existing flows at the project, PG&E’s alternative condition 19 and Forest Service modified condition 19 minimum flow regime would likely result in an additional 100 cfs available in the reach in late March through mid-May in wet years and an additional 200 cfs in mid-April through early June in very wet years, therefore providing more opportunities for whitewater boating than currently exist during these water years. Although California Trout’s recommendation would create more early spring whitewater opportunities than currently exist, the recommended flow regime would likely provide for fewer days with flows greater than 300 cfs in wet years and fewer days with flows greater than 600 cfs in very wet years.

In addition to our analysis of recreational boating flows, we also analyzed the effects of flows on recreational fishing. As noted in section 3.3.5.1, *Affected Environment, Angling Resources*, in the surveys conducted for the relicensing proceeding, anglers and guides indicated higher flows diminish fishing quality by decreasing the angler’s ability to wade, cross the water, and cast, as well as decreasing fishable water and safety. PG&E’s study results indicate that 210 to 375 cfs, as measured at the Ah-Di-Na gage (MC-1), is optimal for wading anglers, with the acceptable range

from 200 to 475 cfs. In addition, while higher flows still allow for some fishable locations, there are fewer of them and each has a smaller fishable area, creating the potential for overfishing. PG&E's controlled flow study also found that as flow increased, use levels decreased, with fewer anglers fishing for shorter durations.<sup>33</sup> Though all angling groups and Lower McCloud River users support enhancing aquatic habitat in the Lower McCloud River, most do not support flow releases for whitewater recreational boating in the Lower McCloud River. These groups oppose changes from the existing daily flow requirements in the Lower McCloud River due to concerns for angler safety and in order to preserve the high quality trout fishing for California licensed anglers. Fishing is open in the Lower McCloud River from the last Saturday in April through November 15. Under current conditions, after high spring flow conditions, the river is usually fishable by mid-May.

As previously stated, California Trout's spring pulse flow regime is slightly different than the Forest Service and PG&E's spring pulse flow regime. Under California Trout's flow regime, flows would increase at a slower rate at the beginning of the season during normal to dry years and decrease at a faster rate at the end of the season during normal to wet years. Additionally, during normal to dry years, the spring pulse flow would peak at about 450 to 100 cfs lower than the peak flow under the Forest Service and PG&E's regime in similar conditions. Therefore, during normal to wet years, California Trout's regime would allow for optimal angling conditions, between 200 and 300 cfs, up to 4 weeks earlier in the fishing season than in the Forest Service and PG&E's regime. California Trout's recommendation would increase angling opportunities by allowing anglers to access the river earlier in the fishing season.

Because the low end of the range for optimal conditions for wading anglers is 210 cfs, while the minimum base flow in most recommendations is 200 cfs, all of the recommended flow scenarios would result in a decrease in optimal fishing days when compared to the existing license. The Forest Service modified condition 19 would generally have resulted in the least amount of optimal fishing days lost than the recommendations made by PG&E (both in its license application and its alternative), California Trout, California Fish and Game, and American Whitewater. In contrast, while the number of optimal days would have decreased, the number of acceptable days for wading anglers would generally have increased during most of the 13-year period of analysis under all flow proposals. There were no significant differences in the number of days gained among the recommendations from PG&E, California Trout, California Fish and Game, and American Whitewater, and the Forest Service's modified condition 19.

American Whitewater's recommendation and PG&E's original proposal to release higher peak flows in April would create more opportunity for whitewater boating at the project overall; however, these higher flows would decrease the number of angling days

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<sup>33</sup> Technical Memorandum 58: Lower McCloud River Report on Flows and Fishing Conditions (RL-S3).

at the project in all but critically dry water-years and potentially compromise the safety of those anglers who wade in the stream to fish. For these reasons, we do not recommend either of these flow regimes.

In the draft EIS, we recommended the minimum flow regime proposed by California Trout. At that time, we concluded that California Trout's recommendation struck the best balance between angling opportunities, aquatic resources, and recreational boating. However, in light of comments on the draft EIS, we have reevaluated our draft EIS minimum flow recommendation for the Lower McCloud River.

Our analysis leads us to conclude that Forest Service modified condition 19, not unlike our draft EIS recommendation, would provide for wadeable conditions beneficial to anglers by the trout fishing season. Although both flow regimes would provide for favorable wading conditions, our draft EIS lower late winter-spring flow recommendation would reduce recreational boating opportunities sooner in the spring when compared to the Forest Service modified condition 19 flow regime. We note that numerous draft EIS comments filed by local recreational boaters and American Whitewater expressed the need for more whitewater flows on the Lower McCloud River below McCloud dam.

As we stated in the draft EIS, in making a final minimum flow recommendation for the Lower McCloud River, in addition to power generation, we must weigh the needs of aquatic resources, anglers, and recreational boaters. Given the importance of the existing blue ribbon fishery in the Lower McCloud River, and also recognizing the demand for recreational boating, we now conclude that the minimum flow regime recommended by Forest Service modified condition 19 strikes the best balance between angling opportunities, aquatic resources, and recreational boating. This flow regime would provide more aquatic habitat and create some early spring whitewater opportunities while still making sure the river is accessible for angling early in the fishing season (by mid-May). While the PG&E minimum flow regime also would provide these opportunities and enhancements, including more aquatic habitat and recreational boating, it would result in fewer angling opportunities early in the fishing season in a majority of water years. While our draft EIS flow regime would provide benefits for aquatic habitat and also angling, it would limit recreational boating opportunities in the spring as compared to the Forest Service's modified condition 19 flow regime. As such, and because the costs associated with both recommendations are similar, we do not recommend PG&E's minimum flow regime and no longer recommend our draft EIS flow regime. Instead, we now recommend that PG&E implement the flow regime specified in Forest Service condition 19, as modified on November 29, 2010 (table 3-22). We estimate this flow regime would reduce the average annual power generation at the project by 40 GWh and would reduce the annual net benefit of the project by \$3,500,000, compared to current operations. Given the enhancements noted above, however, we conclude that implementation of the minimum flow regime is worth the cost.

### *Flow Compliance and Monitoring*

PG&E and Forest Service/California Fish and Game have proposed different methods to measure compliance with the proposed minimum flow releases, although the two approaches appear to accomplish essentially the same goal by requiring compensation for under-release of minimum flows.

PG&E proposed that the minimum flow requirements be met on the basis of the seven-day running average of mean daily flow. PG&E proposed the following: (1) individual mean daily flows may be less than the required minimum streamflow; (2) however, the instantaneous 15-minute streamflow should be at least 90 percent of the required minimum streamflow; and (3) the seven-day running average of the daily mean be equivalent to or greater than the required minimum flow. Therefore, any under-release could be averaged out by over-releases on other days within each successive seven-day window (averaging period).

Under Forest Service condition 19 and the California Fish and Game recommendation, PG&E would release the equivalent under-released volume of water within seven days following the discovery of the under-release. Credit for such additional releases would not exceed 20 percent of the instantaneous flow amount, when used to attain the equivalent of the under-released volume. In addition to this provision, if PG&E finds that flow releases are non-compliant, it would be required to notify the Commission of the potential violation, and to take immediate action to return to compliance.

PG&E alternative condition 19, Forest Service condition 19, and the California Fish and Game recommendation accomplish the same objective. However, PG&E's proposal to determine compliance via a seven-day running average provides a better defined and more reliable accounting mechanism that can be verified by any outside entity and is consistent with flow compliance mechanisms used at other Commission-licensed projects. Further, we note that if PG&E were found to be in non-compliance by the Commission, it would be required to take immediate action to return to compliance consistent with Forest Service condition 19. Therefore, we recommend PG&E's proposed method.

In its license application, PG&E proposed to change the compliance point for measuring instream flows below McCloud dam from gage MC-1 to gage MC-7, and provide real-time flow data on the internet from gage MC-1. California Fish and Game supported PG&E's proposal for a single compliance point near McCloud dam and NMFS also recommended a single compliance point at either MC-7 or MC-1. In contrast, Forest Service condition 19 specified flows be measured at two compliance points (MC-1 and MC-7 or near the dam) for McCloud dam. PG&E alternative condition 19 proposed the use of two compliance points below McCloud dam.

The Ah-Di-Nah gage (MC-1) captures flow augmentation from Hawkins Creek immediately upstream of the gage. Thus, under current conditions, the minimum flow

between the dam and Hawkins Creek (gage MC-7) can be as low as 40 cfs, as long as flow from Hawkins Creek is adequate to augment flows to the required minimum at the MC-1 gage. In order to assure that flows are augmented below Hawkins Creek, even during dry periods and dry years when flows from Hawkins Creek could be minimal, PG&E and the Forest Service proposed increasing the minimum flow at McCloud dam if needed. Thus, at any time during the year, if discharge from Hawkins Creek is not adequate enough to augment flows in the Lower McCloud River to meet the minimum instream flow requirement at MC-1, PG&E would be required to release additional flow from the dam. We find the Forest Service's specification to use two compliance points below McCloud dam to be reasonable because it would ensure minimum flows at the dam are adequate to provide sufficient habitat for fish and other aquatic biota throughout the entire reach between McCloud dam and Squaw Valley Creek.

The Forest Service also specified the use of existing compliance points for Iron Canyon dam and Pit 7 dam and that PG&E must provide flow values (generally 15-minute interval recordings) to resource agencies upon request. In addition, the Forest Service specified that PG&E operate, maintain, and, if necessary, modify under USGS supervision, all existing gages needed to determine the river stage and minimum instream flow in project-affected reaches, and the Forest Service specified the methodology that PG&E must utilize to determine water year type and guide implementation of minimum flows. In its original condition 19, the Forest Service specified the use of the DWR Bulletin 120 of the Sacramento River near Redding to determine water year type for the implementation of minimum flows. In concurrence with staff's recommendation from the draft EIS and PG&E's proposal, Forest Service modified condition 19 specifies the use of the DWR Bulletin 120 of the McCloud River above Shasta Lake, for implementing minimum flows for Iron Canyon dam which is consistent with the water year type determination specified by the Forest Service for the Lower McCloud River. We recommend the water year index recommended by PG&E's alternative condition and specified by Forest Service modified condition 19 as it provides a better representation of local hydrology and serves as a consistent methodology for implementing minimum flows on both the McCloud River and Iron Canyon Creek.

Continued operation of the USGS gages in each of the affected reaches, including any modifications that may be required to accurately measure minimum flows or ramping rates that are included in the new license, would help to ensure that these gages remain functional and can be used to effectively monitor compliance with flow-related measures included in the new license. The gages would also help to ensure that flow data continues to be available to other water users in the basin and to the general public. Provision of flow data recorded at 15-minute intervals to the agencies upon request would help to verify compliance with any instantaneous flows and ramping rates that are included in the license. We estimate that funding the continued operation of the USGS gages would have an annualized cost of \$120,000. Because continued operation of these gages is needed to verify license compliance and to ensure that the benefits of

implementing minimum flows to the project-affected reaches are realized, we conclude that the benefits of this measure are worth its costs.

### *Ramping Rates*

Under the existing license, there are no ramping rate requirements downstream of any project impoundments and no ramping is required when changing between seasonal required minimum flow rates. PG&E proposed to establish a good-faith effort to achieve a target maximum upramping rate of 100 cfs per hour for spill flows at McCloud dam prior to the start of an uncontrolled spill event. This upramping rate is consistent with current practice, although the existing project license does not require it. American Whitewater proposed alternative upramping rates at McCloud dam using stage rather than flow as a unit of measure for ramping operational controllable spills in order to provide flow rates that more closely mimic the natural hydrograph. Specifically, American Whitewater proposed maximum upramping rates based on river stage, 1-foot per 24 hours, as measured at gage MC-7.

Upramping of spill events, to the extent possible, allows aquatic organisms time to seek refuge before high flow events and prevents excessive scour and destruction of instream habitat structures. The relationship between flow and water depth (stage-discharge) varies along the stream channel depending on the complexity and configuration of the channel cross-section and in particular the dimensions of the floodplain; therefore, the gage location may not be indicative to the stage-discharge relationship throughout much of the reach that it represents. Therefore, it is appropriate to control ramping rates through changes in flow rather than American Whitewater's stage-discharge method. Because PG&E's proposed upramping procedure would help protect aquatic resources, we recommend it.

PG&E does not propose to downramp seasonal high flows. California Fish and Game recommended and the Forest Service specified that PG&E ramp down all McCloud dam spill events once the spill reaches 1,000 cfs at which point the control valve could be used to control the discharge. Downramping would proceed at a 150-cfs decrease every 48 hours until the prescribed minimum instream flow value is reached. Additionally, operational controllable spills would be upramped in increments not to exceed 200 cfs in a 24-hour period. In its alternative recommendation, PG&E incorporated the downramping schedule outlined by California Fish and Game and the Forest Service. American Whitewater proposed downramping rates of 0.2 foot per 48 hours until the prescribed minimum flow value is reached, as measured at MC-7.

Rapid changes in streamflow have the potential to strand and kill young fish and macroinvertebrates, and may also cause adverse effects on amphibians including the foothill yellow-legged frog. Our recommended ramping protocol would reduce the potential for fish stranding at times when flows are reduced following spill flows. As previously explained, we find that the existing gage provides an appropriate control cross section for determining the relationship between flow and stage. It is appropriate, therefore, to control ramping rates through changes in flow rather than stage.

Implementing ramping rates would have a negligible cost; therefore, we conclude the benefits of this measure warrant the cost.

PG&E also did not propose flow ramping for annual dam safety valve testing at Iron Canyon Creek. California Fish and Game recommends and the Forest Service's original condition 19 specified that valve testing for dam safety compliance at Iron Canyon dam be conducted between March 5 and March 15 when the highest instream flows are released, in order to minimize impacts to the reproductive success of breeding aquatic organisms, that these flows should be kept to the minimum level allowable (possibly in the range of 150 cfs) to minimize channel damage, and that upramping and downramping related to testing of the flow valve at Iron Canyon dam should occur in 20-cfs increments, assuming a 200-cfs maximum. PG&E proposed an alternative valve testing schedule of March 1 to March 31 to allow for potential winter access issues and associated safety risks. In its modified conditions 19, the Forest Service concurs with PG&E that valve testing could be conducted between March 1 to March 31 to avoid potential access related safety risks during winter.

We recommend the inclusion of flow ramping procedures, as recommended by California Fish and Game and specified by the Forest Service for spill events and valve testing at McCloud dam and Iron Canyon dam. Implementing ramping rates would improve on existing conditions by providing a clearly documented procedure for reducing high flows associated with operational testing to reduce effects on aquatic resources. Our recommended ramping protocol would reduce the potential for fish stranding at times when flows are reduced following proposed test valve flow releases, as well as minimize the impacts to spring breeding aquatic organisms. However, we recommend including the expanded schedule for the Iron Canyon safety valve testing for dam compliance, as recommended by PG&E alternative condition 19 and Forest Service modified condition 19 in the staff alternative to ensure safety at the project. The timing, frequency, and magnitude of natural peak spring runoff events can be highly variable depending on storms and snowmelt; therefore, shifting the valve test one to two weeks earlier or later to accommodate safety and access is not likely to have adverse effects on aquatic resources.

#### *Water Quality and Temperature Monitoring Plan*

PG&E proposes to develop and implement a water quality and temperature monitoring plan in consultation with the California Water Board, the Forest Service, California Fish and Game, and other interested parties within 1 year of license issuance. Under the plan, PG&E would provide monitoring for temperature, turbidity, and contaminants in project-affected reaches and reservoirs.

Forest Service modified condition 20 specifies a water quality monitoring plan that includes a schedule and monitoring requirements for project-affected reaches. The Forest Service specifies that PG&E: conduct periodic monitoring of contaminants including *E. coli* in all project reservoirs once every 5 years for the term of the license; conduct periodic monitoring of DO at McCloud, Pit 6, and Pit 7 reservoirs for the term of

the license; conduct annual monitoring of temperature for 10 years, with additional monitoring if temperatures exceed 20°C in reservoirs or downstream reaches; conduct continuous monitoring of turbidity in the Lower McCloud River during the fishing season and provide real-time turbidity information on PG&E's public project website; conduct turbidity monitoring for at least 5 years in Iron Canyon Creek at MC-10; and implement BMPs to satisfy Aquatic Conservation Strategy objectives. PG&E withdrew its alternative condition 20 and accepts Forest Service modified condition 20.

Monitoring of contaminants, including *E. coli*, in project reservoirs would provide information that could be used to ensure public health and determine potential impacts of project facilities or operations. DO data collected periodically from McCloud, Pit 6, and Pit 7 reservoirs would ensure concentrations of DO in project reservoirs are sufficient to support aquatic life and to determine effects, if any, of changes to project operations resulting from the proposed operational changes under the new license. Temperature data collected from project reaches and reservoirs would ensure project operations are providing conditions supportive of resident fish populations. Continuous monitoring of turbidity in the Lower McCloud River during the fishing season and providing real-time turbidity on PG&E's public project website would provide valuable information to recreation users. Continuous monitoring of turbidity in Iron Canyon Creek for at least 5 years would provide information on the effectiveness of mitigation actions and ensure levels are reduced to at or below the basin plan levels. Implementing BMPs would be beneficial for minimizing any impacts to aquatic resources associated with O&M activities, recreation, land use, and other practices associated with the project. We estimate that developing the water quality and temperature monitoring plan specified by the Forest Service would have an annualized cost of \$86,000. Given the benefits of water quality monitoring and temperature parameters, as described, we conclude that the benefits of this measure are worth the costs.

#### *Fish Entrainment*

Entrainment of fish into hydroelectric intakes typically causes injury or mortality to a portion of the fish that are entrained, with mortality rates tending to be lower for smaller fish and higher for turbines that operate under higher levels of head, with higher rotational speeds, and with smaller passageways. PG&E developed and implemented a study in consultation with the agencies to assess the potential for entrainment losses to affect fish populations in the project area. The results of PG&E's entrainment studies and literature review indicate that entrainment potential at the project intakes is negligible. Therefore, PG&E did not propose any measures to protect fish from entrainment.

NMFS recommends that PG&E construct effective screening facilities at project intakes following the return of listed salmonid species. No listed anadromous salmonids would be expected to have access to habitat in the Lower McCloud River until upstream migration of listed species is implemented through Shasta Lake; therefore, at this time the screening facilities recommended by NMFS would provide no benefit for listed species.

However, we recommend that at such time as fish passage facilities provide access to these reaches for listed salmonid species, the need for screening facilities can be re-evaluated based on fish population monitoring studies included in the new license.

#### *Aquatic Biological Management and Monitoring Plan*

Forest Service modified condition 27 specifies that PG&E develop and implement an Aquatic Biological Monitoring Plan, in consultation with interested parties and approved by the Forest Service, for fish, benthic macroinvertebrates, special status aquatic mollusks, special status species, and invasive aquatic species. The number of sites, site locations, sampling methods, and data protocols would be consistent with pre-filing relicensing studies and plans. The Forest Service also specifies a reporting requirement for providing monitoring results. In addition, the Forest Service filed a draft Aquatic Biological Monitoring Plan as an enclosure to modified condition 27.

In its alternative condition 27, PG&E generally supported the Aquatic Biological Management Plan specified by the Forest Service in original condition 27, but proposed that 2 years, rather than the 1 year specified by the Forest Service, would be more adequate to develop and finalize the Aquatic Biological Management and Monitoring Plan. PG&E also proposed monitoring of only stream fish populations rather than reservoir and stream fish populations recommended by the Forest Service. With the filing of the Forest Service's modified condition 27, however, PG&E withdrew its alternative condition 27 and accepts Forest Service modified condition 27.

We support the development and implementation of an Aquatic Biological Management and Monitoring Plan specified by Forest Service modified condition 27. Because the Forest Service and PG&E have worked collaboratively on the draft Aquatic Biological Monitoring Plan and it is substantially complete, we expect that 1 year would be adequate time to finalize and implement the plan. Forest Service modified condition 27 also specifies that fish population surveys be conducted in Iron Canyon Creek, Lower McCloud River, and the Pit 7 reservoir. Analysis of project reservoir fish population data obtained during project relicensing studies indicated that fish populations do not appear to be affected by project operations and are sustained by natural production and fish stocking. Therefore, monitoring of fish populations in the Pit 7 reservoir would provide little additional useful information.

Furthermore, we expect that monitoring and evaluation of fish populations in project reservoirs would be conducted, as needed, as part of PG&E's proposed fish stocking plan (discussed below under *Recreation*), and therefore do not support additional monitoring studies in project reservoirs specified by the Forest Service. We estimate that developing the Aquatic Biological Management and Monitoring Plan specified by the Forest Service and modified by PG&E would have an annualized cost of \$195,000. Because biological monitoring would assist with determining the effects of any changes in operation or measures that are implemented in the new license to enhance resident fish populations, and with assessing whether any modifications or additional measures are needed, we conclude the benefits of the program are worth the costs.

### *Fish Passage*

In its original condition 27, the Forest Service specified that, within 1 year of license issuance, as a component of the Aquatic Biological Management Plan, PG&E develop specific management actions and schedule for providing fish passage and monitoring at road crossings for affected reservoir tributaries, in consultation with the Forest Service, California Fish and Game, potentially affected tribes, and other interested parties. These management actions specified by the Forest Service include:

- Constructing or correcting fish passage structures on Deadlun, McGill, Cedar Salt Log, Little Gap, and Gap Creek on Iron Canyon reservoir and Tarantula Gulch and Battle Creek on McCloud reservoir;
- Maintaining the fish passage structures on an annual basis, if needed, concurrent with road condition surveys;
- Monitoring each stream reach every 3 years to determine fish passage structure effectiveness; and
- Providing the results of fish passage monitoring concurrently with aquatic monitoring reports.

PG&E alternative condition 27 stated that roads impeding fish passage on tributaries to the project reservoirs are not project roads, therefore, PG&E is not responsible for maintaining fish passage structures associated with these roads. PG&E indicated, however, that it would provide compensation to the Forest Service for fish passage maintenance as part of an off-license road agreement.

Forest Service modified condition 27 specifies that, as a component of the Aquatic Biological Management Plan, PG&E conduct periodic monitoring of fish passage conditions at Gap Creek, Deadlun Creek, and Cedar Salt Log Creek road crossings around Iron Canyon Reservoir in consultation with the Forest Service, State Water Resources Control Board, California Fish and Game, potentially affected tribes, and other interested parties. In the draft Aquatic Biological Monitoring Plan filed as an enclosure to modified condition 27, the Forest Service recommends fish monitoring beginning the first year following license renewal, and then once every 5 years for the term of the new license. In addition, the Forest Service specifies a reporting requirement for providing monitoring results. PG&E filed comments withdrawing its alternative condition 27 analyzed in the draft EIS and concurring with Forest Service modified condition 27.

The roads noted by the Forest Service in modified condition 27 are not project roads, and therefore, PG&E should not be responsible for monitoring or maintaining fish passage road crossings. It is clear that these roads and any resulting impediments to fish passage would be manifested with or without the project. Subsequently, we have not included this provision in our staff alternative.

### *Listed Salmonid Technical Integration Committee*

NMFS filed a recommendation that, as soon as listed salmonids are documented within the McCloud River and affected by the project, PG&E should, in consultation with the U.S. Bureau of Reclamation, NMFS, FWS, California Fish and Game, and the Commission, create and implement a Listed Salmonid Technical Integration Committee. According to the recommendation, the Listed Salmonid Technical Integration Committee would assess and mitigate the project's effects on listed salmonids and could be integrated with the existing Interagency Fish Passage Steering Committee (or affiliated Technical Advisory Committees) to begin discussions of passage logistics at Shasta dam habitat assessments that include studies of McCloud River historic anadromous salmonid habitats. We estimate that, upon implementation, the annualized cost of this measure would be \$20,000.

No listed anadromous salmonids would be expected to have access to the Lower McCloud River until upstream fish passage is implemented through the Keswick and Shasta dams, downstream of the project; however, dependent on the results of the proposed studies to assess habitat suitability for listed salmonids conducted as part of the RPA for the OCAP BiOp, pilot re-introduction studies could result in the presence of listed salmonids in the Lower McCloud River and waters of the McCloud-Pit project below McCloud dam as early as 2012. In concert with continuing consultation, the adaptive nature of proposed and specified existing biological and habitat monitoring programs would allow for the re-evaluation of project mitigation and enhancement measures at such time as fish passage facilities provide access to project reaches for listed salmonid species. We find that it would be beneficial for PG&E to maintain awareness of the ongoing feasibility studies and the status of the potential re-introduction of listed anadromous species in the vicinity of the project. Therefore, we recommend that PG&E file an annual report with the Commission that details the status of listed anadromous species in the project vicinity. When the presence of listed anadromous fish in the project area is deemed imminent, the plan would provide an assessment of any project O&M measures that would have the potential to contribute to the take of any listed species. We estimate that, upon implementation, the annualized cost of this measure would be \$1,000. Because these proposed and specified biological and habitat monitoring programs and annual listed anadromous species status reports will provide a mechanism for the continuing evaluation of project and mitigation and enhancement measures, including the evaluation of the potential for the presence of listed salmonids, as well as their environmental requirements, we do not recommend requiring PG&E to implement a Listed Salmonid Technical Integration Committee, as the measure is not worth the cost.

### *Reintroduction of Anadromous Fish*

NMFS provided eight recommendations that included protection, mitigation, and enhancement measures to be implemented as soon as federally listed anadromous salmonids, including Chinook salmon and steelhead, are documented within the McCloud River. In the draft EIS, we did not recommend these measures because they were

premature. We found that no listed salmonid species have been documented within the project area due to the barrier created by the Bureau of Reclamation's downstream Shasta dam.

On November 17, 2010, we met in Sacramento, California with representatives of NMFS, California Fish and Game, PG&E, and other interested parties, to discuss NMFS's eight recommendations. In written comments and at the meeting, NMFS noted that in the draft EIS, Commission staff did not analyze NMFS's OCAP BiOp (NMFS, 2009a). NMFS also noted that on October 7, 2009, the agency released a Public Draft Recovery Plan (NMFS 2009b) that is a comprehensive plan describing the strategies and actions necessary to recover each species sufficiently to support its removal from listing under ESA. We agreed to analyze these documents in the final EIS and, in light of that analysis, reevaluate NMFS's eight recommendations.

Our review and detailed analysis of the OCAP BiOp and Public Draft Recovery Plan can be found in section 3.3.2.3, *Aquatic Resources, Cumulative Effects*. Located on the Sacramento River, downstream of the McCloud dam, the Bureau of Reclamation's Keswick and Shasta dams are existing barriers to upstream passage of anadromous salmonids. None of these listed fishes would be expected to have access to habitat in the Lower McCloud River until upstream migration is facilitated past these dams and through Shasta Lake. While the OCAP BiOp includes an RPA that would require the Bureau of Reclamation to begin a program to reintroduce ESA-listed salmon species in Shasta Lake and the Upper Sacramento River and its tributaries (including the McCloud River) by 2012, the program, as outlined in the Public Draft Recovery Plan, is only in the pilot stage and many aspects of the plan are still in flux. Furthermore, as noted in section 3.3.2.3, many factors, including budget, habitat assessment completion, future NEPA analyses, and feasibility must be determined before the program can move forward. As such, it does not appear that even with the pilot program's goal of reintroducing listed species above Shasta dam in 2012, these listed species will become present in McCloud-Pit Project waters in the foreseeable future; therefore, we continue to conclude that the eight general recommendations by NMFS would provide no benefit for listed species at this time.

Despite the uncertainty regarding the timeframe for the reestablishment of listed anadromous salmonids in the project area, however, we recognize the potential for the future presence of listed anadromous species in the project area. Therefore, we continue to recommend the implementation of several adaptive monitoring plans, which include the Gravel and Coarse Sediment Management Plan, the water quality and temperature monitoring plan, and the Aquatic Biological Monitoring Plan. In addition, we now recommend that PG&E file an annual report on the status of listed anadromous species in the project area. This report would detail the steps that have been taken in the reintroduction, require PG&E to keep abreast of the findings and actions of the Interagency Fish Passage Steering Committee, and should include the comments of NMFS. The filing of this report will ensure that PG&E and the Commission are kept informed of the progress of the potential reintroduction and this information would then

be used to determine when it is appropriate to consider any needed changes to project structures and or operations, in light of the presence of ESA-listed salmonids in project waters. Jointly, these recommendations would serve as an adequate mechanism for determining the presence of listed anadromous salmonids in project-affected areas, the status of associated habitat variables, and the need for any future changes to project structures or operations.

At the November 17, 2010, meeting, NMFS also indicated that the Commission retain, by means of a specific ESA reopener provision and other appropriate reservations of authority, sufficient discretionary involvement or control with respect to project construction, modification, maintenance, and operation under the new license to ensure full compliance with the requirements of the ESA during the term of the license. We note that standard Form L, Article 15, provides such authority.<sup>34</sup> Thus, given that standard article and our recommendation for an annual report on the status of listed anadromous species in the project area, we conclude that, in this instance, there is no need to include a specific reservation of authority for ESA. As stated in the October 30, 2000, Order On Rehearing for Avista Corporation's Clark Fork Hydroelectric Project (Project No. 2058-015),<sup>35</sup> while the Commission has included specific ESA reopeners in some cases,<sup>36</sup> doing so does not suggest that a specific reopener was required, or that our standard reservation of authority for fish and wildlife resources would not suffice to permit compliance with our obligations on ESA.

### **Terrestrial Resources**

#### *Vegetation and Invasive Weed Management Plan*

Project operations may potentially affect vegetation through the introduction and spreading of invasive weed species. Any O&M activities that disturb soil or remove existing vegetation could increase the spread of invasive weeds and would have a direct effect on vegetation and associated wildlife species. Potential indirect project effects could come from recreational users who spread invasive weed seeds or other regenerative plant materials from colonized to non-colonized areas or whose activities disturb existing plant communities.

PG&E proposed a Vegetation Management Plan that would minimize adverse effects on the environment, protect special status species and culturally significant plants, control the spread of noxious weeds, and ensure revegetation of disturbed sites.

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<sup>34</sup> This also was affirmed in the March 13, 2002, Order Approving Settlement and Issuing New License for the City of Tacoma, Washington's Cowlitz River Project (Project No. 2016-044). 98 FERC ¶ 61,274 (2002).

<sup>35</sup> 93 FERC ¶ 61,116 (2000).

<sup>36</sup> Central Nebraska Public Power and Irrigation District, 84 FERC ¶ 61,079 (1998); and The Montana Power Company, Confederated Salish and Kootenai Tribes of Flathead Reservation, 84 FERC ¶ 61,164 (1998).

Development and implementation of a Vegetation Management Plan would provide guidance, methods, and protocols for management and monitoring of botanical resources, including special status species, within the project area.

In its original condition 25, the Forest Service specified that PG&E file a Vegetation and Invasive Weed Management Plan within 1 year of license issuance that would include: treatment protocols and measures for removing or trimming vegetation within the project and project-affected area; specific conditions for the protection of special status and culturally significant plants and populations; invasive species management and monitoring; and pesticide or herbicide use restrictions and prohibitions. PG&E would be required to consult with the Forest Service annually to review procedures for special status species surveys. In its original condition 25, the Forest Service also specified that periodic monitoring of special status and culturally significant plants should occur every 5 years at known locations and every 10 years for the entire project and project-affected area.

Forest Service condition 15 specifies that PG&E exclude the use of pesticides and herbicides on NFS lands unless prior written approval is received from the Forest Service. Materials used would be limited to those registered by U.S. EPA and consistent with those used by the Forest Service at Shasta-Trinity National Forest.

PG&E alternative condition 25 proposed revisions to the schedule for preparation and implementation of the Vegetation and Invasive Weed Management Plan and the language of a few of the plan's elements. PG&E alternative condition 25 would provide a period of 2 years to develop the Vegetation Management Plan, which is consistent with PG&E's original proposal. Additionally, PG&E would limit culturally significant plant species to those species associated with TCPs and limit invasive weed species to those on a list of high priority species, to be developed in consultation with the Forest Service, FWS, NMFS, and other agencies, as appropriate.

Forest Service modified condition 25 specifies provisions similar to those in the Forest Service's original condition 25, except that specific details of the plan components and monitoring schedules from the 4(e) condition have been placed in the draft Vegetation and Invasive Weed Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3), with some modifications. PG&E filed comments supporting Forest Service modified condition 25 and withdrawing its alternative condition 25.

We recommend finalization and implementation of a Vegetation and Invasive Weed Management Plan as specified by Forest Service modified condition 25, with modifications as described below. Because the Forest Service and PG&E have worked collaboratively on the draft Vegetation and Invasive Weed Management Plan and it is substantially complete, we expect that 1 year would be adequate time to finalize and implement the plan. We recommend the inclusion of language in the plan clarifying that for special status plant species, PG&E would inform managers of sensitive or rare species locations. Additionally, surveys of known culturally significant plant species not

associated with TCPs should be conducted within the first year of plan approval and every 5 years thereafter, to be consistent with other vegetation surveys and protect these revegetation source populations. PG&E should also create an operations map with revegetation source population locations, including culturally significant plant populations not associated with TCPs. Furthermore, we recommend the inclusion of language to address the use of BMPs to avoid/minimize effects on wetlands.

Application of pesticides and herbicides on Forest Service lands within the project area may occur as treatment or control methods for invasive weed species, as contained within the proposed Vegetation and Invasive Weed Management Plan. However, Forest Service condition 15 requires PG&E to exclude the use of pesticides and herbicides on NFS land, unless prior written approval is received first from the Forest Service. We recommend the incorporation of parameters into the guidelines in the Vegetation and Invasive Weed Management Plan regarding the use of pesticides and herbicides associated with future project O&M. For example, application of herbicides for the purpose of eliminating vegetation to meet federal safety regulations would be acceptable in specific areas such as dam groins, under penstocks, around switchyards, and adjacent to project hydropower facilities. Similarly, selective application of herbicides to weeds would be a reasonable approach to prevent obstruction of project transmission or distribution lines. BMPs should be established in the Vegetation and Invasive Weed Management Plan, for implementation should the use of pesticides or herbicides be employed in these limited applications. Special precautions should be implemented for any herbicide application, particularly in any situation that may involve the use of an herbicide to control invasive plant species near water, on vegetation in highly used recreation sites, near riparian areas or wetlands, or near areas containing special status or culturally significant plant species, due to the sensitivity of these systems and associated biota. Emphasis should be placed on the use of non-herbicide techniques, and allow for herbicide use, if any, only at specific sites. For these specific sites, the plan should indicate why other techniques would not be effective and identify special precautions that would be taken to protect non-target plants. Additionally, techniques and plans for the application of pesticides and herbicides should be approved by a licensed pest control advisor.

We consider the proposed staff alternative measure for managing vegetation, controlling the spread of noxious weeds, monitoring and protecting culturally significant plant species, and limiting the use of pesticides and herbicides to represent an effective approach to minimizing and avoiding project-related effects on vegetation and the wildlife that depend on this vegetation for habitat. We estimate that PG&E's proposed plan would have an annualized cost of \$332,000, and that our recommended approach would have an annualized cost of \$337,000. Given the added benefits of implementing the staff-recommended alternative as described above, we consider this cost to be warranted.

### *Terrestrial Wildlife Management and Monitoring*

Project O&M activities at existing project facilities and proposed new construction sites may generate short-term disturbances to general wildlife species. Isolated, short-term disturbances may occur to wildlife as a result of activities associated with project O&M activities tasks and could cause mobile wildlife species to leave an area until tasks are completed. Less mobile species may, on occasion, incur direct mortality as a result of actions such as trampling and those related to vegetation management.

PG&E proposed to develop a Wildlife Management Plan that would provide protection and monitoring of special status species, but also would protect the habitat and general wildlife populations that co-exist with special status species. PG&E's proposed Wildlife Management Plan would contain monitoring methodologies, pre-construction survey protocols, and avoidance and protection measures as appropriate for special status species. The Wildlife Management Plan proposed by PG&E also would include a process and schedule for reporting survey and monitoring results as well as a process for periodic plan review and revision. PG&E also proposed an avian hazard reduction measure to ensure transmission and distribution lines meet bird electrocution prevention standards as recommended by APLIC.

In its original condition 26, the Forest Service specified development and implementation of a Terrestrial Biological Management Plan<sup>37</sup> that would include: (1) monitoring of populations and locations occupied by special status species; (2) periodic surveys throughout the term of the license within the project and project-affected area to determine the location of any additional populations; and (3) reporting every 5 years (or at species-specific frequencies identified by the Forest Service) of terrestrial survey and monitoring results. In its original condition 26, the Forest Service also specified pre- and post-construction surveys for Forest Service special status species along with post-disturbance and construction monitoring to identify whether mitigation measures are necessary. The Forest Service specified that PG&E conduct surveys for neotropical breeding birds within suitable habitat prior to disturbance activities or observe annual limited operating periods during April 1 through August 30. Furthermore, within 1 year of license issuance, PG&E would be required to file with the Commission an avian collision and electrocution hazards plan approved by the Forest Service, in consultation with appropriate federal and state agencies, which minimizes adverse interactions between project transmission lines and avian species.

PG&E alternative condition 26 addressed the schedule for preparation and implementation of the Terrestrial Biological Management Plan and specific elements of

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<sup>37</sup> While PG&E proposes to develop a Wildlife Management Plan and Forest Service condition 26 refers to a Terrestrial Biological Management Plan, we note that these two plans are meant to address the same issues and the names are generally interchangeable.

the plan. PG&E alternative condition 26 would provide a period of 2 years to develop the Terrestrial Biological Management Plan, consistent with PG&E's original proposal. Survey areas where access is unsafe (steep terrain or high water flows) or private property for which PG&E does not have access would be excluded. In addition, instead of developing a plan, avian collision and electrocution hazards would be addressed by upgrading segments of existing distribution lines that do not currently meet the APLIC standards within 3 years of license issuance and ensuring that new lines would meet current APLIC standards. If existing and new poles are brought into compliance with APLIC standards, an avian hazard and electrocution plan would be unnecessary.

Forest Service modified condition 26 specifies provisions similar to those in the Forest Service's original condition 26, except that specific details of the plan components and monitoring schedules from the 4(e) condition have been placed in the draft Terrestrial Biological Management Plan, included as an enclosure to the filing (Forest Service, 2010d, Enclosure 3), with some modifications. PG&E filed comments supporting Forest Service modified condition 26 and withdrawing its alternative condition 26.

Forest Service modified condition 27 specifies that PG&E move the northwestern pond turtle and foothill yellow-legged frog into the Aquatic Biological Monitoring Plan, rather than including these species in the Terrestrial Biological Management Plan. PG&E filed comments supporting Forest Service modified condition 27 and withdrawing its alternative condition 27.

We recommend finalization and implementation of a Terrestrial Biological Management Plan, as specified by Forest Service modified condition 26, with modifications, as described below. Because the Forest Service and PG&E have worked collaboratively on the draft Terrestrial Biological Management Plan and it is substantially complete, we expect that 1 year would be adequate time to finalize and implement the plan.

The Forest Service specifies in modified condition 27 that the northwestern pond turtle and foothill yellow-legged frog be included in the Aquatic Biological Management Plan. We recommend, for clarity, that both species be included in the Aquatic Biological Management Plan. However, the northwestern pond turtle and foothill yellow-legged frog are discussed below because of their original inclusion within the Terrestrial Biological Management Plan.

Surveys for known populations of the Shasta salamander and northwestern pond turtle, along with any required pre-construction surveys, would provide information on the existing populations of these special status species and their overall condition, and minimize any potential effects to these species from project O&M and construction activities. Surveys for known populations within 1 year of license issuance and every 5 years thereafter would provide a baseline status assessment of existing populations and be more protective of these existing populations than the schedules recommended by the Forest Service in the draft Terrestrial Biological Management Plan and Aquatic

Biological Management Plan. Surveys of suitable habitat within the first year of license issuance and every 10 years thereafter, and adaptation of management to include new species or populations that are detected would ensure protection of potential future populations of Shasta salamander, foothill yellow-legged frog, and northwestern pond turtle within the project area for the term of the license. These survey schedules would also be consistent with those for other special status species, as discussed below. The Forest Service has not provided justification for the monitoring of foothill yellow-legged frog on NFS lands along the Lower McCloud River, where habitat is not suitable for this species. We recommend that surveys for foothill yellow-legged frog exclude the NFS lands along the Lower McCloud River and include tributaries to the Pit 6 and Pit 7 reservoirs if the foothill yellow-legged frog becomes established in the Pit 5 reach and the likelihood of its presence in the McCloud-Pit Project area increases. We do recommend the Foothill Yellow-Legged Frog Monitoring Plan, as proposed by the Forest Service in its 10(a) recommendation in the draft Aquatic Biological Management Plan.

In the draft Terrestrial Biological Management Plan, filed as an enclosure to modified condition 26, the Forest Service recommends modifications to limited operating periods and monitoring schedules for bird species. For the bald eagle, American peregrine falcon, northern goshawk, and Southwestern willow flycatcher, we recommend that the following modifications be incorporated into the Terrestrial Biological Management Plan:

- Surveys for bald eagle populations would occur annually at known nest sites and in suitable habitat annually. This modification would provide more protection than surveying annually for known populations and within 1 year of plan approval and every 10 years thereafter in suitable habitat.
- Surveys for American peregrine falcon would occur within 1 year of plan approval and every fifth year thereafter at known nest sites and within suitable habitat. These modifications would provide more protection than surveying annually for known populations and within 1 year of plan approval and every 10 years thereafter in suitable habitat.
- Northern goshawk surveys would occur within 0.5 mile of proposed construction or a limited operating period of February 1 through August 15 would be implemented, as an alternative to monitoring once per 10 years.
- The limited operating period for willow flycatcher would be April 1 through August 31 rather than May 1 through August 1, and surveys for suitable habitat would occur within the first year after plan approval and every fifth year. This is an alternative to surveying for known populations within 1 year and at 6 years after plan approval and every 10 years thereafter and in suitable habitat within 1 year of plan approval and every 10 years thereafter. These modifications would provide adequate protection for this species.

- The limited operating period for neotropical breeding birds would be April 1 through August 31 rather than May 1 through August 1 and only pre-construction surveys would be required. These modifications would provide adequate protection for these species.

Details defining precise locations for surveys to occur should be a component of consultation with the Forest Service and other appropriate agencies and interested parties during the development of the Terrestrial Biological Management Plan.

We recommend the inclusion of alternative language in the Terrestrial Biological Management Plan clarifying that special status bat species surveys, for both known populations and for new populations in suitable habitat, would begin within the first year after plan approval and every fifth year thereafter. Additionally, the limited operating period would be during the maternity period of May 1 to August 31, rather than between May 1 and August 1. This clarified approach would be sufficient to assess the presence and roosting use of project facilities within the project area, and pre-construction surveys of implementation of the limited operating period would provide the necessary interim prevention measure if disturbance from construction were probable. Sites would be identified in consultation with participating agencies, and this alternative language would provide a good mechanism for continued communication with agencies on the presence and status of bat species within the project area.

Additionally, we recommend the inclusion of alternative language in the Terrestrial Biological Management Plan clarifying that surveys for known populations of special status terrestrial mollusks would begin within the first year of plan approval and every fifth year thereafter. This clarified approach would be more protective of these special status species than the Forest Service's recommended schedule of known population surveys within one and at 6 years after plan approval and every 10 years thereafter.

We consider the proposed staff alternative measure for monitoring and mitigating project effects on wildlife to represent an effective approach to minimize and avoid project-related effects on wildlife, including special status species. We estimate that our recommended approach would have an annualized cost of \$198,000. Given the benefits of implementing the staff-recommended alternative as described above and the projected cost savings associated with the staff-recommended alternative, we consider this cost to be warranted.

### **Threatened and Endangered Species**

The VELB, Pacific fisher, and northern spotted owl are federally-listed threatened and endangered species that might occur within the project area and could potentially be affected by project O&M and any proposed construction measures. In order to protect threatened and endangered species, which are also listed as Forest Service sensitive species, PG&E proposed to prepare a biological evaluation of the potential effects to Forest Service special status species prior to any action to construct project features on

NFS lands. In addition, specific measures for protection of elderberry are specified in the PG&E's programmatic biological opinion and incidental take permit (FWS, 2003); PG&E would apply these measures to routine O&M activities, including development and maintenance of recreational areas.

In its original condition 26, the Forest Service specified components particular to the VELB, specifically that known suitable habitat should be monitored once every 5 years for VELB individuals, and if the species is detected, elderberry plants would be protected from disturbance. Regarding the northern spotted owl, the Forest Service's original condition 26 would require monitoring for this species within 0.25 mile of suitable habitat in the project area once every 5 years. Surveys conducted once every 10 years in suitable habitat would identify new individuals, pairs, or nest sites. Surveys also would be conducted prior to any disturbance activities, or PG&E could schedule construction or disturbance activities outside of the limited operating period of February 1 through July 9. Regarding the Pacific fisher, the Forest Service's original condition 26 specifies that the Terrestrial Biological Management Plan should provide for surveys to be conducted once every 5 years in suitable habitat within the project and project-affected areas.

Forest Service condition 11 specifies that PG&E prepare a biological evaluation prior to any proposed action to construct project features on NFS lands. This measure is consistent with PG&E's proposed measure. NMFS and FWS also recommend that PG&E prepare a biological evaluation or biological assessment prior to construction of new project features or non-routine maintenance activities that may affect special status species or their habitats.

PG&E alternative condition 26 proposed alternative language that provides more specificity to the monitoring schedule and survey area designations specified by the Forest Service. PG&E alternative condition 26 proposed:

- Pre-construction surveys for the presence of elderberry shrubs would be conducted for construction proposed below 3,000 feet msl in the project area, and a 100-foot protective buffer would be provided around any identified VELB habitat during construction consistent with the FWS biological opinion for VELB. Monitoring surveys also would be conducted in areas of known VELB habitat every 5 years, concurrently with noxious weed and vegetation surveys.
- Pre-construction surveys for the presence of northern spotted owl would be conducted in suitable habitat within 1.3 miles of proposed construction. Surveys would follow standard protocols for the species. Alternatively, PG&E could schedule construction activity for outside of the limited operating period of February 1 to July 9.
- Pre-construction surveys for the presence of Pacific fisher would occur in areas of suitable habitat within 0.5 mile of any planned construction.

Forest Service modified condition 26 specifies provisions for threatened and endangered species similar to those in the Forest Service's original condition 26, except that specific details of the original plan components and monitoring schedules from the 4(e) condition have now been placed in the draft Terrestrial Biological Management Plan and included with some modifications as an enclosure to the filing (Forest Service, 2010d, Enclosure 3). In particular, the Forest Service has modified its original recommendation to reflect our staff recommendation to remove specified protective measures for the VELB from the draft Terrestrial Biological Management Plan and include them as part of the Vegetation and Invasive Weed Management Plan. In the Forest Service modified condition, surveys for VELB populations are no longer required; only habitat surveys for elderberry plants and pre-construction surveys below 3,000 feet msl. This is consistent with our recommendation that the range of elderberry growth is limited by elevation, so maintaining surveys below 3,000 feet msl is adequate for pre-construction surveys.

In addition, the Forest Service has specified the inclusion of a new survey for the VELB that was not part of our original recommendation. The original staff recommendation requires pre-construction surveys and monitoring of known populations within the first year of license issuance and every 5 years thereafter. Forest Service modified condition 26 agrees with this recommendation, but also specifies an additional comprehensive survey for all populations of elderberry plants within 1 year and every 10 years thereafter. This comprehensive survey would provide more protection and greatly minimize any potential effects to elderberry populations. PG&E filed comments supporting Forest Service modified condition 26 and withdrawing its alternative condition 26. We recommend Forest Service modified condition 26 and its inclusion within the Vegetation and Invasive Weed Management Plan.

We recommend implementing Forest Service condition 11, but modify it to include all project lands. This would require biological evaluations for Forest Service special status species on all project lands when constructing new facilities, instead of just NFS lands as specified by the Forest Service, as well as requiring biological assessments for federally threatened or endangered species, and would allow for more comprehensive protection of the species.

We recommend the inclusion of language in the Terrestrial Biological Management Plan clarifying that, at a minimum, pre-construction surveys or a limited operating period of February 1 through July 9 should be implemented for the northern spotted owl, per our staff recommendation in the draft EIS. Although potential habitat for the northern spotted owl exists, no individuals are known to be present within the project area and we expect that pre-construction surveys would sufficiently minimize any potential construction-related effects from disturbance. Alternatively, avoidance of construction activity during the limited operation period also would protect any individuals within the project area from construction activity. Additionally, we agree with the Forest Service's recommendation that PG&E would follow the FWS guidance for northern spotted owl surveys.

Potential habitat for the Pacific fisher exists within the project boundary, and while no individuals were located during PG&E's relicensing surveys, the Forest Service and FWS have identified the Pacific fisher as potentially occurring in the project vicinity based on tracks reported in the project vicinity in 1982, and a Pacific fisher skull found on the ridge between Fisher Creek and Bald Mountain Creek in the mid-1970s. More recently, a wildlife biologist observed a Pacific fisher crossing FR 11 on the northeast side of Iron Canyon reservoir on April 25, 2007. As such, we conclude that the species most likely is present within the project area. Due to the lack of known individuals, it is unlikely that normal project O&M activity or proposed construction would have an effect on the Pacific fisher. The Forest Service has changed its recommendation to agree with the staff recommendation from the draft EIS regarding pre-construction surveys for the Pacific fisher. For the construction associated with the proposed additional generation units, pre-construction surveys would provide adequate protection for the potential habitat that may occur within the project area.

We consider the staff alternative measure for monitoring and mitigating project effects on federally-listed wildlife species to represent an effective approach to minimizing and avoiding project-related effects. Costs for the proposed plans described above are included in the estimates for the *Terrestrial Biological Management Plan*, in section 5.2.1, *Discussion of Key Issues, Terrestrial Resources*. Given the benefits of implementing the staff-recommended alternative as described above, we consider this cost to be warranted.

In the draft EIS, we concluded that relicensing of the McCloud-Pit Project, as described under the staff alternative, was not to likely adversely affect the VELB, Pacific fisher, and northern spotted owl. On August 6, 2010, we issued a letter seeking concurrence from FWS on this determination.

By letter dated December 21, 2010, FWS responded to our request for concurrence, regarding effects of the proposed action on the VELB, northern spotted owl, and Pacific fisher. FWS states that it is not necessary to reanalyze the effects of the proposed action on the VELB, because the FWS biological opinion (11-01-F-0114) (FWS, 2003) addressed the potential effects of project O&M, which are anticipated to be the same for the proposed action. FWS provides guidance for protection of the northern spotted owl within the project area and concurs with the Commission's determination that the proposed issuance of a new license is not likely to adversely affect the owl or critical habitat. FWS also concurs with the Commission's determination that the proposed issuance of a new license is not likely to adversely affect the Pacific fisher.

## **Recreation Resources**

### *Recreational Access to Lower McCloud River Flows*

Recreational access on the Lower McCloud River is limited due to the amount of public lands located along the Lower McCloud River. The area immediately below McCloud dam and NFS lands, specifically at Ash Camp, Ah-Di-Na Campground, and the

river corridor between these facilities, currently provide the only public access for both boaters and anglers on this 24-mile stretch of the river from McCloud dam to Shasta Lake. The remainder of the land located along the Lower McCloud River, except for The Nature Conservancy's McCloud River Preserve which is used by some anglers, is privately owned. In addition to the base of McCloud dam, Ash Camp and Ah-Di-Na Campground are the origin of whitewater boat trips on the Lower McCloud River, however there is no public take-out for boaters below Ah-Di-Na Campground until they reach Shasta Lake, located 24 miles below McCloud dam.

Numerous comments filed and raised at the public meetings on the draft EIS were related to the inability of recreationists to access the Lower McCloud River during the early spring for the purpose of whitewater boating. Most of the recommended minimum flow regimes for this reach would provide higher flows for recreational boaters than currently exist; however, these higher minimum streamflows would occur during the early spring months when the roads to Ah-Di-Na Campground and Ash Camp are generally inaccessible due to snow. For this reason, a number of commenters recommend that PG&E be responsible for snow plowing the roads below McCloud dam to provide recreational access to the Lower McCloud River flows.

Ash Camp and Ah-Di-Na Campground are both Forest Service recreation facilities located about 1 mile outside the existing project boundary and are not currently used for project purposes. Although Ash Camp and Ah-Di-Na Campground provide access to recreational flows on the Lower McCloud River, PG&E proposes to provide access at the base of McCloud dam by constructing a day-use area and a whitewater boater put-in.

Although the Forest Service suggests that recreation development cannot be accommodated at the base of McCloud dam, PG&E states that it is premature to make that determination because there is uncertainty about how and where gravel augmentation and LWD placement would be implemented. Forest Service has modified its condition 30 to specify that if the site at the base of McCloud dam is infeasible for the day-use site, then PG&E would construct recreational access facilities at Ash Camp and include it within the project boundary or within a settlement agreement with the Forest Service for non-project facilities. A separate settlement agreement, executed between PG&E and the Forest Service, would address O&M of non-project recreation facilities (specifically, Ash Camp, Ah-Di-Na Campground, and the Lower McCloud River Trail) and roads in the Shasta-Trinity National Forest, including Ash Camp (FR U38N11Y) and Ah-Di-Na (FR 38N53) roads.

By developing a boater put-in at the base of the dam, boaters would have access to the Lower McCloud River within the project where access currently does not exist. Because Ash Camp and Ah-Di-Na campground are Forest Service-owned and operated, it is reasonable to assume the Forest Service will continue to operate and maintain them and the roads to access these sites throughout a new license term. Therefore, we do not recommend PG&E be responsible for snow plowing the roads to Ah-Di-Na Campground and Ash Camp below McCloud dam, nor do we recommend these facilities be brought

into the project boundary as project recreation facilities. If the recreation needs change during the term of the license, Standard Article 15 of a new license provides the mechanism for the Commission to reopen the license to require additional recreation measures.

### *Fish Stocking*

One of the primary recreational activities associated with the project includes angling and, based on recreation studies completed during the relicensing process, the demand for angling at the project is projected to increase over the term of a new license. In addition, the numerous proposed recreation facility upgrades and construction of new recreation facilities have the potential to result in increased angling pressure at the project. PG&E originally proposed to continue funding California Fish and Game for the stocking of up to 38,800 pounds of trout and 500,000 kokanee per fiscal year (July 1 through June 30) in the drainages of the Pit and McCloud Rivers below the uppermost project reservoir thereon and in Shasta Lake. In contrast, California Fish and Game, in its 10(j) recommendation, recommends that PG&E reimburse California Fish and Game for stocking of up to 60,000 pounds of trout annually within the McCloud-Pit Project boundary and that costs would be assessed at the standard rate for catchable-sized hatchery grown trout in the year of stocking. In addition, California Fish and Game recommends that PG&E, if requested by California Fish and Game, pay \$5,000 annually for monitoring and evaluation of the fish stocking program or for mitigation of sturgeon reintroduction into Shasta Lake. In its response comments, PG&E states that it agrees with California Fish and Game's fish stocking 10(j) recommendation

In 1942, the construction of Shasta dam isolated a population of white sturgeon; however, the population was self-sustaining in the Pit River arm of Shasta Lake until experiencing a decline in the 1970s and 1980s. California Fish and Game began an experimental sturgeon planting program early in 1988 to evaluate stocking as a means of restoring the sturgeon fishery; however, the program was discontinued later that year due to disease problems in the rearing facilities.<sup>38</sup> California Fish and Game states that 1.8 percent of the planted sturgeon were caught or observed from 13 months to 13 years after stocking, indicating that low natural recruitment may be the cause of the sturgeon population decline.<sup>39</sup> California Fish and Game further suggests that the construction of Pit 6 and 7 dams in the early 1960s, which eliminated access to 16 miles of stream likely utilized by white sturgeon during spawning, likely caused the decline. There is no conclusive evidence, however, that the loss of riverine habitat, or any project-related effects, is directly correlated to the low recruitment of white sturgeon.

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<sup>38</sup> Licensee's Pre-Application Document.

<sup>39</sup> California Fish and Game. 10(j) Recommendations for the McCloud-Pit Hydroelectric Project. January 28, 2010.

Increasing the number of fish stocked at the project would help meet the estimated future demand for angling at the project. Furthermore, annual monitoring and evaluation of the fish stocking program would provide the means for coordinated development to allow for the flexibility to increase or decrease stocking numbers over the term of a new license in order to meet future demand for angling. However, consistent with Commission policy to recommend a specific environmental measure for inclusion in a license, we must be assured that the measure relates to project impacts or project purposes.<sup>40</sup> At this time, and given low natural recruitment and the problems associated with the previous sturgeon planting program, it is not clear how \$5,000 would be used to implement a mitigation program that would successfully maintain a white sturgeon population in Shasta Lake. Furthermore, it also is not clear at this time how the \$5,000 would be used to monitor and evaluate the fish stocking program and we have no way of knowing if these funds would be used solely to evaluate the program at the project. Thus, we do not recommend that PG&E provide funding for white sturgeon mitigation.

While PG&E agrees to reimburse California Fish and Game for fish stocking, we note that PG&E is ultimately responsible for the management of all project reservoirs and project reaches. Instead of recommending funding for California Fish and Game, we recommend PG&E be responsible for stocking 60,000 pounds of trout annually within the project boundary and develop a fish stocking plan to evaluate and monitor the amount of fish to be stocked every 6 years. Accordingly, the number of pounds of fish to be stocked could fluctuate up or down on a 6-year cycle depending on monitoring results. We estimate that the annualized cost of developing and implementing this plan would be \$117,000, and we conclude that the benefits of this measure warrant the cost.

#### *Recreation Management Plan*

PG&E proposes to finalize the Recreation Development and Management Plan (Recreation Plan) after consultation with the Forest Service, California Fish and Game, California Water Board, and other interested parties, within 2 years of license issuance. Including Native American representatives, conditioning agencies (Forest Service, California Water Board, and NOAA), American Whitewater, and Friends of the River during the development of the Recreation Plan would better inform the development of the Recreation Plan. We recommend PG&E consult with all of the aforementioned parties during the development of the Recreation Plan.

In addition, PG&E proposes to construct new recreation facilities and reconstruct existing project recreation facilities within 5 years of Commission approval of the Recreation Plan and to replace each facility in-kind or with an appropriate upgraded facility within 25 years of license issuance or the mid-point of the license term.

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<sup>40</sup> For more information regarding the Commission's policy, please see the Commission's Policy Statement on Hydroelectric Licensing Settlements, issued September 21, 2006.

Recreation facilities and infrastructure could be become degraded over the term of the license; however, all facilities may not need to be reconstructed near mid-license term as proposed by PG&E or recommended by the Forest Service. To ensure that recreation facilities and infrastructure would continue to provide safe, reliable public access to recreational opportunities at the project and would address growing recreational demand over the term of the new license, we recommend that PG&E reevaluate as part of the recreation monitoring component of the Recreation Plan the facilities for degradation at mid-license term or 25 years, whichever is greater.

PG&E's proposal would allow the Forest Service and other stakeholders to have input in the development of these plans and would ensure the proposed measures would be implemented in a manner consistent with the Forest Service's management goals and other resource management plans at the project. Although coordination among PG&E, governmental agencies, and interested stakeholders is encouraged in development and implementation of the proposed recreation measures, PG&E is ultimately responsible for the construction, operation, and maintenance of the project's recreation facilities upon license issuance. The specific measures are discussed in more detail below.

#### McCloud Reservoir

PG&E's proposal to construct a day-use area, reconstruct and extend the existing one-lane boat ramp to 3 feet (vertical) below the minimum operating pool elevation, and add more parking spaces at Tarantula Gulch boat ramp would help relieve overcrowding and reduce user conflicts at McCloud reservoir. Demand for boating access coupled with crowding issues at McCloud reservoir demonstrates the need for improved recreational boating access at the project. The Forest Service specifies in modified condition 30 that PG&E reconstruct the Tarantula Gulch boat ramp to provide two lanes, instead of one, and originally specified a minimum of a 4-foot draft clearance below minimal pool level to further reduce crowding at the ramp and include 30-40 total parking spaces. However, PG&E states that site constraints may affect the amount and type of improvements that can be made to project recreation facilities. Constructing additional parking spaces as the site will allow and the proposed day-use area would provide increased parking to accommodate increased recreational use during the term of a new license and provide a designated area for day-use that would help reduce user conflicts at the boat ramp. Currently the bottom of the boat ramp is 1 foot below the normal minimum operating reservoir level (elevation 2,634 feet msl) and typically provides boater access during most of the recreation season. Reconstructing the boat ramp to a 3-foot draft clearance, as proposed by PG&E, would provide even greater access and extend the current recreation boating season. We recommend that PG&E reconstruct the Tarantula Gulch boat ramp with the toe of the ramp extending to an elevation no less than three vertical feet below minimum pool and that the boat ramp remain one lane. We also recommend that PG&E construct additional parking spaces as the site will allow and the proposed day-use area.

In its original condition 30, the Forest Service specified that PG&E provide lighting and snow plowing between April 1 and December 1 at the Tarantula Gulch boat ramp to provide safety for anglers fishing early or late in the day and to improve access at the ramp. Forest Service modified condition 30 does not specify these measures, but they are recommended in the draft Recreation Development Management Plan included as an enclosure to modified condition 30. Lighting would improve safety at the boat ramp and allow anglers to fish longer during the recreation season; however, there is little evidence to support snow plowing the ramp in the shoulder months when PG&E does not need access to the boat ramp for project purposes. Although 10 percent of visitors reported use of the reservoir during the winter and expressed the need for a longer use season, there is not enough use at McCloud reservoir during the shoulder and winter months to warrant the Forest Service's specified snow plowing. We recommend, however, that PG&E provide lighting at the Tarantula Gulch boat ramp, which will allow anglers to fish longer by providing light during longer periods of the day.

PG&E proposes and Forest Service specifies that PG&E construct day-use areas at Red Banks and Tarantula Gulch inlet and access sites at Battle Creek and on both sides of McCloud dam to provide additional day-use areas and shoreline access at McCloud reservoir. Constructing additional day-use areas at Red Banks and Tarantula Gulch inlet and access sites at Battle Creek and on both sides of McCloud dam would help relieve overcrowding and reduce user conflicts at Tarantula Gulch boat ramp by providing recreation users with other access areas to McCloud reservoir. Moreover, constructing a floating fishing/swimming platform at one of the proposed day-use areas would potentially alleviate overcrowding and user conflicts even further. We recommend that PG&E construct day-use areas at Red Banks and Tarantula Gulch inlet, a floating fishing/swimming platform at one of the proposed day-use areas, and access sites at Battle Creek and on both sides of McCloud dam.

There are no existing campgrounds at McCloud reservoir to meet existing or projected demand for overnight use; however, regular dispersed camping is occurring at Star City. PG&E's suitability assessment shows the only potential site to accommodate camping at the reservoir is at Star City. Providing a formal campground and day-use area at this location, as proposed by PG&E and specified by the Forest Service, would help manage the already existing use and reduce negative impacts on natural resources by eliminating erosion and soil compaction from user-created trails and vehicles from dispersed camping and provide for proper sanitation disposal and trash removal. We recommend that PG&E develop a campground and day-use area at Star City; however, if PG&E is unable to secure the use of the land at the site, we recommend that PG&E at that time file a plan with the Commission for approval for a different campground location at McCloud reservoir.

We estimate that the annualized cost of implementing these recreation measures at McCloud reservoir would be \$1,860,000 and we conclude that the benefits associated with maintaining existing recreation facilities and expanding recreational opportunities at McCloud reservoir would be worth this cost.

### Lower McCloud River

Constructing a day-use site and designing an access trail to accommodate both fishing and boating access at the Lower McCloud River, as proposed by PG&E and specified by Forest Service modified condition 30, would facilitate the use of the area by both anglers and boaters.

Forest Service original condition 30 and 30a specified that PG&E upgrade the user-created river trail from Ash Camp Campground to Ah-Di-Na Campground and, if agreement with PG&E was not reached outside the license, reconstruct and provide O&M over the term of the license for Ash Camp and Ah-Di-Na Campground. PG&E does not propose to upgrade and maintain the Lower McCloud river trail nor does it propose to reconstruct, operate, and maintain the Ash Camp and Ah-Di-Na Campground because these are not project facilities. Although upgrading the existing trail along the Lower McCloud River from Ash Camp Campground at the Ash Camp bridge/PCT junction to Ah-Di-Na Campground would improve access, our review does not lead us to conclude that the existing user-created trail or the campgrounds are project facilities. The Forest Service trail and campgrounds are located outside the project boundary a mile or more from the project. The trail and campgrounds are not used for project purposes and do not provide access to the project lands or waters. A separate settlement agreement, executed between PG&E and the Forest Service and filed with the Commission on December 14, 2010, addresses O&M of non-project recreation facilities (specifically, Ash Camp, Ah-Di-Na Campground, and the Lower McCloud River Trail) and roads in the Shasta-Trinity National Forest, including Ash Camp (FR U38N11Y) and Ah-Di-Na (FR 38N53) roads.

We recommend PG&E construct a day-use facility at the base of McCloud dam. We estimate that the annualized cost of implementing this recreation measure at this location would be \$90,000, and we conclude that the benefits associated with expanding recreational opportunities below McCloud dam would be worth this cost. For reasons noted above, we are not recommending upgrading the trail from Ash Camp to Ah-Di-Na and the reconstruction, operation, and maintenance of the Ash Camp and Ah-Di-Na Campground.

### Iron Canyon Reservoir

PG&E proposes to reconstruct Hawkins Landing boat ramp and campground, and provide additional parking and restroom facilities, which would enhance recreational opportunities at Iron Canyon reservoir and ensure that the project recreation facilities meet current and future demand over the term of a new license. In addition, constructing a new boat ramp at Iron Canyon reservoir and providing additional shoreline access areas, also proposed by PG&E and specified by Forest Service modified condition 30, would increase boating access at the reservoir and help alleviate dispersed recreation use occurring along the shoreline. The Forest Service's original and modified condition 30 further specified that PG&E provide three reservoir access sites that include surfaced parking and trail to the reservoir. In PG&E alternative condition 30, PG&E would

conduct a site evaluation and construct the paved parking areas with pedestrian shoreline access trails. Constructing the proposed shoreline access areas with the addition of the parking areas would provide developed access areas along the shoreline to help alleviate some of the dispersed recreation use occurring along the reservoir shoreline.

We recommend that PG&E reconstruct the existing Hawkins Landing campground and boat ramp and construct a new boat ramp at Iron Canyon reservoir that is usable at the reservoir's minimum operating pool (2,593 feet msl). In addition, we recommend PG&E construct three shoreline access areas that include paved parking with pedestrian trails to the shoreline. Because the Forest Service has not provided suggested locations for feasible sites, we recommend that PG&E conduct a site evaluation, as proposed, within 90 days of license issuance to determine the locations for the three shoreline access areas.

In its original condition 30, the Forest Service specified that, if possible under reservoir operations, the Hawkins Landing boat ramp should be operable a minimum of 155 days during the recreation season and the new Iron Canyon reservoir boat ramp should be functional at 90 percent of operational lake levels. PG&E's proposal to construct the new, additional Iron Canyon dam boat ramp so that it is usable at the reservoir's minimum operating pool (2,593 feet msl) would result in public boating access to Iron Canyon reservoir over the entire recreation season and should accomplish the level of use the Forest Service is seeking, although we note that Forest Service modified condition 30 does not include these specifications for operational use of the boat ramps. This additional boat ramp would help to alleviate overcrowding of the existing Hawkins Landing boat ramp. As such, we recommend that PG&E reconstruct the Hawkins Landing boat ramp and construct a new boat ramp at Iron Canyon dam that is functional at the reservoir's minimum operational lake levels (2,593 feet msl) during the recreation season.

In its original condition 30, the Forest Service specified that PG&E relocate Deadlun campground to one or two location(s) along the Iron Canyon reservoir shoreline and provide a mix of single and group campsites with no less than a capacity of 200 people at one time total. Forest Service modified condition 30 specifies that PG&E provide about the same minimum number of sites for overnight camping at Iron Canyon as originally specified but that PG&E reconstruct Deadlun Campground to provide double and triple campsites and construct an additional new campground at Gap Creek to provide single unit sites. Because dispersed camping generally occurs along the main body of Iron Canyon reservoir and the campground is currently located in a creek off the main body of the reservoir, the Forest Service states that relocating Deadlun Campground to a more desirable location would likely increase the use of this facility. The new Gap Creek site would be located along the main body of the reservoir in a more desirable location. PG&E states that poor facility conditions and upkeep of the campground may contribute to the prevalence of dispersed sites around the reservoir. As a result, PG&E originally proposed to reconstruct Deadlun Campground. PG&E alternative condition 30, however, proposes conducting a site assessment to determine if there are one or more

suitable sites to relocate the existing Deadlun Campground along the Iron Canyon reservoir shoreline. If agreement can be reached on alternate location(s), PG&E would construct a new campground at the new location(s). If a suitable location(s) does not exist, however, PG&E would reconstruct the campground in its current location with access to the reservoir shoreline.

In its license application, PG&E identified 22 dispersed recreation sites around Iron Canyon reservoir with heavily used dispersed recreation sites at the areas adjacent to Deadlun Campground. In the draft EIS, staff recommended PG&E reconstruct Deadlun Campground and provide access to the shoreline to improve camping opportunities at the reservoir. At that time, no other suitable sites to relocate the campground had been identified. Forest Service's specification in its modified condition 30 to reconstruct Deadlun Campground as a group campground at its existing location and construct a new, single-site campground at Gap Creek on the main body of Iron Canyon reservoir would not only alleviate the issue of dispersed recreation sites adjacent to Deadlun Campground, but it also would increase camping capacity at this popular project reservoir. Further, providing formal access to Iron Canyon reservoir shoreline from both Deadlun Campground and Gap Creek Campground would likely increase the use of this reservoir, thereby increasing the need for more campsites. We recommend that PG&E reconstruct Deadlun Campground to provide double and triple campsites with access to the shoreline and construct a new campground at the Gap Creek site for single unit campsites.

In its original condition 30, the Forest Service specified that PG&E provide lighting at the new Iron Canyon dam boat ramp to ensure safety for anglers fishing early or late in the day. The Forest Service does not include this specification in modified condition 30, but it recommends in the draft Recreation Development and Management Plan lighting at Iron Canyon dam boat ramp when the boat ramp is snow-free. Lighting would allow anglers to fish longer during the recreation season and increase safety at the boat ramp. Therefore, we recommend that PG&E provide lighting at the new boat ramp.

In its original condition 30, the Forest Service also specified that PG&E provide snow removal at the Iron Canyon boat ramp during the shoulder season (March or April through December) and at the new boat ramp when Oak Mountain access road and the new Iron Canyon boat ramp surfaces are passable. PG&E alternative condition 30 proposes that PG&E would remove snow from the access road to the boat ramp, the boat ramp, and parking area when project operations require snow removal from Oak Mountain Road. Although winter use is minimal at this site, because PG&E would already be plowing Oak Mountain Road, plowing the short access road, boat ramp, and small parking area would not add much additional time or cost. In addition, it would allow access to the boat ramp during the shoulder season, therefore extending the regular recreation use season.

We estimate that the annualized cost of implementing these recreation measures at Iron Canyon reservoir would be \$1,851,000, and we conclude that the benefits associated expanding recreational opportunities at Iron Canyon reservoir would be worth this cost.

#### Pit 6 and 7 Reservoir

In its original condition 30, the Forest Service specified that PG&E develop a shoreline trail at Pit 6 reservoir if capacity or demand (based on 6-year recreation use monitoring) indicates increased use of the reservoir for fishing or boating; however, Forest Service modified condition 30 does not specify this trail. Providing access to the river near Pit 6 and 7 reservoirs would improve recreational access at the project if there is an increase in recreation use at the Pit 6 reservoir. This measure could be considered in the future if the recreation use data collected every 6 years shows it is warranted.

Additionally, constructing the proposed river access trail at the upper end of Pit 7 reservoir and conducting a feasibility assessment for providing a hand-carry boat launch at Montgomery Creek near the lower end of Pit 7 reservoir, as proposed by PG&E, would enhance access to Pit 7 reservoir for existing pedestrian fishing and hand-launch boating. Although Forest Service modified condition 30 specifies two surfaced parking areas with reservoir access trails at the upper end of Pit 7 reservoir instead of the one that was specified in original condition 30, the Forest Service has not provided any justification for the additional access area and this additional access area does not seem to be warranted at this time.

The Forest Service specifies that PG&E construct a boat put-in/take-out on the lower end of Pit 7 reservoir at Montgomery Creek or near the dam. PG&E has expressed concern for public safety if boating access is provided at the upper and lower portions of Pit 7 reservoir due to riverine high flows from the Pit 6 powerhouse and riverine conditions at low reservoir levels (fast flowing water) that could increase the likelihood of boats overtopping the dam and prevent boaters from returning upstream to exit the reservoir. PG&E further indicates in its comments on the draft EIS that it has thoroughly investigated all potential options and determined that it is not feasible to provide safe and secure public access to Pit 7 reservoir near the dam. Boating is prohibited within 500 feet of the dam and PG&E is concerned that providing shoreline access may encourage boating use which would create a concern for public safety. Although constructing a hand-carry boat launch where Montgomery Creek enters Pit 7 reservoir or in the lower portion of Pit 7 reservoir would increase boating and fishing access, it would not be appropriate to launch boats at this location because of the public safety concerns raised by PG&E. Therefore, we do not recommend PG&E conduct a feasibility assessment for providing a hand-launch boat put-in where Montgomery Creek enters Pit 7 reservoir or provide the hand-launch boat put-in.

We recommend that PG&E construct one parking area with river access trail at the upper end of Pit 7 reservoir, conduct a site evaluation to determine the location for a pedestrian shoreline river access trail with parking at the lower end of Pit 7 reservoir, and provide a pedestrian shoreline river access trail with parking at the lower end of Pit 7

reservoir. We estimate that the annualized cost of implementing this recreation measure at Pit 7 reservoir would be \$17,000, and we conclude that the benefits associated with providing additional pedestrian access at Pit 7 reservoir would be worth this cost.

### Pit 7 Afterbay

PG&E does not propose any new recreation facilities at Pit 7 afterbay. Public access to Pit 7 afterbay is currently restricted by PG&E for public safety reasons due to the rapidly fluctuating water level and strong water current. Both fencing and warning signs have been posted to prohibit shoreline and boating access. However, PG&E's proposal to reconstruct Fenders Flat day-use area (above Pit 7 afterbay dam), and if the Pit 7 afterbay powerhouse is constructed, to provide access near the proposed Pit 7 afterbay powerhouse, with parking at the end of the powerhouse access road or along Fenders Ferry Road, subject to public safety, would enhance recreational opportunities in the vicinity of the afterbay by formalizing this existing dispersed recreation area. Moreover, reconstructing the existing Forest Service Fenders Flat car-top boat launch would provide boater access to the Pit arm of Shasta Lake during late winter and early spring when high lake levels allow boat launching. Although not specified by the Forest Service in its modified condition 30, providing shoreline access to the Pit River near the proposed Pit 7 afterbay powerhouse, if the powerhouse is constructed, would provide a formal shoreline access area for anglers in the vicinity of the Pit 7 afterbay that could help discourage trespass at the Pit 7 afterbay dam where safety is an issue.

PG&E's proposal to upgrade the existing recreation facilities in the vicinity of Pit 7 afterbay and continue prohibiting public access to Pit 7 afterbay water surface by maintaining fencing, signage, and patrols would help to ensure public safety at the project. We recommend that PG&E reconstruct Fenders Flat day-use area and car-top boat launch at Pit 7 afterbay and continue to prohibit public access to Pit 7 afterbay water surface. We estimate that the annualized cost of implementing the recreation measures at Pit 7 afterbay would be \$437,000, and we conclude that the benefits would be worth this cost. If the Pit 7 afterbay powerhouse is constructed, we recommend PG&E provide a formal shoreline access area for anglers in the vicinity of the Pit 7 afterbay powerhouse with parking. We estimate that the annualized cost of implementing this additional recreation measures at Pit 7 afterbay would be \$38,000, and we conclude that the benefits would be worth this cost.

### Recreation Monitoring

Recreation use at the project is expected to double over the next 50 years. The level and type of recreation use and recreation user preferences could change over the term of a new license. PG&E's proposal of periodic monitoring of recreation use, user preference surveys, assessment of facility capacity and recreation demand, and inventorying areas used for dispersed recreation would help to determine if the project's recreation facilities provide adequate public recreation access and meet user demand over the term of the license. In addition to PG&E's proposal, the Forest Service recommends in the draft Recreation Development and Management Plan and originally specified in

condition 30 that PG&E include monitoring of boat use during the recreation season as a part of recreation monitoring efforts every 6 years. Monitoring boat use would help to identify excessive use and potential user conflicts on the reservoirs. FERC Form 80 Recreation Report already requires facility capacity and demand to be reported every 6 years; however, the additional recreation report would provide more specific information such as changes in use patterns and whether or not resource damage is occurring. We recommend that PG&E implement recreation monitoring as a part of the Recreation Plan for all project recreation facilities and file a monitoring report concurrently with the FERC Form 80 schedule every 6 years after license issuance. We estimate that the annualized cost of this measure would be \$300,000 and conclude that the benefits of this measure are worth the cost.

#### Reservoir Water Surface and Shoreline Management

PG&E originally proposed to clean debris from the McCloud reservoir boat ramp and Iron Canyon reservoir water surface annually, weather permitting, and as needed throughout the recreation season. In its original condition 30, the Forest Service specified that PG&E conduct annual surface sweeps prior to the start of the recreation season on both McCloud and Iron Canyon reservoirs and boat ramps to collect logs and debris from the lake surface with smaller debris and trash removed from NFS lands, but the Forest Service does not specify a frequency or the reservoirs where surface debris would be captured in its modified condition 30. PG&E alternative condition 30 proposes to conduct surface sweeps to collect logs and other debris from the surface of McCloud and Iron Canyon reservoirs once every 5 years or as needed, prior to the start of the recreation season. Surface sweeps of McCloud and Iron Canyon reservoirs and boat ramps would remove surface debris to reduce boating hazards and ensure that the boat ramps are not blocked by debris. Annual sweeps would ensure that winter storm debris that could accumulate seasonally is removed prior to the beginning of each recreation season.

Additionally, PG&E originally proposed to develop a surface water and shoreline management plan for McCloud reservoir that includes installing 5-mph signs on the bridge that spans the northern end of the reservoir, points of public access to the shoreline, and boating speeds. Developing protocols for preventing/removing unapproved buoy courses and approved use of docks, as specified by the Forest Service in its original condition 30 and proposed by PG&E in alternative condition 30, would help prevent boating hazards and improve public recreational safety at the project reservoirs.

In its original condition 30, the Forest Service specified, and in alternative condition 30, PG&E modified its original proposal for the surface water and shoreline management plan for McCloud reservoir to propose that PG&E would submit requests to the Shasta County Boating Unit of the Sheriff's office for the establishment of a 5-mph restriction on a portion of McCloud reservoir and for a buoy line near Huckleberry Creek on McCloud reservoir. Although speeding on the reservoirs has been identified as an

issue by project users, enforcement of speed restrictions is not the responsibility of the Commission. The Shasta County Boating Unit of the Sheriff's office is responsible for boating safety enforcement on all waterways within Shasta County, including the project reservoirs. PG&E is subject to local laws and ordinances as they pertain to reservoir speed limits.

Additionally, the Forest Service specifies that PG&E implement measures to discourage trespass on private lands to protect public safety. The Commission does not have authority on private lands outside the project boundary; it is the responsibility of private landowners to clearly mark their property if trespassing is problematic. However, measures to prevent unauthorized access to project lands and waters where necessary to protect the public would ensure public safety at the project and help address the issue of trespassing at the project, especially at Pit 7 afterbay where public access is prohibited.

We recommend that PG&E implement a water surface management component of the Recreation Plan to include protocols for preventing/removing unapproved buoy courses and approved use of docks; surface sweeps of McCloud and Iron Canyon reservoirs and boat ramps, annually or as needed; and measures to prevent unauthorized access to project lands and waters, where necessary, to protect public safety. We estimate the annualized cost of the overall surface water management component would be \$50,000 and conclude that the benefits of this measure are worth the cost.

#### Project Signage and Interpretative Information

The project currently does not have a coordinated and systematic process for the development of signage and interpretative information associated with the project. Development and implementation of a Project Sign Plan with an updated sign inventory and associated interpretive and educational measures for the project would provide the means for coordinated and systematic development of signage and interpretative information to ensure public safety and help the public receive the most out of visits to the project. Furthermore, providing informational kiosks or interpretive and education materials at developed project facilities and a public website to host recreation information would provide a source for visitors to locate recreation information about the project both on the internet and onsite. Therefore, we recommend the development of the Project Sign and Interpretive Education Plan in consultation with the Forest Service and that PG&E be responsible for ensuring that public information required under the Project Sign and Education Plan is available through the internet, via PG&E's website. We estimate that the annualized cost of the Project Sign Plan would be \$42,000 and the annualized cost of the interpretive and educational component would be \$30,000, and we conclude that the benefits of these measures are worth the cost.

#### *Dispersed Use and OHV Use*

PG&E's proposal to work with the Forest Service to discourage littering and OHV use through the assessment and evaluation of road closures, trail closures, and dispersed use would improve visitors' recreational experience at the project and enhance public

safety. Further, by implementing measures to block vehicle access and discourage OHV use at the project, environmental resources would be further protected although these measures are no longer specified by the Forest Service in modified condition 30. The Forest Service originally specified in condition 30 that PG&E implement measures to evaluate road closures, trail closures and dispersed use closure around Iron Canyon reservoir. Although not specified by the Forest Service or proposed by PG&E in alternative condition 30, including McCloud reservoir in the evaluation would address areas identified at both reservoirs where dispersed use occurs. Prohibiting vehicle access and OHV use between the roads and reservoir shorelines would help reduce this resource damage and improve the aesthetic quality of the area for visitors to the project. To help reduce resource damage from dispersed-use recreation, we recommend that PG&E evaluate and implement appropriate road closures and trail closures, in coordination with the Forest Service, for the area inside the project boundary around both McCloud and Iron Canyon reservoirs. We estimate the annualized cost of this measure would be \$114,000 and conclude that the benefits of this measure would be worth the cost.

#### *Project Patrol*

PG&E proposes to prepare a Project Patrol Plan in consultation with the Forest Service that would address patrol at the project, including NFS land within the project area. Similarly, Forest Service modified condition 30 specifies that PG&E develop and implement a Project Patrol Plan and coordinate annually with appropriate agencies and other interested parties to review information from the prior season and plan any adjustments for the next high-use season. Forest Service modified condition 30 also specifies that PG&E would employ a year-round project patrol person or, alternately, provide funding to an appropriate federal, state, or local agency to provide that same. The Hearst Corporation filed comments supporting the concept of a host or project patrol person.

Although more visible patrol or law enforcement may help reduce conflicts between recreation users and improve visitor safety, the state and county are responsible for law enforcement activities at public recreation sites, including within the project area. Further, the Commission has no way of ensuring that the hiring of a patrol person or campground host paid for by PG&E would actually accomplish a project purpose or ameliorate a project effect. There would be no indication that existing recreation conflicts would be reduced through the proposed measure; therefore, we do not recommend that PG&E provide patrol (i.e., seasonal or year-round employee, campground host) or funding for a law enforcement position.

#### *Provision of Streamflow Information*

Accurate and timely streamflow information and information about the usability of the project boat launches can assist recreationists in planning water-related visits to the project. PG&E proposes and Forest Service modified condition 19, part 2 specifies that accurate and timely streamflow information be provided to the public. This would provide the means for the public to gain information regarding streamflow and reservoir

levels for specified stream reaches and reservoirs at the project. Providing accurate and timely streamflow information at gage MC-7, in addition to gage MC-1, to the public via the internet would also provide the public with additional streamflow information for the Lower McCloud River. Therefore, we recommend PG&E provide streamflow data from gage MC-1 and gage MC-7 and reservoir drawdown information to the public via its website on the internet. We estimate the annualized cost of this measure to be \$4,000, and conclude that the benefits outweigh the costs.

## **Cultural Resources**

### *National Register of Historic Places Eligibility*

As part of the required cultural resource surveys, PG&E surveyed all accessible project lands within the APE. Although PG&E has not yet conducted all evaluations to determine which, if any, of the identified sites are eligible for inclusion in the National Register, we conclude that one archaeological site (CA-SHA-252) that is currently being adversely affected by the project is eligible for the National Register. In the draft EIS, we also recommended that PG&E set up a schedule to determine National Register eligibility on all remaining sites that either currently or have the potential to be adversely affected by the project. On October 26, 2010, PG&E filed a revised HPMP that lists site CA-SHA-252 as a National Register-eligible site being adversely affected by the project and states that site specific measures for its protection will be developed within 1 year of license issuance. PG&E also provided a schedule indicating that National Register eligibility for the remaining sites would be determined within 1 year of license issuance, and any necessary protection measures would be developed within 2 years of license issuance. These revisions are consistent with our recommendations in the draft EIS and we recommend that they be implemented.

### *Cultural Resource Management*

Continued operation of the project, along with construction of the proposed generation and recreation facilities, could adversely affect properties eligible for listing in the National Register. To protect and manage historic properties within the project APE, PG&E prepared and filed a draft HPMP (dated, July 2009) and proposed to continue consultation to develop a final HPMP. In the HPMP, PG&E proposes to conduct monitoring of sites within the project area that are eligible for listing on the National Register. In addition, the HPMP includes additional mitigation and management measures for historic properties affected by the project, as well as proposals for continuous cultural resource consultation with the Forest Service, the Pit River Tribe, and the Winnemem Wintu Tribe. The Forest Service's original condition 34 also specified finalization and implementation of the HPMP and that the HPMP should: (1) fully integrate all cultural resource studies completed for the project relicensing, including each tribe's TCP studies; (2) take into account project effects on National Register-eligible properties that are being periodically inundated by Iron Canyon reservoir and elsewhere on NFS lands; (3) provide measures to mitigate effects on historic properties; (4) evaluate whether an archaeological or ethnographic historic district should be

established on the Lower McCloud River within the project's expanded APE; and (5) provide for a monitoring program and management protocols on NFS lands.

PG&E alternative condition 34 proposed slight modifications to Forest Service condition 34. PG&E proposed that: (1) if a TCP report from the Winnemem Wintu is completed after a final HPMP is filed, then the final HPMP would need to be amended; (2) National Register eligibilities would be applied to sites periodically inundated that are being affected by project-related effects; (3) mitigation measures would be applied after the California SHPO determined that those project-related affects are adverse, and such measures are necessary; and (4) determining a historic district involving archaeological and ethnographic sites would be done only if there is compelling evidence that supports such a historic district. Forest Service modified condition 34 is similar to its original condition 34, except that in the modified condition, the Forest Service requests further revision of the HPMP. PG&E filed a letter on December 14, 2010, stating that it accepts the Forest Service modified condition 34, and withdrew its alternative condition 34.

In our draft EIS, we recommended that PG&E include the following additional measures in the HPMP:

- Treatment measures, to be conducted within 1 year of license Issuance, that resolve project-related adverse effects on National Register-eligible archaeological site CA-SHA-252;
- National Register evaluations, to be completed within 1 year of license issuance, on all cultural resources that are currently, or in the future will be, adversely affected by the project;
- Site-specific protection measures, to be completed within 2 years of license issuance, to resolve project-related erosion effects on all National Register eligible archaeological sites; and
- Measures for handling of newly discovered paleontological resources, due to the recent paleontological law enacted by Congress in March 2009 that requires all federal land managers to manage and protect paleontological resources discovered on their lands.

On October 26, 2010, PG&E filed a revised HPMP with the Commission that included these draft EIS recommended measures. With the addition of these measures, we find that the October 2010 final HPMP is revised adequately.

In addition to these measures, PG&E has also stated in the October 2010 final HPMP that it will pursue investigations on any additional cultural resource sites identified by the Forest Service that have not already been addressed in the final HPMP, and that such related documentation will be completed within 1 year of license issuance. We agree that addressing any sites identified by the Forest Service would ensure that all

cultural resource sites being adversely affected by the project are adequately protected and recommend that this measure be implemented, as well.

PG&E has not yet filed the results of its Winnemem Wintu TCP study. On April 23, 2010, and May 25, 2010, PG&E and the Winnemem Wintu Tribe (Tribe), respectively, filed letters with the Commission explaining the parties' disagreement about who can gain access to Tribe's TCP study.<sup>41</sup> The Commission is not the appropriate venue for resolving this issue.<sup>42</sup> However, PG&E's final HPMP provides a process to incorporate the Winnemem Wintu TCP study and to protect or resolve project-related adverse effects to any TCP that is located within the project's APE. Amendments to the final HPMP can also be used to incorporate additional information and treatment measures for TCPs resulting from such studies when they are completed. Furthermore, any other measures recommended by the Forest Service can be added as an amendment to the final HPMP, as may be required by the Forest Service's modified condition 34.

Implementation of PG&E's October 2010 final HPMP would ensure that adverse effects on historic properties, as a result of project operation, maintenance, recreation, vandalism, or other existing and future project-related activities, would be addressed over the term of any new license issued for the project. In order to implement the terms of the final HPMP, Commission staff would execute a PA with the California SHPO.<sup>43</sup> PG&E, the Forest Service, Pit River Tribe, and Winnemem Wintu Tribe would be invited to sign the PA as concurring parties. With the execution of the PA and implementation of a final HPMP, all anticipated effects on any historic properties within the project APE would be resolved. Therefore, we recommend implementation of the final HPMP upon license issuance. We estimate that implementation of the protective measures proposed in PG&E's final HPMP would have an annualized cost of \$284,000. These costs would include any additional modifications to the HPMP as specified by Forest Service condition 34, and we conclude that the expected benefits of implementing the HPMP with any recommended modifications are worth the cost.

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<sup>41</sup> Letter from Steve Nevares, PG&E, dated April 23, 2010, and letter from Stephen Volker, Attorney for Winnemem Wintu Tribe, dated May 25, 2010.

<sup>42</sup> As the MOU is a legal document between PG&E and the Tribe, the Commission cannot enforce any of the clauses contained within the document. While the Commission itself is not the appropriate venue for resolving these issues, we can refer the parties to the Commission's Dispute Resolution Service. If both parties feel facilitation could assist in resolving their dispute, please contact Commission staff.

<sup>43</sup> We issued a draft PA on August 27, 2010, and invited the Council to participate in the PA. Since then, we have not received a response back from the Council, and as with other draft PAs we issued and ask whether the Council chooses to participate, we conclude that the Council has chosen not to participate in this particular PA.

## **Land Use and Aesthetic Resources**

### *Road and Transportation Facilities Management Plan*

A Road and Transportation Facilities Management Plan, as proposed by PG&E and specified by Forest Service condition 29 and modified condition 29, would establish a forum for coordination of road maintenance activities among PG&E, the Forest Service, and other affected parties. Specifically, the plan would address operations, maintenance, construction and reconstruction, monitoring, and road use within the project boundary (project roads are listed in table 3-41). A plan would help to clarify and memorialize PG&E's road management responsibilities within the project boundary, ensure safe public access to project lands and waters, and ensure the adequate protection of natural and environmental resources in the project area. A separate settlement agreement, between PG&E and the Forest Service, would address O&M of non-project recreation facilities and roads in the Shasta-Trinity National Forest. We estimate that the annualized cost of developing and implementing this plan would be \$3,950,000 and conclude that the benefits of this measure warrant the costs. We recommend the implementation of this measure.

### *Fire Prevention and Response Plan*

The development and implementation of a Fire Prevention and Response Plan in consultation with the Forest Service, the California Department of Forestry and Fire Protection, the Big Bend Volunteer Fire Department, and others, as appropriate, that addresses fuels treatment, prevention and response, access and safety, emergency response preparedness, investigation and reporting, and post-fire activities, as proposed by PG&E and specified by Forest Service condition 33, would improve planning, management, and coordination of wildfire protection and prevention measures. Implementation of the plan would also lead to a reduction in the occurrence and suppression of wildfires in the project area. We estimate that the annualized cost of developing and implementing this plan would be \$4,000. Given the benefits of improved public safety and reduced potential damage to property and natural resources, we conclude that the benefits of this measure are worth the cost and recommend the implementation of this measure.

### *Hazardous Substance Management Plan*

To meet the regulatory requirements for handling, storage, and emergency response related to hazardous materials, PG&E has developed a Spill Prevention, Control, and Countermeasures Plan and Hazardous Materials Business Plan. The continued implementation of these plans would ensure that spills of hazardous substances within the project boundary are promptly contained and cleaned up to avoid/minimize the potential extent of adverse environmental effects. Although the Forest Service did not specify a Hazardous Substance Management Plan in its modified 4(e) conditions, the California Water Board and the Center for Water Advocacy supported the original proposal. We recommend that PG&E provide copies of the existing plans to the

Commission, the Forest Service, and the Central Valley Regional Water Board within 30 days of license issuance. We estimate that the annualized cost of filing the existing Spill Prevention, Control, and Countermeasures Plan and Hazardous Materials Business Plan with the Commission and providing copies to the Forest Service would be minimal, and we recommend implementation of this measure.

#### *Project Boundary*

We have concluded that certain roads and dispersed areas recommended by the Forest Service to be included in the project boundary do not meet the Commission's criteria for roads used primarily for project purposes and should not be included in the project boundary.<sup>44</sup> In modified condition 30, the Forest Service also specifies that all new, proposed recreation sites and facilities be included within the project boundary prior to ground disturbance. We conclude that it would be premature to alter the project boundary before new recreational facilities are actually constructed, as the location of the facilities or design plans may change, possibly requiring multiple, unnecessary, changes to exhibit maps. By requiring PG&E to include all existing project recreation sites, to include any roads necessary for project purposes within the project boundary within 1 year of license issuance, the Commission would have the authority to ensure that PG&E maintains adequate and safe public access to project lands and waters for recreational purposes. If new recreation sites are included in a new project license, PG&E would be required to file a revised exhibit G that would include the new facilities and roads, as appropriate, once construction of the facilities is complete. We estimate that the annualized cost of filing revised exhibit maps with the Commission would be \$10,000 and conclude the benefits of this measure warrant the costs. We recommend the implementation of this measure.

#### *Visual Quality Management Plan*

Aesthetic resources can be affected by project facilities and operations. Project facilities, such as project powerhouses, transmission lines, and recreation facilities can dominate views, creating contrast with the natural landscape. Forest Service condition 32 specified that PG&E develop, for Forest Service approval and filing with the Commission, an implementation schedule of visual quality mitigation measures. Forest Service modified condition 32 specifies and PG&E agrees to develop tasks and a timeline to ensure implementation of certain mitigation measures to blend project and project-related facilities on project and project-affected NFS lands with the natural surroundings. These measures apply to existing, modified, and constructed and reconstructed project facilities. However, existing facilities in good repair would only have mitigations applied as maintenance is needed.

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<sup>44</sup> For more information regarding the Commission's roads policy, please see the Commission's Policy Statement on Hydroelectric Licensing Settlements, issued September 21, 2006.

The implementation of visual quality mitigation measures would help to ensure that project facilities blend with the natural environment and are consistent with the Forest Service's VQOs for the project area. The measures proposed by PG&E and specified by the Forest Service, such as visual screening, painting, providing interpretive information, and maintaining reservoir levels during the peak recreation season would collectively reduce the impacts on aesthetic resources in the project area. We agree that a tasks and timeline approach is a reasonable alternative to a management plan. We recommend PG&E identify specific mitigation measures and develop an implementation schedule, in consultation with the Forest Service and stakeholders, as appropriate, to protect the visual quality of lands in the project area within 1 year of license issuance. At a minimum the proposed measures should address the effect of project facilities on the aesthetics in the project area, including but not limited to generating facilities, recreation sites and facilities, and spoil piles. We estimate an annualized cost of \$11,000 and recommend implementation of this measure.

### **Proposed Additional Generation Units**

To develop the hydro potential from higher instream flows that may be required in a new license, PG&E studied the feasibility of installing new generation units at both the McCloud and Pit 7 afterbay dams. For McCloud dam, PG&E studied the feasibility of both a 5-MW powerhouse and an 8-MW powerhouse. For the Pit 7 afterbay development, PG&E analyzed both a 5-MW powerhouse and a 10-MW powerhouse. In the final license application, PG&E says it will determine the final size of the units and their hydraulic capacity based on instream flow requirements of the new project license. In table 4-7 of section 4.4, *Comparison of Alternatives for PG&E's Proposed Powerhouses*, we compare our estimate of the power value, annual costs, and net benefits of the powerhouse alternatives presented by PG&E in the license application. As table 4-7 shows, the four alternatives that PG&E is considering would have initial annual costs that far exceed the current power value.

PG&E needs to decide whether to propose the new units at McCloud dam and the Pit 7 afterbay dam, and how to appropriately size them. Though our analysis shows that the cost of these new units could exceed the potential power benefits, PG&E might consider whether these hydro proposals would qualify as part of its state requirement to develop renewable resources and whether to accept the financial risk that entails from developing these units. Therefore, until PG&E decides on the final capacity of these minimum flow units, we make no recommendation at this time regarding the proposed additional generation units.

### **5.3 UNAVOIDABLE ADVERSE EFFECTS**

The continued operation of the project would result in some minor unavoidable adverse effects on geologic, soil, and terrestrial resources. The geologic and soil resources effects could include some minor continued erosion associated with project operation and renovation of recreational facilities and interruption of sediment transport

at project reservoirs. Most of these effects would be reduced by the proposed resources enhancement measures, including: (1) development and implementation of an Erosion and Sediment Control Plan; and (2) development and implementation of an LWD Plan.

For terrestrial resources, these effects could include short-term loss of vegetation communities along the proposed transmission line. Most of these effects would be reduced by proposed resource enhancement measures, including the development and implementation of a Vegetation and Invasive Weed Management Plan and vegetation management BMPs. Vegetation within the permanent corridor would re-establish; however, the vegetation within the corridor would be managed and maintained as necessary and in the long-term would be permanently altered from the original plant communities that existed prior to the construction of the new transmission lines.

We have identified no other unavoidable adverse effects on resources influenced by project operation.

## **5.4 SUMMARY OF SECTION 10(j) RECOMMENDATIONS AND 4(e) CONDITIONS**

### **5.4.1 Fish and Wildlife Agency Recommendations**

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by state and federal fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of the agency. If the Commission still does not adopt a recommendation, it must explain how the recommendation is inconsistent with Part I of the FPA, or other applicable law and how the conditions imposed by the Commission adequately and equitably protect, mitigate damages to, and enhance fish and wildlife resources.

In response to the Commission's Ready for Environmental Analysis notice, issued December 1, 2009, California Fish and Game (February 2, 2010) and NMFS (January 29, 2010) filed letters providing comments and terms and conditions for the McCloud-Pit Project, pursuant to section 10(j). In response to the Commission's draft EIS, NMFS also filed a letter on September 28, 2010, providing comments on the draft EIS and requesting a meeting with Commission staff to discuss our preliminary determinations on inconsistency regarding NMFS's 10j recommendations. Commission staff held a 10(j) meeting with NMFS in Sacramento, California, on November 17, 2010, in an attempt to resolve these preliminary inconsistencies. California Fish and Game did not request a 10(j) meeting. Table 5-2 summarizes the agency recommendations made under section 10(j), as well as whether the recommendations are adopted under the staff alternative. Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document and in section 5.2, *Comprehensive Development and Recommended Alternative*.

Of the 15 recommendations, we make a preliminary determination that two of the recommendations made by NMFS and two recommendations made by California Fish and Game are within the scope of section 10(j). Of those four recommendations filed by NMFS or California Fish and Game, we adopt two and partially adopt one.

NMFS provided 12 section 10(j) recommendations, and we make the preliminary determination that two of those recommendations are within the scope of section 10(j) and we recommend both of those measures. In the staff alternative, we recommend that PG&E submit draft biological evaluation or assessment for special status species protection and mitigation. We also recommend that PG&E measure instream flows at

gage MC-7. We make a preliminary determination that the remaining 10 measures, however, are outside the scope of section 10(j) and we analyze these recommendation under section 10(a) of the FPA. Of these 10 measures, we recommend one (that PG&E consult annually on newly added special status species), but we do not recommend that PG&E create the Listed Salmonid Technical Integration Committee. Instead, we recommend that PG&E file an annual report on the status of listed anadromous fish reintroduction in the project area.

The remaining eight section 10(j) recommendations from NMFS include protection, mitigation, and enhancement measures to be implemented as soon as listed salmonids are documented within the McCloud River. As discussed previously, however, no listed salmonids are present in the project area. Although NMFS has issued a final biological opinion on long-term operations of Reclamation's Central Valley Project and State Water Project in the Central Valley, California, as well as a Public Draft Recovery Plan for ESA-listed salmon species, a review of documented scientific, legal, regulatory, and economic resources indicates that the reestablishment of listed salmonids both above Shasta dam and in the project area is not assured. Furthermore, NMFS states that the eight recommendations that provide for the protection, mitigation, and enhancement of listed salmonids would be implemented as soon as the species were documented in the McCloud River. In the draft EIS, we analyzed the recommendations and made a preliminary determination that they were within the scope of section 10(j), but we did not recommend these eight measures because they were premature since listed salmonids were not currently present in project waters. After further review of the eight NMFS section 10(j) recommendations and the NMFS OCAP BiOp and Public Draft Recovery Plan, we have now revised our preliminary determination with regard to scope. As these are measures that would be instituted at an indeterminate future time, it is our preliminary determination that these eight measures do not fall within the scope of section 10(j). Instead, we consider these measures under section 10(a) of the FPA and they are addressed in the specific resource sections of this document and in section 5.2, *Comprehensive Development and Recommended Alternative, Reintroduction of Anadromous Fish*.

California Fish and Game provided three 10(j) recommendations, and we recommend one of the recommendations, partially recommend another recommendation, and do not recommend the third recommendation, which also is outside the scope of 10(j). While we recommend adopting California Fish and Game's recommended minimum instream flow regime for Iron Canyon Creek and Pit 7 dam, we do not recommend adopting California Fish and Game's recommended minimum flow regimes for below McCloud dam. Our analysis in sections 3.3.2.2, *Environmental Effects*, and 5.2, *Comprehensive Development and Recommended Alternative*, indicates that the staff-recommended Lower McCloud River flow regime, as specified in Forest Service modified condition 19, would provide a similar level of increased trout habitat with less loss to generation. We estimate that the annualized cost of implementing the minimum flow regime recommended by California Fish and Game would be \$15,910,000 per year,

which is \$1,459,000 more than the cost of the staff-recommended flow regime and the added benefit is not worth the cost. Therefore, we find that California Fish and Game's recommended minimum flow regime for the Lower McCloud River is inconsistent with the comprehensive planning standard of section 10(a) of the FPA, as well as the equal consideration provision of section 4(e) of the FPA.

Table 5-2. Analysis of fish and wildlife agency section 10(j) recommendations for the McCloud-Pit Hydroelectric Project. (Source: Staff)

| <b>Recommendations</b>  | <b>Agency</b> | <b>Within Scope of 10(j)?</b>  | <b>Annualized Cost</b> | <b>Adopted?</b>   |
|---|---------------|--|------------------------|---|
| 1. Submit draft biological evaluation or assessment for special status species protection and mitigation  | NMFS          | Yes  | \$0                    | Yes   |
| 2. Consult annually on newly added special status species   | NMFS          | No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources. | \$11,000               | Yes   |
| 3. Provide access to suitable habitat for anadromous fish and restore fully functioning habitat conditions for spawning, rearing, migration, and adjoining habitats | NMFS          | No. This is a measure that would be instituted at an indeterminate future time.          | NA                     | Not adopted; premature given lack of anadromous fish on the McCloud River |
| 4. Implement scheduled instream flows for McCloud River to the benefit of native anadromous fishes  | NMFS          | No. This is a measure that would be instituted at an indeterminate future time.          | NA                     | Not adopted; premature given lack of anadromous fish on the McCloud River |

| <b>Recommendations</b>  | <b>Agency</b> | <b>Within Scope of 10(j)?</b>   | <b>Annualized Cost</b> | <b>Adopted?</b>   |
|---|---------------|---|------------------------|---|
| 5. Move instream flow compliance point from gage MC-1 to gage MC-7 or at McCloud dam  | NMFS          | Yes   | \$60,000               | Yes   |
| 6. Implement instream flow range estimates that meet the thermal summer spawning requirements for winter-run Chinook salmon | NMFS          | No. This is a measure that would be instituted at an indeterminate future time. | NA                     | Not adopted; premature given lack of anadromous fish on the McCloud River |
| 7. Implement ramping to minimize impacts of flows on listed salmonids   | NMFS          | No. This is a measure that would be instituted at an indeterminate future time. | NA                     | Not adopted; premature given lack of anadromous fish on the McCloud River |
| 8. Augment gravel substrates for listed salmonids   | NMFS          | No. This is a measure that would be instituted at an indeterminate future time. | NA                     | Not adopted; premature given lack of anadromous fish on the McCloud River |
| 9. Maintain channel to minimize impacts of project operations on habitat for listed salmonids                               | NMFS          | No. This is a measure that would be instituted at an indeterminate future time. | NA                     | Not adopted; premature given lack of anadromous fish on the McCloud River |
| 10. Protect and enhance riparian habitat and habitat function for listed salmonids  | NMFS          | No. This is a measure that would be instituted at an indeterminate future time. | NA                     | Not adopted; premature given lack of anadromous fish on the McCloud River |

| <b>Recommendations</b>   | <b>Agency</b>            | <b>Within Scope of 10(j)?</b>  | <b>Annualized Cost</b> | <b>Adopted?</b>  |
|--|--------------------------|--|------------------------|--|
| 11. Maintain water quality, including temperature, for the benefit of listed salmonids                         | NMFS                     | No. This is a measure that would be instituted at an indeterminate future time.          | NA                     | Not adopted; premature given lack of anadromous fish on the McCloud River  |
| 12. Create the Listed Salmonid Technical Integration Committee   | NMFS                     | No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources. | \$20,000               | Not adopted. Recommended annual reports on the status of listed anadromous fish in the project area.   |
| 13. Implement minimum instream flows for Lower McCloud River, Iron Canyon Creek, and Pit River below Pit 7 dam | California Fish and Game | Yes  | \$15,910,000           | Partially adopted: recommend implementation of Iron Canyon Creek and Pit 7 dam flow, but find Lower McCloud River flow recommendation inconsistent with the comprehensive planning standard of sections 4(e) and 10(a) of the FPA, because the loss of generation associated with the higher instream flows do outweigh the negligible benefits. |

| <b>Recommendations</b>  | <b>Agency</b>            | <b>Within Scope of 10(j)?</b>  | <b>Annualized Cost</b> | <b>Adopted?</b>   |
|---|--------------------------|--|------------------------|---|
| 14. Prepare a Gravel/Sediment Management Plan, which includes requirement to add a minimum of 150 tonnes of gravel and associated sediment to the McCloud River annually  | California Fish and Game | Yes  | \$75,000               | Not adopted   |
| 15. Reimburse California Fish and Game for increased stocking of trout annually, at levels above current levels in order to meet recreational needs. PG&E shall also pay California Fish and Game \$5,000 annually for mitigation for white sturgeon. | California Fish and Game | No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources. | \$117,000              | Partially adopted; recommend PG&E be responsible for stocking trout annually within the project boundary and developing a fish stocking plan. Payment for white sturgeon mitigation not adopted |

#### **5.4.2 Forest Service 4(e) Conditions**

In section 2.2.4.1, *Section 4(e) Federal Land Management Conditions*, we note that section 4(e) of the FPA, 16 U.S.C. §797(e), provides that any license issued by the Commission for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. Thus, any condition that meets the requirements of the law may be included in a license issued by the Commission, regardless of whether we include the condition in our staff alternative.

In section 2.2.4.1, *Section 4(e) Federal Land Management Conditions*, we identify that we consider 15 of the Forest Service conditions to be administrative or legal in nature and not specific environmental measures. We therefore do not analyze these 15 conditions in our draft EIS. Table 5-3 summarizes our staff conclusions with respect to

the conditions that we consider to be environmental measures. In its November 29, 2010, filing, the Forest Service withdrew original conditions 24 and 28. Of the remaining 18 Forest Service conditions that we do not consider administrative or legal in nature, we fully recommend 8 in the staff alternative and partially recommend 10. Our reasons for not including measures in the staff alternative are summarized in table 5-3 and are discussed in more detail in section 5.2.1, *Discussion of Key Issues*.

Table 5-3. Forest Service 4(e) conditions for the McCloud-Pit Hydroelectric Project. (Source: Forest Service, 2010a)

| <b>Condition</b>   | <b>Annualized Cost</b> | <b>Recommended?</b> |
|--|------------------------|---------------------|
| Condition 1: Consult with the Forest Service annually on project O&M activities. Shall include status reports on license condition implementation, results of monitoring studies, routine and non-routine maintenance, review of any necessary revisions or modifications of plans included in license, discussion of any measures that are needed to protect special status species or changes to existing management plans, and any planned pesticide use. | \$30,000               | Yes                 |
| Condition 11: Submit a biological evaluation to the Forest Service before taking actions to construct new project features that may affect Forest Service special status species or their critical habitat. This shall include procedures to minimize impacts to special status species, adhere to restrictions in site management plans for special status species, and develop monitoring to reduce effects to special status species.                     | \$0                    | Yes                 |
| Condition 15: Obtain prior written approval from the Forest Service for use of pesticides on NFS lands or in areas affecting NFS lands. Pesticide use would be excluded from NFS lands within 500 feet of known locations of Shasta salamanders, northwestern pond turtles, foothill yellow-legged frogs, or known locations of Forest Service special status or culturally significant plant populations.   | \$0                    | Yes                 |

| Condition  | Annualized Cost | Recommended? |
|--|-----------------|--------------|
| <p>Condition 19: Maintain specified minimum streamflows in project reaches in accordance with the provisions described in the Forest Service filing. The minimum instantaneous 15-minute streamflow shall be at least 80 percent of the prescribed mean daily flow for those minimum streamflows less than or equal to 10 cfs, and at least 90 percent of the streamflows required to be greater than 10 cfs. Should the mean daily flow as measured be less than the required mean daily flow but more than the instantaneous flow, PG&amp;E shall begin releasing the equivalent under-released volume of water within 7 days of discovery of the under-release.</p> | \$14,451,000    | Yes          |
| <p>Condition 19: Determine the water year type for minimum flow compliance based on the DWR Bulletin 120 water year forecast of unimpaired runoff for the McCloud River above Shasta Lake.</p>   | \$5,000         | Yes          |
| <p>Condition 19: Operate, maintain, and modify (if necessary) gages needed to determine river stage and minimum streamflow and measure and document all instream flow releases in publicly available formats.</p>  | \$120,000       | Yes          |

| Condition   | Annualized Cost | Recommended? |
|---|-----------------|--------------|
| <p>Condition 20: Prepare a water quality and temperature monitoring plan in consultation with agencies and approved by the Forest Service. The plan shall include monitoring of all project reservoirs every 5 years for contaminants including <i>E. coli</i>; periodic monitoring of DO at McCloud, Pit 6, and Pit 7 reservoirs; annual temperature monitoring for 10 years from May 1 through September 30, ; continuous monitoring of turbidity for the term of the license in the Lower McCloud River during the fishing season, and periodically during construction or other soil disturbing activities; continuous monitoring of turbidity for 5 years after license issuance at Iron Canyon Creek to ensure that repairs have reduced sedimentation into the creek below the dam; implementation of best management practices (BMPs) to satisfy the Aquatic Conservation Strategy objectives from the Northwest Forest Planning area; and mitigation of impacts from project O&amp;M, recreation, road use and maintenance, vegetation management, fire management, and watershed practices.</p> | \$86,000        | Yes          |
| <p>Condition 21: Prepare an LWD Management Plan in consultation with agencies and approved by the Forest Service. The plan will specify size criteria, placement and storage sites, volume and frequency of placement, and monitoring procedures to assess mobilization of LWD from the augmentation site.</p>  | \$214,000       | Yes          |

| Condition   | Annualized Cost | Recommended?                  |
|---|-----------------|-------------------------------|
| <p>Condition 22: Prepare an Erosion and Sediment Control Management and Monitoring Plan developed in consultation with agencies, and approved by the Forest Service. The plan shall include methods for inventorying and monitoring project-related erosion and sedimentation, inspection schedule, inventory of erosion sites, criteria for treating erosion sites, schedule for repair of erosion sites, protocols for emergency erosion and sediment control, a process and schedule for reporting monitoring results including plan review and revision, and BMPs for erosion control measures.</p>   | \$120,000       | Yes                           |
| <p>Condition 23: Develop a Gravel and Coarse Sediment Management Plan in consultation with agencies and approved by the Forest Service. The plan shall require the periodic addition of 150-600 tonnes of gravel and coarse sediment, ranging in size between 8 and 128 mm, to the Lower McCloud River directly below the McCloud dam spillway splash pool. The plan shall identify the source of materials, identify the locations for gravel introduction in the Lower McCloud River below McCloud dam, identify any facilities or improvements necessary for accessing the sites for gravel and coarse sediment placement, identify coarse sediment storage sites, develop a schedule for placement, and include an adaptive management component to allow higher or lower quantities of gravel and coarse sediment to be delivered based upon spill and monitoring results.</p> | \$79,000        | Yes, with staff modifications |
| <p>Note: Condition 24 was withdrawn on November 29, 2010.</p>   |                 |                               |

| Condition  | Annualized Cost | Recommended?                  |
|--|-----------------|-------------------------------|
| <p>Condition 25: Develop a Vegetation and Invasive Weed Management Plan in consultation with agencies and approved by the Forest Service. The plan will address special status species, aquatic and terrestrial invasive species, and revegetation source plant populations, including culturally significant plants, within the project boundary and adjacent to project features directly affecting NFS lands including roads and distribution and transmission lines. The plan shall address treatment protocols for removing vegetation; protection of special status plants, revegetation source plants, and critical wildlife habitat; invasive species management and monitoring; and pesticide use restrictions.</p>   | \$337,000       | Yes, with staff modifications |
| <p>Condition 26: Develop a Terrestrial Biological Management Plan, including Forest Service special status species potentially affected by the project on NFS lands. This plan should be consistent with the recent plans for the relicensing of the Pit 3, 4, 5 Project. The plan should include monitoring for the species listed in the Forest Service filing, periodic surveys of the project area to determine if additional populations develop, and reporting of survey results including suitable habitat, populations, individuals, pairs, and nest locations every 5 years or as determined for individual species. Mitigation measures include conducting pre-construction surveys for special status species, observing limited operating periods where required, and using surveys to determine if additional mitigation measures are necessary to protect Forest Service special status species. PG&amp;E shall ensure that all power poles conform to APLIC guidelines.</p> | \$198,000       | Yes, with staff modifications |

| Condition   | Annualized Cost | Recommended?   |
|---|-----------------|--|
| <p>Condition 27: Develop an Aquatic Biological Monitoring Plan in consultation with agencies and approved by the Forest Service. The plan will include monitoring of fish, benthic macroinvertebrates, special status aquatic mollusks, special status species, and invasive aquatic species. PG&amp;E would conduct monitoring of fish passage structures at stream crossings at listed streams.</p>   | \$195,000       | Yes, with staff modifications  |
| <p>Note: Condition 28 was withdrawn on November 29, 2010.</p>   |                 |  |
| <p>Condition 29: File a Road and Transportation Facility Management Plan, approved by the Forest Service, for protection and maintenance of project and project-affected roads on or affecting NFS lands. The plan shall include the following components: planning and inventory; operation, maintenance, and road-associated debris; construction and reconstruction; monitoring; PG&amp;E road MOU; road use by government; and road use. The Forest Service filing lists project and project-affected roads, and roads with high erosion potential requiring repair.</p>  | \$3,950,000     | Yes, with incorporation of some of PG&E alternative condition 29                         |
| <p>Condition 30: Prepare a Recreation Development and Management Plan in consultation with agencies and approved by the Forest Service to address recreation resource needs associated with the project. New and reconstructed project recreation facilities on NFS lands would meet all Forest Service laws, standards and policy and meet Forest Service recreation design guidelines. The plan will address the following components (included below) and specify location, design, structures, and schedules for completion as appropriate: O&amp;M; recreation survey and monitoring; project patrol; reservoir surface water management; and construction and reconstruction of project facilities.</p> | \$29,000        | Yes, with staff modifications and incorporation of some of PG&E alternative condition 30 |

| <b>Condition</b>   | <b>Annualized Cost</b> | <b>Recommended?</b>  |
|--|------------------------|--|
| Condition 30: Develop and implement recreation survey and monitoring component of Recreation Plan.   | \$300,000              | Yes  |
| Condition 30: Develop and implement Project Patrol Plan.   | \$263,000              | No   |
| Condition 30: Develop and implement reservoir water surface management component of Recreation Plan.   | \$50,000               | Yes, with staff modifications  |
| Condition 30: Reconstruct Tarantula Gulch boat launch.   | \$936,000              | Yes, with staff modifications and incorporation of some of PG&E alternative condition 30 |
| Condition 30: Develop Star City day-use area and campground.   | \$571,000              | Yes  |
| Condition 30: If land at Star City cannot be acquired for overnight use, construct overnight camping facilities on NFS lands near Tarantula Gulch. | NA                     | No   |
| Condition 30: Construct Red Banks day-use area.  | \$170,000              | Yes  |
| Condition 30: Construct Tarantula Gulch inlet day-use area.  | \$40,000               | Yes  |
| Condition 30: Provide West McCloud dam reservoir access site.  | \$49,000               | Yes  |
| Condition 30: Provide East McCloud dam reservoir access site.  | \$47,000               | Yes  |
| Condition 30: Provide Battle Creek reservoir access site.  | \$47,000               | Yes  |
| Condition 30: Provide day-use area at base of McCloud dam.   | \$90,000               | Yes  |
| Condition 30: Construct three reservoir access sites with parking and trail to Iron Canyon reservoir.  | \$177,000              | Yes, with staff modification   |

| <b>Condition</b>  | <b>Annualized Cost</b> | <b>Recommended?</b>   |
|---|------------------------|---|
| Condition 30: Design and construct Iron Canyon dam boat launch.   | \$471,000              | Yes, with staff modification and incorporation of some of PG&E alternative condition 30 |
| Condition 30: Reconstruct Hawkins Landing Campground and boat launch.   | \$317,000              | Yes   |
| Condition 30: Reconstruct Deadlun Campground.   | \$443,000              | Yes   |
| Condition 30: Construct new Gap Creek Campground.   | \$443,000              | Yes   |
| Condition 30: Develop two surfaced parking areas with reservoir access trails below Pit 6 dam to provide fishing access and boating put-in onto the upper Pit 7 reservoir.  | \$35,000               | Yes, with staff modifications   |
| Condition 30: Develop road access to a surfaced parking area and short walkway to put-in/take-out onto the lower Pit 7 reservoir, either at Montgomery Creek or near the Pit 7 dam.   | \$109,000              | No  |
| Condition 30: Construct day-use site at Fenders Flat in vicinity of boat launch.  | \$423,000              | Yes   |
| Condition 30: Reconstruct the car-top boat launch near Fenders Flat.  | \$14,000               | Yes   |
| Condition 30: Investigate known safety and public access issues at Pit 7 afterbay dam.  | NA                     | No, will be addressed under current license   |
| Condition 31: Develop and implement a Project Sign and Interpretive/Education Plan for all non-traffic signs within the project, and an interpretive and educational component. Sign locations and design elements will be collaboratively developed. | \$72,000               | Yes, with staff modifications   |

| Condition   | Annualized Cost | Recommended?                  |
|---|-----------------|-------------------------------|
| Condition 32: Develop procedures and a timeline for mitigation measures to provide for visual quality of project and project-affected NFS lands. Specific measures are listed in the Forest Service filing.   | \$11,000        | Yes                           |
| Condition 33: Develop a Fire and Fuels Management Plan in consultation with agencies and approved by the Forest Service. The plan shall set forth PG&E's responsibility for prevention, reporting, and emergency response to fires in the vicinity of the project resulting from project operations. The plan shall address fuels treatment, prevention and response, and investigation of project-related fires.   | \$4,000         | Yes                           |
| Condition 34: File a Historic Properties Management Plan with the Commission, approved by the Forest Service. The plan is tiered to a PA to which the Forest Service will be a signatory, as defined by 36 CFR 800, and implements regulations of the NHPA. PG&E shall consult with the SHPO, tribes, Forest Service, and other applicable agencies during preparation of the plan. The plan shall include the CR-S1 and CR-S2 study results, detailed site monitoring and schedule, National Register determinations of eligibility for sites periodically inundated by reservoir fluctuations in Iron Canyon reservoir, and potential effects of current or proposed project operations on historic properties including detailed mitigations. If items of potential cultural, historical, archaeological, or paleontological value are reported or discovered during ground disturbing activities or as a result of project operations, PG&E shall cease work immediately and notify the Forest Service. | \$284,000       | Yes, with staff modifications |

## 5.5 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA requires the Commission to consider the extent to which a project is consistent with federal and state comprehensive plans for improving, developing, and conserving waterways affected by a project. Under this section, federal and state agencies filed numerous qualifying comprehensive plans, of which we identified 13 California and five federal plans that are applicable to the project. The continued operation of the McCloud-Pit project, as recommended in this draft EIS, is consistent with the 18 state and federal plans listed below.

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California Department of Parks and Recreation. 1998. Public opinions and attitudes on outdoor recreation in California. Sacramento, CA. March 1998.

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## **Appendix A**

# **Staff Responses to Comments on the Draft Environmental Impact Statement**



## APPENDIX A

### STAFF RESPONSES TO COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

The U.S. Environmental Protection Agency (EPA) notice of availability of the draft environmental impact statement (EIS) for the McCloud Pit Hydroelectric Project (project) was issued on July 30, 2010, and comments on the draft EIS were due on September 28, 2010. In addition, Federal Energy Regulatory Commission (Commission) staff conducted two public meetings to receive oral comments on the draft EIS in Redding, California, on September 9, 2010. Twenty-one out of 33 members of the public that attended the meetings spoke. Speakers commented on instream flows for the project, including support for boating and angling/fishery flows; designation of project roads; delineation of the project boundary; snow removal; recreation facilities and access; dam safety; and the potential for anadromous fish reintroductions in the project area. Additionally, there were 428 filings by individuals during the comment period, which included comments regarding the hydrograph and fishery in the project area, as well as boating and angling flows. These topics were also addressed in 26 additional filings by individuals, organizations, or agencies, after the conclusion of the formal comment period.

In this appendix, we summarize the written and oral comments received; provide responses to those comments; and indicate, where appropriate, how we modified the text in the final EIS. We grouped the comment summaries and responses by topic for convenience. We do not summarize comments that point out minor edits to the draft EIS; however, we have made these edits in the final EIS. The following entities filed comments on the draft EIS.

| <b>Commenting Entity</b>                    | <b>Filing Date</b> |
|---|--------------------|
| California Fisheries and Water Unlimited    | August 5, 2010     |
| Pacific Gas and Electric (PG&E)             | August 5, 2010     |
| California Salmon and Steelhead Association | August 6, 2010     |
| California Fisheries and Water Unlimited    | August 19, 2010    |
| California Fisheries and Water Unlimited    | August 20, 2010    |
| McCloud RiverKeepers                        | August 23, 2010    |
| California Coastkeeper Alliance             | September 17, 2010 |

| <b>Commenting Entity</b>   | <b>Filing Date</b> |
|--|--------------------|
| California Sportfishing Protection Alliance  | September 22, 2010 |
| California Fisheries and Water Unlimited   | September 23, 2010 |
| U.S. Department of Agriculture – Forest Service (Forest Service)   | September 24, 2010 |
| Forest Service   | September 24, 2010 |
| Forest Service   | September 27, 2010 |
| PG&E   | September 27, 2010 |
| The Hearst Corporation   | September 27, 2010 |
| California State Water Resources Control Board (California Water Board)  | September 28, 2010 |
| National Park Service  | September 28, 2010 |
| U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) | September 28, 2010 |
| California Trout, Trout Unlimited, Northern California Council, Federation of Fly Fishers                              | September 28, 2010 |
| Center for Water Advocacy  | September 28, 2010 |
| EPA, Region 9  | September 28, 2010 |
| McCloud River Club   | September 28, 2010 |
| American Whitewater and Friends of the River   | September 28, 2010 |
| Winnemem Wintu Tribe   | September 28, 2010 |
| Winnemem Wintu Tribe   | September 29, 2010 |
| McCloud RiverKeepers   | September 29, 2010 |
| Pit River Tribe  | September 29, 2010 |

| <b>Commenting Entity</b>   | <b>Filing Date</b> |
|--|--------------------|
| California Fisheries and Water Unlimited                             | November 12, 2010  |
| McCloud RiverKeepers   | November 30, 2010  |
| California Department of Fish and Game<br>(California Fish and Game) | December 22, 2010  |
| McCloud RiverKeepers   | December 23, 2010  |
| McCloud RiverKeepers   | December 29, 2010  |
| California Fisheries and Water Unlimited                             | January 3, 2011    |

| <b>Individual Commenter</b> | <b>Filing Date</b> | <b>Individual Commenter</b> | <b>Filing Date</b> |
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| <b>Individual Commenter</b> | <b>Filing Date</b> | <b>Individual Commenter</b> | <b>Filing Date</b> |
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| Jerome Marek                | September 15, 2010 | Rosealea Bond               | September 15, 2010 |
| RP                          | September 15, 2010 | Mark Mills                  | September 16, 2010 |
| Sarah Hugdahl               | September 15, 2010 | Marsh Chamberlain           | September 16, 2010 |
| Scott                       | September 15, 2010 | Matt Zidar                  | September 16, 2010 |
| Susan Clymer                | September 15, 2010 | Michael Holstrom            | September 16, 2010 |
| Suzanne Remien              | September 15, 2010 | Mike Kempf                  | September 16, 2010 |
| Teresa Fantasia             | September 15, 2010 | Paul Cress                  | September 16, 2010 |
| Terry and Sue Hall          | September 15, 2010 | Paul Sumner                 | September 16, 2010 |
| Thomas Bates                | September 15, 2010 | Richard Schieffer           | September 16, 2010 |
| Tim Hunt                    | September 15, 2010 | Roger Finke                 | September 16, 2010 |
| Timothy Devine              | September 15, 2010 | Steve Schramm               | September 16, 2010 |
| Tom Venus                   | September 15, 2010 | Steven Schlegel             | September 16, 2010 |
| Tom Williams                | September 15, 2010 | Steven Tichenor             | September 16, 2010 |
| Chris Noyes                 | September 16, 2010 | Tom Chandler                | September 16, 2010 |
| Colin Drake                 | September 16, 2010 | Brian Ginsberg              | September 17, 2010 |
| Don Iverson                 | September 16, 2010 | Charles Belsom, Jr.         | September 17, 2010 |
| Don McEnhill                | September 16, 2010 | Dave Wilkinson              | September 17, 2010 |
| Greg Gotham                 | September 16, 2010 | Gabriel Lopez               | September 17, 2010 |
| James Kirwan                | September 16, 2010 | Justin Cordonnier           | September 17, 2010 |
| John Barry                  | September 16, 2010 | Linda Pepin                 | September 17, 2010 |
| John Donati                 | September 16, 2010 | Michael Russell             | September 17, 2010 |

| <b>Individual Commenter</b> | <b>Filing Date</b> | <b>Individual Commenter</b> | <b>Filing Date</b> |
|-----------------------------|--------------------|-----------------------------|--------------------|
| John Wylie                  | September 16, 2010 | Peter Przybylinski          | September 17, 2010 |
| Keith Anderson              | September 16, 2010 | Roger Watson                | September 17, 2010 |
| Tom Rafalovich              | September 17, 2010 | Ron Szymanski               | September 21, 2010 |
| Bill Street                 | September 20, 2010 | Dan Barber                  | September 23, 2010 |
| Dennis Johnson              | September 20, 2010 | Terrance Carr               | September 23, 2010 |
| Don Mittelstaedt            | September 20, 2010 | Randy Brown                 | September 24, 2010 |
| Doug Walker                 | September 20, 2010 | Beth Gaydos                 | September 27, 2010 |
| Esther Mecking              | September 20, 2010 | Cyrus Merrill               | September 27, 2010 |
| Gary Sanda                  | September 20, 2010 | Dick Harris                 | September 27, 2010 |
| Lewis Leichter              | September 20, 2010 | Eric Arons                  | September 27, 2010 |
| Mark York                   | September 20, 2010 | Frank Babbitt               | September 27, 2010 |
| Mike and Jude Lee           | September 20, 2010 | Ida Crawford                | September 27, 2010 |
| Peter Klosterman            | September 20, 2010 | J. Larry Carroll            | September 27, 2010 |
| Raffi Boloyan               | September 20, 2010 | Jesse Johnson               | September 27, 2010 |
| Saskia Baur                 | September 20, 2010 | Kathy Gray                  | September 27, 2010 |
| Thomas Lane                 | September 20, 2010 | Leila Lanctot               | September 27, 2010 |
| Will Gardner                | September 20, 2010 | Marilyn Freedberg           | September 27, 2010 |
| Bruce Forsythe              | September 21, 2010 | Robin Stocum                | September 27, 2010 |
| Gregory Reis                | September 21, 2010 | Rudy Ramp                   | September 27, 2010 |
| Harald Ekman                | September 21, 2010 | Todd Walsh                  | September 27, 2010 |
| Jennie Goldberg             | September 21, 2010 | Urs Schhuler                | September 27, 2010 |
| Kevin Mather                | September 21, 2010 | Victor Simend               | September 27, 2010 |

| <b>Individual Commenter</b> | <b>Filing Date</b> | <b>Individual Commenter</b> | <b>Filing Date</b> |
|-----------------------------|--------------------|-----------------------------|--------------------|
| Lowel Sims                  | September 21, 2010 | Victoria Smith              | September 27, 2010 |
| Luke Kornbluh               | September 21, 2010 | William H Bunstock          | September 27, 2010 |
| Adam Dwinells               | September 28, 2010 | Craig Nielsen               | September 28, 2010 |
| Alan Chaplin                | September 28, 2010 | Dan Sadowski                | September 28, 2010 |
| Alex Cichy                  | September 28, 2010 | Darrell Boyle               | September 28, 2010 |
| Alex Gutt                   | September 28, 2010 | Dave Kellogg                | September 28, 2010 |
| Allen Hallock               | September 28, 2010 | David Balducci              | September 28, 2010 |
| Amit Kapoor                 | September 28, 2010 | David Figur                 | September 28, 2010 |
| Andy Coradeschi             | September 28, 2010 | David Garfin                | September 28, 2010 |
| Barry Urbach                | September 28, 2010 | David Hale                  | September 28, 2010 |
| Bill Lattin                 | September 28, 2010 | David Hobbs                 | September 28, 2010 |
| Bill Wharton                | September 28, 2010 | David Hohler                | September 28, 2010 |
| Bob                         | September 28, 2010 | David Knapp                 | September 28, 2010 |
| Bob Shoberg                 | September 28, 2010 | David Lipscomb              | September 28, 2010 |
| Brian Wright                | September 28, 2010 | David Morris                | September 28, 2010 |
| Bruce Antell                | September 28, 2010 | David Peterson              | September 28, 2010 |
| Bruce Pederson              | September 28, 2010 | David Sesline               | September 28, 2010 |
| Caleb Garling               | September 28, 2010 | David Varney                | September 28, 2010 |
| Carl Searway                | September 28, 2010 | David Wood                  | September 28, 2010 |
| Chris                       | September 28, 2010 | Derald Lahti                | September 28, 2010 |
| Christopher Fox             | September 28, 2010 | Don Meehan                  | September 28, 2010 |
| Christopher Hest            | September 28, 2010 | Donald Pierce               | September 28, 2010 |

| <b>Individual Commenter</b> | <b>Filing Date</b> | <b>Individual Commenter</b> | <b>Filing Date</b> |
|-----------------------------|--------------------|-----------------------------|--------------------|
| Cliff Butcher               | September 28, 2010 | Doug Durham                 | September 28, 2010 |
| Clint Kelley                | September 28, 2010 | Edgar Fincher               | September 28, 2010 |
| Edward Bruno                | September 28, 2010 | James Mathis                | September 28, 2010 |
| Ellwood Jones               | September 28, 2010 | James Scanlon               | September 28, 2010 |
| Eric Miller                 | September 28, 2010 | Jamie Lyle                  | September 28, 2010 |
| Evan Elliott                | September 28, 2010 | Jeff McLoughlin             | September 28, 2010 |
| Gary Bard                   | September 28, 2010 | Jeff Ramsdell               | September 28, 2010 |
| Gene Gantt                  | September 28, 2010 | Jeffrey Henigan             | September 28, 2010 |
| George Hayford              | September 28, 2010 | Jeremy Cadagan              | September 28, 2010 |
| George Williams, Sr.        | September 28, 2010 | Jim Collins                 | September 28, 2010 |
| George Yandell              | September 28, 2010 | Jim DeSwarte                | September 28, 2010 |
| Gerald Weisbach             | September 28, 2010 | Jim Gaumer                  | September 28, 2010 |
| Greg Dinger                 | September 28, 2010 | Jim Kuehne                  | September 28, 2010 |
| Hal Watts                   | September 28, 2010 | Jim Miller                  | September 28, 2010 |
| Heather Carrico             | September 28, 2010 | Jim Milligan                | September 28, 2010 |
| Hobson Brown                | September 28, 2010 | Joe Euphrat                 | September 28, 2010 |
| Hugh Barron                 | September 28, 2010 | John Curran                 | September 28, 2010 |
| Hugh Beattie                | September 28, 2010 | John Davey                  | September 28, 2010 |
| Hugh Kuhn                   | September 28, 2010 | John DeMartino              | September 28, 2010 |
| Jack Campbell               | September 28, 2010 | John H. Davis               | September 28, 2010 |
| Jack Street                 | September 28, 2010 | John Kagel                  | September 28, 2010 |
| James Feller                | September 28, 2010 | John McGuire                | September 28, 2010 |

| <b>Individual Commenter</b> | <b>Filing Date</b> | <b>Individual Commenter</b> | <b>Filing Date</b> |
|-----------------------------|--------------------|-----------------------------|--------------------|
| James Ferguson              | September 28, 2010 | John Newhoff                | September 28, 2010 |
| James Hann                  | September 28, 2010 | John Reed                   | September 28, 2010 |
| John Rickard                | September 28, 2010 | Melvin                      | September 28, 2010 |
| John Street                 | September 28, 2010 | Michael Balog               | September 28, 2010 |
| Jon Goerke                  | September 28, 2010 | Michael Carey               | September 28, 2010 |
| Jon Goulden                 | September 28, 2010 | Michael Jordan              | September 28, 2010 |
| Jon Steele                  | September 28, 2010 | Michael Kalinowski          | September 28, 2010 |
| Joseph Bunning              | September 28, 2010 | Michael Tomlinson           | September 28, 2010 |
| Joseph Sturla               | September 28, 2010 | Mike Bobbitt                | September 28, 2010 |
| Joy Chesna                  | September 28, 2010 | Mike Miller                 | September 28, 2010 |
| Karen Henderson             | September 28, 2010 | Mike Milliorn               | September 28, 2010 |
| Katherien Brandt            | September 28, 2010 | Mike O'Dell                 | September 28, 2010 |
| Kelly Barlow                | September 28, 2010 | Mike Pingree                | September 28, 2010 |
| Ken Kerley                  | September 28, 2010 | Mike Rogers                 | September 28, 2010 |
| Kirk Clague                 | September 28, 2010 | Nathan Hall                 | September 28, 2010 |
| Laura Loper                 | September 28, 2010 | Nick Di Croce               | September 28, 2010 |
| Laurie Urbach               | September 28, 2010 | Nick Salle                  | September 28, 2010 |
| Lawrence Miller             | September 28, 2010 | Pat Carroll                 | September 28, 2010 |
| Leland Wilson               | September 28, 2010 | Paul McKee                  | September 28, 2010 |
| Lisa Hogan                  | September 28, 2010 | Paul Siple                  | September 28, 2010 |
| Marc Ericksen               | September 28, 2010 | Peter Michaelides           | September 28, 2010 |
| Mark Adams                  | September 28, 2010 | Peter Towle                 | September 28, 2010 |

| <b>Individual Commenter</b> | <b>Filing Date</b> | <b>Individual Commenter</b> | <b>Filing Date</b> |
|-----------------------------|--------------------|-----------------------------|--------------------|
| Mark Kanai                  | September 28, 2010 | R. Burke                    | September 28, 2010 |
| Mark Spieler                | September 28, 2010 | Randall Boyd                | September 28, 2010 |
| Randy Renick                | September 28, 2010 | Steve Kopp                  | September 28, 2010 |
| Rex Murphy                  | September 28, 2010 | Ted Shapas                  | September 28, 2010 |
| Richard Hanavan             | September 28, 2010 | Terence Grant               | September 28, 2010 |
| Richard Scott Nelson        | September 28, 2010 | Terry Fernandez             | September 28, 2010 |
| Rika Nelson                 | September 28, 2010 | Thomas Bertetta             | September 28, 2010 |
| Rober Pauli                 | September 28, 2010 | Tim Burwell                 | September 28, 2010 |
| Robert                      | September 28, 2010 | Tim Hanagan                 | September 28, 2010 |
| Robert Alex Corum           | September 28, 2010 | Tim McCrone                 | September 28, 2010 |
| Robert Miller               | September 28, 2010 | Tim Polishook               | September 28, 2010 |
| Robert Minor                | September 28, 2010 | Tim Stutz                   | September 28, 2010 |
| Robert Oliver               | September 28, 2010 | Tim Sullivan                | September 28, 2010 |
| Ryan Popple                 | September 28, 2010 | Tim Swihart                 | September 28, 2010 |
| Sage Donnelly               | September 28, 2010 | Tom Higgins                 | September 28, 2010 |
| Sam Bishop                  | September 28, 2010 | Tom Street                  | September 28, 2010 |
| Seymour Singer              | September 28, 2010 | Tony Alex                   | September 28, 2010 |
| Sheree Kajiwara             | September 28, 2010 | Tony Brookfield             | September 28, 2010 |
| Stanley Bricker             | September 28, 2010 | Trevor Rhodes               | September 28, 2010 |
| Stanley O'Hara              | September 28, 2010 | Tricia                      | September 28, 2010 |
| Stephen Haggard             | September 28, 2010 | Walter Bird                 | September 28, 2010 |
| Stephen Neff                | September 28, 2010 | Will Lyon                   | September 28, 2010 |

| <b>Individual Commenter</b> | <b>Filing Date</b> | <b>Individual Commenter</b> | <b>Filing Date</b> |
|-----------------------------|--------------------|-----------------------------|--------------------|
| Stephen Ordway              | September 28, 2010 | William O'Brien             | September 28, 2010 |
| Stephen Zakur               | September 28, 2010 | William O'Kelly             | September 28, 2010 |
| William Werner              | September 28, 2010 | Kevin Eastman               | September 29, 2010 |
| Alan Chun                   | September 29, 2010 | Libby McLaren               | September 29, 2010 |
| Alex Cichy                  | September 29, 2010 | Lyle Timmerman              | September 29, 2010 |
| Andy Benkert                | September 29, 2010 | Mark Rockwell               | September 29, 2010 |
| Barbara Korb                | September 29, 2010 | Martin M. Seldon            | September 29, 2010 |
| Barry Vorpahl               | September 29, 2010 | Matthew P. Walters          | September 29, 2010 |
| Brett Henderson             | September 29, 2010 | Michael McGibben            | September 29, 2010 |
| Brian Stewart               | September 29, 2010 | Michael Rettie              | September 29, 2010 |
| Chris Crofford              | September 29, 2010 | Nancy R. Ihara              | September 29, 2010 |
| Chris Little                | September 29, 2010 | Nathan                      | September 29, 2010 |
| Chris Moore                 | September 29, 2010 | Pamela Gach                 | September 29, 2010 |
| Craig Jaffurs               | September 29, 2010 | Patrick McKee               | September 29, 2010 |
| Curtis Kroeker              | September 29, 2010 | Patrick Ryan                | September 29, 2010 |
| David Bender                | September 29, 2010 | Paul Crafts                 | September 29, 2010 |
| David Carter                | September 29, 2010 | Paul Martzen                | September 29, 2010 |
| Derrell Bridgman            | September 29, 2010 | Paul Stiff                  | September 29, 2010 |
| Diane Lowe                  | September 29, 2010 | Piasente                    | September 29, 2010 |
| Domi Fellers                | September 29, 2010 | Robert Bonfilio             | September 29, 2010 |
| Erik White                  | September 29, 2010 | Robert Williams             | September 29, 2010 |
| Jeff Spurr                  | September 29, 2010 | Ron Azevedo                 | September 29, 2010 |

| <b>Individual Commenter</b> | <b>Filing Date</b> | <b>Individual Commenter</b> | <b>Filing Date</b> |
|-----------------------------|--------------------|-----------------------------|--------------------|
| John Phair                  | September 29, 2010 | Sean Solway                 | September 29, 2010 |
| Ken Del Monte               | September 29, 2010 | Sonia Dinger                | September 29, 2010 |
| Steven Gwozdz               | September 29, 2010 | Bob McConachie              | October 4, 2010    |
| Tom Waters                  | September 29, 2010 | David Hale                  | October 4, 2010    |
| Woody Lowe                  | September 29, 2010 | Loren Crow                  | October 4, 2010    |
| Brian Sugrue                | September 30, 2010 | Luis Motes                  | October 4, 2010    |
| Donald Wayne                | September 30, 2010 | S.Sax                       | October 4, 2010    |
| Gary Rich                   | September 30, 2010 | Bart Hughes                 | October 8, 2010    |
| Henry Bramhall              | September 30, 2010 | Bill Lang                   | October 12, 2010   |
| John McCosker               | September 30, 2010 | Charles Hammerstad          | October 12, 2010   |
| Roger Bevers                | September 30, 2010 | Michael Culcasi             | October 12, 2010   |
| Stephanie Bates             | September 30, 2010 | Wade Goertz                 | October 12, 2010   |
| David Fiore                 | October 1, 2010    | John Hamilton               | October 19, 2010   |
| Trevor Fagerskog            | October 1, 2010    |                             |                    |

## **GENERAL**

**Comment:** The Forest Service and PG&E note that, as a result of a recent land interchange between the Forest Service and the Bureau of Land Management (BLM), the current project boundary now encompasses 1,651.4 acres of National Forest System (NFS) lands, and 0 acres of BLM lands. PG&E also clarifies that except for the area immediately below McCloud dam, no project lands are located along the Lower McCloud River.

**Response:** We have updated the EIS text to reflect these changes to the project acreage.

**Comment:** PG&E notes that figure 1-1 is missing several project powerlines and should show the: (1) 12-kV distribution line between James B. Black Powerhouse and Iron Canyon dam; (2) transmission line between the James B. Black and Pit 5 switchyards; and (3) Pit 6 and Pit 7 transmission lines.

**Response:** We have updated figures 1-1 and 2-1 to provide this additional detail regarding project powerlines.

**Comment:** The California Water Board states that the scope in the final EIS should include the McCloud River to Shasta reservoir (not just to the mouth of Squaw Valley Creek), because studies were conducted throughout these areas. EPA, Region 9 notes that the draft EIS limits the project scope on the McCloud River to the mouth of Squaw Valley Creek, but that the project controls water flow down to Shasta reservoir. EPA, Region 9 recommends that the scope of analysis in the final EIS be modified to reflect this.

California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers also disagree with the assertion that the effect of project operations is not measurable below Squaw Valley Creek, and that this is the extent of project nexus. They state that there is a direct and quantifiable relationship between instream flow requirements for the McCloud River and streamflows all the way to Shasta reservoir, and that license requirements for instream flow releases from McCloud reservoir have a direct relationship to streamflow quantity and timing all the way to Shasta reservoir. They agree, however, that the increased flow is no longer a project nexus once it reaches Shasta Lake, and that any differences that might exist in timing are inconsequential.

**Response:** The project scope was defined through the scoping process and comments received on geographical and temporal scope at that time. After scoping, we determined that generally, the magnitude of project effects decrease going downstream as other tributaries enter the river, and therefore, the project has minimal additional impacts below Squaw Valley Creek. We acknowledge, however, that several studies proposed by PG&E included study sites on the Lower McCloud River, below the confluence of Squaw Valley Creek, as requested by the parties involved in this Integrated Licensing Process. Commission staff did not require studies at these sites because they found these sites to be outside of the geographic scope and have no project nexus; however, PG&E decided to continue to include them within its proposed studies. We note that with these study sites on the Lower McCloud River, below the confluence of Squaw Valley Creek, the scope of analyses in the environmental document was not necessarily limited to areas upstream of Squaw Valley Creek. In evaluating project impacts during preparation of the draft EIS, we again determined that project effects decrease going downstream as other tributaries enter the river, the project has minimal additional impacts below Squaw Valley Creek, and the project geographic scope did not need to be modified for the environmental analysis.

**Comment:** The Center for Water Advocacy recommends that plans should provide a means of funding local Indian tribes to cover monitoring and assist with mitigation activities.

**Response:** The Commission cannot require applicants to make funding provisions to third parties. PG&E may agree to pay a third party to perform mitigation and monitoring activities; however, the Commission has jurisdiction only over its licensee and thus

cannot ensure that a measure will be carried out if only funding is required. The Commission will leave it to PG&E to determine how to best fulfill the requirements of any license issued.

**Comment:** The Forest Service notes that it discussed and agreed with PG&E that all final 4(e) conditions would consistently refer to “license acceptance” and not “license issuance” as the trigger date for implementation of the 4(e) condition requirements. This distinction would provide a minimum of one additional month for PG&E to comply with the measures.

**Response:** It is general Commission practice to use the more certain date of license issuance rather than license acceptance as a trigger point for development and implementation of environmental actions. If deadlines for compliance with the requirements of license articles become an issue, the appropriate remedy is for PG&E to seek extensions of those deadlines.

**Comment:** PG&E states that because the Forest Service recently completed a land exchange that transferred management of the 29.5 acres of project lands administered by BLM to the Forest Service and all federal lands occupied by the project are now managed by the Forest Service, the BLM resource management plan is no longer applicable to the project.

**Response:** We agree that the BLM resource management plan is no longer applicable to the project because of the recent land exchange and have removed references to this resource management plan from the EIS text.

**Comment:** The California Salmon and Steelhead Association feels that the draft EIS does not disclose and evaluate cumulative effects on the human environment resulting from Forest Service 4(e) conditions.

**Response:** The EIS includes a comprehensive analysis of the measures specified in the Forest Service 4(e) conditions. Furthermore, as stated in the EIS, based on information in the license application, agency comments, other filings related to the project, and preliminary staff analysis, we identified the following resources that have the potential to be cumulatively affected by the continued operation of the McCloud-Pit Project, in combination with other activities: water resource, fisheries resources, and recreation. Accordingly, we included a discussion of cumulative effects on applicable resources in sections 3.3.2.3, *Cumulative Effects*, of the draft and final EIS.

**Comment:** The California Water Board comments that the section on cumulative effects does not address the impact of this project incrementally with other past, present, and reasonably foreseeable future actions. The California Water Board recommends that, at a minimum, this project should be evaluated with the operation of the Pit 3, 4, 5 Project.

**Response:** The cumulative effects analysis has been expanded to include a summary of the potential effects of project operations in conjunction with operation of the Pit 3, 4, 5 Project and other reasonably foreseeable future actions.

**Comment:** The California Water Board states that for projects with less than significant impacts, a negative declaration or mitigated negative declaration can be issued. The California Water Board states that the California Environmental Quality Act (CEQA) also provides categorical and statutory exemptions for certain projects. The California Water Board states that the draft EIS incorrectly implies that an environmental impact report (EIR) will be required for this project (section 1.3.6, page 19). The California Water Board states that under CEQA, a project may be analyzed for its incremental effects over existing baseline conditions. Typically the reauthorizing of an existing hydroelectric project will not yield many environmental impacts, because most of the impacts have already occurred and, when compared to the existing condition, do not register as significant. The California Water Board notes that often, significant impacts occur from construction of new facilities necessary to obtain all necessary permits and approvals and/or bring the project into compliance with existing law. Further, because National Environmental Policy Act (NEPA) documents do not specifically identify significant impacts, the California Water Board notes that additional analysis may be required to identify the impacts and comply with CEQA. California Water Board states that staff may rely on sections of this draft EIS or final EIS.

**Response:** We understand the comments from the California Water Board concerning the relationship of the NEPA and CEQA process and documents, and we have updated the final EIS, section 1.3.6., *California Environmental Quality Act*, to reflect the California Water Board's comments.

**Comment:** The California Water Board notes that, unless PG&E is moving forward with plans for the proposed new powerhouses at McCloud dam and Pit 7 afterbay dam, it will be difficult to analyze the impacts resulting from construction and operation. The California Water Board notes that construction of new facilities could result in impacts that must be analyzed in CEQA.

**Response:** Although PG&E studied the feasibility of installing new generation units at the base of McCloud dam and at the Pit 7 afterbay dam, the final license application for the McCloud-Pit Project did not include the final size of these units because PG&E stated that it would determine the size and hydraulic capacity based on instream flow requirements of the new project license. Furthermore, our economic analysis of the proposed units found that the cost could exceed the potential power benefits; however, we could not make a final recommendation until PG&E decided on the exact capacity of the units. If PG&E decided to move forward with either of the proposals, further analysis would be required at that time.

**Comment:** The California Water Board states that allowing a project to operate indefinitely without making progress to obtain a new license is inconsistent with the Federal Power Act (FPA) and the California Water Board requests a more realistic evaluation of the no-action alternative in the final EIS.

**Response:** The purpose of the no-action alternative, as described in section 2.1, *No-Action Alternative*, is to establish baseline environmental conditions for comparison

with other alternatives. We intend to issue a new project license prior to the expiration of the current license on July 31, 2011, so that the project will not be operated indefinitely under the existing license.

However, the Commission cannot issue a new license for the project without water quality certification from the California Water Board under section 401 of the Clean Water Act. Therefore, for the Commission to timely act on PG&E's relicense application by this date, the California Water Board will need to do its part by timely acting on PG&E's application for water quality certification.

To help expedite the CEQA process that the California Water Board must undertake before acting on PG&E's water quality certification, we have expanded the final EIS to include several elements needed in an environmental report prepared under CEQA (please see final EIS section 1.3.6, *California Environmental Quality Act*). Though not a joint environmental document between the Commission and the California Water Board, we hope that including these CEQA-required elements will reduce the time the California Water Board needs to act on the pending water quality certification application.

**Comment:** California Fisheries and Water believes that the draft EIS does not comprehensively disclose and evaluate the effects to the human environment resulting from section 4(e) requirements of the Forest Service and also section 401 of the Clean Water Act, water quality certification requirements of the California Water Board. For example, California Fisheries and Water believes that the draft EIS fails to consider the effects to federally protected Shasta crayfish of the Pit River below Fall River. California Fisheries and Water feels that the draft EIS is in violation of NEPA and must be amended. California Fisheries and Water also believes that the draft EIS does not disclose and evaluate the effects to the safety of California licensed anglers (including disabled anglers) resulting from specific daily flow section 401 requirements of the Clean Water Act.

California Fisheries and Water feels that the draft EIS does not disclose and evaluate the direct and cumulative effects to wild trout fisheries of the Lower McCloud (including the potential stranding of juvenile and adult trout), macroinvertebrate species and their habitat, water quality, the State of California Wild Trout Policy, the environment, the California Wild and Scenic River Act for the McCloud River, and boating requirements, resulting from the effects to power production, as related to section 401 requirements of the Clean Water Act.

**Response:** We have addressed both resource-specific and cumulative effects of the project alternatives, including flow recommendations, in the sections of the EIS on aquatic resources, special status species, water quality, and recreation. We considered all relevant federal or state comprehensive plans for waterways affected by the project in our comprehensive analysis. We have not addressed impacts of Clean Water Act section 401 requirements because those requirements are not known at this time. Neither PG&E nor the consulting agencies identified the Shasta crayfish as a special status species occurring within the project boundary or as being affected by the project; however, in the EIS we

recommend that prior to any project-related construction within the project boundary, PG&E conduct biological evaluations in order to adequately identify and mitigate potential effects to affected species. If the Shasta crayfish is present and affected by the project-related construction, these evaluations would help identify and mitigate those effects.

**Comment:** The California Salmon and Steelhead Association feels that the draft EIS is premature because the Commission must disclose and evaluate the direct, indirect, and cumulative effects to the human environment as related to section 401 Clean Water Act conditions of the California Water Board.

**Response:** We disagree with the California Salmon and Steelhead Association's assessment of the draft EIS. We cannot issue a new license until the state issues the 401 certification; however, the state's 401 certification is not required prior issuance of a NEPA document. The California Water Board will address issues specifically pertinent to its review under CEQA when it prepares its EIR.

**Comment:** The Center for Water Advocacy states that the draft EIS lacks any analysis of the impacts of climate change both on the operation of the project and other water issues. The Center for Water Advocacy is concerned that the draft EIS does not mention the effects of climate change of the project's hydrological management.

EPA, Region 9 notes that the draft EIS does not discuss the impacts of climate change on the project, and that changes in the timing and quantity of precipitation may impact dam stability, hydropower operation, water releases, and erosion of project roads. EPA, Region 9 recommends that the final EIS describe any reasonably anticipated impacts of climate change on the proposed project and any measures that could be incorporated to address these impacts.

**Response:** Few resources are available for the evaluation of future climate change impacts, although some models may attempt to predict change in certain river basins. The Commission's standard re-opener article would be included in any license issued for the project and would be the vehicle for making changes to the license should a material change in conditions occur that results in unanticipated environmental effects.

**Comment:** PG&E is concerned about broad general statements on project effects that are contained in the draft EIS Executive Summary. There is no question that there have been project effects, but general statements either overstate these effects or are not supported by extensive data presented in PG&E's license application and FERC's draft EIS.

**Response:** We disagree. The summary of project effects provided in the Executive Summary of the draft EIS identifies the resources that are affected by the continued operation and maintenance (O&M) of the project based on the best available information. These may appear general, but these statements serve as an overall summary of the project's issues and impacts.

**Comment:** The California Water Board notes that without details of the contents of the various monitoring/management plans that PG&E plans to develop and/or implement, it is impossible to determine the environmental impacts of implementation. The California Water Board recommends that one way to help avoid impacts from implementation plans is to require approval from the agency(ies) with authority over the subject resource area.

**Response:** The EIS evaluates the anticipated impacts of the proposed project, including considerations of various mitigation options intended for inclusion in the draft plans as proposed by the applicant, state and federal agencies, etc. As such, we consider most of the proposed management and monitoring plans to contain enough detail to be able to implement the plan at the time of license issuance and recommend that these plans be considered final. We also note that the Commission and appropriate state agencies, including the California Water Board, will have an opportunity to review and comment on whether any of the remaining draft management and monitoring plans achieve the purposes of the mitigation described in the EIS during finalization of those plans.

## **DEVELOPMENTAL ANALYSIS**

**Comment:** PG&E states that it is unclear in the draft EIS how or if the Commission analyzed costs for any of the alternative conditions that were filed. PG&E states that it appears that the PG&E-proposed action does not include the flow scenario for the Lower McCloud River that was filed on March 3, 2010, in PG&E's alternative condition but if it does, this should be clarified in the final EIS.

**Response:** PG&E's March 3, 2010, flow recommendations are the same as the alternative Forest Service 4(e) proposal filed on March 1, 2010; see table 3-21 of the draft EIS. Consequently, our analysis of flows treated these conditions as a single recommendation. The costs associated with the various alternatives/recommendations were analyzed in section 4.0, *Developmental Analysis*, of the draft EIS.

**Comment:** The California Water Board states that the annual cost for developing and implementing the fish stocking plan should include an inflation factor.

**Response:** As discussed in draft EIS section 4.1.1, *Economic Assumptions*, the Commission employs an analysis that uses current costs to compare the costs of the project and likely alternative power with no consideration for potential future inflation, escalation, or deflation beyond the license issuance date. Instead, the Commission's economic analysis provides a general estimate of the potential power benefits and costs of a project and reasonable alternatives to project-generated power, as articulated in Mead Corporation, Publishing Paper Division (72 FERC ¶ 61,027, July 13, 1995).

**Comment:** PG&E comments that implementing Forest Service 4(e) flows below McCloud dam and California Trout, Trout Unlimited, and McCloud River Club alternative 4(e) flows below McCloud dam will require replacement of the Howell-Bunger valve at McCloud dam. PG&E notes that this capital cost is not reflected in the cost table for either of these alternatives. PG&E is developing a cost estimate and will provide this information to FERC as soon as it is available.

**Response:** We acknowledge that the Howell-Bunger valve at McCloud dam would require replacement to implement modified instream flows below McCloud dam. Minimum flow at McCloud dam under the no-action alternative is 40-50 cubic feet per second (cfs) depending on the time of year (table 3-26). PG&E's proposed minimum flow is 150-220 cfs (table 3-22). The minimum flow specified by the Forest Service is 175 cfs or greater (table 3-22). Therefore, the Howell-Bunger valve discharge capacity would have to be at least three times the normal discharge capacity of the existing valve. PG&E would have to complete a detailed engineering study to properly size the replacement valve and determine installation costs at McCloud dam. Because PG&E has not completed this study and has not provided costs for replacement of this valve, we have updated EIS section 4.0, *Developmental Analysis*, to include a \$300,000 capital cost for replacement of the valve (see also appendix C). This cost would include installation of a larger bifurcation in the 84-inch outlet pipe and a valve twice the size of the existing valve. The new valve would have a flow capacity about four times the existing 24-inch valve.

**Comment:** California Fisheries and Water feels that the draft EIS does not disclose and evaluate the direct and cumulative effects to California power consumers related to Forest Service 4(e) conditions effects on power production.

**Response:** Draft EIS section 3.2, *Scope of Cumulative Effects Analysis*, describes the scope of our cumulative effects analysis for the McCloud-Pit project and identifies water quality, fisheries, and recreation as the resources having a potential for cumulative effects in this proceeding.

In section 4.0, *Developmental Analysis*, we give our estimate of the direct annual cost of proposed measures, including the Forest Service's 4(e) conditions that would reduce the current power production of the project. In section 5.0, *Staff's Conclusions*, of the draft and final EIS, we compare the cost of Forest Service 4(e) conditions to the effects of these environmental measures in making recommendation to the Commission. Because the Commission makes decisions on individual proceedings, we do not believe that an estimate of the total cost of 4(e) conditions of other projects now being relicensed in California would help the Commission make a license decision for the McCloud-Pit Project.

**Comment:** McCloud RiverKeepers is concerned that the draft EIS does not include details on relicensing costs that are passed on to electric ratepayers. Specifically, McCloud RiverKeepers is referring to all the costs including the costs of flow used under "Other Uses of the Resource" policy, specifically whitewater boating and the intended use versus any habitat need for water quality flows. McCloud RiverKeepers requests information on how the Commission calculates its Power Production Analysis, because the relicensing costs presented in the draft EIS appear to be lower than expected based upon the McCloud RiverKeepers' understanding of relicensing costs that are not paid for by licensees.

**Response:** In our economic analysis, we do not attempt to predict what costs would be passed onto the electric ratepayers. Table 4-2 in section 4.1.2, *Current Annual Costs and Future Capital Costs Under the No-Action Alternative*, presents the relicensing costs, including original net investment, license application preparation, and annual O&M that are the basis of section 4.0, *Developmental Analysis*, for the no-action alternative. Table C-1 in appendix C presents capital and annual costs for mitigation measures. Costs resulting from minimum flow releases, including the whitewater boating releases, are referenced in section 4.3.2, *Effect of Environmental Measures on Energy Generation*, and reflected in the annual power generation summarized in table 4-6. We have calculated lost power using differences between existing minimum flow releases and proposed releases and the normal heads at the powerhouses. All of these costs are included in the Developmental Analysis of PG&E's proposed action, the staff alternative, and the staff alternative with mandatory conditions (table 4-3). As shown in table 4-3, the Developmental Analysis is based on an average energy value published by the California Public Utilities Commission.

## **GEOLOGY AND SOILS**

**Comment:** Due to past incidents in portions of the McCloud penstock and identified soils and geologic stability conditions, the Forest Service stated in its comments on the draft EIS that it will request, in the final 4(e) conditions, copies of the project safety reports prepared by the independent consultant on dam safety. The Forest Service also stated it will require real-time monitoring of soil and ground movement at high risk sites along the penstock alignment to detect movement prior to total failure.

**Response:** It does not appear that the modified Forest Service conditions or recommended management plans provide guidance related to submission of project safety reports for penstock areas. However, in final EIS section 3.3.1.2, *Environmental Effects, Erosion and Sediment Control*, we note that monitoring implemented as part of routine safety inspections at penstocks and project water conveyance structures would minimize the risk of erosion-associated leakage or potential failure.

In the final EIS, section 3.3.1.2, *Environmental Effects, Erosion and Sediment Control*, we have noted the Forest Service's recommendation in the draft Erosion and Sediment Control Management Plan (provided as an enclosure to the Forest Service final 4(e) condition 22 filed on November 29, 2010) for PG&E to provide real-time seismic monitoring along the James B. Black penstock at the McCloud-Pit project.

**Comment:** The Forest Service concurs with the TM-67 results that erosion is occurring at Tarantula Gulch recreation area, Ash Camp and Ah-Di-Na Campgrounds, and Star City Creek, and agrees that treatment by PG&E is needed. The Forest Service also notes that, in addition to erosion at road-related sites along Forest Road (FR) 38N11, erosion is also occurring along the access road to three day-use sites (Red Banks, Battle Creek, and West dam), McCloud dam and spillway, and the minimum instream flow intake gate access.

**Response:** Mitigation of erosion sites would be implemented as part of the Erosion and Sediment Monitoring and Control Plan we recommend PG&E prepare within 1 year of license issuance, in consultation with the Forest Service and other appropriate agencies. Project-related erosion sites such as those identified in the Forest Service comment would be prioritized for restoration.

**Comment:** The Forest Service notes that a total of 22 erosion sites were identified along the shoreline of Iron Canyon Reservoir within the high water zone, and not only “few erosion sites,” as the draft EIS states.

**Response:** We have revised the text in final EIS to specify the number of erosion sites identified along the shoreline of Iron Canyon reservoir.

**Comment:** The Forest Service notes that additional erosion control and treatment measures will be required at sites used for borrow material during construction of Iron Canyon dam, and this treatment of the borrow sites will need to be included in the draft Erosion and Sediment Control Management Plan, to be submitted to the Commission with the final 4(e) conditions.

The California Water Board agrees with the Forest Service’s above statement.

**Response:** The Erosion and Sediment Monitoring and Control Plan would be prepared by PG&E in consultation with the Forest Service to ensure that Forest Service concerns are adequately addressed.

**Comment:** The Forest Service clarifies that updates to the Forest Service -compatible database of erosion sites and detailed site-specific erosion and sediment control measures will be required annually when treatment measures have been completed.

**Response:** The requirements of this erosion and sediment control measure have been clarified in the final EIS.

**Comment:** The California Water Board requests that the Commission provide more details on PG&E’s Erosion and Sedimentation Plan addressing fine sediment delivery to Iron Canyon reservoir as a result of unrestricted off-highway vehicle (OHV) use and future expanded OHV use. The California Water Board requests additional details on the scope of the plan to ensure it will prevent impacts to water quality. The California Water Board states that increases in OHV use over the life of the license could result in water quality impacts and recommends that these be evaluated and notes that the shallow slope of the Iron Canyon reservoir shoreline makes it more vulnerable to OHV use.

The California Water Board also suggests that the final EIS evaluate the impacts to water quality if the dispersed recreation use increases at McCloud reservoir or at other project locations. Uncontrolled dispersed camping can result in increases in shoreline erosion and in human waste entering waterways. The California Water Board notes that construction of campgrounds and addition of restrooms will prevent or reduce impacts from dispersed camping.

**Response:** In section 3.3.1.1, *Affected Environment*, we discuss the results of the PG&E pre-licensing surveys within the project area to determine the distribution of erosion sites, which identifies several sites caused by recreation use. In order to manage existing erosion and minimize future erosion and sediment delivery to stream channels, PG&E proposes to prepare an Erosion and Sediment Monitoring and Control Plan, which among other measures, would provide an inventory of project-related erosion and sedimentation, including recreational use areas and criteria for treating erosion sites.

In section 3.3.5.2, *Environmental Effects, Dispersed Use and OHV Use*, we recommend measures proposed by PG&E and specified by the Forest Service to block vehicle access and discourage dispersed use and OHV use at the project that would benefit environmental resources by closing degraded areas to intense recreational use. Project-related roads that are a direct source of erosion and fine sediment loading have been identified in the erosion site inventory and would be remediated as prioritized under the Erosion and Sediment Monitoring and Control Plan. In addition, we support the construction of designated camping areas to prevent dispersed use in sensitive or overused areas.

In section 3.3.2.1.2, *Water Quality*, of the draft EIS, we indicate that coliform analyses collected during a heavy recreational use period (2008 Labor Day weekend) in Iron Canyon reservoir and its tributaries did not appear to show significantly altered concentrations. Samples collected from both historical and recent sampling efforts in recreational areas in McCloud and Iron Canyon reservoirs resulted in generally low concentrations of total coliform, fecal coliform, and *E. coli*. In our analysis of the water quality and temperature monitoring plan we recommended the measure for PG&E to conduct periodic monitoring of all project reservoirs once every 5 years for *E. coli* and contaminants to ensure proper water quality conditions for recreational users at the project.

**Comment:** PG&E notes that Study GS-S2, *Assessment of Channel Morphology and Fluvial Geomorphic Process in the Lower McCloud River*, did not find armoring to be a significant problem in the Lower McCloud River, and that the statement by NMFS that armoring is “a significant problem” is unsupported by the results of the relicensing studies.

**Response:** We have revised the text in the final EIS to reflect the findings reported in GS-S2, TM-68.

**Comment:** The Forest Service supports closure of the user-created roads and trails around McCloud and Iron Canyon reservoirs to prevent further erosion.

**Response:** In the final EIS, we have recommended the license application proposal by PG&E to implement closure of existing and future user-created roads around McCloud and Iron Canyon reservoirs as discussed in section 3.3.5.2, *Environmental Effects, Dispersed Use and OHV Use*.

**Comment:** The Forest Service states that the draft EIS contains several inaccuracies regarding the current status of roads and spoil piles on the project. The Forest Service will remove references to bridges; however, contrary to PG&E statements, road spoil piles do occur on Forest Service lands along road alignments noted in the Commission’s listing of roads, and on Forest Service lands near project infrastructure.

**Response:** We have revised the final EIS to clarify that there are road spoil piles along roads on NFS lands that may be within the project boundary. The details about who is responsible for correcting problems created by these spoil piles (e.g., removal) should be included in the proposed Road and Transportation Facilities Management Plan, which we recommend and would be filed with the Commission for approval within 1 year of license issuance.

**Comment:** The Forest Service states that the Large Woody Debris (LWD) Plan for McCloud reservoir shows an annualized cost of \$452,506 (section 5.2.1, *Discussion of Key Issues, Geology and Soils, Large Woody Debris*), but notes that, in appendix B of the draft EIS, a one-time capital cost of \$1,500,000 and an annual O&M cost of \$167,000 are shown for this plan. The Forest Service states that it is baffled by these costs. The Forest Service states that the LWD Plan is no more than a plan to have PG&E place woody debris they already collect into the river rather than burn it—those costs are already incurred by PG&E under the existing license and should be shown in the current environmental measures in table 4-3. The Forest Service acknowledges that the deployment of additional boom line may be an additional capital cost but that it should not cost \$1.5 million. The Forest Service envisions monitoring as no more than ensuring that the material does not create log jams near the toe of the dam or pile up on property below the dam. The Forest Service reviewed the costs associated with the Coarse Sediment Plan and note that the annualized costs for that activity are only \$78,000. The Forest Service feels that the Coarse Sediment Plan and LWD Plan are similar activities and that the activities associated with the Coarse Sediment Plan would be the more expensive since it requires more handling of material. The Forest Service states that the main point is that the cost of environmental measures needs to be more clearly documented and include discussion of how PG&E and the Commission determined the capital and O&M costs.

**Response:** We reviewed the cost estimate for the LWD program and agree that it seems too high. In its response to comments, PG&E (October 2010) concurred that the costs in the license application assumed a LWD program that was significantly greater than that now being considered; however, they did not provide a revised estimate of cost for the LWD program. No commenting party has made other estimates of these costs and the cost of this measure has a small effect on the overall economic benefits of the project; however, we have re-analyzed the costs and presented these updated costs in the final EIS.

**Comment:** PG&E states that surveying for LWD effectiveness would likely result in unreliable data, and considering the high cost of this measure, PG&E disagrees that it is

appropriate to conduct this monitoring. PG&E goes on to state that cost-effective implementation of a gravel augmentation plan depends on the use of a gravel source near McCloud dam. PG&E anticipates that sediment stored in the Star City Creek delta deposit will likely be suitable material and provide adequate quantity. If this is not the case, PG&E states that it and the Forest Service will re-evaluate the cost effectiveness of this measure.

**Response:** In the final EIS, we concur with the Forest Service modified condition for monitoring of LWD dispersal from the placement to adaptively manage the amount and timing of placement of LWD below McCloud dam. Additionally in the final EIS, we recommend the use of Star City delta for collection of coarse sediment and to evaluate other potential sites that could provide suitable coarse sediment for augmentation.

**Comment:** In its comment on the draft EIS, the Forest Service states that monitoring for LWD dispersal could be integrated into the Aquatic Biological Monitoring Plan to ensure that large accumulations of LWD do not form along the Lower McCloud River margins.

PG&E states that its management plan does not propose long-term monitoring of the volume and distribution of LWD that is mobilized from the placement site and distributed in the downstream channel. PG&E states that long-term monitoring of the dispersal of LWD would not be effective for many reasons (e.g., LWD is unlikely to be retained in the river and distinguishing between LWD moved from McCloud reservoir and LWD from the forest below McCloud dam would be problematic).

**Response:** In its modified condition 21, the Forest Service specifies monitoring of LWD as a component of the LWD Plan rather than the Aquatic Biological Monitoring Plan, so its comment above is no longer applicable. In modified condition 21, the Forest Service also recommends monitoring LWD only to assess mobilization from the placement site and not downstream dispersal. PG&E has accepted the Forest Service's modified condition 21.

In the draft EIS, we incorrectly indicated that PG&E's proposal for a LWD Management Plan included monitoring of mobilization and dispersal of LWD. In the final EIS, we have corrected PG&E's proposal for the LWD Management Plan to not include specific monitoring procedures. In the final EIS, we recommend Forest Service modified condition 21 and its monitoring component, because it allows the volume and frequency of LWD placement to be adaptively managed and only specifies monitoring of LWD mobilization from the placement site. We find monitoring of LWD mobilization from the placement site would be adequate to minimize issues associated with downstream dispersal and therefore do not recommend any additional long-term monitoring of downstream dispersal and distribution.

**Comment:** PG&E agrees with the Forest Service that monitoring of gravel augmentation should be focused on assessing spawning gravel characteristics between McCloud dam and Hawkins Creek, because below Hawkins Creek, augmented gravel will not be distinct from naturally recruited gravel. PG&E clarifies that the gravel augmentation

plan addresses the interruption of sediment transport, not the LWD Plan as stated in the draft EIS.

McCloud RiverKeepers believes that gravel augmentation should be implemented on an experimental basis with moderate amounts being added over a number of years while monitoring and verified results determine additional need based upon confirmed additional spawning activity and a benefit to fish population. McCloud RiverKeepers states that, if positive results do not materialize within a reasonable number of years, the augmenting should be terminated due to the additional expense to ratepayers.

**Response:** As stated in section 5.2.1, *Discussion of Key Issues*, we recommend modification of Forest Service condition 23 according to PG&E alternative condition 23, to specify that gravel augmentation should occur based on monitoring results, rather than a fixed time period, in order to provide a more flexible mechanism for determining the volume and frequency of sediment introduction necessary to maintain aquatic habitat. We also indicated that monitoring results would aid in determining the success of gravel augmentation and the need for adjustments to source material, timing, and placement. Consultation will allow PG&E and the agencies to adaptively manage the resources to ensure the measures contained within the plans are appropriate and beneficial.

**Comment:** The California Water Board suggests that monitoring of large bivalves (California floater and shell mussels) should occur throughout the life of the license since these are long-lived species. In addition, the California Water Board notes that the reintroduction of anadromous salmonids may result in reintroduction of mollusks in McCloud River and that future monitoring may be appropriate.

**Response:** In the draft EIS, we recommend PG&E monitor aquatic mollusks consistent with Forest Service condition 27. This Forest Service condition specifies that PG&E monitor suitable habitat of California floater and other special status aquatic mollusks for the term of the license. In addition, the proposed monitoring plan allows for new species to be added to the list of monitored species if necessary.

**Comment:** The Forest Service agrees to drop the requirement for a reservoir dredging plan. The Forest Service states that if dredging is required that will be on or affect NFS lands, a suitable plan, approved by the Forest Service and recommended to the Commission can be developed at that time.

**Response:** In the final EIS, we have updated our analysis to reflect this change to Forest Service condition 24.

**Comment:** The Forest Service supports an adaptive approach to the introduction of coarse sediment to ensure that placed sediments are mobilized. However, the Forest Service clarifies that Aquatic Conservation Strategy benefits of augmentation include geomorphic as well as aquatic outcomes. The Forest Service notes that monitoring is intended to track mobilization and dispersal of coarse sediments, with emphasis on the sediment-deficient portion of the river between McCloud dam and Hawkins Creek as well as any unintended consequences of augmentation (e.g. large accumulations or

scouring). The Forest Service agrees that 1 year after license acceptance is adequate to complete the Coarse Sediment Management and Monitoring Plan.

**Response:** We appreciate the clarification on the benefits of gravel augmentation, and have modified the text in the final EIS to reflect the intent of monitoring from an aquatic habitat and geomorphic standpoint.

**Comment:** The California Water Board states that the draft EIS does not quantify the current sediment delivery, or describe how this impact will change over the life of the license. The draft EIS should contain additional details on the scope of the plan to ensure it will prevent impacts to water quality.

**Response:** Section 3.3.1, *Geology and Soils*, in the draft EIS we summarized the results of PG&E's prelicensing studies on erosion and sediment delivery to the project [Technical Memorandum; Erosion and Sediment Inventory (TM-67)] and provided rankings corresponding to the potential of project sites to cause future effects to project infrastructure or water resources. On page 69 of the draft EIS, we stated that cumulative sediment supply to the Lower McCloud River under regulated conditions ranges from 1,450 tonnes per year at the Hawkins Creek confluence to 7,050 tonnes per year at the Squaw Valley Creek confluence. In section 5.2.1., *Discussion of Key Issues*, we recommended Forest Service condition 23, which specifies that PG&E develop and implement a Gravel and Coarse Sediment Management Plan which provides an adaptive management component for augmentation of gravel and coarse sediment. We further recommend modification of Forest Service condition 23 according to PG&E alternative condition 23, to specify that gravel augmentation should occur based on monitoring results, rather than annually. We believe this approach would allow PG&E to minimize any new impacts of sediment delivery and water quality resulting from the project throughout the term of the license.

In the final EIS, we provide details of the draft Coarse Sediment Management Plan, filed as an enclosure to Forest Service modified condition 23.

**Comment:** The Forest Service agrees that baseline monitoring of erosion and sediment over the term of the new license will help identify new sites and those where treatment has been unsuccessful. The Forest Service also supports a new baseline survey within 1 year of license issuance, because study results will be out of date by that point. The Forest Service's proposal prioritizes treatment for all 56 sites identified as high risk and includes 6-year schedule for treatment or repair of all sites.

**Response:** We appreciate the clarification to your recommendation for the Erosion and Sediment Monitoring and Control Plan.

**Comment:** EPA notes that the draft EIS does not state whether the rivers and reservoirs of the project are considered waters of the United States. EPA encourages FERC and PG&E to discuss this issue with the U.S. Army Corps of Engineers (USACE), because if waters of the United States are present, a Clean Water Act section 404 permit may be required for activities described in the draft EIS, such as the excavation of gravel and

coarse material from Star City Creek and other potential sites; the placement of gravel and coarse material in the McCloud River; construction of additional power generating facilities at the base of McCloud dam and the Pit 7 afterbay dam; shoreline boat ramps; and other recreational improvements. EPA recommends that the final EIS should discuss the applicability of Clean Water Act section 404 permitting to the project and quantify the direct and indirect impacts to waters of the United States.

**Response:** The project contains waters of the United States; however, as stated on page 80-81 of the draft EIS, PG&E acknowledges that implementation of the gravel augmentation plan, which would include removal and placement of fill into the stream, would be contingent on receipt of a section 404 permit from USACE, and other permits. We note that PG&E is responsible for obtaining necessary permits from the appropriate agencies for all other project activities.

### **AQUATIC RESOURCES/RECREATIONAL BOATING**

**Comment:** The Forest Service observes that it is unclear what “suitable” boating might be in terms of cfs, and recommends that this term be clarified.

**Response:** In the final EIS, text has been revised to note flows, in cfs, for acceptable and optimal conditions for boating and angling.

**Comment:** Eighty-six individuals stated their support for a hydrograph that would support whitewater boating on the Lower McCloud River.

PG&E states that whitewater boating and angling opportunities exist over a wide range of flows. Consequently, the effects of the flow regime in terms of opportunities are more accurately described as providing more whitewater boating opportunities and fewer angling opportunities within the preferred ranges of flows for these activities. PG&E notes that analyses presented to relicensing participants showed that for the period of record (1974-2006), the revised preliminary 4(e)/PG&E alternative condition would have provided an average of 11 days per year with flows in the optimal range (601-1,000 cfs) for whitewater boating as compared to 7 days per year under the present license requirement.

The California Water Board states that the quantification of boating days does not adequately describe the actual number of days for boating that were available. The actual number of boating days in each of the years in the period of record (past operation) should be provided so that it can be compared to the number of days available under unimpaired hydrology. The California Water Board states that the final EIS should quantify the number of boating days for each of the agency/non-governmental organization proposals provided, compare these numbers to the baseline conditions, and describe the impact of each of the flows. The California Water Board notes that under the unimpaired flow regime, whitewater boating flows would have been available 365 days per year.

American Whitewater and Friends of the River state that using average number of boatable days mischaracterizes the amount of boating opportunity that currently exists on

the Lower McCloud River (p. 217 of the draft EIS) and recommends that the current draft EIS language be changed to reflect the content of TM-24 (p. 25), specifically the median number of boatable days. American Whitewater and Friends of the River note that under the PG&E/Forest Service flow schedule, the median number of boatable days in the optimal boating timeframe should be 4, which American Whitewater and Friends of the River states is an improvement over the existing condition of zero boatable days. American Whitewater and Friends of the River note that under the PG&E/Forest Service flow schedule, the median number of optimal angling days is 191 and 200 days under existing conditions.

**Response:** The analysis of boating opportunities has been expanded in the final EIS with an analysis of the potential affect of each alternative/recommendation on opportunities for boating and angling at various flow levels. The number of available days that could have been available with each flow scenario during historic water year conditions has been estimated and is presented to show the increase or decrease in days for each scenario relative to the current license conditions (no-action alternative).

The baseline condition for this environmental analysis is the existing condition, not the pre-project condition. Therefore, the analysis of effects of various flow scenarios is based on comparison to the no-action alternative as opposed to unimpaired flows.

**Comment:** PG&E notes that the staff recommendation referring to California Trout, Trout Unlimited, and McCloud River Club does not recognize conflicts with the Forest Service preliminary 4(e) condition, for some periods and under some types of runoff. To avoid the potential for a license with conflicting terms, PG&E recommends the Commission delete reference to the California Trout, Trout Unlimited, and McCloud River Club flow regime because any 4(e) conditions must be included in their entirety, without modification.

**Response:** For preparation of the EIS under the NEPA process, we are required to independently analyze a range of alternatives/proposals and balance the effects of the project on various beneficial uses when making recommendations. Thus, our recommendations in the final EIS may differ from the 4(e) conditions, but, as stated in the draft and final EIS, the Forest Service 4(e) conditions will become part of any license issued by FERC.

**Comment:** The Center for Water Advocacy believes that the McCloud RiverKeepers' recommended flows would further reduce the amount of water that is released by PG&E into the McCloud River from McCloud reservoir. The Center for Water Advocacy states that the condition 19 flows already incorporated a reduction in springtime flows by the Forest Service, compared to its first set of preliminary flow conditions. The Center for Water Advocacy believes that the Commission's adoption of the alternative flow recommendations will further weaken prescriptions designed to protect the aquatic ecosystem in the McCloud River.

The Center for Water Advocacy and California Sportfishing Protection Alliance believe that the incremental potential benefits to recreational angling and to power generation represented by the staff alternative do not outweigh the superior aquatic benefits of the 4(e) flows. The Center for Water Advocacy also states that the Commission revised article 421 of the current license to require a minimum flow of at least 1,000 cfs or inflow, if less, through May and June.

**Response:** In the draft EIS, we did not recommend the minimum instream flows for the Lower McCloud River proposed by McCloud RiverKeepers but instead recommended the minimum instream flows recommended by California Trout, Trout Unlimited, and McCloud River Club. The benefits of this flow regime were supported by the instream flow and aquatic habitat studies designed in collaboration with resource agencies and other interested parties and conducted by PG&E during the development of its final license application. In the final EIS, we recommend the minimum instream flows for the Lower McCloud River specified by Forest Service modified condition 19 and supported by California Trout, Trout Unlimited, and McCloud River Club. Again, the relicensing studies conducted by PG&E support this recommendation and the recommended timing and magnitude of seasonal flow augmentation would help maintain channel morphology and aquatic habitat and create a more natural hydrograph. We find that the flow regime specified by Forest Service modified condition 19 strikes the best balance between angling opportunities, aquatic resources, and recreational boating, as compared to the alternatives.

**Comment:** California Fisheries and Water states that the draft EIS did not disclose and evaluate the effects resulting from 4(e) flow boating requirements by the Forest Service.

**Response:** The Forest Service did not specify recreation flow events in its 4(e) conditions; however, boatable days would occur under the flow scenarios specified by Forest Service 4(e) conditions. In the final EIS, we have expanded the analysis of boating opportunities and the potential effects of each alternative/recommendation on opportunities for boating and angling at various flow levels.

**Comment:** The California Water Board recommends that additional studies are needed to determine if the flows in the 175-200 cfs range, as recommended in the draft EIS, are supported by the corrected flow models.

The Center for Water Advocacy believes that there is substantial risk of scientific error in the flow measurements upon which the draft EIS is based resulting from an insufficient number of flow gages and/or poor quality data from existing gages. The Center for Water Advocacy states that the use of these unreliable data gathered by PG&E will affect existing and future aquatic species in the McCloud River and requests additional instream flow modeling due to situations that can occur that result in unusual gage height recordings (e.g., the incident at MC-10 on June 7, 2008).

**Response:** The models and field sampling methodologies PG&E used to assess appropriate flows, and the number and location of flow gages from which historical flow

data were derived, were developed and implemented in coordination with resource agencies and other interested parties. Although some data errors were identified in the historical flow data from some gages and during estimation of flows, PG&E applied several quality assurance methods to ensure reasonable results of the flow analysis. We also recognize that although each of these study approaches looked differently at the aquatic community and habitat, and some erroneous data were identified by PG&E, the model results collectively provide consistent, weight-of-evidence information to support the recommended flow scenario. The methods and results of these studies are consistent with scientific standards of precision and accuracy. We believe that additional data collection to support these models would not be likely to significantly improve the characterization of the appropriate flows.

**Comment:** American Whitewater and Friends of the River state that the flow proposals from the Forest Service, California Fish and Game, and PG&E evaluated in the draft EIS provide a peak release of 250 cfs in 76-89 percent water years, which is just under the minimum boatable flow. American Whitewater and Friends of the River state that an additional release of 50 cfs in these water years would provide boating opportunity, would not interfere with wading based angling, and would more closely mimic the natural hydrograph.

**Response:** During below-normal runoff water years (76-89 percent) when water resources and aquatic resources may be stressed and water storage capacity may be reduced, we must balance the requirements of power generation, aquatic resources, and other users. The recommended 250-cfs peak flow during dry years, falls within the acceptable range for access boating, but below requirements for whitewater boating. During dry conditions, we have emphasized conservation of water during the period of spring seasonal high flows in order to help maintain and prolong adequate flows into the summer period of minimum precipitation and runoff.

**Comment:** McCloud RiverKeepers feels that it is inappropriate for agencies to “balance” the interests of anglers and the fishery itself against those of kayakers or some other interest. McCloud RiverKeepers states that the creation of boating flows for the purpose of whitewater recreation is unsubstantiated and that the focus should be on habitat needs and the objectives of the Forest Service’s Aquatic Conservation Strategy. McCloud RiverKeepers opposes the Forest Service’s flow rule because McCloud RiverKeepers feels the flow rule is not based on ecosystem need and is apparently designed to create the opportunity for whitewater boating at the expense of habitat damage. McCloud RiverKeepers states that according to the California Wild and Scenic Rivers Act, the California legislature guarantees management of the Lower McCloud river in its “existing natural condition” to “protect the unique fishery in its free-flowing condition,” which is the “highest and most beneficial use of the waters of the McCloud,” and that the code also states that PG&E’s existing and future facilities “cannot alter the existing flow regime below the dam.”

The California Fisheries and Water states that the draft EIS does not evaluate effects related to the California Wild and Scenic River Act for the McCloud River.

American Whitewater and Friends of the River state that the Commission should demonstrate how various beneficial use interests are being met by project operations, rather than giving more deference for safe wading opportunities than to whitewater boating.

**Response:** The Forest Service 4(e) flow conditions and staffs' flow recommendation in the draft EIS are measures intended to enhance aquatic habitat conditions compared to current license conditions, but they are measures to enhance recreational opportunities. A key feature of several of the recommended flow scenarios is the management of high flows during late winter and spring to more effectively mimic the seasonal variation typical of the natural hydrograph of an unregulated river. These peak flows are a necessary condition for natural maintenance of channel morphology and substrate conditions associated with quality aquatic habitat. Peak flows associated with seasonal weather patterns and significant runoff events can also provide white water boating opportunities that may, however, be excessive for comfortable or safe angler wading depending on when they occur. Our analysis and recommendations are made based on review of the available scientific data and our charge to determine the best comprehensive use of the waterway as mandated by the FPA. Each relevant beneficial use interest is discussed in more detail in its respective resource analysis section of the final EIS.

**Comment:** McCloud RiverKeepers recommends that the Commission identify costs related to whitewater boating flows. In particular, McCloud RiverKeepers requests identification of: (1) the project's actual market value dollar costs of the lost power production paid by electric ratepayers for an additional 75 cfs in minimum dam releases for four months (Jan-April); and (2) the Forest Service's flow rule, over the duration of the expected 50-year license. McCloud RiverKeepers states that it received an estimate of the cost of whitewater boating flows from PG&E for a recreational flow event below McCloud dam (11 days at 150 cfs between May and June), and that the estimate was \$200,000 to \$300,000.

**Response:** Because the recommended flows provide a balance of benefits between multiple uses, including power generation, aquatic habitat, aquatic resources, and recreational users, costs cannot be segregated by "user." In reality, high seasonal flows that may benefit whitewater boaters, are also an integral part of natural ecosystem dynamics necessary for habitat maintenance for aquatic and terrestrial resources.

**Comment:** American Whitewater and Friends of the River state it is unclear whether certain areas of discussion (e.g., p. 217 of the draft EIS) refer to boating or angling and recommend clarification.

**Response:** We have revised text in the final EIS to better clarify analysis of differing flow recommendations relative to boating and angling.

**Comment:** California Fisheries and Water states that the draft EIS does not disclose and evaluate the effects to the wild trout fisheries (including the effects to juvenile and adult trout that may be stranded resulting from ramping rate) or the California Wild Trout Policy of the Lower McCloud River resulting from daily 4(e) flow requirements specified by the Forest Service.

**Response:** The effects of rapid changes in flow and ramping proposals are discussed in section 3.3.2.2, *Environmental Effects, Ramping*, and section 5.2.1, *Discussion of Key Issues, Ramping*. In the draft EIS, we indicate that PG&E did not conduct any analyses of the potential for fish stranding to occur in the project reaches; however, we believe there is some potential for fish to be stranded at times when flows are reduced following spill events or valve test flow releases. In these cases, we recommended implementing the ramping rates specified by the Forest Service and recommended by California Fish and Game to help to limit the potential for stranding of fish and macroinvertebrates.

In section 5.2.1, *Discussion of Key Issues*, of the draft EIS we acknowledge that California Fish and Game designates the Lower McCloud River a “Wild Trout Water” and indicate the results of aquatic flow-habitat studies generally predicted that increasing minimum instream base flows from the current 40-50 cfs to between 175 and 200 cfs in summer and fall would provide the greatest abundance and highest habitat values for resident trout species. Forest Service modified condition 19 specifies a minimum baseflow of 175 cfs for the Lower McCloud River and a flow regime that varies by month and water year type. During above normal years the base flow would increase in July and August to 215 cfs. Our analysis of stranding indicates that the proposed rate for down ramping flows at the time of high spring releases would minimize the potential for stranding. We find that the flow regime specified by the Forest Service would create a spring pulse flow condition which more closely reflects a natural hydrograph and would benefit the resident trout population.

**Comment:** McCloud RiverKeepers expresses concerns about increased costs to taxpayers as a result of the proposed flows. McCloud RiverKeepers states that whitewater boating is a declining recreational activity while fishing is enjoyed by a much larger percentage of the population, and that increasing flows for whitewater boating at the detriment of harming the fishing industry, hurting the ecosystem, and increasing costs is not justified. McCloud RiverKeepers goes on to request a boating ban on the Lower McCloud River during the fishing season in order to emphasize year-round high-quality fishing on the river, claiming that there are many other local whitewater boating opportunities, and the Lower McCloud River’s narrow structure makes whitewater boating a conflicting recreational activity during the fishing season.

**Response:** High flow spill events typical of a natural hydrograph benefit the Lower McCloud River as a mechanism for enhancement and maintenance of channel morphology and aquatic habitat as well as provide whitewater boating opportunities. The various alternative recommendations to provide such late winter early spring events under a managed flow regime are generally designed to return flows to the range

considered acceptable to wading anglers by fishing season. Furthermore, we do not consider a ban on boating to be necessary as there is not significant overlap between the flows preferred by whitewater boaters and wading anglers. In addition, boat-based angling, which prefers flows in the range of wading anglers, provides access for anglers to reaches of the Lower McCloud River that would otherwise not be available.

**Comment:** PG&E believes the statement of “No flow change” for row 3 of the table on p. 53 of the draft EIS (March 16-31, 90-99 percent runoff) is incorrect. PG&E states that the March 3, 2010 alternative condition from the California Trout, Trout Unlimited and McCloud River Club flow proposal specifies a 50 cfs increase for this runoff category.

PG&E notes that p. 136 of the draft EIS, paragraph 1 should state that “...during the first half of April if runoff is less than 120 percent...” and not “...less than 102 percent.”

**Response:** In the final EIS, appropriate edits have been made to this table. Under March 16-31, the flows after 09-99 percent and 100-119 percent should be 100 cfs, not 50 cfs as shown in draft EIS. The text in the final EIS also has corrected the typographic error for percent runoff, which should have read 120 percent, as opposed to 102 percent.

**Comment:** The Forest Service agrees with the Commission’s conclusions that flow regulation at McCloud and Iron Canyon dams and diversion of water to the project powerhouses affect recreational opportunities, including in the Lower McCloud River reach below McCloud dam (24-mile bypassed reach) but states that it does not understand conflicting language elsewhere in the draft EIS which does not recognize the project nexus for recreation in the Lower McCloud River between McCloud dam and Squaw Valley Creek tributary inflow.

**Response:** In the draft EIS, we incorrectly stated that some recreational facilities (e.g., campgrounds at Ah-Di-Na and Ash Camp) were located below Squaw Valley Creek and therefore did not have project nexus. In final EIS section 3.3.5.2, *Environmental Effects, Lower McCloud River Recreation Facilities*, we have clarified that these facilities are above Squaw Valley and that although they provide access to the Lower McCloud, they are not project facilities. Although we agree that flow regulation at McCloud dam affects recreational opportunities, this does not change our conclusion that these facilities do not have a project nexus because they do not serve a project purpose or provide direct access to the project.

**Comment:** The Forest Service notes that PG&E studies indicate that 210-375 cfs are optimal flows for angling, but that these numbers are inconsistent between each section of the draft EIS and should be corrected.

**Response:** In the final EIS, we have revised the text to assure consistency between sections and the findings and cfs ranges reported in Technical Memoranda 24 and 58.

**Comment:** The California Water Board acknowledges that the McCloud River is closed to fishing from November 16 to the last Saturday in April so flows during this period would have no impact on fishermen. The California Water Board notes that, according to Technical Memorandum 58, the optimal range of flows for fishing at Ah-Di-Na is

210-375 cfs, which does not agree with the draft EIS statement that, "...flows higher than 300 were too stressful for all but the youngest and most aggressive waders."

American Whitewater and Friends of the River agree with the Commission that 210-375 cfs at Ah-Di-Na gage (gage MC-1) is optimal for angling and note that other sections of the draft EIS are contradictory to this and state 200-300 cfs as the optimal flow range for angling; American Whitewater and Friends of the River assert that the latter flow values are incorrect and should be changed. American Whitewater and Friends of the River note that at the Ah-Di-Nah gage, summer flows have typically been 220 cfs or higher, rarely below 200 cfs, and never as low as 160 cfs, although some anglers indicated baseflows at this location most suitable for angling were 160-200 cfs and flow information has only been posted online since 2009. American Whitewater and Friends of the River state that using the median number of optimal angling days results in a median of 191 days under the PG&E/Forest Service flow schedule and a median of 200 days under the base case.

**Response:** The statements relative to the optimal and acceptable flow ranges for fishing have been revised in the final EIS to be consistent with Technical Memorandum 58; however, we would like to note that the reference to 300 cfs being too strong for all but the youngest and strongest anglers came from the personal interviews and focus groups conducted for the McCloud River Recreational Flow Assessment and associated Technical Memorandum 24.

We have provided an expanded analysis in the final EIS of number of boating and fishing days available under various flow scenarios. As part of the analysis, we have summarized the change in the number of boating and fishing days for each of the flow scenarios compared to the no-action alternative. We find this analysis adequately estimates the differences between the number of angling and boating days under the various flow scenarios and relative to existing flows.

**Comment:** California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers state that the minimum flow issue is important for anglers because Ah-Di-Na flows have only recently (2009) been available to the public real time via the internet. In previous years, the public could only assume that 200 cfs was flowing by Ah-Di-Na during the summer months during normal years because that was the FERC mandated minimum flow.

**Response:** Real-time flow data will continue to be available for the gage at Ah-Di-Na (MC-1) and flow data at the McCloud dam (MC-7) will also become available under staff's recommendations to assist anglers in knowing the flow conditions.

**Comment:** Several individuals who filed comments expressed concern regarding increased flows and mud events in fall 2009 and spring 2010 and related these effects to the increased flow regimes, as proposed.

PG&E states that whitewater boating and angling opportunities exist over a wide range of flows and that consequently, the effects of the flow regime in terms of opportunities are

more accurately described as providing more whitewater boating opportunities and fewer angling opportunities within the preferred ranges of flows for these activities. Analyses presented to relicensing participants showed that for the period of record (1974-2006), the revised preliminary 4(e)/PG&E alternative condition would have provided an average of 11 days per year with flows in the optimal range (601-1,000 cfs) for whitewater boating as compared to 7 days per year under the present license requirement.

McCloud RiverKeepers defines fishable flows at MC-1 as the existing flow regime and states that flows at MC-1 begin to be wadeable for angling at about 250 cfs and become marginally fishable at 275 cfs (between late April and early May). McCloud RiverKeepers expresses concern that the Forest Service flow rule does not result in a flow reduction to 250 cfs until June/July. McCloud RiverKeepers states that the Forest Service's flow rule will result in a threat to the fishery due to increasing flows in March and April and extending those increased flows into May, June, and July, and is in opposition to the rainbow trout pre-spawn, spawn, and post-spawn flows recommended in Technical Memo 54. McCloud RiverKeepers states that changing the flow above the current 190 cfs for rainbow trout upstream of Squaw Valley Creek and 358 cfs downstream of Squaw Valley Creek is not justified and would threaten the fishery. McCloud RiverKeepers also believes the flow changes will negatively affect the macroinvertebrate and fish community that is beginning to emerge in March, April, and May.

**Response:** The instream flow and aquatic habitat studies designed in collaboration with resource agencies and other interested parties and conducted by PG&E support the staff-recommended flow regime for enhancement of aquatic habitat in the Lower McCloud River in general and for rainbow trout in particular. The recommended timing and magnitude of seasonal flow augmentation would help maintain channel morphology and aquatic habitat and create a more natural hydrograph. These are consistent with FERC's responsibility to consider both developmental and non-developmental resources. The magnitude and duration of turbidity in the Lower McCloud River and Iron Canyon reservoir associated with natural flow events from Mud Creek is affected by project operations at McCloud dam; however, the recommended flow regimes would not be expected to change conditions compared to the no-action alternative. Our analysis of other water quality conditions indicates that the recommended alternative and Forest Service 4(e) conditions would not adversely affect existing conditions. The monitoring plan proposed would document the affect of the new flow regime on water quality and provide a tool for adaptive management to assure maintenance of adequate water quality conditions.

**Comment:** Several individual commenters request that timelines for observation and study be established for water flow releases into the Lower McCloud River

California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers note that the flow study (Technical Memo 58) found optimal angling flows to be

210-375 cfs, and acceptable angling flows from 200-475 cfs. They feel that the final EIS should reflect this in its interpretation of the Recreation Flow Assessment Study.

The California Water Board states that problems with the collection and processing of hydrology data for the flow models renders the results of the models inadequate for making flow decisions.

**Response:** The license will provide a schedule for preparation, approval and implementation of aquatic monitoring plans and the frequency of periodic surveys of aquatic and terrestrial resources.

The analysis has been expanded in final EIS section 3.3.5.2, *Environmental Effects, Recreation Flows*, to evaluate the effect of proposed flow scenarios on acceptable and optimal fishing and various levels of boating experience.

PG&E used several models to assess appropriate flows for protection and enhancement of selected species and life stages important to the aquatic community and recreational fishery in the Lower McCloud River. The models and field sampling methodologies were developed and implemented in coordination with resource agencies and other interested parties. The models selected utilized different approaches to assess the affect of flow on fish populations and habitat. At the request of a resource agency, Physical Habitat Simulation Modeling (PHABSIM), which has been refined and routinely used to evaluate flow requirement for licensing and relicensing of hydroelectric projects, was added to the study design after the field data collection had been completed. Following the initial PHABSIM model runs, several agencies identified several issues with the method by which cross section flow data were collected as those data were later applied to the PHABSIM model. PG&E performed a more refined analysis of the data and revised the PHABSIM input files as requested by the agencies. These models have been used as tools to aid in evaluating the relative relationship of various flows, aquatic habitat, and the potential of habitat to support, maintain, and enhance aquatic populations. Ultimately, while each of these study approaches looked differently at the community and aquatic habitat, they collectively provide consistent, weight-of-evidence information to support the recommended flow scenario. The methods and results of these studies are consistent with scientific standards of precision and accuracy. We find that additional data collection to support these models would not significantly improve the characterization of the habitat provided by the models or change the findings relative to recommendations of appropriate flows.

**Comment:** Three hundred fifty-nine organizations and individuals stated their support for a hydrograph that would support angling and/or fish habitat in the Lower McCloud River. Individuals expressed concern regarding economic impact of perceived future angler absence on the Town of McCloud.

McCloud RiverKeepers feels that it is inappropriate for agencies to “balance” the interests of anglers and the fishery itself against those of kayakers or some other interest. McCloud RiverKeepers believes state agencies should not support flows that have an

adverse affect on the trout fishery. McCloud RiverKeepers claims that PG&E's use of McCloud dam is regulated such that the existing flow regime below the dam may not be altered from the "1989 flow regime," as these flows are beneficial to the trout fishery. McCloud RiverKeepers suggests that the Commission should support the preservation of the trout fishery, under the California Wild and Scenic Rivers Act. McCloud RiverKeepers is "opposed to any speculative changes in the existing normative flow regime that represent decisions of policy not based on substantiated needs of the near-perfect ecological condition of the aquatic habitat and fishery of the Lower McCloud River." McCloud RiverKeepers states there is no specific habitat need identified to warrant the magnitude of flows specified under Forest Service condition 19 and feels there are ecologically adverse effects that could occur if these flows are implemented.

The California Water Board states that 58 percent of anglers surveyed support balancing both fish habitat and fishing conditions, and about 33 percent thought that fish habitat was more important than good fishing conditions. The California Water Board states that, based on this information (Technical Memo 58), establishing flows to meet the needs of less capable waders may not provide the correct balance.

**Response:** We continue to conclude that the weight-of-evidence from analysis of the licensing studies conducted by PG&E and comments on those studies, support the flow regime we recommended in the draft EIS; however, we have revised our staff alternative in the final EIS to recommend flows specified by the Forest Service modified 4(e) conditions. The Forest Service modified 4(e) flows were developed to more closely match flows recommended by California Trout, Trout Unlimited, and McCloud River Club, which we originally recommended in the staff alternative of the draft EIS. Further, California Trout, Trout Unlimited, and McCloud River Club concurred with the flow conditions specified by the Forest Service in the modified 4(e) conditions. Overall, changes in the flow regime specified by the Forest Service in its modified 4(e) condition and the flow regime recommended by staff in the draft EIS are relatively small and temporally limited and not likely to result in measurable differences in aquatic habitat conditions; differences in number of days predicted from the hydrograph available for fishing and whitewater boating are small enough that they would be difficult to distinguish against the typical inter and intra-annual variability of flow associated with weather conditions and runoff.

**Comment:** Seven individuals stated their support for increased late winter/early spring flows in general or a more "natural" hydrograph on the Lower McCloud River.

The California Coastkeeper Alliance states its support for increased later winter and early spring flows in the Lower McCloud River.

The Center for Water Advocacy and California Sportfishing Protection Alliance recommend that the Commission replicate the snowmelt hydrograph in river reaches affected by the project as reflected in the Forest Service's flow regime, which it believes will benefit fisheries, aquatic insects, amphibians, and other biota

EPA states that while the dam-controlled Lower McCloud River no longer experiences a natural flow regime, the river can still benefit from an attempt to mimic natural flow, which can benefit native vegetation, scour and redeposit fine sediment, benefit aquatic biota, and foster greater ecological integrity. EPA recommends that the final EIS consider the long-term value of seasonally higher flow, mimicking natural flows, to aquatic resources of the Lower McCloud River

American Whitewater and Friends of the River recommend flows with the goal of restoring a more natural hydrograph in the Lower McCloud River, especially in the spring, and would like an analysis of their proposed flows included in the draft EIS. Their proposal would provide an elevated flow, coinciding with the spring snowmelt, would gradually taper off in April or May depending on water year, and would not have elevated flows during the fishing season in dry and critically dry years. They believe that the spring flow schedule proposed by the Forest Service and California Fish and Game would be an improvement to the current flow regime and superior to any of the other flow regimes that have been proposed thus far. American Whitewater and Friends of the River support the minimum instream flows proposed by California Fish and Game. American Whitewater and Friends of the River recommend a flow increase from the Forest Service/California Fish and Game/PG&E proposal of 50 cfs on March 15 in years when the expected runoff is 76-89%. Mr. Dave Steindorf, representing American Whitewater, made a public comment at the morning draft EIS meeting on September 9, 2010, that addressed many of the aforementioned comments given by American Whitewater.

**Response:** We acknowledge and agree with the support expressed for a more natural hydrograph on the Lower McCloud River. Several of the recommended flow regimes would better manage peak seasonal flows and the ramping of flows associated with significant runoff events than the current license conditions. In the draft and final EIS, we analyze the flow recommendations and recommend a flow scenario that would augment flows in later winter through early spring and mimic natural flow conditions.

**Comment:** California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers states that the minimum flow release schedule does not take into account California Trout, Trout Unlimited, and McCloud River Club alternative 4(e) minimum flow schedule for the summer months. In this proposal, it is recommended that summer base flows at Ah-Di-Na to be higher of (1) 200 cfs or (2) the historic average summer (i.e., July and August) base flows during normal years under the existing license—which historically appears typically in the range of 210 to 220 cfs during normal year designations. California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers wants to avoid a situation where the new license flows create lower summer base flows than what currently exists.

**Response:** In final EIS section 3.3.2.2, *Environmental Effects, Minimum Flows*, we have expanded the analysis of the hydrograph to characterize historic average base flows during the summer and incorporated this analysis into our recommended flow regime in

section 5.2.1, *Discussion of Key Issues, Aquatic Resources*. This is also consistent with the Forest Service modified condition 19, which specifies flows of 215 cfs at Ah-Di-Na (MC-1), if the flow at MC-7 is equal to or greater than 200 cfs on April 15 and, therefore, avoids a situation where the new license flows create lower summer base flows than what currently exists.

**Comment:** The Forest Service comments that the Commission's analysis provides some erroneous information when comparing the California Trout, Trout Unlimited, and McCloud River Club flow proposal with the Forest Service revised flow proposal. The Forest Service comments that the draft EIS incorrectly states the magnitude and duration of the difference between the Forest Service and Cal Trout/Trout Unlimited/McCloud River Club flow proposals for the spring ramping rate. The Forest Service flow rule requires higher flow releases in mid-March through May, but the difference between the two flow regimes is generally no more than 125 to 175 cfs in additional flow as measured at Ah-Di-Na, not the 450 cfs reported in the draft EIS. The Forest Service notes that the greatest difference observed was 225 cfs for one week in May 1978.

Additionally, the Forest Service provides details showing the minimum required flow release from McCloud dam for the two flow rules for Water Years 1974 through 2009 (36 years) and notes that in many years there is no difference between the two proposals but that, rather, based on the results from PG&E's flow modeling, only 6 of these 14 years would have actually resulted in differing flow regimes. The Forest Service states that the California Trout, Trout Unlimited, and McCloud River Club flow proposal's objective is to generate flows that mimic the natural hydrograph but to return flows to under 300 cfs at Ah-Di-Na by May 1 which is the approximate beginning of stream fishing season. The Forest Service notes that in all but the 6 years noted above, the Forest Service and California Trout, Trout Unlimited, and McCloud River Club flow proposals produce identical results. The Forest Service comments that in wet years, spill overshadows the rules and natural flow events cause flow at Ah-Di-Na to be above 300 cfs, and in normal to dry years, both rules generate flows that are at or under 300 cfs by May 1 at Ah-Di-Na. The Forest Service comments that the flow generated by the California Trout, Trout Unlimited, and McCloud River Club flow rule on April 29, 1978 (opening day of fishing season that year) was 349 cfs, and the flow generated by the Forest Service flow rule is 574 cfs. The California Trout, Trout Unlimited, and McCloud River Club flow at Ah-Di-Na drops to about 300 cfs on May 5. The Forest Service flow reaches 300 cfs on May 26 about 3 weeks later. By June 1, as in most water years, the required flows are identical and much below 300 cfs. The Forest Service notes that 1978 shows the greatest difference in flow between the two regimes, and the greatest time span between the dates when the California Trout, Trout Unlimited, and McCloud River Club flow reaches 300 cfs and the Forest Service flow reaches 300 cfs, which is in contrast to the statement in the draft EIS that the California Trout, Trout Unlimited, and McCloud River Club flow regime provides four more weeks of flows less than 300 cfs than the Forest Service regime.

American Whitewater and Friends of the River believe the summer flows proposed by California Fish and Game are equivalent to the alternative proposed by California Trout, Trout Unlimited, and McCloud River Club (about 210 to 220 cfs). American Whitewater and Friends of the River believes that the summer minimum flows proposed by the Forest Service in the original preliminary 4(e) conditions were consistent with California Fish and Game and the California Trout, Trout Unlimited, and McCloud River Club proposal.

**Response:** For the final EIS, we updated our analysis by water year of flow proposals and determined that for most years there is little or no difference in flow between the Forest Service condition and California Trout, Trout Unlimited, and McCloud River Club recommendation, and the differences are slight and short in duration.

We have evaluated the historic record for the Ah-Di-Na gage to determine the average flows for different water year types. The discussion has been expanded in the final EIS.

**Comment:** The Forest Service notes that while the Commission states that it chose the California Trout, Trout Unlimited, and McCloud River Club flow proposal because it provided more fishing days, the Forest Service's rationale for its flow regime was not based on favoring fishing or boating. The Forest Service flow proposal was developed to meet the requirements of the Aquatic Conservation Strategy in the Northwest Forest Plan which guides management for Shasta-Trinity National Forest.

California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers agree with our conclusion in the draft EIS that the "flow regime" recommended by California Trout, Trout Unlimited, and McCloud River Club strikes the best balance between angling opportunities, aquatic resources, and recreational boating, because this regime would provide more aquatic and create some early spring whitewater opportunities while still making sure the river is accessible for fishing. The McCloud River Club strongly supports the Commission's decision to recommend the California Trout, Trout Unlimited, and McCloud River Club alternative flow proposal over the Forest Service's proposed flow regime. They agree with the draft EIS that the California Trout, Trout Unlimited, and McCloud River Club proposal strikes the best balance and agree that it is appropriate to give more weight to safe angling opportunities than recreational boating.

McCloud RiverKeepers feels that the increased minimum dam release of 175 cfs in the Forest Service's Flow Rule is not rational because there is no demonstrated need of the ecosystem in the McCloud River Basin for these changes. McCloud RiverKeepers states that from an economic standpoint, lost power production and impact on ratepayers, the Forest Service's proposed Flow Rule and increase to a 175 cfs minimum dam release is considered an inefficient use of flow based on the needs of the ecosystem. McCloud RiverKeepers requests that the Forest Service provide an explanation of the McCloud ecosystem's need of: (a) the proposed increased magnitude and duration of flows resulting from the flow rule; and (b) the magnitude of the increases and decreases (Sept and Oct) to the existing flow regime measured at MC-1 that result from a 175 cfs year-round minimum dam release.

The California Sportfishing Protection Alliance and the Center for Water Advocacy believe that it is important to support the Forest Service flows. These groups believe the Forest Service flow regime does a better job of replicating the snowmelt hydrograph, both in terms of flow quantity and in terms of timing, than does the staff alternative. The California Sportfishing Protection Alliance believes that the staff alternative (which incorporates a position taken by California Trout, Trout Unlimited, and McCloud River Club) seeks to reduce even further still the amount of water that is released by PG&E into the McCloud River from McCloud reservoir.

**Response:** We recognize the difference in opinion among the Forest Service and the various user groups regarding our recommend flow regime and we have addressed those differences in both the draft and final EIS.

Based on relicensing studies conducted by PG&E, in the draft EIS, we concluded that flow regime alternatives submitted by the Forest Service (revised)/PG&E, California Fish and Game, California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers would improve aquatic habitat and benefit aquatic resources; differences between these flow regimes would be relatively small and vary depending on the water year type. In addition, the proposed flow regimes would provide a few additional days during most years (except dry or extremely dry conditions) with improved conditions for recreational boaters (whitewater and access) while maintaining safe and acceptable conditions for wading anglers. On November 29, 2010, Forest Service filed its modified 4(e) minimum flow conditions for the McCloud-Pit project. Modifications to the 4(e) proposal included changing the March 16 to 31 incremental flow increase to 50 cfs rather than 100 cfs when McCloud River runoff on March 1 is 100 to 119 percent and requiring the flow at Ah-Di-Na gage to at least 215 cfs (instead of 200 cfs) in July and August in wetter water years. Following consultation with Forest Service relative to final 4(e) conditions, California Trout, Trout Unlimited, and McCloud River Club indicated concurrence with the modified 4(e) condition 19 flows proposed by the Forest Service. We have modified our staff alternative in the final EIS to reflect our recommendation of this flow proposal because it provides appropriate flows to support aquatic resources, recreational uses, and power generation and closely mimics the natural hydrograph of the McCloud River.

**Comment:** California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers states that the line item for March 16-31 for water years in the 90-99% range should read “50 cfs,” and not “no change.” The McCloud River Club agrees with this observation.

**Response:** Flow changes, as noted by California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers, have been corrected in table 3-25 of the final EIS.

**Comment:** The California Coastkeeper Alliance states that the comments by “McCloud RiverKeepers” should not be viewed as in any way representing the California Coastkeeper Alliance, the international Waterkeeper Alliance, or any licensed

Waterkeeper alliance. The California Coastkeeper Alliance supports the adoption of a science-based flow regime that achieves these objectives such as the flow regimes proposed by the Forest Service or by California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers. The California Coastkeeper Alliance states that such alternative flow regimes call for increased flows in late winter and early spring, during the critical time that rainbow trout are spawning and fry are rearing, and that these types of proposals would decrease the risk of fry stranding and reduce fish mortality and would help minimize the amount of uncontrolled spills from the dam.

**Response:** We appreciate the information on the Waterkeeper Alliance, and we recognize the difference between McCloud RiverKeepers and the other Waterkeeper alliances.

As stated in our draft EIS, we concur with California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers that alternative flow regimes which call for increased flows in late winter and early spring would be beneficial to resident fish species.

**Comment:** The Forest Service comments that the proposals from the McCloud RiverKeepers and American Whitewater/Friends of the River should not be classified as alternative condition filings to the Forest Service’s Preliminary Section 4(e) Conditions under the provisions of the Energy Policy Act of 2005, because they were not filed within the regulatory timeframe. The Forest Service suggests that these proposals can instead be included and analyzed as part of the NEPA analysis.

**Response:** As alternative 4(e) conditions are covered under Forest Service regulations under the Energy Policy Act of 2005, staff defer to the Forest Service comments filed with the Commission on September 27, 2010, and have removed references to the filings by the McCloud RiverKeeper and American Whitewater and Friends of the River from the “alternative conditions” sections and analyze them as recommendations in the NEPA analysis. In the final EIS, we also add a footnote to section 1.3.1.3, *Alternative 4(e) Conditions Pursuant to the Energy Policy Act of 2005*, clarifying that the filings occurred after the March 18, 2010, filing deadline.

**Comment:** McCloud RiverKeepers has also has submitted supporting documents for inclusion in the final EIS and license approval process, including: California Public Resource Code section 5093.50-5093-70; McCloud RiverKeepers’ recommended flows; and McCloud RiverKeepers’ response to the Forest Service original 4(e) conditions. McCloud RiverKeepers also requests Commission assistance in procuring flow and power generation comparisons from PG&E. McCloud RiverKeepers also requests that its proposed flows are included as supporting documentation and that its relicensing positions and proposed flows are included when discussing environmental effects of minimum flows.

**Response:** McCloud RiverKeepers’ comments were filed on the public record and have been considered in preparation of the final EIS. PG&E is required to conform to all local

and state laws including California Public Resource Code, as applicable. Issuance of a new license for the McCloud-Pit Project by FERC would not affect PG&E's responsibility to comply with applicable state and local regulations. We have included the McCloud RiverKeepers' comments and recommendations on the license application and draft EIS in our analysis for the final EIS.

**Comment:** American Whitewater and Friends of the River agree with the Commission that the potential for stranding fish and other aquatic organisms during rapid changes in flow is a function of changes in water depth rather than flow rate and feels that the Commission presents contradictory information by rejecting American Whitewater and Friends of the River's recommendation to use stage rather than flow as the unit of measure for ramping rates. American Whitewater and Friends of the River state that the Commission claimed that American Whitewater and Friends of the River did not provide evidence that using stage measurements at the Ah-Di-Na gage as a guide for ramping would be any more appropriate for protection of aquatic resources than the use of flow measurements, but American Whitewater and Friends of the River disagree, stating that in their alternative condition submitted to the Forest Service they did articulate that using stage rather than flow would more closely mimic natural recession rates. American Whitewater and Friends of the River also feel that the Commission staff fail to explain how using flow as the unit of measure for ramping is more protective of the resource. In addition, American Whitewater and Friends of the River believe that the stage at the Ah-Di-Nah gauge is, in fact, an appropriate representation of other cross-sections within the reach, and they request that information is provided to substantiate the Commission's position. American Whitewater and Friends of the River also state that the Commission provides no information to demonstrate that the Ah-Di-Nah cross section is not representative of the Lower McCloud River.

**Response:** Stranding can occur along the water edge during rapid decrease in water level primarily for lifestages with limited mobility (such as recently emerged salmonid fry), or by entrapment in side channels and backwater areas. The probability of stranding is a function of channel configuration and slope as well as the rate of fall in the water surface. The rate of fall or change in stage (water depth) is affected by the channel cross section. U.S. Geological Survey gage are placed at locations with uniform cross sections along straight reaches of a stream to ensure consistent, reproducible measurement of stage. The gage typically measures stage and the relationship between stage and flow (cfs) (stage-discharge) is calibrated for the gage through a series of surveys of cross section and velocity performed over a range of flows. The stage-discharge relationship is applicable only to the cross section at the gage, but provides a dependable method for estimating flow based on a simple depth measurement. The characteristics of channel configuration which are desirable for establishing a gaging station are characteristics that are likely to minimize the probability of stranding. As concluded in the draft EIS, while stage is an important factor in stranding, stage at the Ah-Di-Na gage would not necessarily provide an appropriate indication of the potential for stranding throughout the Lower McCloud

River. For the purpose of compliance with ramping rates we find that, change in flow is more functional than change in stage and has generally been used for license compliance.

**Comment:** The California Sportfishing Protection Alliance states that a small part of the calculus is also recreational, in that the broader angling constituency does not have the luxury of joining or using the facilities of the elite McCloud River Club or the equally elite, neighboring Bollibokka Club, and the only opportunity that many anglers will have to fish the bottom end of the Lower McCloud River is to gain access by boat. The California Sportfishing Protection Alliance states that the 4(e) condition flows may provide marginally more opportunities to access the bottom end of the Lower McCloud River by boat than would the staff alternative.

**Response:** In the final EIS, we have revised our recommendation to support the flows specified by the Forest Service modified 4(e) conditions; however, we continue to conclude that the licensing studies conducted by PG&E provide adequate evidence to support the flow regime recommendation for the project in the draft EIS. We believe our recommended flows provide a suitable balance between the different user groups, aquatic habitat, and power generation. We also note that in the final EIS, we recommend that PG&E provide an access site at the base of McCloud dam that would accommodate fishing and boating access at the Lower McCloud River and allows anglers greater access to the recommended flows.

**Comment:** The California Sportfishing Protection Alliance states that until measures in support of reintroducing salmonids to the McCloud have practical effect, the Commission should adopt the flow measures proposed by the Forest Service in its proposed section 4(e) conditions.

**Response:** We concur that until listed-salmonids are present in project waters, the flows developed for the new license should be supportive of the existing aquatic community. In addition, the specific habitat conditions including flows, water temperature and substrate have not been adequately defined for the listed salmonids at this time. In final EIS section 5.2.1, *Discussion of Key Issues, Aquatic Resources*, we have revised our recommendation to support the flows specified by the Forest Service modified 4(e) conditions.

**Comment:** California Fish and Game notes that its understanding is that its 10(j) recommendation for instream flows was determined to be inconsistent with the FPA, specifically related to the additional cost of its proposed alternative in comparison to the staff-recommended flows. California Fish and Game commented that the process for determining these costs were not detailed in the draft EIS and requested additional information about how the Commission determines project costs.

**Response:** We provided a cost analysis of proposed flow alternatives in appendix B of the draft EIS. In section 4.1.1, *Economic Assumptions*, we state that our economic analysis provides a general estimate of the potential power benefits and costs of a project and reasonable alternatives to project-generated power. We provide the assumptions,

values, and sources in table 4-1 of the draft EIS used to calculate our estimate of the project alternatives, including proposed flow regimes.

**Comment:** The Forest Service and PG&E note that the aquatic resources flow release tables for McCloud and Iron Canyon dams need definitions provided for indicated footnotes a, b, & c.

**Response:** The footnotes for this flow release table were lost during production of the draft EIS have been inserted back into the table in the text of the final EIS.

**Comment:** The Forest Service recommends that the sentence stating that the Lower McCloud River is used for fishing below McCloud reservoir be deleted since it is misleading, because the Lower McCloud River has a much broader use. The Forest Service also suggests that the term project “reservoirs” be used instead of project “waters.”

**Response:** All designated uses are identified in the final EIS. We use project reservoirs to discern the project impoundments from project streams, whereas, project waters refer to all waters within the project boundary.

**Comment:** The Forest Service recommends that Kokanee Salmon (*Oncorhynchus nerka*) in Shasta Lake be added to the historical species list, as it spawned in the Lower McCloud River prior to dam construction, as stated in the 1963 Multiple Use Impact Report.

**Response:** The historic occurrence of Kokanee in Shasta Lake and the McCloud River immediately upstream of Shasta Lake during 1984-1987 studies is identified in section 3.3.2.1.3, *Aquatic Biota, Stream Fish Populations*, in the draft and final EIS.

**Comment:** PG&E comments that the sentence addressing forecast of unimpaired runoff of the Sacramento River near Redding is incorrect; it should instead reference the unimpaired runoff forecast for the *McCloud River above Shasta Lake*.

**Response:** Text and table footnotes in the final EIS have been corrected to reference the unimpaired runoff forecast for the McCloud River above Shasta Lake.

**Comment:** The Forest Service has met with PG&E to discuss flow compliance and the conversation has focused on using compliance measures that are compatible with PG&E’s upstream Pit 3, 4, 5 Project because they are operated together, and the Forest Service has no objection to using weekly means with daily compliance if that provides the best means to assure basin-wide compliance.

The California Water Board states that most of the Commission’s proposed methods of measuring minimum flow compliance are complex and allow for some under release and averaging over time. The California Water Board recommends that Commission staff explain why the current method of compliance is not adequate. The California Water Board states that from an enforcement perspective, it is easier to assure compliance with an instantaneous minimum flow requirement. The California Water Board states that, in this case, PG&E has the ability to accurately release flows at the two flow compliance

locations. The California Water Board recommends that the Commission explain why an averaging period is necessary for flow compliance.

American Whitewater and Friends of the River state that PG&E's proposed flow compliance measure is far too complex and that flows should be a minimum flow based upon a 15-minute instantaneous reading. American Whitewater and Friends of the River state that this would allow PG&E's operators, and the general public, to understand the condition and know if PG&E is in compliance.

**Response:** We have updated the final EIS to recommend, in section 5.2.1, *Discussion of Key Issues, Aquatic Resources, Flow Compliance and Monitoring*, the modified Forest Service condition which requires that individual 15-minute instantaneous flow measurements be within 80 percent of the minimum flow prescription for flows less than 10 cfs or at least 90 percent for flows greater than 10 cfs. If the daily average flow is less than the required minimum flow, PG&E would be required to begin releasing the equivalent under-released volume within 7 days following discovery of the under-release. This method for determining instream flow compliance should be less complex than the method recommended in the draft EIS.

**Comment:** California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers agree with the Commission and the Forest Service that there is a need for two compliance points at both MC-1 (Ah-Di-Na) and MC-7 (McCloud dam) and state that it is essential for the implementation of the proposed flow schedule. McCloud RiverKeepers is in agreement with this too. California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers believe real-time flow data should be made available at MC-7 at McCloud dam and state that MC-1 at Ah-Di-Na is already available real-time on the internet. California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers states that under existing conditions and as proposed for a new license, MC-7 is a compliance point and should be made available real-time on the internet.

**Response:** We recommend two flow compliance points in section 5.2.1, *Discussion of Key Issues*, of the draft EIS and continue to recommend two compliance points in the final EIS. Under the staff's recommendations, real-time flow data will continue to be available for the gage at Ah-Di-Na (MC-1) and flow data at the McCloud dam (MC-7) will also become available to assist anglers in knowing the flow conditions.

**Comment:** The Forest Service notes that the water year type determination is only relevant to the flow regime proposed for Iron Canyon Creek, since the flow in the Lower McCloud River is set by monthly McCloud runoff (Bulletin 120).

McCloud RiverKeepers states that the Forest Service's run-off percentages and the five water-type year categories are inadequate and do not adequately provide for a "normal or average" water-type year. McCloud RiverKeepers states that the flow rule also changes the existing flow regime in that it does not include decreases in minimum required flows during dry years.

American Whitewater and Friends of the River state that the hydrologic record shows that there is a clear snowmelt pulse that occurs in all but the most extreme dry years. They also note that with the potential for the reintroduction of anadromous fish, flows that allow fish to migrate throughout the Lower McCloud River will be required in all water year types. They believe that the flow proposal from the Forest Service/California Fish and Game/PG&E will help meet that requirement.

**Response:** Water year types listed for Iron Canyon dam releases (wet, above normal, below normal, dry, and critically dry) correspond to the five runoff percent ranges (> 120 percent, 100-119 percent, 90-99 percent, 76-89 percent, and 0-75 percent) listed for McCloud River dam releases. We find that these ranges adequately capture the range of flow conditions and provide an appropriate mechanism and protocol to mimic a more natural hydrograph, capturing the late winter/spring snowmelt event(s).

**Comment:** PG&E comments that the water year types contained in the March 3, 2010, alternative condition from the California Trout, Trout Unlimited, and McCloud River Club flow proposal differs from the March 1, 2010, Forest Service revised 4(e) condition 19 that specifies forecasts for the McCloud River above Shasta Lake.

**Response:** The text has been appropriately revised in the final EIS section, 3.3.2.2, *Environmental Effects, Flow Monitoring and Determination of Water Year Type*, to indicate that water year type would be determined based on the forecast of unimpaired runoff for the McCloud River above Shasta Lake.

**Comment:** McCloud RiverKeepers states that the hydrology of the lower-upper McCloud River measured at gauge MC-3 has no intrinsic relevance in the Lower McCloud River's ecosystem and therefore should not be used to determine a change to the existing flow regime measured at either MC-1 or MC-7.

**Response:** Gage MC-3 on the upper McCloud River was used by PG&E as a measure of unregulated flow conditions in order to estimate unimpaired flow in the Lower McCloud River. Flows at MC-3 were augmented by estimates of direct runoff to the McCloud reservoir. We consider this method described in TM-46 to be appropriate and adequate for the analysis.

**Comment:** The Forest Service states that the final 4(e) conditions should reflect the PG&E proposed extension of the valve safety testing window from March 5-15 to March 1-31.

PG&E states that, although the Commission analyzed the valve testing window specified by California Fish and Game and the Forest Service (between March 5 and 15), the draft EIS does not include an analysis of the valve testing window of March 1 through 31 submitted in PG&E's alternative condition (March 3, 2010). PG&E states that its alternative condition allows a slightly wider scheduling window for adjusting flows and testing the Iron Canyon dam valve based on weather conditions because snow, ice, and winter storms can restrict access to the site and create unsafe working conditions from December through March. PG&E states that monthly adjustments to minimum flow

requirements and annual valve testing would be conducted as early in these periods as practical, based on conditions on the ground.

**Response:** We note that in section 3.3.2.2, *Environmental Effects* (page 138 of the draft EIS), we analyzed and recommended implementation of the March 1-31 window for valve testing. We have updated the final EIS, to reflect Forest Service's modified condition 19, which specifies the valve safety testing window from March 1-31.

**Comment:** The Forest Service would support the installation of the turbidity monitor on PG&E lands within the boundary near the minimum instream flow outlet of McCloud dam if needed; the Forest Service would also support the opportunity to combine the turbidity monitor with the flow monitoring gage at MC-7 if this is desirable.

**Response:** Our analysis in the final EIS does not preclude the option of placing turbidity monitoring at either of these locations; the final decision on placement can be determined during preparation of the monitoring plan.

**Comment:** The Forest Service completed an Environmental Assessment in 2005 that evaluated fish passage concerns at road culverts in Shasta-Trinity National Forest. The Environmental Assessment identified three tributaries to Iron Canyon reservoir (Cedar Salt Log, Deadlun and Gap Creeks) above Iron Canyon Loop Road with substantial fish spawning habitat (>1 mile) where improved culvert passage would provide support and reproductive opportunity to fish populations in the reservoir. The Forest Service notes that these culverts were installed by PG&E during project construction and, in addition to blocking fish passage for spawning, have created erosional concerns.

The Forest Service acknowledges that fish stocking may be provided in Pit 7 reservoir in the future, if recreation access increases fishing pressure. In addition, the Forest Service reiterates that fish passage issues associated with the Iron Canyon Loop Road (FR 37N78) are the responsibility of PG&E, not the Forest Service as implied in the draft EIS. Correcting this fish passage would provide access to substantial spawning habitat for fish, and the Forest Service suggests that addressing the fish passage impediments, in lieu of stocking the river reaches, would be an alternate and beneficial means to mitigate for the fish entrainment losses.

**Response:** We determined that only a 0.7-mile portion of the Iron Canyon Loop road needs to be within the project boundary. PG&E would be responsible for maintenance of that road section. Any culverts in those sections of road within the project boundary would be the responsibility of PG&E to improve/repair in order to enhance fish passage at those locations. PG&E is not responsible for providing fish passage and maintenance of culverts on the remaining non-project segments of this road. Plans for culvert improvements would be part of the road maintenance plan.

**Comment:** PG&E notes that, with regard to fish surveys, it conducted fish surveys at nine sites on the mainstem Lower McCloud River in fall 2009, including one additional site added between Hawkins Creek and McCloud dam, and that results were similar to those of 2007 and were presented in Technical Memo 18, updated November 2009.

**Response:** We have modified section 3.3.2.1.3, *Aquatic Biota, Stream Fish Populations*, to recognize the additional year of sampling and similarity of results.

**Comment:** The Forest Service states that a draft Aquatic Biological Monitoring Plan will be submitted in the Forest Service's final 4(e) conditions, allowing PG&E to complete the plan within the first year of its acceptance of the license.

PG&E states the timeframe presented in the draft EIS for the development of the Aquatic Resources Management Plan appears inconsistent. PG&E believes the 18-months timeframe is the most appropriate.

**Response:** We have revised the text in the final EIS to indicate that because the Forest Service has provided a first draft as a working document for further consultation and finalization, we find that 1 year following license issuance would be a reasonable time to complete the final Aquatic Biological Monitoring Plan.

**Comment:** The Forest Service recommends that aquatic monitoring should occur at sites sampled for relicensing studies, and that the benthic macroinvertebrate monitoring should follow the State of California's Surface Water Ambient Monitoring Program protocols.

PG&E comments that the number of sites for monitoring of fish, benthic macroinvertebrates, and special status mollusks may not need to be as large as for relicensing studies, particularly because some resource inventories for relicensing were conducted in areas downstream of the Squaw Valley Creek confluence with the McCloud River, an area FERC's scoping document determined were beyond the limit of project effects.

**Response:** We have updated the analysis of the Aquatic Biological Monitoring Plan requirements in section 3.3.2.2, *Environmental Effects, Fish Population Monitoring*, to reflect Forest Service modified condition 27, which includes the use of Surface Water Ambient Monitoring Program protocols for the benthic macroinvertebrate monitoring component.

In the final EIS, we recommend that the number and location of sites to be surveyed should be consistent, to the extent possible, with the relicensing surveys in order to determine effects, if any, to aquatic resources resulting from O&M of the project under the new license. The specific details of the plan, including the number of survey sites and their location will be determined by PG&E in consultation with conditioning agencies and must be approved by the Commission prior to implementation.

**Comment:** The Center for Water Advocacy states that the draft EIS lacks sufficient water quality monitoring, and this will impact aquatic species and the fishery habitat.

California Fisheries and Water states that the draft EIS does not disclose and evaluate effects to water quality in the Lower McCloud River and Pit River resulting from the 4(e) requirements by the Forest Service.

**Response:** We consider the water quality monitoring data provided by PG&E relicensing studies to be adequate to determine potential impacts on aquatic species and

fishery habitat. In the draft EIS, we recommend PG&E develop and implement a water quality monitoring plan that would assess potential impacts of the project on aquatic species and habitat over the term of the license.

Our analysis of water quality conditions indicates that the recommended alternative and Forest Service 4(e) conditions would not adversely affect existing conditions. The proposed water quality and temperature monitoring plan would document the affects of O&M from the project on water quality and provide a tool for adaptive management to assure maintenance of adequate water quality conditions.

**Comment:** PG&E comments that Iron Canyon reservoir has never spilled and that McCloud reservoir water levels are managed to prevent spill from Iron Canyon Reservoir. PG&E notes that this is not stated correctly in the draft EIS.

**Response:** Final EIS, section 2.1.3, *Existing Project Operation*, has been modified to reflect spill conditions at McCloud and Iron Canyon reservoirs as described by PG&E.

**Comment:** PG&E feels that the draft license article detailing minimum flow releases within 90 days of license issuance below McCloud dam, Iron Canyon dam, and Pit 7 dam needs to be clarified to differentiate between implementation of minimum flow requirements below McCloud dam and those below Iron Canyon and Pit 7 dams. PG&E states that the minimum flow requirements specified below Iron Canyon and Pit 7 dams could be implemented within 90 days of license issuance; however, implementing the springtime minimum flow requirements specified below McCloud dam would require installing a new valve, which could not be accomplished within 90 days of license issuance—the process would likely take 2 to 3 years. PG&E states that until the valve is replaced, the only way to meet the specified flow requirement at McCloud dam would be to operate at full pool and pass water over the spill gates, which would significantly constrain project operations and could increase downstream water temperatures.

**Response:** The text in the license articles is clarified to differentiate the minimum flow requirements below McCloud dam and those below Iron Canyon and Pit 7 dams. Spring minimum flows which require design and installation of a new valve at Iron Canyon dam would be required within 3 years of license issuance.

**Comment:** The Center for Water Advocacy recommends that PG&E gather the following information: (1) hydrograph of mean daily flow for the gauge on the McCloud River above Shasta Lake; and (2) daily maximum mean and minimum water temperature at the McCloud River. The Center for Water Advocacy also recommends that PG&E refer to models produced by The Nature Conservancy for McCloud reservoir in developing the Operations Model (in addition to the USACE-Hydrologic Engineering Center Reservoir Simulation Version 3.0).

**Response:** As part of the relicensing studies, PG&E conducted water quality temperature modeling and flow modeling, using flow data from gages in the project-affected stream reaches. The models and field sampling methodologies were developed and implemented in coordination with resource agencies and other interested parties. We

continue to consider these models appropriate to assess flows necessary to protect and enhance the aquatic community and recreation in the Lower McCloud River.

**Comment:** The California Water Board believes that the three models developed by PG&E to evaluate flow habitat relationships for the Lower McCloud River (e.g., Individual Base Modeling [IBM], Habitat Criteria Mapping [HCM], and PHABSIM) all have limitations and will not yield accurate results, and thus cannot be used in the final EIS. The California Water Board believes that the IBM is particularly flawed and its conclusions are unreliable. In addition, the California Water Board states there are problems with the use of depth and velocity data collected by the Acoustic Doppler Current Profiler and its unreliable results should not be used in the final EIS. The California Water Board states that, because the Acoustic Doppler Current Profiler data were used for both the HCM and PHABSIM models, it likely generated errors in data collection and processing that provided velocity data that over-estimates the actual velocities of the river. The California Water Board advises that another study be required to determine the amount of error; additional data should be collected in the field; new transects should be selected in consultation with agencies; and depth and velocity data should be collected using a flow meter. The California Water Board states that additional studies are needed to determine if the flows in the 175-200 cfs range, as recommended in the draft EIS, are supported by the correction flow models. Based on information from Technical Memorandum 58, the California Water Board states that establishing flows to meet the needs of less capable waders may not provide the correct balance.

**Response:** We acknowledge that all models have limitations in their ability to predict possible scenarios or conditions. We also agree that the IBM in particular had problems in accurately predicting flow relationships, as was pointed out by PG&E in Technical Memorandum 58 (TM-58); however, the IBM was requested by the resource agencies and aided in confirming the precision of all three models in evaluating the optimum flow-habitat relationships. In our analysis of minimum flows in section 3.3.2.2, *Environmental Effects*, we indicate that the results of the IBM and HCM were generally similar and indicated flows at the lower end of the range studied (175-200 cfs) provide greatest abundance or highest habitat values. Similarly, the PHABSIM modeling runs provided nearly identical estimates of flows for peak habitat for each life stage evaluated, which demonstrates the robustness of the model.

**Comment:** The California Water Board also states that the Commission staff does not consider the benefits of high spring flows, since construction of the project has resulted in riparian encroachment. The California Water Board notes that alder and dogwood can now become established in the flatter areas next to the channel, but under pre-project flow conditions, these species were forced out of the relatively broad channel and onto the steeper slope. The California Water Board states that this information was not considered in Commission staff's flow recommendations.

American Whitewater and Friends of the River state that higher flows are required in the spring to keep the river channel clear of vegetation. American Whitewater and Friends of

the River believe that the proposed Forest Service/California Fish and Game spring flow schedule will help to meet this objective.

**Response:** In section 3.3.3.2, *Environmental Effects, Riparian and Wetland Vegetation*, we peak flows and a decrease in duration of inundation from flooding, leading to increased riparian vegetation along the lower reaches of the river. In our analysis, we indicate that PG&E proposed a minimum instream flow that would provide additional flow volumes over an annual and seasonally distributed schedule and that the upward ramping of flows prior to uncontrolled spill events would return scouring flows to the stream channel, which would reduce the ability of riparian vegetation to become established along the channel.

**Comment:** The Center for Water Advocacy feels that the relicensing of the project will interfere with other existing and future uses of water since the project is currently the only regulation of the McCloud River and Iron Canyon Creek and the only hydroelectric project on the McCloud River. The Center for Water Advocacy notes that existing and future uses of water in the project-affected area include recreation use (boating, fishing, camping) and instream flow use to protect aquatic resources.

EPA is concerned that the draft EIS does not give full consideration to meeting all beneficial uses of the McCloud River in the context of the minimum flow determination. EPA recommends seasonal variation of water release from McCloud dam to create a more natural flow regime that better supports beneficial downstream uses of the river. EPA states that beneficial uses include municipal and domestic supply, hydropower generation, water contact recreation, non-contact water recreation, canoeing and rafting, cold freshwater habitat, coldwater spawning, and wildlife habitat.

**Response:** In section 3.3.2.2, *Environmental Effects*, we analyzed the recommended alternatives to PG&E's minimum flow regime proposals for the project's reaches. Most of these participants, including PG&E, recommended minimum flows that vary by month and water year type in order to more closely reflect a natural hydrograph for the system and support aquatic resources and other users. In section 4.1, *Power and Economic Benefits of the Projects*, we analyzed how the proposed and recommended minimum flows decrease the project's power generation. In section 5.2.1, *Discussion of Key Issues*, we considered both the cost of raising instream flows and how the recommended minimum flows affect other competing flow uses, including aquatic habitat and recreational resources, such as angling and boating. Based upon these analyses, we made a minimum flow recommendation that provides the best balance of developmental and non-developmental resources.

**Comment:** The California Water Board notes that the draft EIS states that the primary consumptive uses of water in the Lower McCloud and Pit Rivers within the project area are recreation and wildlife/aquatic habitat. The California Water Board states that recreation and wildlife/aquatic habitat are not usually considered consumptive uses but are beneficial uses identified in the basin plan. The California Water Board states that the

list of beneficial uses for the McCloud River is incomplete and should include canoeing and rafting.

**Response:** We removed wildlife and aquatic habitat from the discussion of consumptive uses in section 3.2.2.1, *Affected Environment, Water Quantity*, of the final EIS and we modified the description of beneficial uses in the final EIS to include non-contact recreation uses such as fishing, canoeing, and kayaking.

**Comment:** The Center for Water Advocacy feels that the current draft EIS lacks measures to address potential channel maintenance problems typically associated with hydro-power operations. The Center for Water Advocacy feels that it is likely, therefore, that PG&E would be unprepared for a major event that would devastate the cultural and fishery resources in the McCloud River.

**Response:** Section 3.3.1.2, *Environmental Effects*, of both the draft and final EIS notes that continued operation of the project could affect geomorphic characteristics of the stream channel. In the *Sediment and Erosion Control* section, our analysis indicates that PG&E's proposal for management and control of erosion and sedimentation would provide development of emergency response protocols to manage erosion and sedimentation. The measures in this proposal would also provide mitigation for existing erosion sites and prevention of erosion and sedimentation associated with project infrastructure and future project actions. In the *Large Woody Debris* section, we note that the addition of LWD is an important component of channel maintenance, and we recommend the incorporation of an LWD Plan in the license.

## **ANADROMOUS FISH**

**Comment:** The California Water Board states that changes in project operations to support the reintroduction of anadromous fish to the McCloud River must be included as an alternative in the final EIS. This is because a required plan to re-introduce winter-run and spring-run Chinook salmon to habitats upstream of Shasta dam will be in place by January 2011, with reintroductions beginning January 2012. The California Water Board notes that winter-run and spring-run Chinook salmon will thus be present in watersheds upstream of Shasta dam by January 2012.

The Winnemem Wintu Tribe states that Chinook salmon require different flow regimes than those considered in the preliminary 4(e) proposals submitted, and that none of the proposed 4(e) flow conditions submitted maintain sufficient summer flows to preserve the cooler temperatures required by the winter-run Chinook. The Winnemem Wintu Tribe proposes that flows below McCloud reservoir be increased to 600 cfs in July, 400 cfs in August, and 400 cfs in dry and critically dry Septembers to support the reintroduction of anadromous fish populations.

**Response:** After reviewing the NMFS Operations Criteria and Plan Biological Opinion (OCAP BiOp) and other documents associated with NMFS Reasonable and Prudent Alternative (RPA), we continue to find a lack of specific detail regarding the reintroduction of Endangered Species Act (ESA) listed salmonids into project-affected

stream reaches. As this reintroduction program continues to be in flux, with research, budget, and feasibility still undetermined, and no solid timeline for the salmonids to be fully present in project waters, we continue to find that this is not the appropriate time to consider project operational conditions for the benefit these listed species. At such a time that the species are present in the watershed, then measures for their protection can and should be considered. As such, in final EIS section 5.2.1, *Discussion of Key Issues, Listed Salmonid Technical Integration Committee*, we have revised the text to recommend that PG&E keep abreast of the findings and actions of the Interagency Fish Passage Steering Committee and file an annual report with the Commission detailing the steps that have been taken in the reintroduction and the status of the reintroduction. The filing of this report will ensure that PG&E and the Commission are kept informed of the progress of the potential reintroduction and this information would then be used to determine when it is appropriate to consider any needed changes to project structures and or operations in light of the presence of ESA-listed salmonids in project waters.

The RPA determined by NMFS in the OCAP BiOp for reintroduction of listed salmonids in the Lower McCloud River proposes only a pilot study to determine the suitability for potential introductions in the future. If, and, when NMFS decides that such reintroductions are necessary, they may decide to conduct a NEPA analysis.

We also note that we have not been provided a basis or supporting evidence that flows proposed by NMFS would support reintroduced listed salmonids; the flows we recommend in the final EIS have been supported by modeling studies and input from license participants and are aimed at providing habitat conditions suitable for the existing fish community.

**Comment:** California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers state they are willing to participate in a process to attempt to develop commonly agreed upon measures for streamflow requirements that will take effect upon reintroduction of salmon and steelhead.

**Response:** We appreciate the interest in participating in a process to develop streamflow requirements for the proposed salmon and steelhead reintroductions; however, we cannot specify which interested parties or agencies are required to attend such proceedings because the Commission only has jurisdiction over its licensees.

**Comment:** The Center for Water Advocacy believes this project blocks all upstream movement of anadromous fishes from the Pacific Ocean at McCloud reservoir and interferes with anadromous fish passage at each facility within the project. In the Center for Water Advocacy's opinion, PG&E's facilities impair or preclude upstream fish movements for spawning fishes such as Chinook salmon, redband trout, lamprey, and various sucker species.

NMFS states that a RPA to proposed operations at the Bureau of Reclamations Central Valley Project includes a program to reintroduce salmonid species in the McCloud and/or

upper Sacramento Rivers by providing fish passage upstream and downstream of the Shasta dam.

**Response:** We note that the Shasta and Keswick projects downstream on the Sacramento River prevent access for anadromous species to even access the upper Sacramento River and its tributaries, including the McCloud and Pit Rivers and their tributaries.

As part of NMFS's restoration plan (RPA for the OCAP Bi-Op) for listed salmonid species, we understand that studies are ongoing to assess the feasibility of alternatives to facilitate fish passage at Keswick and Shasta dams and the quality and availability of appropriate habitat in tributaries to Shasta Lake including the Lower McCloud River. None of the listed anadromous salmonids would be expected to have access to habitat in the Lower McCloud River until reintroduction of listed species is implemented through Shasta Lake.

With regard to anadromous fish, if these fish are successfully reintroduced into project waters, the license could be reopened to address the potential effects of project operations and the need for fish passage. NMFS has reserved the authority to prescribe fish passage at such time as it becomes necessary. In the final EIS, we recommend that PG&E file annual reports listing the progress and status of the reintroduction program. The information contained in these reports can then be used to determine when it is appropriate to revisit the license conditions and consult on project-related effects as they relate to the ESA-listed species now present in project waters.

**Comment:** The Winnemem Wintu Tribe feels that FERC should address potential fishway modifications to the McCloud dam in conjunction with PG&E's proposed McCloud powerhouse. The Winnemem Wintu Tribe states PG&E must install a new release valve and make other modifications to the McCloud dam in order to install its new powerhouse. The Tribe states that if the McCloud powerhouse is approved/constructed without any consideration of potential fishway needs, its operation may further impede NMFS's planned restoration of the listed species and PG&E may have to make expensive modifications later.

**Response:** Due to a lack of more specific information, we do not make any recommendations with regard to PG&E's proposed new powerhouse. Regardless, we fail to see the link between construction of that powerhouse and fish passage.

**Comment:** NMFS states that its June 2009 Biological Opinion mandates reintroduction of anadromous fish species, protected under the ESA, into the project watershed in the foreseeable future. The species at issue are Sacramento winter-run Chinook salmon (*Oncorhynchus tshawytscha*), Central Valley spring-run Chinook salmon (*O. tshawytscha*), and Central Valley Steelhead (*O. mykiss*). NMFS notes that its October 2009 Public Draft Recovery Plan for Central Valley ESA-listed salmonids describes strategies/actions required to recover these species and includes recovery scenarios that involve the reintroduction into the upper Sacramento-McCloud River

watersheds upstream of Shasta dam. As stipulated by the RPA of the OCAP BiOp, a plan for the reintroduction of these salmonid species is scheduled to be in place by January 2011. NMFS states that this pilot reintroduction program for the three ESA-protected anadromous fish species is a mandatory condition on Bureau of Reclamation's Central Valley Project and State Water Project operations and is not optional.

NMFS notes that the purpose of NMFS's recommended 10(j) conditions is to have conditions in the license in advance so that such terms would benefit listed salmonids as soon as they arrive within the McCloud-Pit Project watershed. NMFS states that by ignoring the imminent nature of anadromous fish reintroduction into the project area, the Commission fails in its responsibility to balance resource values under the FPA, as well as in responsibilities under ESA section 7(a)(1) and (2).

NMFS disagrees with the Commission's preliminary determination of inconsistency with six of NMFS's wildlife protection, mitigation, and enhancement recommendations under FPA 10(j), and seeks to correct the misperception that the remaining two recommendations are not within the scope of 10(j). The Commission's alternative recommendations in the draft EIS are unacceptable to NMFS, and NMFS requests the Commission revise its preliminary determination of inconsistency under the FPA proceedings and commence preliminary consultation with NMFS under provisions of the ESA.

California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers do not agree with the Commission's rejection of NMFS 10(j) recommendations to conduct an environmental analysis for the purpose of evaluating and developing PM&E measures related to the reintroduction of anadromous fish into the Lower McCloud River. California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers feel this is in violation of NEPA and is contrary to the FPA's comprehensive planning mandate, and that it is legally required because NMFS mandates the reintroduction of salmon and steelhead upstream of Shasta Reservoir.

California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers feel that it is critical that the Commission recognizes that its draft NEPA document is not sufficient and takes action to address that shortcoming. Mr. Curtis Knight, representing California Trout and Trout Unlimited, made a public comment at the morning draft EIS meeting on September 9, 2010, that addressed many of the aforementioned comments made by California Trout and Trout Unlimited concerning bull trout and reintroductions of steelhead and salmon into the McCloud River.

The California Sportfishing Protection Alliance states that the final EIS should evaluate under NEPA the reasonably foreseeable actions and effects that may come to pass through the future reintroduction of salmon and steelhead to the McCloud River.

The Winnemem Wintu Tribe states that the Commission's failure to use the integrated relicensing procedure as designed to efficiently incorporate the restoration of anadromous species is a violation of its duties under NEPA and the ESA.

**Response:** We acknowledge the stated goals of the OCAP BiOp and the Public Draft Recovery Plan and progress of the programs to-date; however, based upon documented scientific, legal, regulatory, and economic uncertainties, the reestablishment of listed salmonids both above Shasta dam and in the project area is not assured. We note that in October, 2010, the Interagency Fish Passage Steering Committee’s Annual Report of Activities indicated that the Bureau of Reclamation requested, but has not received funding for fiscal year 2012 and does not have dedicated fiscal year 2011 funding for the Fish Passage Program. The program is currently subsisting by requesting that partner agencies “...provide what support they are able to provide within existing budgets and staffing.” Therefore, we continue to conclude that eight of NMFS’s recommendations are inconsistent with the comprehensive planning standard of section 10(a) of the FPA, as well as the equal consideration provision of section 4(e) of the FPA. However, despite the uncertainty regarding the reestablishment of listed anadromous salmonids in the project area, we continue to recognize the potential for the future presence of listed anadromous species in the project area.

Final EIS section 3.3.2.2, *Environmental Effects*, incorporates discussion of the RPA of the OCAP BiOp. As a result of additional analysis, we recommend that PG&E file annual reports listing the progress and status of the reintroduction program. The information contained in these reports can then be used to determine when it is appropriate to revisit the license conditions and consult on project-related effects as they relate to the ESA-listed species now present in project waters. We understand that an assessment of the Lower McCloud River for habitat suitable for the listed salmonids is being undertaken by Bureau of Reclamation and that a pilot reintroduction study is scheduled to occur sometime during 2012-2015. The annual reports filed by PG&E will provide for ongoing information regarding the restoration process and facilitate evaluation of appropriate flow conditions to assure adequate flows and temperatures to support the listed salmonids, when the time is appropriate. As the appropriate conditions for these species are more clearly identified through ongoing studies and stakeholder consultations, changes to the license can be implemented through the standard license reopener.

**Comment:** PG&E concurs with the Commission’s analysis indicating that recommendations by NMFS would provide no benefit for listed species at this time because listed anadromous salmonids would not have access to habitat in the Lower McCloud River until upstream migration of listed species is implemented through Shasta Lake.

NMFS suggests that the Commission adopt their 10(j) conditions during this relicensing action, with an active “trigger mechanism” that will put the conditions into effect as soon as listed species are present and impacted by project operations, rather than suddenly having to deal with the presence of listed species.

California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers state that the comprehensive planning mandate of the FPA argues strongly for

consideration of project effects on these fish, not against it (as was suggested in the draft EIS). Mr. Curtis Knight, representing California Trout and Trout Unlimited, made a public comment at the morning draft EIS meeting on September 9, 2010, that addressed many of the aforementioned comments made by California Trout and Trout Unlimited concerning bull trout and reintroductions of steelhead and salmon into the McCloud River.

The California Water Board, EPA, California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers, Center for Water Advocacy, and California Sportfishing Protection Alliance indicate that the draft EIS fails to sufficiently address the plan for salmon reintroduction in Shasta Lake and the McCloud River.

EPA is concerned that the draft EIS does not adequately evaluate the reasonably foreseeable introduction of ESA-listed species, anadromous salmonids, into the McCloud River over the term of the license. EPA recommends this scenario be fully evaluated in the cumulative impact assessment for this project and that, furthermore, the final EIS and FERC license should include mitigation and license conditions that require PG&E to evaluate, and, if appropriate, implement restoration activities for anadromous salmonids.

**Response:** In the final EIS, we have updated the text in section 3.3.2, *Aquatic Resources*, to acknowledge the potential for the reintroduction of listed salmonids into Shasta Lake and the McCloud and Pit Rivers that coincides with the RPA of the OCAP BiOp; however, as discussed in section 3.3.2.3, *Cumulative Effects*, we continue to maintain that there are uncertainties regarding the viability and implementation of the reintroduction program set forth by the OCAP BiOp. We also maintain that recommendations provided by NMFS present no benefit to listed salmonids until they are present within project waters and that the requested flows have not been based on results of the minimum flow studies conducted by PG&E, nor have they been consulted on among the McCloud-Pit Project stakeholders. We note that PG&E will be required to implement a Coarse Sediment Management Plan under the Forest Service modified 4(e) conditions, which may provide adequate spawning habitat the listed salmonids. Furthermore, the proposed aquatic resources monitoring plan should provide information to assess the quality of substrate and water temperatures under the new minimum flow regime to support listed salmonids. In addition, we recommend in the final EIS that PG&E file annual reports detailing the progress and status of the potential reintroduction efforts and these reports would provide a mechanism for evaluating the need for altering project operations based upon the presence or imminent presence of listed salmonids.

**Comment:** The Center for Water Advocacy, California Sportfishing Protection Alliance, Winnemem Wintu Tribe and EPA comment that the EIS and project license should include mitigation and license conditions that require PG&E to evaluate and, if appropriate, implement restoration activities for anadromous salmonids in the McCloud River as recommended in the OCAP BiOp.

**Response:** We have revised the text in the final EIS, section 3.3.2, *Aquatic Resources*, to acknowledge the OCAP BiOp, and the plans by NMFS to conduct a listed salmonid

reintroduction pilot study in the project area during 2012-2015. We have also recommended that PG&E file annual reports detailing the progress and status of the potential reintroduction efforts and these reports would provide a mechanism for evaluating the need for altering project operations based upon the presence or imminent presence of listed salmonids.

**Comment:** The Center for Water Advocacy believes that the project produces serious impacts to fish because it has permanently blocked access to historical salmon habitat in the Upper McCloud-Pit Basin since 1968, and the draft EIS mostly fails to address this impact; the Center for Water Advocacy states that the draft EIS does not address changes to mitigate the project impacts.

**Response:** It is not within the temporal scope of the EIS to evaluate the pre-project conditions. The baseline for the draft EIS includes the existing conditions under the current license which is the no-action alternative.

**Comment:** The Center for Water Advocacy believes that allowing access above McCloud reservoir to salmonid populations would provide an impetus for applying ecosystem restoration measures over the course of a new PG&E license and that salmonids would be able to migrate from the upper McCloud and Pit River basins to the ocean if modifications were made, such as the building of a screen structure and yearly opening of the gates for the winter-run of the species. The Center for Water Advocacy states that freeing of the Red Band and other trout species so they can migrate to the Pacific Ocean—through modifications of the Red Bluff diversion dam and the project—would mean the return of the anadromous Steelhead. They note that modeling results indicate that the volitional fish passage options rank higher than trap-and-haul options and that under restored conditions, tributaries above Upper McCloud-Pit Lake provide significant spawning and rearing capacity in the model.

NMFS states that the McCloud River in particular is a primary Candidate Area for reintroductions of the listed species and that during the pilot program from January 2012 through 2015, the winter-run, spring-run, and steelhead will be reintroduced into suitable habitats upstream of Shasta dam in the Sacramento River Watershed. The specific places and methods of reintroductions will be determined by the Interagency Fish Passage Steering Committee.

**Response:** We have recommended in EIS section 5.2.1, *Discussion of Key Issues, Aquatic Resources, Listed Salmonid Technical Integration Committee*, that PG&E file annual reports detailing the progress and status of the potential reintroduction efforts and these reports would provide a mechanism for evaluating the need for altering project operations based upon the presence or imminent presence of listed salmonids. NMFS has reserved its authority to prescribe fish passage at such time as it is appropriate in the restoration process; at that time NMFS will be able to prescribe the most appropriate method to provide fish passage up and downstream at the McCloud dam.

**Comment:** The Center for Water Advocacy states that modeling shows that the project increases in water temperatures in late summer and fall will reduce the survival of adult Chinook salmon (because they return to spawn during this period) and cause poor egg quality, ultimately leading to decreased production. Furthermore, the Center for Water Advocacy states that the project causes lower water temperatures during winter, spring, and early summer, which will reduce the growth and maturation rates of salmon and steelhead during incubation, emergence, and juvenile stages. The Center for Water Advocacy states that this will impact the ability of fish to survive their migrations through the McCloud River.

**Response:** In the final EIS, our analysis of the proposed minimum flows in section 3.3.2, *Aquatic Resources, Water Quality Monitoring*, indicates some uncertainty of the effects that the new flow regime will have on water temperatures in the project reaches or on the cold water pool available below the thermocline in McCloud reservoir; however, in order to minimize effects, we recommend implementation of water quality and temperature monitoring program capable of providing data to evaluate water temperatures under the new flow regime and assess the compatibility with requirements of anadromous salmonid life stages.

**Comment:** The Center for Water Advocacy states that because PG&E relies heavily on monthly mean, minimum and maximum inflow into the project reservoirs from the McCloud, Iron Creek and Pit Rivers for its hydrological record data base as reported by water gages and that the draft EIS ignores data that could be collected from potential stream reaches in which salmonid species could be re-established and the impacts of flows on other significant existing and future water uses.

The Center for Water Advocacy states that the approach to analyzing affected river flows and water uses other than the project ignores the fact that watersheds, and aquatic ecological systems in particular, do not recognize subbasin divisions, which makes it impossible to analyze the role of unimpaired hydrological development in the potential return of salmonid species to the upper basin of the project-affected area.

American Whitewater and Friends of the River believe that the proposed flows should be reviewed and revised to allow for the reintroduction of anadromous fish into the Lower McCloud before that reintroduction occurs.

The Winnemem Wintu Tribe states that Chinook salmon require different flow regimes than those considered in the preliminary 4(e) proposals submitted. The Tribe feels that none of the proposed 4(e) flow conditions submitted maintain sufficient summer flows to preserve the cooler temperatures required by the winter-run Chinook. The Tribe feels that necessary instream flows, gravel augmentation, and LWD placement should all be implemented so that these restored fish have a chance for survival. The Winnemem Wintu Tribe proposes a flow regime for the Lower McCloud River to support salmonids, including the endangered Sacramento River winter-run Chinook salmon and the threatened Central Valley spring-run Chinook salmon. The Tribe also supports gradual

down-ramping after McCloud dam spill events in order to decrease risks to aquatic resources.

**Response:** It is our understanding that NMFS is planning habitat evaluation and pilot reintroduction studies for listed salmonids in the upper Sacramento River watershed above Shasta dam during the next 5 years. In final EIS section 5.2.1, *Discussion of Key Issues, Aquatic Resources, Listed Salmonid Technical Integration Committee*, we recommend that PG&E file annual reports detailing the progress and status of the potential reintroduction efforts and these reports would provide a mechanism for evaluating the need for altering project operations based upon the presence or imminent presence of listed salmonids.

In the final EIS, our analysis of the proposed minimum flows in section 3.3.2, *Aquatic Resources, Water Quality Monitoring*, indicates some uncertainty of the effects that the new flow regime will have on water temperatures in the project reaches or on the cold water pool available below the thermocline in McCloud reservoir; however, in order to minimize effects, we recommend implementation of water quality and temperature monitoring program capable of providing data to evaluate water temperatures under the new flow regime and assess the compatibility with requirements of anadromous salmonid life stages. Water temperature recorded as part of the water quality monitoring plan and at other gages in the McCloud River basin can be used in this evaluation.

**Comment:** The Center for Water Advocacy does not agree with conclusions in the supplemental plan that discount the potential salmon and other fishery habitat in the Upper McCloud River and tributaries. The Center for Water Advocacy is also concerned that the list of agencies provided for the supplemental plan do not include tribal consultations or tribal studies regarding fishery resources and feels that further, PG&E should commit to continue to consult with the Winnemem Wintu and other federally recognized Indian Tribes in relation to fishery resources portion of the draft EIS.

The Winnemem Wintu Tribe disagrees with the Commission's preliminary determination of inconsistency as to the restoration of anadromous fish to the McCloud River under 18 Code of Federal Regulations (CFR) section 5.27.

**Response:** Please see our previous comments regarding NMFS restoration plans and the potential for reintroduction of anadromous salmonids in project waters.

**Comment:** NMFS notes that no costs would be incurred under the recommended 10(j) conditions until fish are present. NMFS states that inadequate information exists in the preliminary determination of inconsistency to support any analysis of costs the Commission used in any balancing exercise it conducted in reaching its preliminary finding.

**Response:** We concur that no costs would be incurred associated with the 10(j) recommendations until fish are present; however, we also find that habitat conditions including flows, water temperature and substrate have not been adequately defined for

the listed salmonids at this time. Therefore, given the absence of listed salmonids at this time, no costs would be justified.

**Comment:** California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers ask that the Commission investigate the issue of bull trout reintroductions more thoroughly and require PG&E to fund a bull trout reintroduction effort. California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers recommend this be done in close cooperation with California Fish and Game and other stakeholders. California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers believe it is necessary to review the reasons for decline of the bull trout, current and potential future habitat conditions, and life history requirements to determine feasibility of a reintroduction plan or if alternative mitigation measures should be pursued. This proposed assessment would form the basis for making informed management decisions for bull trout in the McCloud River. California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers state that there is evidence to indicate a clear project nexus and requirement to more thoroughly address the extirpation of bull trout in the McCloud River final EIS. Mr. Curtis Knight, representing California Trout and Trout Unlimited, made a public comment at the morning draft EIS meeting on September 9, 2010, that addressed many of the aforementioned comments made by California Trout and Trout Unlimited concerning bull trout and reintroductions of steelhead and salmon into the McCloud River.

The Winnemem Wintu Tribe is also concerned that the current configuration of the dam at the McCloud River prevents any fish passage, making successful restoration of the bull trout population unlikely.

**Response:** In sections 3.3.2.1.3, *Aquatic Resources, Aquatic Biota* and 3.3.2.3, *Cumulative Effects*, of the draft EIS, we discuss that the extirpation of bull trout from the watershed is thought to be the results of a number of factors including, but not limited to, loss of the forage base, excessive fishing pressure, competition from other managed game species, and reduction of habitat associated with construction of McCloud dam. We also indicate that past efforts by California Fish and Game to restore the species through stocking were unsuccessful and the restoration is not currently a primary management goal of the agency. In addition, no recommendations by other agencies have been proposed specifically to support restoration of this species at this time.

**Comment:** The Winnemem Wintu Tribe believes the Commission has failed to examine the impacts of the McCloud powerhouse on the McCloud River's native fish species, such as riffle sculpin, McCloud redband trout, and Sacramento suckers. The Tribe states that the addition of a powerhouse at the base of the McCloud Reservoir has the potential to alter the temperature, turbidity, and dissolved oxygen (DO) levels of the McCloud River, and could increase fish entrainment. The Tribe feels that, in order for the McCloud River to present a hospitable environment for these salmonids, upon reintroduction the McCloud River flows must provide adequate temperatures, depths, and

velocities to support these fish, which will require different flow regimes than those contained in the various proposed 4(e) flow conditions in the draft EIS. The Winnemem Wintu Tribe proposes that flows below the McCloud Reservoir be increased to 600 cubic feet per second (cfs) in July, 400 cfs in August, and 400 cfs in dry and critically dry Septembers to assure the survival of these restored salmonids.

**Response:** The draft EIS evaluates the anticipated impacts of the additional generation unit at the base of McCloud dam, as currently proposed, including considerations of various mitigation options proposed by the applicant, state and federal agencies, etc. The management plans to be finalized post-licensing will provide specific details of how PG&E would implement the final mitigation options. The recommended monitoring plans will determine if the mitigation required in the license is achieving its purpose of avoiding or minimizing impacts. FERC and appropriate agencies will have an opportunity to review and comment on whether draft management and monitoring plans achieve the purposes of the mitigation described in the EIS. We also note that PG&E has only studied the feasibility of installing the generation unit at the base of McCloud dam, but has not yet determined the hydraulic capacity of the unit. We currently find that the cost of the unit would outweigh any potential power benefits; however, we state in the final EIS that we cannot make any recommendation until PG&E determines the final size of the unit. If PG&E decides to move forward with the proposal, further analysis would be required at that time.

**Comment:** NMFS states that the OCAP BiOp, which it considers a regulatory certainty, contains a RPA for the Bureau of Reclamation to develop a fish passage program. NMFS is concerned that the draft EIS does not consider the impending implementation of the RPA.

NMFS noted that the current legal challenge to the BiOp would likely not affect the schedule for implementation of the pilot program and the longer term reintroduction program, and that the BiOp is current and valid at this point. NMFS noted that court's ruling resulting from the legal challenge indicated that the implementation of the BiOp and its RPA on the project operations, without any NEPA documentation, violated NEPA; NMFS further noted that the legal challenge was to portions of the RPA, which are unrelated to the fish restoration measures that were part of NMFS's 10(j) recommendations.

**Response:** We acknowledge the future implementation of the RPA of the OCAP BiOp in the final EIS and appreciate NMFS clarification on the legal proceedings concerning the OCAP BiOp. This, together with the OCAP BiOp that was filed on the record have allowed Commission staff to further review and analyze the potential reintroduction activities and the final EIS text has been updated to include greater discussion and analysis of the reintroduction.

## WATER RESOURCES

**Comment:** PG&E states that because only bacterial contamination was identified as a specific issue during relicensing and no other contaminants of concern were identified in pre-licensing surveys, the license provision identifying “specific contaminant monitoring locations” should be changed to “bacterial monitoring locations.” PG&E notes that this is consistent with both PG&E’s draft water quality monitoring plan and Forest Service condition 20, which discuss the potential for bacterial contamination within McCloud and Iron Canyon reservoirs near recreation sites.

**Response:** Although only bacterial contamination has been identified as a specific issue, we consider that monitoring project reservoirs once every 5 years for other contaminants would be useful for ensuring public health and determining the potential impacts of project operations. We recognize that the term “contaminants” has not been defined, but specific monitoring parameters would be identified in the water quality and temperature monitoring plan that would require Commission approval, and therefore, would not contain unreasonable monitoring requirements. In the final EIS, we recommend Forest Service modified condition 20, which specifies that the plan include monitoring for contaminants, including *E. coli*, in project reservoirs every 5 years.

**Comment:** The Center for Water Advocacy suggests that PG&E conduct temperature modeling for the following: (1) the annual pattern of daily mean water temperature, seasonal means, maximum temperatures; (2) daily water and air temperature during the summer and fall at the McCloud River Preserve; (3) specific conductance (the Center for Water Advocacy feels that other models in the McCloud river indicate “very noisy” specific conductance data); (4) daily maximum, mean and minimum specific conductance; (5) DO; (6) daily maximum, mean, and minimum DO; (7) correlation between daily mean DO and mean water temperature; and (8) daily mean turbidity.

**Response:** In 2007, PG&E conducted temperature monitoring (*Technical Memorandum 28: 2007 Water Temperature Monitoring*) to evaluate the influence of the various tributary inflows on water temperatures in the main stem of the McCloud River. In addition, PG&E used the StreamTemp Version 1.0.4 (*Technical Memorandum 38: Lower McCloud Water Temperature Modeling*) to model temperatures in the Lower McCloud River from McCloud dam to Gage MC-5 upstream of Shasta Lake from June to October. This model was used to predict mean and maximum daily water temperatures and aid in analyzing the thermal consequences of releasing alternative flows below McCloud dam. In 2007 and 2008, PG&E conducted monthly and seasonal water quality sampling (*Technical Memorandum 26: Water Quality Data Summary*) to determine baseline water quality conditions in the project area; sampling components included DO, specific conductance, and turbidity. In 2007 and 2008, PG&E also conducted turbidity monitoring (*Technical Memorandum 30: Results of Suspended Sediment Monitoring*) to determine the potential effects of project operations on turbidity in McCloud reservoir and the Lower McCloud River. We continue to consider the data provided by PG&E to be sufficient to address the environmental effects upon water quality associated with the

continued operation of the project, including the alternatives recommended by the license participants.

**Comment:** Center for Water Advocacy states that the recommendations in the final EIS should minimize thermal impacts to listed salmonids by passing water through the reservoir bypass; require installation of adequate temperature monitoring devices and develop a monitoring plan to track compliance; and require PG&E to develop a water quality management plan to insure water quality standards are met and to safeguard ecological resources in the McCloud River.

**Response:** Because habitat feasibility studies are ongoing and the reintroduction of listed salmonids above Shasta Lake are not imminent, we do not recommend a continuous flow bypass to maintain flow releases beneficial to listed salmonids at this time. In the EIS, we recommend the development and implementation of a water quality and temperature monitoring plan, which would provide guidance for monitoring potential effects of project operations on water quality and temperature for the term of the license and ensure proper conditions for aquatic biota. We find these monitoring activities adequate to detect and minimize any adverse impacts to the aquatic community resulting from O&M of the project.

**Comment:** The Center for Water Advocacy states that the draft EIS fails to provide any information about what chemical water purification agents will be used, and if they are part of an EPA-approved system. In addition, the Center for Water Advocacy states that the draft EIS lacks any analysis of the pH, DO, and turbidity in the system.

**Response:** PG&E has not identified any chemical water purification agents that it is planning to use at the project. If operation and/or maintenance of the project require use of chemical agents, PG&E would be required to report these chemicals in its application for 401 water quality certification.

**Comment:** The Center for Water Advocacy states that a National Pollutant Discharge Elimination System (NPDES) permit may be needed if an entity who owns/operates facilities discharge pollutants into surface waters.

**Response:** In lieu of an NPDES permit, under the Clean Water Act the license applicant is required to obtain 401 water quality certification from the appropriate state pollution control agency, in this case the California Water Board. The Water Board will specify any measures necessary to comply with the Clean Water Act and protect beneficial uses in its water quality certification. By letter dated January 5, 2011, PG&E resubmitted its application for water quality certification to the California Water Board.

**Comment:** The Center for Water Advocacy advises the Commission to provide a list of tribal agencies and studies/data that PG&E consulted with regarding fishery resources. The Center for Water Advocacy states that the current lack of deferring to tribal data and information regarding fishery resources eliminates important information related to the impacts of the development on water resources and fish and wildlife habitat and is in violation of other legal requirements. The Center for Water Advocacy states that Indian

Tribes should be consulted with regarding the impacts of any hydropower re-licensing on tribal land, water, and fish and wildlife resources. The Center for Water Advocacy states that PG&E has not committed to continuing to consult with the Winnemem Wintu and other federally recognized Indian Tribes in relation to the fishery resources portion of the draft EIS.

**Response:** In section 1.4, *Public Review and Comment*, we provide a list of comments or additional information received by the tribal agencies in response to the scoping document and the final license application (FLA). We describe and evaluate recommendations of tribal agencies in the EIS.

**Comment:** The Center for Water Advocacy is concerned that the draft EIS fails to incorporate the results of the California Stream Bioassessment Protocol, which is designed to assess the biological integrity of wadeable streams in California. The Center for Water Advocacy states that if the California Stream Bioassessment Protocol cannot be incorporated into the draft EIS, then similar studies with similar methodologies should be included.

**Response:** The results of the benthic macroinvertebrate sampling conducted by PG&E during prelicensing studies were discussed in the draft EIS, section 3.3.2.1.3, *Aquatic Biota*. PG&E conducted sampling following the California Stream Bioassessment Protocol and assessed the results using a multimetric index (MMI) that is sensitive to the cumulative effects of hydropower operations on streams. In addition, PG&E acquired historical (1999-2008) benthic macroinvertebrate data from The Nature Conservancy's McCloud River Preserve for comparison purposes.

The benthic monitoring component of the draft Aquatic Biological Monitoring Plan specified by Forest Service modified condition 27 recommends the use of the California Water Board's Surface Water Ambient Monitoring Program protocol, which replaces the widely used California Stream Bioassessment Procedure developed by California Fish and Game.

**Comment:** The Center for Water Advocacy is concerned that the draft EIS does not provide conclusions regarding the health or population dynamics of invertebrates or habitat in the analysis of benthic invertebrates in the habitat assessment. The Center for Water Advocacy recommends that the information provided in the McCloud River Preserve Research and Monitoring Report 2007 by the Nature Conservancy be incorporated into the final EIS.

California Fisheries and Water states that the draft EIS does not disclose and evaluate the effects to the macroinvertebrate species of the Lower McCloud River resulting from Forest Service 4(e) conditions.

**Response:** In section 3.3.2.1.3, *Aquatic Biota*, of the draft and final EIS, we summarize the conclusions of the benthic macroinvertebrate assessment conducted by PG&E during the pre-licensing studies. As stated previously, PG&E used an MMI, which assesses the ecological impacts of hydropower projects on benthic macroinvertebrate communities.

On page 115 of the draft EIS we indicated that MMI values from the McCloud River sites were lower when compared to MMI values of reference sites and at Iron Canyon Creek the values were within or slightly below the range of MMI values of reference sites.

We also indicate that that PG&E compared the MMI values to historical data collected over a 10-year period (1999–2008) on the Nature Conservancy’s McCloud River Preserve and that these MMI values were consistently closer to those of the reference sites and higher than those collected from the other Lower McCloud River sites. We also stated that the physical habitat data and benthic macroinvertebrate samples collected over 10 years within the project area generally indicated good aquatic habitat conditions and water quality.

**Comment:** The Center for Water Advocacy states that the only way to completely eliminate adverse impacts to aquatic habitat and cultural resources is to provide substantial flows down the bypass reaches to assure waters in those reaches are neither seasonally warmer nor cooler than adjacent river reaches. The Center for Water Advocacy suggests that the final EIS include an analysis of operating the project with a run-of-river flow pattern such that the amount of water entering an impoundment is equal to the sum of water passed over the dam, through fish passage facilities, and through turbines at any given point in time at every relevant facility structure.

EPA expresses concern that the flow regime selected by FERC, as proposed by California Trout, Trout Unlimited, and McCloud River Club, may not be the best alternative for the long-term health of the river ecosystem.

**Response:** Analysis of alternative flow scenarios evaluated the benefits of water releases that mimic a more natural hydrograph to enhance, channel morphology, aquatic habitat, and water quality. The project is not proposed as a run-of-river operation. Instead, the recommended flow regime in the final EIS attempts to match a more natural hydrograph while still providing aquatic habitat benefits and recreational opportunities.

**Comment:** California Fisheries and Water states that the draft EIS does not disclose and evaluate the specific Forest Service 4(e) condition daily flow requirements.

**Response:** The effects of alternative flow recommendations (including the Forest Service 4(e) condition) on aquatic habitat are evaluated in section 3.3.2.2, *Environmental Effects*, and the staff’s recommendation is expected to enhance water quality and aquatic habitat.

**Comment:** We revised the draft license article, *Reservation of Authority to Prescribe Fishways*, in the final EIS to match the language provided by NMFS in its request.

**Response:** We modified the text of the draft license article “Reservation of Authority to Prescribe Fishways” to our standard license text because only the Commission has the authority to reopen a FERC-issued license. The Commission is still the only entity that can reopen a license; however, if necessary, another agency can request the Commission to reopen the license. In this case, construction, operation, and maintenance of mandatory fishways prescribed by the Secretaries of Interior and Commerce under

section 18 of the FPA are a cause for reopening the license. Furthermore, the standard language used by the Commission matches in spirit the language requested by NMFS in its reservation of authority.

**Comment:** NMFS emphasizes that its “reopener” term for the project, 10(j) recommendation #1, is tailored to address the specific concerns necessary to address recovery of the particular listed species at issue, and is thus superior to a general term, such as the generic Commission term. NMFS states that its 10(j) recommendation #1 and Forest Service 4(e) conditions 1, 11, and 27, including biological monitoring, special status species review, and consultations, will serve to detect, document, study the project’s impacts, and recommend mitigations so as to benefit listed salmonids.

American Whitewater and Friends of the River consider the use of the standard re-opener clause to be an inadequate substitute for the NMFS proposed 10(j) recommendations.

California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers do not agree that the standard opener provisions in a license include sufficient detail to deal with the probable reintroduction of salmon and steelhead into the McCloud River and recommend that the Commission insist that PG&E develops environmental information sufficient to adopt a legal NEPA document on project effects on reintroduced salmon and steelhead.

**Response:** Forest Service conditions 1, 11, and 27, require PG&E to provide specific information related to the presence of listed species and habitat conditions supporting listed species. Annual reports required for the monitoring plans will support a scientifically based request for reopening the license, as necessary, to further enhance habitat for listed species. Furthermore, as discussed previously, we recommend that PG&E file annual reports on the progress and status of the potential reintroduction and these reports will form the basis of any decision regarding the need to reopen the license to address the presence or imminent presence of listed salmonids in project waters.

The Commission's standard reservation of authority to reopen the license for the conservation and development of fish and wildlife resources can be used to address impacts to listed salmonids once they are present in project waters and are found to be affected by O&M of the project. We recognize that NMFS could invoke this article to recommend that the Commission reopen a license to permit compliance with the ESA; however, because listed salmonids are not present in project waters and are not affected by the project at this time, and studies to determine feasibility of reintroduction are ongoing, we continue to find that, if and when, listed salmonids are present in project waters in the future, reopening the license at such a time to address additional project impacts is adequate and reasonable.

**Comment:** NMFS states that its recommendations are crafted as complete terms and that subsections were used only to make the text more readable. NMFS states that the Commission renumbered its recommendations so as to consider the subsections as individual recommendations, which is incorrect. For example, NMFS states that 10(j)

recommendations #3CD (Instream Flow Estimates...) should be #3C; and #3DF (Flow Ramping) should be #3D. Further, NMFS states that 10(j) recommendation #1B is actually part of 10(j) recommendation #1 (and/or #1A), which the Commission agrees is within the scope of the FPA. NMFS states that 10(j) recommendation #1B must be considered within the context of NMFS 10(j) recommendation #1 because the annual consultation process affords an opportunity for FERC and PG&E to exchange information, and coordinate management actions and schedules.

**Response:** We understand that the NMFS recommendations were provided as complete terms; however, sections or subsections were discussed and analyzed separately in the appropriate resource section. In some cases, we have incorporated portions of recommendations into the development of our staff alternative. Our 10(j) numbering system in the draft and final EIS was intended to help the reader track these portions of NMFS's 10(j) recommendations throughout the document.

## TERRESTRIAL RESOURCES

**Comment:** The Forest Service states that the foothill yellow-legged frog was found in the Lower McCloud River at one time, although it is unlikely that this population would be affected by gravel and coarse sediment augmentation near McCloud dam. The Forest Service notes that, to the contrary, the draft EIS states that the foothill yellow-legged frog is not found in the Lower McCloud River.

**Response:** We modified the EIS text in section 3.3.1.2, *Environmental Effects, Gravel and Coarse Sediment*, to specify that the foothill yellow-legged frog is not found in the reach of the Lower McCloud River targeted for gravel and coarse sediment augmentation, because water temperatures are generally too cold to support the species.

**Comment:** The Forest Service states that the Commission fails to note that many pioneering species that have established themselves in the maintenance areas, transmission corridors, and roadways are invasive species. Therefore, the Forest Service disagrees with the blanket proposal to allow areas disturbed by project activities to re-vegetate naturally by pioneering species. In addition, the Forest Service states that erosion and sedimentation to the disturbed areas are also of concern. The Forest Service suggests that larger sites, especially those near invasive populations, be re-vegetated to prevent soil erosion and encourage native vegetation. The Center for Water Advocacy is also concerned that measures will not be in place to prevent reestablishment of invasive species.

**Response:** We acknowledge the Forest Service's concern regarding a "blanket proposal" for revegetation of disturbed areas. We have clarified the text to indicate that over time, vegetation would be expected to reestablish as a result of pioneering of plant species in adjacent areas (with measures to control invasive species, erosion, and sedimentation), and growth of plants from the existing seed bank, and restoration of native vegetation by PG&E. Specifically, in section 3.3.3.2.1, *Vegetation*, we state that implementation of the Vegetation and Invasive Weed Management Plan specified in Forest Service condition 25

would provide potential enhancement of existing populations and habitat by managing and minimizing encroachment of invasive noxious weeds, and we expect that these monitoring and management measures would be implemented in conjunction with natural and planned revegetation efforts in disturbed areas. Treatment protocols that will be implemented as part of the Vegetation and Invasive Weed Management Plan specified in Forest Service condition 25 include soil protection and erosion control to minimize the risk of introducing non-native invasive plant species.

**Comment:** The Center for Water Advocacy is concerned that the draft EIS fails to specifically state which species of native plants will be used for restoration in order to reduce the potential for spread of invasive plants. The Center for Water Advocacy suggests the frequency of reporting on revegetation monitoring should be within 10 working days after surveys are conducted. The Center for Water Advocacy also recommends that the draft EIS provide that interpretive signs be posted at revegetation sites in areas of wildlife habitat. Finally, the Center for Water Advocacy recommends that the local Indian tribes should be added to the parties receiving such reports and as entities to receive a specific revegetation plan and to be consulted during preparation of the review draft that will be submitted to the Commission and other agencies.

**Response:** As noted in section 3.3.3.2.1, *Vegetation, Upland Vegetation*, the Vegetation and Invasive Weed Management Plan developed in consultation with the Forest Service, would provide guidance regarding revegetation efforts using native plant species and associated reporting requirements and public communication. Furthermore, in this section of the EIS, we note that Forest Service condition 25 specifies that PG&E develop a Vegetation and Invasive Weed Management Plan also in consultation with the County Agricultural Commissioner, California Department of Food and Agriculture, potentially affected tribes and other interest parties. Additionally, as noted in section 3.3.3.1.1, *Vegetation, Special Interest Plants*, native plants that are suitable for revegetation source material include culturally significant plant species that have been identified in a confidential list that was created in consultation with the Tribes.

**Comment:** The Forest Service states that additional time should not be needed to incorporate already approved protocols from the vegetation plan for the Pit 3, 4, 5 Project into the draft Vegetation and Invasive Weed Management and Monitoring Plan. The Forest Service will submit collaboratively developed draft plans, in addition to the final 4(e) conditions; therefore plan preparation should be substantially complete.

**Response:** Because the Forest Service and PG&E have worked collaboratively on the draft Vegetation and Invasive Weed Management Plan and it is substantially complete, we have modified our recommendation for completion of the plan to be within 1 year of license issuance, rather than the 2-year timeframe we recommended in the draft EIS.

**Comment:** The Forest Service agrees with the Commission and suggests that PG&E collect seeds and cuttings from culturally significant populations that are not associated with Traditional Cultural Properties (TCPs) (as identified in the Historic Properties Management Plan [HPMP]), in order to support the use of culturally significant

populations in revegetation and erosion control efforts. The Forest Service suggests that the locations of culturally significant populations, or other sites requiring protection, be displayed on an Operations Map to avoid impact during management activities such as dumping, herbicide application, materials staging, etc. This would be an alternative to annual monitoring of these sites.

The Forest Service states that culturally significant population monitoring will be included in the botanical monitoring survey scheduled at 5-year intervals and that selection of final populations will be from those located in Study CR-S2 for the Pit River Tribe but not identified in association with TCPs. The Forest Service states that a similar protocol will be suggested for the Winnemem Wintu Tribe if it requests that culturally important plant species be included in revegetation efforts. The Forest Service feels that botanical surveys need to be completed within the expanded area of potential effects (APE) for the Winnemem Wintu Tribe along the Lower McCloud River, because this information will be necessary to identify the culturally significant plants associated with TCPs.

PG&E notes in its reply comments filed on October 27, 2010, that it completed botanical surveys for the entire APE on the Lower McCloud River between McCloud dam and Squaw Valley Creek. PG&E notes that mapped locations of culturally significant populations of importance to the Pit River Tribe in this area were presented in appendix D of the CR-S2 report, *Traditional Cultural Properties*, prepared in consultation with the Pit River Tribe. PG&E states that mapped locations for culturally significant plants of importance to the Winnemem Wintu Tribe will be similarly included in an appendix to the TCP report prepared for the Winnemem Wintu Tribe after the study is complete.

**Response:** We have revised EIS sections 3.3.3.2.1, *Vegetation*, and 5.2.1, *Discussion of Key Issues, Terrestrial Resources*, to support the Forest Service recommendation that PG&E utilize native plants including culturally significant plants that are not associated with TCPs for revegetation and erosion control efforts. Additionally, we clarify in the EIS that the component for special status plant species (including culturally significant plant species) of the Vegetation and Invasive Weed Management Plan would include surveys to determine the presence of any new populations of special status species including culturally significant plant species or newly listed special status species; alternatively, these sites requiring protection could be displayed on an operations map as areas to avoid, in order to prevent impact during management activities. In the EIS we also clarify that the component for special status plant species of the Vegetation and Invasive Weed Management Plan would also include populations of culturally significant species not identified in association with TCPs for periodic monitoring. This comment is addressed further under section 3.3.6, *Cultural Resources*.

**Comment:** PG&E states that the scope of its alternative condition 25 is not properly characterized in the draft EIS (draft EIS p. 170). PG&E states that its alternative condition 25 proposed limitations to the scope of Forest Service condition 25 so that it would only apply to culturally significant species associated with TCPs; that is, areas

“that are currently utilized by tribal members to gather plants for traditional purposes and that qualify for inclusion on the National Register of Historic Places as Historic Properties.”

Additionally, PG&E states that text in the draft EIS does not accurately state PG&E’s alternative condition regarding culturally significant populations and TCPs. The text should read, “and limit *invasive weed* species to those on a list of high priority species,” not *special status* species.

**Response:** In section 3.3.3.2.1, *Vegetation*, we clarify the text to accurately reflect the scope of PG&E’s alternative condition 25 to “only apply to culturally significant species associated with TCPs.” We have updated the EIS text in section 5.2.1, *Discussion of Key Issues, Terrestrial Resources, Vegetation and Invasive Weed Management Plan*, to reflect PG&E’s clarification regarding culturally significant plants and TCPs.

**Comment:** The Forest Service notes that there is pertinent language that is not included in the Commission’s analysis. Specifically, the Forest Service recommends that the Commission’s analysis state that there is a potential nexus between project operations that have restricted flow and the creation of additional favorable riparian habitat along the Lower McCloud River margins for black locust establishment downstream from Ah-Di-Na, as documented in Technical Memorandum 65, which describes the colonization of black locust in the riparian areas created by the project flow regime.

**Response:** We have updated our discussion in section 3.3.3.2.1, *Vegetation, Noxious Weeds*, to indicate that there is a potential project nexus between decreases in base flow and annual peak flow and increased black locust habitat, particularly in areas with high percent cover of coarse material downstream of Ah-Di-Na.

**Comment:** The Forest Service clarifies that the 3-year annual monitoring schedule following license acceptance does not apply to all high priority weeds but is meant to create situational awareness of weed encroachment into Forest Service Sensitive and culturally significant populations so that treatment can be scheduled promptly. In addition, the Forest Service states that monitoring is required for 3 years following ground-disturbing activities and a 5-year monitoring protocol is required to update the original survey work (which includes the expanded APE from Ash Camp to Squaw Valley Creek). The Forest Service agrees that annual monitoring of noxious weeds at undisturbed sites is not necessary.

**Response:** We have updated our analysis in section 3.3.3.2.1, *Vegetation, Noxious Weeds*, to specify that monitoring of known invasive plant species populations would create situational awareness of weed encroachment into locations of existing special status or culturally significant plant populations, determine if other adverse impacts are occurring to these plant populations, and facilitate prompt scheduling of treatment as necessary. Additionally, we have clarified that monitoring, inventory, and mapping of areas of “high priority” noxious weed populations that remain undisturbed would

facilitate updates to original survey work, including in the area of the Commission-approved APE (see section 3.3.6, *Cultural Resources*, for a description of the APE).

**Comment:** The Forest Service states that it is more accurate to say that there may be some adverse effects to wildlife but they will be mitigated through implementation of the Terrestrial Biological Management and Monitoring Plan, as opposed to stating that there will be no adverse effects. This is because adverse effects depend on the species, and timing and/or duration of the O&M activities. The Forest Service states that specific O&M activities that may affect species must observe the limited operating periods and have been defined in table B2-1 in the draft Road and Transportation Facility Management Plan. Special status species that occur in the project should be protected from further damage, especially specific endemic species (e.g., Shasta Salamander). Thus, the Forest Service states that if relocation is possible for these species then it is preferable so they will not incur direct mortality due to disturbance from project activities.

**Response:** We have modified EIS section 3.3.3.2.2, *Wildlife, General Wildlife*, to clarify that project O&M activities that may negatively affects terrestrial wildlife species that occupy habitats within the project area as resident, transient, or migratory species would be mitigated through the implementation of limited operating periods and other monitoring and mitigation measures such as relocation. Furthermore, we add additional clarification that implementation of the Terrestrial Biological Management Plan would mitigate project-related effects on less mobile species that may not leave areas of disturbance.

**Comment:** The Center for Water Advocacy recommends that the draft EIS address potential impacts to terrestrial resources, including the need for roosting trees and open corridors for wildlife regardless of the presence of critical migration routes. The Center for Water Advocacy is concerned that the entire preventative measures provided (monitoring plans) in the draft EIS are based on little more than inadequate pre-construction and non-existent future monitoring efforts. The Center for Water Advocacy also believes that the due dates for the reports are untimely and do not allow for any adaptive management or prevention or mitigation should there be disturbances to these sites and species.

**Response:** Potential impacts as well as mitigation measures to address potential project-related impacts to wildlife, including special status species, are addressed in EIS sections 3.3.3.2.2, *Wildlife*, 3.3.4, *Threatened and Endangered Species*, and 5.2, *Comprehensive Development and Recommended Alternative*. These analyses are based on extensive scientific assessments conducted by PG&E of terrestrial resources in the project area. Requirements for monitoring and mitigation actions for wildlife and associated reporting requirements will be included in the management plans that PG&E will develop in consultation with the Forest Service, including the Aquatic Biological Management Plan, Terrestrial Biological Management Plan, and Vegetation and Invasive Weed Management Plan. As discussed in EIS section 3.3.3.2.1, *Vegetation*, revegetation

in disturbed areas as well as invasive weed control will help re-establish and maintain habitat for wildlife species within the project area.

**Comment:** The Forest Service recommends that the Terrestrial Biological Management Plan should be finalized within 1 year of license acceptance. The Forest Service is currently working with PG&E on the draft Terrestrial Biological Management Plan and it is substantially complete.

**Response:** We have modified our recommendation in section 5.2.1, *Discussion of Key Issues, Terrestrial Resources*, regarding the development of the Terrestrial Biological Management Plan such that the plan would be completed within 1 year of license issuance, rather than the 2-year timeframe we recommended in the draft EIS.

**Comment:** The Forest Service agrees with the modification that PG&E should upgrade segments of the existing transmission lines within 3 years of license issuance that are not currently in compliance with APLIC guidance. If within 3 years, all lines are upgraded and all new construction is compliant, an additional plan will not be required.

**Response:** We have updated EIS section 3.3.3.2.2, *Wildlife*, to reflect the requirements of Forest Service modified condition 26. Modified condition 26 specifies that PG&E should upgrade segments of the existing transmission lines that are not currently in compliance with Avian Power Line Interaction Committee (APLIC) guidance within 3 years of license issuance; if, within 3 years, all lines are upgraded and all new construction is compliant, an additional plan will not be required.

**Comment:** The Forest Service agrees with our recommendation in the draft EIS that pre-construction surveys in suitable habitat for the Shasta hesperian, Shasta chaparral, and Shasta salamander would adequately identify the presence of these species before any construction activities. The Forest Service clarifies that it also requires monitoring of the known sites where these sensitive species are found 1 year after license acceptance and every 5 years thereafter to determine population changes resulting from project activities such as O&M. Additionally, new population surveys every 10 years would assist in locating potential future populations of these species.

PG&E clarifies that, in regards to terrestrial mollusks, the draft EIS does not accurately describe its alternative condition 26. The draft EIS states that PG&E proposes monitoring of known populations every 5 years and pre-construction surveys in lieu of monitoring for new populations in suitable habitat every 10 years, but PG&E states that its alternative condition includes: (1) surveys of known populations every 5 years; (2) surveys of other suitable habitat every 10 years; and (3) pre-construction surveys.

**Response:** We have clarified our analyses of terrestrial mollusk and amphibian monitoring. Because of the presence and sensitivity of the Shasta hesperian and Shasta chaparral and Shasta salamander, we have updated EIS section 3.3.3.2.2, *Wildlife, Special Status Wildlife Species*, and our recommendations in EIS section 5.2.1, *Discussion of Key Issues, Terrestrial Resources*, to state that surveys for known individuals of these species should be conducted within 1 year of license acceptance and every 5 years thereafter, in

order to monitor any population changes that may result from project activities. We also recommend surveys for new populations in suitable habitat within the first year of license issuance and every 10 years thereafter.

We have also clarified our analysis of amphibian and reptile species monitoring to specify implementation of surveys for known populations within 1 year of license issuance and every 5 years thereafter, and surveys of suitable habitat within the first year of license issuance and every 10 years thereafter, with adaptation of management to include new species or populations that are detected. This monitoring plan would be more protective of the Shasta salamander than the particular measures included in the draft Terrestrial Biological Monitoring Plan.

**Comment:** PG&E notes that tailed frogs are associated with cold, rocky streams, not freshwater emergent wetlands or reservoirs. PG&E notes that the Commission states that the Forest Service commented on November 18, 2006, that the tailed frog is known to be present in the McCloud reservoir based on unpublished data from a Forest Service employee. PG&E states that it assumes this comment is referring to a tributary of the McCloud reservoir or the watershed as a whole because tailed frogs are associated with cold rocky streams, not reservoirs.

**Response:** We acknowledge that the tailed frog is typically associated with cold, rocky streams and have noted the sighting of the tailed frog in McCloud reservoir, as observed and reported by the Forest Service. We have not identified that this species has established a presence in McCloud reservoir, which represents a habitat typically not associated with the tailed frog, and we are not requiring mitigation for this species.

**Comment:** The Forest Service notes, and PG&E agrees, that in addition to the Shasta salamander, the northwestern pond turtle is also a Forest Service sensitive species that occurs within potentially proposed recreation construction sites near Pit 6 and Pit 7 reservoirs. In addition, the Forest Service states that pre-construction surveys and relocation of individuals, in combination with monitoring known locations every 5 years, and surveys every 10 years for potential future species locations should be specified for the northwestern pond turtle.

PG&E states that, in respect to the northwestern pond turtle, its alternative condition proposed monitoring: (1) unknown populations at Pit 6 and 7 reservoirs beginning the first year after plan approval, and every fifth year thereafter; and (2) potential habitat in McCloud and Iron Canyon reservoirs every 10 years. In addition to monitoring of the northwestern pond turtle, PG&E will also conduct pre-construction surveys in areas of suitable habitat that could potentially be affected by planned construction.

**Response:** We have included the northwestern pond turtle in our discussion in EIS section 3.3.3.2.2, *Special Status Wildlife Species*, of potential effects to special status amphibian and reptile species in proposed construction areas. In addition, we have clarified in EIS section 5.2.1, *Discussion of Key Issues, Terrestrial Resources*, that pre-construction surveys should also be conducted for this species and that monitoring and

mitigation actions for these species would be included in the Aquatic Biological Management Plan.

**Comment:** The Forest Service will move the surveys for the foothill yellow-legged frog into the draft Aquatic Biological Monitoring Plan associated with its modified 4(e) condition 27. These surveys will reveal any expansion of the habitat upstream on the Lower McCloud River or the Pit River downstream from the known populations in the Pit 4 reach.

The Forest Service states that the monitoring needs described for the foothill yellow-legged frog are unclear. The Forest Service notes that, with the increase in late spring flows under the new flow regime, it is possible that other channel side margin habitat will become more suitable for foothill yellow-legged frog. Thus, the Forest Service believes it is important to periodically survey for foothill yellow-legged frog through the life of the license in the Lower McCloud River. The Forest Service states that surveying every 5 years would be sufficient to determine if the species is expanding its habitat. The Forest Service states that known populations should also be monitored to document the effects of the flow regime on this species, and that pre-construction surveys and relocation of individuals should be performed to provide additional protection. If the population expands into the Pit 5 reach, it will likely continue to expand down to the Pit 6 reach. Thus, the Forest Service recommends the monitoring plan includes surveys conducted into the upper Pit 6 reservoir reach if this occurs.

PG&E clarifies that its alternative condition 26 actually proposed that foothill yellow-legged frog surveys be conducted along the tributaries to Pit 6 and Pit 7 reservoirs but not along the reservoirs themselves because these reservoirs do not provide suitable foothill yellow-legged frog habitat; PG&E makes typographical corrections related to foothill yellow-legged frog surveys (draft EIS p. 187). PG&E did not include surveys of NFS lands on the Lower McCloud River because water temperatures at this location do not consistently reach the threshold to initiate foothill yellow-legged frog breeding until June—which is likely to be too late in the season for foothill yellow-legged frogs to initiate breeding and then have sufficient time for larvae to successfully complete metamorphosis by fall. PG&E notes that the Forest Service suggested that edgewater temperatures need exceed 17°C to be potentially suitable for the foothill yellow-legged frog, while edgewater temperatures in locations closest to Forest Service land never exceeded 15°C.

American Whitewater and Friends of the River recommend that the Commission review Technical Memorandum 9, which documented that the water temperature within side channel sites where tadpoles were found were significantly warmer than the main channel. American Whitewater and Friends of the River note that Technical Memorandum 9 reports that temperatures were above 20°C at these sites while the main river was 13.5 to 16°C, and that the foothill yellow-legged frog has historically been found as far upstream as The Nature Conservancy lands.

**Response:** We have updated EIS section 3.3.3.2.2, *Wildlife, Special Status Wildlife Species*, to note the inclusion of foothill yellow-legged frog monitoring, as part of Forest Service modified condition 27, in the draft Aquatic Biological Management Plan. We have clarified the EIS text to specify that PG&E alternative condition 26 proposed that foothill yellow-legged frog surveys occur along the tributaries to Pit 6 and Pit 7 reservoirs but excludes 5.4 miles of National Forest Service lands and the Pit 6 and Pit 7 reservoirs themselves. We have also clarified our analysis of foothill yellow-legged frog monitoring requirements to state that surveys along the NFS lands of the Lower McCloud River would not be necessary because cold water temperature in the Lower McCloud River and absence of appropriate habitat immediately surrounding the reservoirs would preclude the presence of the foothill yellow-legged frog in those areas. In our recommendations in section 5.2.1, *Discussion of Key Issues, Terrestrial Resources*, we suggest that specific suitable habitat for the foothill yellow-legged frog in the project area be surveyed the first year after plan approval and every 10 years thereafter, for the term of the license.

**Comment:** The Forest Service states that the survey area for bald eagle should be expanded to include additional monitoring along the Lower McCloud River in the event that winter-run Chinook salmon are re-introduced to the McCloud drainage via the NMFS plan to place salmon into Shasta Lake.

**Response:** We have revised our analysis in section 3.3.3.2.2, *Wildlife*, to note that a re-evaluation of the geographic survey area and protocol for bald eagle, if salmon are re-introduced above McCloud dam would provide additional protection for this species.

**Comment:** PG&E clarifies that the bald eagle is a California-listed endangered species, not a state-listed threatened species.

**Response:** We have updated EIS section 3.3.3.1.2, *Wildlife, Special Status Wildlife Species, Birds*, to reflect this correction for the bald eagle's state-protected status.

**Comment:** The Forest Service specifies that PG&E should annually survey known peregrine falcon nest sites within the project APE to quantify the level of recovery of the population in California and renew baseline studies on an annual, statewide basis—as is recommended by the University of California Santa Cruz Predatory Bird Research Group. The Forest Service will require PG&E to meet this standard to determine how project O&M activities affect the recovery and population stability of the peregrine falcon.

**Response:** We have revised our analysis in section 3.3.3.2.2, *Wildlife*, taking into consideration the Forest Service's revised condition 26 and draft Terrestrial Biological Management Plan. In our recommendation, we recommend that surveys for peregrine falcon would occur within 1 year of plan approval and every fifth year thereafter at known nest sites and within suitable habitat, per our recommendation in the draft EIS, rather than annually for known populations and within 1 year of plan approval and every 10 years thereafter in suitable habitat. We also note in our analysis that protocol for

peregrine falcon surveys would follow the University of California Santa Cruz Predatory Bird Research Group guidelines.

**Comment:** The Forest Service will require that annual monitoring be implemented at known locations for Forest Service sensitive bat species (pallid bat, Townsend's big eared bat, and western red bat). This will include monitoring of roost sites for 3 years after disturbing activities to determine the project effects on population stability. The Forest Service agrees with the change in the bat limited operating period to occur from May 1 to August 31. The Forest Service states that pre-construction surveys will be required in order to track the long-term occupancy of these species within project-affected areas. The Forest Service has modified the 4(e) condition to reflect this.

**Response:** We have revised our analysis in section 3.3.3.2.2, *Wildlife*, taking into consideration the Forest Service's revised condition 26 and draft Terrestrial Biological Management Plan. In our recommendation in EIS section 5.2.1, *Discussion of Key Issues, Terrestrial Resources*, we recommend the inclusion of alternative language in the Terrestrial Biological Management Plan clarifying that special status bat species surveys, for both known populations and for new populations in suitable habitat, would begin within the first year after plan approval and every fifth year thereafter. Additionally, the limited operating period would be during the maternity period of May 1 to August 31, rather than between May 1 and August 1.

**Comment:** PG&E notes that the staff alternative requirement to monitor bats "annually for 5 years after plan approval, then once every 5 years" appears to be inconsistent with the recommendation on p. 340, paragraph 2 to "begin within the first year after plan approval and every fifth year thereafter," which is PG&E's preferred approach. PG&E recommends the inclusion of alternative language in the Terrestrial Biological Management Plan clarifying that special status bat species surveys would begin with the first year after plan approval and every fifth year thereafter.

**Response:** We have made table 5-1 and section 5.2.1, *Discussion of Key Issues, Terrestrial Resources, Terrestrial Wildlife Management and Monitoring*, consistent with the staff recommendation that PG&E conduct surveys for special status bat species within the first year after plan approval and then once every 5 years.

**Comment:** PG&E states that winter hibernacula were not observed at the locations listed in the draft EIS (McCloud reservoir intake, McCloud dam diversion/outlet tunnel, Ah-Di-Na campground old cellar building, and Iron Canyon reservoir overflow spillway), but that rather, these locations represent sites at which winter hibernacula surveys were conducted. Survey results did not indicate that bats use these sites as winter hibernacula. PG&E notes that, although acoustic records indicated the presence of bats in the study area during the winter, no project structures were identified as winter hibernacula.

**Response:** We have updated EIS section 3.3.3.1.2, *Wildlife, General Wildlife*, to clarify that winter hibernacula surveys were conducted at McCloud reservoir intake, McCloud

dam diversion/outlet tunnel, Ah-Di-Na campground old cellar building, and Iron Canyon reservoir overflow spillway, but no evidence of hibernacula was observed.

**Comment:** The Forest Service agrees that in addition to pre-construction surveys, monitoring of known valley elderberry plant populations should occur concurrently with the 5-year monitoring conducted as part of the Vegetation and Invasive Weed Management Plan. The Forest Service has moved the monitoring component to the draft Vegetation and Invasive Weed Management Plan and associated 4(e) condition 26.

**Response:** We have updated EIS section 3.3.4.2, *Environmental Effects, Valley Elderberry Longhorn Beetle*, to state that Forest Service modified condition 26 specifies that valley elderberry longhorn beetle (VELB) monitoring should also include pre-construction surveys and that monitoring for known valley elderberry plant populations should occur concurrently with the 5-year monitoring conducted as part of the Vegetation and Invasive Weed Management Plan.

**Comment:** PG&E states that two of the 15 populations of valley elderberry plants documented were found along Oak Mountain Road, which is not included in the list of locations described in the draft EIS.

**Response:** We have updated EIS section 3.3.3.1.1, *Vegetation, Special Interest Plants*, to include Oak Mountain Road as one of the locations at which valley elderberry plants were documented.

**Comment:** PG&E also provides a revised version of the VELB section of the draft EIS; the largest change is the following added text: “After acceptance of a new license, PG&E will consult with the U.S. Department of the Interior – Fish and Wildlife Service (FWS) regarding the potential impacts of these activities on VELB habitat. Depending on the nature of the proposed new construction, a VELB protection plan similar to the one developed for Pit 3, 4, and 5 project may provide a suitable mechanism to protect VELB habitat during new construction and when performing recreation facility O&M.”

**Response:** We have modified EIS section 3.3.4.2, *Environmental Effects, Valley Elderberry Longhorn Beetle*, to be more consistent with the programmatic biological opinion for the VELB and PG&E’s VELB Conservation Program, including the recommendation that PG&E consult with FWS regarding the potential impacts of new construction and routine O&M activity on VELB habitat.

**Comment:** American Whitewater and Friends of the River state that the conclusions of the analysis of impacts to riparian vegetation misleads the reader into thinking that operations have not changed riparian communities on the Lower McCloud River. American Whitewater and Friends of the River state that there were many limitations to the study and significant changes in the longitudinal and cross-sectional extent of riparian vegetation due to project-related flow alterations are not discernable using the available historical aerial photography.

PG&E notes in its reply comments filed on October 27, 2010, that the baseline for the EIS is the existing conditions, and that consequently, FERC’s analysis of PG&E’s

riparian study (Technical Memorandum 65, Assess Potential Ongoing Project Effects on Riparian Vegetation Community Types in the Project Area) presented at pages 152–153 in the draft EIS is correct and appropriate.

**Response:** We analyze the proposed project flows in relation to riparian vegetation and related environmental effects in section 3.3.3.2.1, *Vegetation, Riparian and Wetland Vegetation*. Our analysis reflects a consideration of the proposed actions as compared to the no-action alternative, which represents the background conditions under the existing project license.

**Comment:** PG&E notes that the decreased magnitude of annual peak flows affects white alders at both higher and *lower* elevations, as per TM 65.

**Response:** We have made this clarification regarding the effect of annual peak flows on white alders in EIS section 3.3.3.2.1, *Vegetation, Riparian and Wetland Vegetation*.

**Comment:** American Whitewater and Friends of the River express concerns about potential project effects on the foothill yellow-legged frog, particularly at IBM transect-8 (near gage MC-5 at Shasta Lake), because this is a known foothill yellow-legged frog breeding site. American Whitewater and Friends of the River state that a Forest Service amphibian specialist has indicated that the appropriate ramping rate for the protection of the foothill yellow-legged frog is 1 foot in 3 weeks on the descending limb of the hydrograph. American Whitewater and Friends of the River believe that ramping rates that exceed 1 foot in 3 weeks limit the success of the foothill yellow-legged frog on the McCloud River and that ramping conditions off of spill events will only be marginally protective of the foothill yellow-legged frog and other species.

In response to this comment from American Whitewater and Friends of the River, PG&E notes in its reply comments filed on October 27, 2010, that the foothill yellow-legged frog occurs about 18 miles downstream of McCloud dam, in a reach with accretion from more than 12 unregulated major tributaries, and that the project influence on flow recession in foothill yellow-legged frog habitat is significantly attenuated by natural accretion in this area. Additionally, PG&E notes that, as discussed with relicensing participants on May 20, 2009, the pattern of flow recession below McCloud dam during spills approximates the recession rate seen above McCloud reservoir.

**Response:** As detailed in Technical Memorandum 9 and Technical Memorandum 29, surveys of the foothill yellow-legged frog determined that this species is not present within the geographical scope of the project, which includes the Lower McCloud River downstream to the confluence of Squaw Valley Creek. The foothill yellow-legged frog was not found upstream of RM 5.7, which is downstream of Squaw Valley Creek and about 18 miles downstream of McCloud dam. As noted in the draft EIS, we have recommended adoption of the Forest Service's modified condition 27 which contains a monitoring plan specific to the foothill yellow-legged frog and will facilitate identification of any future expansion of the foothill yellow-legged frog into the geographic scope of the project.

Additionally, as noted in the draft EIS, our recommended downramping rates at McCloud dam during spills controllable by valve as well as the water quality and temperature monitoring plan proposed in the staff alternative would limit the potential for stranding of fish and macroinvertebrates. This also would provide an increased level of protection for the foothill yellow-legged frog and balance the developmental values and additional environmental values, including waterway development for beneficial public purposes. Furthermore, we agree with PG&E's analysis of the downramping suggested by American Whitewater and Friends of the River (PG&E 2009a). Faster recession to base flows during egg-laying is less likely to cause stranding or desiccation of egg masses than slower recession. Implementation of the downramping suggested by American Whitewater and Friends of the River, with gradual flow reduction from spring into summer, would result in a period of unnaturally-prolonged higher flows during recession from spills, and contrary to the expectation of such flows improving foothill yellow-legged frog habitat, they are actually expected to lead to less suitable conditions for the foothill yellow-legged frog.

**Comment:** The Forest Service feels that the draft EIS discussion pertaining to pesticide and herbicide use lacks analysis and specificity. The Forest Service suggests that, at a minimum, the draft EIS should contain a general characterization of where herbicide/pesticide use is minimally allowed. In addition, the Forest Service recommends that the final EIS address the following additional topics: (1) locations where the Commission considers the use of pesticides for complete removal of vegetation as reasonable; (2) discussion of pesticide use, application techniques, and affected vegetation guilds for right-of-way areas where selective vegetation removal is applied; (3) discussion of the applicability of pesticides in the treatment of terrestrial and aquatic invasive weeds, including a discussion on the appropriateness of aquatic pesticides for use against specific aquatic invasive species; (4) discussion of areas where pesticide use would not be appropriate (e.g., culturally significant plants, recreation sites, threatened and endangered plant locations, adjacent to water); (5) discussion that identifies mitigation measures, including BMPs and a toxicological/environmental or risk assessment requirement for PG&E before any application. The Forest Service expects some of this detail to be contained in the Vegetation and Invasive Weed Management Plan and site-specific proposals to the Forest Service, as well as in the draft EIS.

**Response:** In its license application, PG&E notes that while herbicide use is a part of project O&M for road and facility maintenance, applications are prescribed by a licensed pest control advisor, and no pesticides are used as a part of project O&M. We recommend additional parameters for incorporation into the guidelines in the Vegetation and Invasive Weed Management Plan regarding the use of pesticides and herbicides associated with future project O&M. Emphasis should be placed on the use of non-herbicide techniques, and allow for herbicide use, if any, only at specific sites; for these sites, the plan should indicate why other techniques would not be effective. We recommend in EIS section 5.2.1, *Discussion of Key Issues, Terrestrial Resources*, that the Vegetation and Invasive Weed Management Plan include restrictions and prohibitions

regarding the use of pesticides and herbicides particularly near riparian areas, wetlands, and areas containing special status or culturally significant plant species, due to the sensitivity of these sites.

Although the EIS establishes a framework for development of the Vegetation and Invasive Weed Management Plan, the plan would need to reflect goals and objectives that have not yet been determined. Detailed weed management measures would depend on site-specific conditions that are best addressed by local expertise during consultation for plan development.

The EIS discusses parameters for use of herbicides near elderberry plants in section 3.3.4.2, *Environmental Effects, Valley Elderberry Longhorn Beetle*.

### **THREATENED AND ENDANGERED SPECIES**

**Comment:** The Forest Service notes that, although no individuals or active nests of northern spotted owls were detected within the project area, a majority of the project and project-affected area occurs in both suitable and designated northern spotted owl habitat. In its comments on the draft EIS, the Forest Service states that formal consultation with the FWS would provide the effects determination to the northern spotted owl and critical habitat. Thus, the Forest Service defers to FWS for guidance and survey requirements.

**Response:** In our recommendation in section 5.2.1, *Discussion of Key Issues*, we note that although no northern spotted owl individuals or active nests were detected within the project area and project O&M or recreation activities are unlikely to affect this species, a majority of the project and project-affected area occurs in both suitable and designated northern spotted owl habitat. We recommend the inclusion of language in the Terrestrial Biological Management Plan clarifying that, at a minimum, pre-construction surveys or a limited operating period of February 1 through July 9 should be implemented for the northern spotted owl, per our staff recommendation in the draft EIS. Additionally, although the Forest Service commented that it would defer to formal consultation with the FWS, in its draft Terrestrial Biological Management Plan submitted as an enclosure to its modified 4(e) conditions, the Forest Service recommends only that PG&E follow the FWS guidance for northern spotted owl surveys; we agree with this recommendation.

**Comment:** The Forest Service clarifies that a biological evaluation is prepared for Forest Service sensitive species and a biological assessment is prepared for federally threatened and endangered species.

**Response:** We have clarified this distinction between biological evaluations for Forest Service sensitive species and biological assessments for federally threatened and endangered species in EIS sections 3.3.4.2, *Environmental Effects*, 5.2.1, *Discussion of Key Issues, Threatened and Endangered Species*, and table 5-1.

**Comment:** PG&E notes that it is appropriate for PG&E to provide plans and reports, such as those prepared for special status wildlife species, to agencies for review and comment, and that PG&E will address comments on plans and reports prior to submittal

to FERC. PG&E states that FERC should be the agency that approves any plans or reports associated with the project license.

**Response:** The Commission will issue final approval of project-related reports on special status species, specifically those that are Forest Service Sensitive, Survey and Manage, Management Indicator Species, or on the Shasta-Trinity National Forest Watch List. Prior to submission of plans and reports to the Commission, review and approval of such reports by the Forest Service will help ensure that all concerns related to potential impacts from project O&M activities are addressed.

## RECREATION RESOURCES

**Comment:** American Whitewater and Friends of the River state that all of the flow proposals that have been suggested will limit boating opportunity to the winter and early spring.

**Response:** The Forest Service 4(e) flow conditions and staff recommendation in the EIS are intended to enhance aquatic habitat conditions compared to current license conditions, as well as, recreational opportunities. A key feature of several of the recommended flow scenarios is the management of high flows during late winter and spring to more effectively mimic the seasonal variation typical of the natural hydrograph of an unregulated river. These peak flows are a necessary condition for natural maintenance of channel morphology and substrate conditions associated with quality aquatic habitat. Peak flows associated with seasonal weather patterns and significant runoff event can also provide whitewater boating opportunities that may, however, be excessive for comfortable or safe angler wading depending on when they occur. Our analysis and recommendations are made based on review of the available scientific data and our charge to balance the needs of occasionally conflicting users and resources, however, under the staff recommendation there would be a few more whitewater boating flows than what currently exist.

**Comment:** PG&E states that only the upper 9 miles of the 24-mile Lower McCloud River reach between McCloud dam and Shasta Lake have land-based public access.

**Response:** The EIS has been revised, under section 3.3.5.1, *Affected Environment, Regional Recreation Resources*, and section 3.3.5.1, *Affected Environment, Project Area Recreation Resources, Lower McCloud River and Hawkins Creek Crossing*, to clarify that only the upper 9 miles of the 24-mile Lower McCloud River reach between McCloud dam and Shasta Lake have land-based public access.

**Comment:** The Forest Service notes that the Pit 3, 4, 5 Project addresses the recreation development in the area where water from the James B. Black powerhouse tailrace passes by the Pit 5 powerhouse. Thus, it is not included in the recreation 4(e) conditions for the McCloud-Pit Project.

**Response:** We acknowledge that the area where water from the James B. Black powerhouse tailrace passes by the Pit 5 powerhouse is not included in the Forest Service recreation 4(e) conditions for the McCloud-Pit Project.

**Comment:** California Fisheries and Water states there are sufficient boating flows in the regional areas such as above McCloud dam in the Upper McCloud River, in the upper Pit River, and elsewhere.

American Whitewater and Friends of the River request that the Commission describe other whitewater recreation opportunities, specifically any that are comparable to the 25 mile class III/IV wilderness run of the Lower McCloud River.

**Response:** Section 3.3.5.1, *Affected Environment, Regional Recreation Resources*, of the EIS has been revised to describe other whitewater recreation opportunities in the region.

**Comment:** The Hearst Corporation states that there is a factual error in the draft EIS that states, "The 1963 agreement between The Hearst Corporation and the Forest Service allows the Forest Service to use and manage the Star City area located on Hearst Corporation lands for public recreation use." The Hearst Corporation states that this is incorrect in that no current lands belonging to The Hearst Corporation are available for public use. The Hearst Corporation clarifies that the area addressed in the 1963 agreement is the area that was donated to the Forest Service and is currently the "day use area" and recommends that this language be revised in the final EIS.

**Response:** The EIS has been revised, under section 3.3.5.1, *Affected Environment, Project Area Recreation Resources, McCloud Reservoir*, section 3.3.5.1, *Affected Environment, Recreational Use, McCloud Reservoir*, and section 3.3.5.2, *Environmental Effects, Recreation Management Plan, McCloud Reservoir Recreation Facilities*, to clarify the 1963 agreement, the use of the lands at Star City, and the relationship between the Forest Service and The Hearst Corporation.

**Comment:** The Hearst Corporation states that the data supports implementing a campground operating season. The Hearst Corporation believes that the operating season of any campgrounds should be limited to April 1 through September 30.

**Response:** The proposed Recreation Management Plan would include O&M of all project recreation areas, including annual schedules and standard protocols for opening and closing recreation facilities, including primary season and shoulder seasons. Section 3.3.5.2, *Environmental Effects, Recreation Management Plan, McCloud Reservoir Recreation Facilities*, of the EIS has been revised to reflect this discussion.

**Comment:** The Hearst Corporation is concerned that the Forest Service proposal for the addition of parking and a trail for access to the Red Banks area will endanger The Hearst Corporation's property rights and subject it to potential liability. The Hearst Corporation states that its historical understanding regarding the Red Banks site was that public access would be provided solely from the surface of the water.

**Response:** PG&E would be responsible for providing any recreation facilities included in any license issued for the project and acquiring the rights necessary to operate those facilities from any private landowners. PG&E proposes to cooperate with private landowners to acquire rights of public access for the purpose of public recreational day-use.

**Comment:** The Forest Service notes that, in addition to the base of McCloud dam, Ash Camp and Ah-Di-Na Campground are the origin of whitewater boat trips on the McCloud River. These sites are within the 4.5 miles of publically accessible Forest Service lands along the Lower McCloud River below the dam and have been managed by the Forest Service for the life of the current license to provide support facilities for these flow-dependent uses. The Forest Service wants to emphasize that it is key that road access is open and available so recreationists can access the project-released minimum instream flows, especially in late spring, to participate in boating or fishing activities. The Forest Service states that the Commission should recognize this necessity in the final EIS. The Forest Service will be working with PG&E in the Settlement Agreement for Ah-Di-Na Road to try to optimize this accessibility, since this road is not currently proposed as a project road.

California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers agree with the Forest Service's statements above regarding the sites within the 4.5 miles of publicly accessible Forest Service lands along the Lower McCloud River below the dam. They recommend that the Commission, PG&E, and the Forest Service determine how to optimize recreation opportunities for the road to Ah-Di-Na and Ash Camp. California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers note that this could particularly help in relieving some of the perceived differences between boater and angler flows by allowing access to boaters to optimum boating flows that occur outside of the fishing season but are otherwise not accessible due to road conditions.

**Response:** A discussion of recreational access to the Lower McCloud River has been added to the final EIS in section 3.3.5.2, *Environmental Effects, Recreational Access to Lower McCloud River Flows*, and section 5.2.1, *Discussion of Key Issues, Recreation Resources, Recreational Access to Lower McCloud River Flows*, to address comments on the draft EIS. We recommend that PG&E provide an access site at the base of McCloud dam that would accommodate fishing and boating access at the Lower McCloud River. Because PG&E would be providing access to the Lower McCloud River from the project, it is not necessary for PG&E to also provide access to the Lower McCloud River outside the project boundary at Ash Camp or Ah-Di-Na Campground. Ash Camp (FR U38N11Y) and Ah-Di-Na (FR 38N53) roads provide access to these campgrounds located outside the project boundary that are not used for project purposes; therefore, they do not meet the Commission's criteria for project roads. Accordingly, PG&E would not be responsible for maintaining these roads, including snow plowing, under the project license.

**Comment:** PG&E clarifies that its objective would be to prohibit vehicle access at McCloud reservoir between the shoreline and the two roads along the reservoir (FR 38N11 and 38N04Y) between Tarantula Gulch and Star City Creek, not to "prohibit vehicle access at the McCloud reservoir between roads FR 38N11 and 38N04Y and the shoreline, at Iron Canyon reservoir between FR 37N78 and the shoreline, and to prohibit

dispersed camping and OHV use between the roads and the shorelines” (draft EIS p. 236).

**Response:** Section 3.3.5.2, *Environmental Effects, Dispersed Use and OHV Use*, and section 5.2.1, *Discussion of Key Issues, Dispersed Use and OHV Use*, of the EIS has been revised to clarify the objectives of PG&E’s proposal.

**Comment:** The Forest Service notes that camping use numbers would likely be higher at McCloud reservoir and Pit 7 afterbay if developed camping facilities were available. The Forest Service does not agree with PG&E’s characterization of the “roaming nature” of visitors to areas around McCloud reservoir.

**Response:** Section 3.3.5.1, *Affected Environment, Recreational Use*, of the EIS has been revised to discuss dispersed used at McCloud reservoir and Pit 7 afterbay instead of the “roaming nature” of visitors.

**Comment:** The Forest Service clarifies that California Fish and Game currently stocks the Upper McCloud River and that fish stocking is not proposed in the Lower McCloud River below the uppermost project development.

**Response:** The EIS has been revised, under section 3.3.5.2, *Environmental Effects, Fish Stocking*, and section 5.2.1, *Discussion of Key Issues, Recreation Resources, Fish Stocking*, to clarify the fish stocking proposal and California Fish and Game 10(j) recommendation.

**Comment:** The Forest Service clarifies that existing recreation development should be reconstructed within 3 years of license acceptance and again at mid-license or 25 years, whichever is greater. This requirement is because the Forest Service has concerns that future rehabilitation and replacement “as needed” of existing recreational facilities may have different interpretations.

**Response:** We have revised the EIS under section 3.3.5.2, *Environmental Effects, Recreation Management Plan, Recreation Facility Design Standard*, section 5.2, *Comprehensive Development and Recommended Alternative, Recreation Resources*, section 5.2.1, *Recreation Resources, Recreation Management Plan*, to clarify the Forest Service recommendation for reconstruction. Instead of requiring PG&E to reconstruct all recreation facilities, regardless of their condition, at mid-license term or 25 years, we have included a recommendation in section 5.2.1, *Discussion of Key Issues, Recreation Resources, Recreation Management Plan*, of the EIS for PG&E to reevaluate the facilities for degradation at mid-license term or within 25 years of license issuance, whichever is greater, to ensure that facilities do not become degraded during the license term.

**Comment:** The Forest Service will require a two-lane boat ramp with a 4-foot vertical draft clearance consistent with the California Department of Boating and Waterways at the Tarantula Gulch Boat Ramp to alleviate congestion during summer months.

**Response:** In the draft EIS, we recommended that PG&E reconstruct the Tarantula Gulch boat ramp with the toe of the ramp extending to an elevation no less than 3 vertical feet below minimum pool and that the boat ramp remain one lane. No new information has been provided to change our recommendation in the final EIS for the Tarantula Gulch Boat Ramp. As discussed in EIS section 3.3.5.2, *Environmental Effects*, PG&E has indicated steep slopes constrain design options for providing an additional lane at the boat ramp. The bottom of the boat ramp is currently 1 foot below the normal minimum operating reservoir level and typically provides boater access during the entire recreation season. Reconstructing the ramp, as proposed by PG&E, with the toe of the ramp to an elevation not less than 3 vertical feet below minimum pool would extend the season for launching boats.

**Comment:** The Forest Service clarifies that it has specified 30-40 total parking spaces, not additional spaces, at Tarantula Gulch Boat Ramp.

PG&E comments that the Forest Service overestimates the parking capacity that can be accommodated at Tarantula Gulch Boat Launch because there are extremely steep slopes that prevent expanding the parking area without significant site modification (e.g., including, but not limited to, blasting and constructing retaining walls). PG&E's states that its preliminary site designs using a site survey with 1-foot contour intervals shows that at most only about 20 vehicles with trailers and 5 single vehicles can be accommodated at the site. PG&E reiterates its commitment to develop the site to its maximum potential; however, it disagrees with specifying 30-40 spaces in any license article because it does not believe this capacity can be possibly be achieved at the site.

**Response:** In the draft EIS, we recommended that PG&E construct additional parking spaces at Tarantula Gulch boat ramp. The final EIS has been revised, under section 3.3.5.2, *Environmental Effects, McCloud Reservoir Recreation Facilities*, and section 5.2.1, *Discussion of Key Issues, Recreation Resources, Recreation Management Plan, McCloud Reservoir*, to clarify the Forest Service's original specification for the number of parking spaces at the Tarantula Gulch Boat Ramp and to include additional information from PG&E's preliminary site designs regarding the number of vehicles that can be accommodated; however, the Forest Service's modified condition does not specify a specific number of parking spaces. We have clarified our recommendation in the final EIS to recommend that PG&E construct additional parking spaces at Tarantula Gulch boat ramp as the site will allow.

**Comment:** The Forest Service notes that the final design and development of the Tarantula Gulch boat ramp will depend on the need to accommodate an overnight camping area in lieu of the preferred location at Star City Creek.

PG&E comments that PG&E and the Forest Service visited the Tarantula Gulch site on May 12, 2010, to discuss a redesign of the Tarantula Boat Ramp area. At that time, the Forest Service suggested the potential for a campground in the adjacent area. Because of its small size and lack of developable area, PG&E believes that it is not reasonable to consider a campground at Tarantula Gulch.

**Response:** The EIS has been revised, under section 3.3.5.2, *Environmental Effects, McCloud Reservoir Recreation Facilities*, and section 5.2.1, *Discussion of Key Issues, Recreation Resources, Recreation Management Plan, McCloud Reservoir*, to acknowledge that if PG&E is unable to secure the use of the land at the Star City Creek site, we would require a proposal for a similar recreation area that provides camping at McCloud reservoir. Although we recommend a campground at McCloud reservoir, we have not recommended a specific location for a campground. PG&E can file a plan with the Commission for approval for a different campground location at McCloud reservoir at that time.

**Comment:** PG&E states that in addressing specifications for reconstruction of Hawkins Landing boat ramp surface (length and width) that the text should actually read: length and width, *but not grade*. PG&E states that this should be consistent with the Forest Service preliminary 4(e) condition to avoid misinterpretations.

**Response:** The EIS has been revised in section 5.2, *Comprehensive Development and Recommended Alternative, Discussion of Key Issues, Recreation Resources, Iron Canyon Reservoir*, to clarify the specifications for reconstruction of Hawkins Landing boat ramp surface.

**Comment:** Multiple individuals noted that recreational access to McCloud River is difficult in the winter due to snow.

California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers note that access to Ash Camp and Ah-Di-Na is not possible in some years due to snow on the road. These groups state that public road access to Ash Camp and Ah-Di-Na (weather permitting) for anglers, boaters, and other recreationists along the Lower McCloud River is important so that project-released minimum instream flows are accessible and state that the Commission should recognize this necessity in the final EIS. California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers feel that this will help in relieving differences between boater and angler flows by allowing access to boaters during optimum boating flows that occur outside of the fishing season but are not accessible due to road conditions.

American Whitewater and Friends of the River recommend that PG&E be required to provide snow removal when flows are above 300 cfs at the Ah-Di-Nah gage to allow for boating access.

PG&E disagrees that it should be required to plow snow to provide vehicular access to Ah-Di-Na Campground for whitewater boating access because of public safety concerns, cost-effectiveness, and inconsistency with FERC's project road determination. PG&E states that, unlike Iron Canyon reservoir, it does not need to plow any roads at McCloud reservoir for operational purposes. PG&E states it has no need to plow snow at McCloud Reservoir. PG&E states that in the early spring, snow storms could suddenly make a plowed road impassable and entrap visitors or prevent their access to parked vehicles. Similarly, uncertain weather during the early spring creates a concern for responding to

boating-related emergencies that may occur. PG&E estimates plowing snow on the road to Ah-Di-Na Campground would cost \$62,000 per year. PG&E states that its study results documented circumstances that present logistical challenges to boaters that would likely affect demand.

**Response:** A discussion of recreational access to the Lower McCloud River has been added to the final EIS in section 3.3.5.2, *Environmental Effects, Recreational Access to Lower McCloud River Flows*, and section 5.2.1, *Discussion of Key Issues, Recreation Resources, Recreational Access to Lower McCloud River Flows*, to address comments on the draft EIS. We agree with PG&E's comments regarding plowing and continue to maintain the PG&E should not be required to plow the access roads to Ash Camp and Ah-Di-Na Campground. As noted previously, Ash Camp (FR U38N11Y) and Ah-Di-Na (FR 38N53) roads provide access to these campgrounds, which located outside the project boundary and are not used for project purposes; therefore, they do not meet the Commission's criteria for project roads. Accordingly, PG&E would not be responsible for maintaining these roads, including snow plowing, under the project license.

**Comment:** The Forest Service clarifies that its preliminary 4(e) condition reads that provision of snow removal on the access road (from junction with 38N11) and parking area will occur between April 1 and December 1—all seasons except winter. The Forest Service will match the snow removal language for both McCloud reservoir and Iron Canyon reservoir boat ramps. The Forest Service clarifies that PG&E proposes to remove snow from portions of the Iron Canyon Loop road in addition to the Oak Mountain Road in order to access the Iron Canyon dam, valve house, boat ramp and day-use area—since these areas cannot be accessed solely by use of Oak Mountain Road.

PG&E comments that it proposes to continue plowing snow at Iron Canyon dam to provide access for operational purposes. However, PG&E disagrees with the Forest Service requirement to plow snow on roads leading to Tarantula Gulch Boat Launch at McCloud Reservoir because it does not need winter access for project purposes and the study results do not demonstrate a need for this measure.

**Response:** The EIS has been revised, under section 3.3.5.2, *Environmental Effects, McCloud Reservoir Recreation Facilities*, section 3.3.5.2, *Environmental Effects, Iron Canyon Reservoir Recreation Facilities*, section 5.2.1, *Discussion of Key Issues, Recreation Management Plan, McCloud Reservoir*, and section 5.2.1, *Discussion of Key Issues, Recreation Management Plan, Iron Canyon Reservoir*, to clarify the Forest Service and PG&E proposals for snow removal at McCloud and Iron Canyon reservoirs.

**Comment:** The Forest Service acknowledges the option to move the development of a day-use area with boating put-in and fishing access from the base of McCloud dam to the Ash Camp Campground (1 mile below the dam at the Hawkins Creek confluence). The Forest Service notes that the need to provide for LWD and coarse sediment augmentation may make recreation use at the base of the dam infeasible due to safety concerns. The Forest Service feels that Ash Camp site could be an improved location. The Forest Service feels that further evaluation does not appear to support developments of a day-

use site at the Lower McCloud River due to safety and space considerations. Ash Camp Campground appears to be a more suitable site and field review by Forest Service, and the Forest Service notes that PG&E has confirmed this. Relocation of the McCloud Dam day-use developments to Ash Camp places these facilities at an existing public recreation site. The Forest Service notes that PG&E has agreed to take over management of Ash Camp and Ah-Di-Na under a Settlement Agreement, as long as the facilities remain outside of the license Boundary. The Forest Service has agreed to this arrangement only if a signed Settlement Agreement or other binding agreement is in place prior to filing of the final 4(e) conditions.

PG&E comments that it is premature to determine recreation development cannot be accommodated at the base of McCloud dam because there is not enough certainty about how and where gravel augmentation and LWD placement will be implemented. PG&E comments that although there may be constraints, it would be preferable to locate development at the base of the dam because it currently receives recreational use and it would not diminish space that could be used for overnight camping when Ash Camp is reconstructed. PG&E comments that it is still proposing to construct a powerhouse at the base of the dam and it would prefer to retain an option to construct the development at the base of the dam until the details of the various plans are known.

**Response:** It is still unclear as to whether the LWD and coarse sediment augmentation may make recreation use at the base of McCloud dam infeasible due to safety concerns. We continue to analyze access at the base of McCloud dam in the EIS as PG&E's proposal. However, if it is determined that this location is not feasible, PG&E can file a plan with the Commission for approval of an alternative facility.

Ash Camp and Ah-Di-Na Campground are both Forest Service recreation facilities located about 1 mile outside the project boundary and are not currently being used for project purposes, nor do they provide access to the project lands or waters. Since we are recommending that PG&E provide, at the project, an access site at the base of McCloud dam that would accommodate fishing and boating access at the Lower McCloud River, it is not necessary for PG&E to also provide access to the Lower McCloud River outside the project boundary at Ash Camp or Ah-Di-Na Campground. We acknowledge that a Settlement Agreement has been executed between PG&E and the Forest Service to address Ash Camp and Ah-Di-Na campgrounds; however, facilities located outside of the project boundary are not subject to Commission jurisdiction or the terms and conditions of the project license.

**Comment:** PG&E states that the McCloud River Preserve is not used as a launch site by boaters. Further, PG&E states that there is text in the draft EIS that implies that the Pacific Crest Trail follows the river upstream of Ash Camp when it actually follows the river to a point upstream of Ah-Di-Na Campground (draft EIS p. 203).

**Response:** Section 3.3.5.1, *Affected Environment, Regional Recreation Resources*, of the EIS has been revised to clarify that the McCloud River Preserve is not used as a launch site by boaters and the location of the Pacific Crest Trail.

**Comment:** Multiple individuals noted that access for disabled persons could be improved.

**Response:** In section 3.3.5.2, *Environmental Effects, Recreation Management Plan*, PG&E proposes to upgrade existing recreation facilities and construct new recreation facilities in accordance with Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG) and the Americans with Disabilities Act. Improving access for the disabled at the project would be consistent with the Commission’s policy on recreation facilities at licensed projects under which licensees are expected to consider the needs of the disabled in the design and construction of such facilities.<sup>45</sup> It also would help address growing recreational demand at this project.

**Comment:** The Forest Service notes that it is difficult to distinguish the project nexus with recreational fishing from recreational fishing access. The Forest Service also notes that safe angling opportunities for the public occur on Forest Service lands along the shoreline of the Lower McCloud River, specifically at Ash Camp, Ah-Di-Na, and the river corridor between these facilities. The Forest Service notes that, although these sites lack a project nexus, all three of these sites are directly related to, were created for, and are strongly impacted by, project flow-based use as described in the draft EIS. These sites currently provide the only public access to both boaters and anglers who have commented extensively on the desire for suitable project flows that support their recreational needs. The Forest Service notes that providing for “optimal” or “acceptable” fishing and boating are project-controlled and the only means available to the Commission to provide for this use is on public or project lands.

The Forest Service disagrees with PG&E’s stance that recreational improvements in areas of access to the Lower McCloud River have no project nexus. The Forest Service states that this opinion by PG&E is in direct conflict with the debate between anglers and whitewater boaters, whose focus is recreational use and access to the Lower McCloud River (specifically between Ash Camp and Ah-Di-Na Campground). The Forest Service feels that it is a necessity to provide a legitimate trail that meets this need while minimizing resource impacts.

**Response:** A discussion of recreational access to the Lower McCloud River has been added to the final EIS in section 3.3.5.2, *Environmental Effects, Recreational Access to Lower McCloud River Flows*, and section 5.2.1, *Discussion of Key Issues, Recreation Resources, Recreational Access to Lower McCloud River Flows*, to address comments on the draft EIS because this issue was not analyzed in the draft EIS. Except for the area immediately below McCloud dam, no project lands are located along the Lower McCloud River. Although we agree that flow regulation at McCloud dam affects recreational opportunities, Ash Camp and Ah-Di-Na Campground and the trail that connects them are not project facilities. We are recommending that PG&E provide, at the

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<sup>45</sup> See 18 CFR § 2.7 (2010).

project, an access site at the base of McCloud dam that would accommodate fishing and boating access at the Lower McCloud River. Because PG&E would be providing access to the Lower McCloud River from the project, it is not necessary for PG&E to also provide access to the Lower McCloud River outside the project boundary at Ash Camp or Ah-Di-Na Campground.

**Comment:** PG&E states that it will provide information on a public website about the general range of McCloud and Iron Canyon reservoir elevations and whether the boat launches are usable. PG&E notes that currently, real-time flow information at MC-1 (Ah-Di-Na) and MC-7 (above Shasta Lake) is (and will continue to be) provided to the public via the California Data Exchange Center (CDEC) website.

California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers state that real-time flow data should be made available (on the internet) at MC-7 at McCloud dam.

American Whitewater and Friends of the River also support the inclusion of a requirement in the new license conditions to post real time flow information for the Ah-Di-Nah gauge online.

**Response:** In the draft EIS, we recommended that PG&E provide real-time from MC-1 via PG&E's website. Since MC-7 is a compliance point for the flows from McCloud dam, the final EIS has been revised, under section 3.3.2.2, *Environmental Effects, Flow Monitoring and Determination of Water Year Type*, section 3.3.5.2, *Environmental Effects, Provision of Streamflow Information*, and section 5.2.1, *Discussion of Key Issues, Provision of Streamflow Information*, to recommend that PG&E provide real-time flow data at MC-7 in addition to MC-1 via PG&E's website. Although visitors commonly use the CDEC website to locate water-based recreation information, the Commission only has authority over its licensees and cannot require the CDEC to post project information on its website.

**Comment:** California Fisheries and Water state that the draft EIS does not disclose and evaluate the effects to California licensed anglers and also California licensed disabled anglers resulting from the specific daily 4(e) requirements by the Forest Service during the angling season.

**Response:** As discussed in section 3.3.5.2, *Environmental Effects, Recreation Management Plan, Recreation Facility Design Standards*, of the EIS, licensees are expected to consider the needs of all recreation users, including the disabled, in the design and construction of recreation facilities consistent with the Commission's policy on recreation facilities at licensed projects. Additionally, a discussion of recreational access is included in the EIS in section 3.3.5.2, *Environmental Effects, Recreational Access to Lower McCloud River Flows*, and section 5.2.1, *Discussion of Key Issues, Recreation Resources, Recreational Access to Lower McCloud River Flows*.

**Comment:** PG&E states that neither it nor the Forest Service identified the need to provide angling access to Iron Canyon Creek. PG&E states that additional angling access

is not necessary because there is already a road to the gauging station near the upstream end of Iron Canyon Creek, which is where the public land is located. Additionally, PG&E states that Iron Canyon Creek flows through private lands and all roads leading to the land adjacent to the creek are gated by the private landowner to restrict public access.

The Forest Service notes that although the Commission recommends that PG&E file a plan to enhance angling access to Iron Canyon Creek, field reviews do not indicate any current use for angling, and the steep narrow nature of the canyon and private property do not appear to invite use.

**Response:** In the draft EIS, we recommended that PG&E file a plan to enhance angling access to Iron Canyon Creek in order to provide additional public benefit as a result of the aquatic enhancement. In its September 27, 2010, letter, PG&E indicated that access to Iron Canyon Creek currently exists via a road that accesses the gaging station near the upstream end of the creek. Additionally, PG&E noted that much of Iron Canyon Creek has exceedingly difficult terrain for access. Due to these circumstances, we no longer recommend that PG&E file a plan to enhance angling access to Iron Canyon Creek. The EIS has been revised in section 5.2.1, *Discussion of Key Issues, Aquatic Resources, Iron Canyon Creek Below Iron Canyon Dam*, to reflect this staff recommendation.

**Comment:** The Forest Service agrees with the proposal to keep the Deadlun Campground in the current location, and additionally proposes (and states that PG&E agrees) that this facility would be redeveloped to provide for multi-family sites that can accommodate larger groups. Development of the new Gap Creek Campground and redevelopment of the Hawkins Landing Campground will focus on single-unit camping. The Forest Service also proposed that at least one campground be available (without water) year-round when the reservoir is accessible, to accommodate the off-season use. Furthermore, the Forest Service states that one day-use site (paved parking, picnic tables, restroom, and trash receptacle) and three shoreline access sites (paved parking and access trail to the water surface) are also proposed around the perimeter of the Iron Canyon reservoir.

**Response:** Subsequent to receipt of this comment dated September 24, 2010, the Forest Service filed its modified conditions by letter dated November 29, 2010, which clarified its modified 4(e) conditions. In the draft EIS, we recommended that PG&E reconstruct Deadlun Campground in its existing location and provide access to the shoreline at this site. The final EIS has been revised, under section 3.3.5.2, *Environmental Effects, Iron Canyon Reservoir Recreation Facilities*, and section 5.2.1, *Discussion of Key Issues, Recreation Resources, Recreation Management Plan, Iron Canyon Reservoir*, to analyze the modified condition related to recreation at Iron Canyon reservoir. Reconstruction of Deadlun Campground as a group campground at its existing location and the construction of a new, single-site campground at Gap Creek on the main body of Iron Canyon reservoir would provide more camping opportunities at the reservoir, improve facility conditions, and increase capacity at the campground. In the final EIS, we recommend PG&E reconstruct Deadlun Campground to provide double and triple campsites with

access to the shoreline and construct a new campground at the Gap Creek site for single unit campsites.

**Comment:** The Forest Service suggests that development of an emergency egress route from the surface of the Pit 6 reservoir at the dam would meet the current need for providing public recreation access within safety constraints. The Forest Service notes that boaters that may put into the Pit 5 reach on the overlapping Pit 3, 4, and 5 Project would need a way out of the Pit 6 reservoir if they fail to take-out appropriately upstream. The Forest Service states that development of a larger put-in/take-out above the Pit 7 dam, with access road and parking, should be possible and would direct use away from the dam and intake facility. The Forest Service will provide additional specifics for this in the final 4(e) conditions. The Forest Service states that an alternate egress point should be located a few hundred yards downstream of both the Pit 6 dam put-in and a bedrock constriction point, with slower flows that should allow egress even if Pit 6 powerhouse is at full load. The Forest Service notes that development at Montgomery Creek does not seem feasible due to access constraints. The Forest Service states that recreational development on Pit 7 reservoir would be included in the schedules for survey and monitoring under the Recreation Management and Monitoring Plan, and would include fish stocking and survey data.

PG&E disagrees with providing proposed enhancements at the lower end of Pit 7 reservoir if Montgomery Creek is not feasible based on public safety, feasibility, and lack of suitability.

PG&E states that, after review of public access options for Pit 6 and 7 reservoirs, it is PG&E's opinion that no safe access point was identified at Pit 6 reservoir. PG&E notes that, at the Pit 7 Reservoir, an access point was identified just downstream of Pit 6 dam, as well as at another potential location several miles downstream. However, in PG&E's opinion, no acceptable public access point was identified at the downstream end of the Pit 7 reservoir near the dam. In addition to the problems associated with public vehicular access to the top of the dam, PG&E notes two additional complications: (1) an ordinance prohibits boating within 500 feet of the dam; and (2) the reservoir elevation can be 35 feet below the high water mark, which would require boaters to scale the dam. PG&E located and investigated potential road access on an abandoned construction access road on September 19, 2010. Based on the suitability study results and subsequent investigations, PG&E believes it has thoroughly investigated all potential options and determined that it is not feasible to provide safe and secure public access to Pit 7 reservoir near the dam. Consequently, it is not appropriate to designate an access route to the feature labeled "Pit 7 Lake Access" located near Pit 7 dam area shown in attachment 2, figure 3, Pit 7 afterbay of the Forest Service comments on the draft EIS. PG&E states that the Commission should disregard this feature.

PG&E comments that the Forest Service implies that an old construction access road can be used to gain access to Pit 7 reservoir. PG&E conducted a site investigation with a civil engineer and found that the grade on the section of the road up and over the ridge

extending about 0.25 mile exceeds 20 percent and there are no options for lessening the grade because of the steep topography. In addition, PG&E states that the access road to the top of the dam is only one lane wide and steep, and there is no place for the public to park along the road or at the top of the dam.

American Whitewater and Friends of the River support the Commission's recommendation for the development of hand launch boating access at the Pit 7 reservoir and request that they be consulted on any plans to provide access for non-motorized boating.

**Response:** Subsequent to receipt of this comment dated September 24, 2010, the Forest Service filed its modified conditions by letter dated November 29, 2010, which clarified its modified 4(e) conditions. In the draft EIS, we analyzed but did not recommend PG&E's proposal and the Forest Service original 4(e) condition for a feasibility assessment for a hand-launch boat put-in where Montgomery Creek enters Pit 7 reservoir due to public safety concerns raised by PG&E about boating near the Pit 7 dam; however, we did recommend a river access trail and parking at the upper end of Pit 7 reservoir and a river access trail and parking at the lower end of Pit 7 reservoir. The final EIS has been revised, under section 3.3.5.2, *Environmental Effects, Pit 6 and 7 Reservoir Recreation Facilities*, and section 5.2.1, *Discussion of Key Issues, Recreation Resources, Recreation Management Plan, Pit 6 and 7 Reservoir Recreation Facilities*, to analyze the modified condition related to recreation at Pit 6 and Pit 7 reservoirs. In the final EIS, we continue to recommend PG&E construct one river access trail with a parking area at the upper end of Pit 7 reservoir but have revised our recommendation to recommend PG&E conduct a site evaluation to determine a location, and provide a shoreline river access trail with parking at the lower end of Pit 7 reservoir.

**Comment:** PG&E comments that in regards to Forest Service condition 30 calling for PG&E to rehabilitate existing facilities, PG&E states that there are no existing facilities at Pit 6 and 7 reservoirs; however, there is an existing Forest Service (non-project) car top boat launch downstream of Pit 7 afterbay.

**Response:** The EIS has been revised, under section 3.3.5.2, *Environmental Effects, Pit 6 and 7 Reservoir Recreation Facilities*, section 3.3.5.2, *Pit 7 Afterbay Recreation Facilities*, and section 5.2.1, *Discussion of Key Issues, Recreation Management Plan, Pit 7 Afterbay Recreation Facilities*, to clarify that there are no existing facilities at Pit 6 and 7 reservoirs; but there is an existing Forest Service (non-project) car top boat launch downstream of Pit 7 afterbay.

**Comment:** PG&E clarifies that public vehicular traffic to the Pit 6 reservoir is available by a gated road about 0.5 mi from Pit 6 dam. PG&E also clarifies that the dispersed recreation site near Pit 6 dam is located about 0.5 mi downstream of the dam (draft EIS p. 207).

**Response:** Section 3.3.5.1, *Affected Environment, Project Area Recreation Resources, Pit River*, has been revised to clarify that public vehicular access to Pit 6 reservoir is available by a gated road and the location of the dispersed recreation area near Pit 6 dam.

**Comment:** American Whitewater and Friends of the River support the Commission's recommendation for the development of hand launch boating access at the Pit 7 reservoir and request that they be consulted on any plans to provide access for non-motorized boating.

**Response:** We agree that consulting with American Whitewater and Friends of the River on plans on related to boating access would better inform the development of public access and the Recreation Plan. We have revised the EIS, under section 3.3.5.2, *Environmental Effects, Recreation Management Plan*, and section 5.2.1, *Discussion of Key Issues, Recreation Management Plan*, to include American Whitewater and Friends of the River as parties to be consulted during the development of the Recreation Management Plan.

**Comment:** The Forest Service proposes that PG&E and the Commission consider removal of the afterbay dam and construction of an alternative structure to attenuate the flows. The Forest Service states that altering this structure would improve the safety of the project and allow for water-based access, including angling and boating at the Fenders Flat site. The two day-use developments within the Fenders Flat area could be combined if the afterbay dam and barbed wire were removed. The Forest Service states that Fenders Flat site is one of the largest flat areas within the project, and the only likely site for overnight camping on the Pit River portion of the project. By consolidating the two proposed day-use developments within the Fenders Flat area, a day-use area, campground, boat launch, and waterplay, whitewater boating and angling access could all be provided with parking and support facilities.

**Response:** Please see our response regarding the safety issues at Pit 7 afterbay dam.

**Comment:** The Forest Service clarifies that, according to the Recreation Demand Assessment RL-S1 (TM-37), angling is projected to increase by 243 percent, camping by 350 percent, boating by 438 percent, and viewing scenery/wildlife by 350 percent. The Forest Service states that this illustrates the need for camping, angling, and boating facilities on this project.

**Response:** The EIS has been revised in section 3.3.5.2, *Environmental Effects, Recreation Monitoring*, section 3.3.5.2, *Environmental Effects, Reservoir Water Surface and Shoreline Management*, and section 5.2.1, *Discussion of Key Issues, Recreation Management Plan, Recreation Monitoring*, to reflect the results of the Recreation Demand Assessment RL-S1 (Technical Memorandum 37). Our recommended recreation facility enhancements would be adequate to support the need described in the Recreation Demand Assessment RL-S1 and the final EIS.

**Comment:** The Forest Service clarifies that the Forest Service Law Enforcement personnel from the Shasta-McCloud and National Recreation Area units of the Shasta-

Trinity National Forest are responsible for enforcing regulations related to the management of Forest Service lands and resources as provided for in the CFR. The Forest Service notes that these personnel do not have jurisdiction on the water surface of the four reservoirs within the project. The Forest Service also notes that McCloud reservoir serves mostly Siskiyou County users and is rarely, if ever, patrolled by Shasta County.

The Hearst Corporation states that the pervasiveness of dispersed use and camping noted in the draft EIS demonstrates the need for enforcement.

**Response:** The EIS has been revised, under section 3.3.5.2, *Environmental Effects, Project Patrol*, and section 3.3.7.1, *Affected Environment, Public Safety and Law Enforcement*, to clarify that the Forest Service is only responsible for enforcing regulations on Forest Service lands and does not have jurisdiction on the water surface of the project reservoirs. All existing project lands are within the jurisdiction of the Shasta County Sheriff. The Shasta County Sheriff is responsible for public safety and law enforcement on lands in the project area. The Shasta County Sheriff's Boating Safety Unit is responsible for boating safety enforcement on all waterways within Shasta County, including McCloud reservoir.

**Comment:** The Forest Service states that it has nearly missed an opportunity to resolve the known safety issues associated with the Pit 7 afterbay dam and V-notch weir. The Forest Service states that flow changes can cause the V-notch weir portion of the afterbay dam facility to go from exposed wing walls with flows confined to the V-notch, to the entire V-notch weir and adjacent afterbay dam completely inundated and not visible to boaters. In both cases, flows through and just downstream of the V-notch weir are dangerous and create hydraulics, which have capsized boats and caused at least three known drownings. The Forest Service notes that anglers regularly cut the fence to gain access to this area, and states that PG&E has noted that maintenance at this site takes place weekly, with no clear improvement of compliance. The Forest Service recommends that the final EIS explore other alternatives to resolve this safety issue. One alternative should include the removal of the existing afterbay dam facility and reconstruction of the river channel between the Pit 7 dam and Fenders Flat, with an alternate energy attenuator. The Forest Service notes that the removal of the Pit 7 afterbay facility would have the added benefit of allowing public use of the 1.5 mile section of the Pit River from the Pit 7 dam to Fenders Flat, which has been fenced and signed since project construction. Ms. Stacy Smith, representing the Forest Service, made a public comment at the morning draft EIS meeting on September 9, 2010, that addressed many of the aforementioned comments.

The California Water Board states that the draft EIS does not disclose the safety issues at the Pit 7 afterbay dam, which creates a dangerous hydraulic condition that has caused the death of fishermen accessing the site by boat from Shasta reservoir. The California Water Board states that low/leakage through the dam results in pools below the dam that hold fish, which creates an attractive but dangerous condition for fisherman and

recommends that this information be included in the final EIS and considered during the development of recreational improvements.

California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers suggests that the Commission explore the removal of Pit 7 afterbay as an alternative way to ameliorate the safety concerns. California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers states that this alternative would also require the reconstruction of the river channel in this area.

American Whitewater and Friends of the River also recommends that FERC require PG&E to remove the Pit 7 afterbay dam and reconstruct the river channel between the Pit 7 dam and Shasta Lake due to the aforementioned safety concerns.

PG&E states that Pit 7 afterbay is a necessary public safety feature of the project—it serves to attenuate the water flow from Pit 7 dam and powerhouse before entering Shasta Lake. PG&E believes the suggestion by the Forest Service that Pit 7 afterbay dam should be removed is ill-advised. PG&E states that removing the afterbay dam would increase the hazard to recreational users in the area from flow fluctuations from Pit 7 dam, or alternatively would require reoperation of the Pit River system as a run-of-the-river operation, because Pit 7 reservoir does not provide sufficient storage to re-regulate all of the flow from peaking operations upstream. PG&E states that this, in turn, would have a significant adverse effect on the ability of PG&E to meet peak consumer power demand. Mr. Steve Nevares, representing PG&E, also made a public comment at the morning draft EIS meeting on September 9, 2010, that addressed many of the aforementioned comments.

**Response:** As several commenters describe, the dangerous hydraulic conditions at the Pit 7 afterbay dam create a public safety concern. As such, our Division of Dam Safety and Inspections (D2SI) has been working with PG&E on ways to address this problem. Given the need for immediate attention, D2SI will continue to work with PG&E and others to resolve this serious concern. We have forwarded the information filed by interested parties in this proceeding that are relevant to this issue to D2SI and revised the EIS in section 3.3.5.2, *Environmental Effects, Pit 7 Afterbay Recreation Facilities*, to reflect this.

**Comment:** The Forest Service supports stocking (with management responsibilities and hatchery infrastructure to provide fish) by California Fish and Game with funds from PG&E to stock the 60,000 pounds of fish. The Forest Service notes that this is contrary to the Commission's conclusion that PG&E will stock the fish themselves and develop a plan to evaluate fish stocking every 6 years.

**Response:** To clarify, PG&E is ultimately responsible for the management of all project reservoirs and project reaches and would be responsible for stocking trout annually within the project boundary. PG&E could meet its responsibility by providing funding to California Fish and Game if it chose to do so.

**Comment:** The Forest Service supports the Commission's concurrence with the California Fish and Game 10(j) recommendation that PG&E provide funding to increase stocking levels of trout to meet recreational demands, and to provide funding for white sturgeon mitigation.

**Response:** To further clarify, PG&E is ultimately responsible for the management of all project reservoirs and project reaches and would be responsible for stocking trout annually within the project boundary. PG&E could meet its responsibility by providing funding to California Fish and Game if it chose to do so.

To clarify, we are not recommending funding for white sturgeon mitigation. As discussed in section 5.2.1, *Discussion of Key Issues, Recreation Resources, Fish Stocking*, given low natural recruitment and the problems associated with the previous sturgeon planting program, it is not clear at this time how \$5,000 would be used to implement a mitigation program that would successfully maintain a white sturgeon population in Shasta Lake. Furthermore, it also is not clear at this time how the \$5,000 would be used to monitor and evaluate the fish stocking program and we have no way of knowing if these funds would be used solely to evaluate the program at the project.

**Comment:** The Forest Service final 4(e) conditions will modify the following recreation items discussed in the January 2010 preliminary 4(e) conditions: (1) the Forest Service believes it will have an agreement with PG&E that three shoreline access areas are appropriate, with specific locations to be defined later; (2) the Forest Service will drop the wording that requires 155-day operability at the Hawkins landing boat ramp and 90 percent operable at the new Iron Canyon dam boat launch/day facility because these requirements are addressed by the elevational requirements of the ramps; (3) although the distance of the existing Deadlun Campground to the water is still a concern, there is an agreement on a reasonable alternative that will include reconstruction of the existing Deadlun Campground to provide for larger group use; and (4) construction of a new campground at Gap Creek will provide for the identified need of individual family use adjacent to project waters (i.e. Iron Canyon Reservoir)—this campground would include standard Forest Service level 3 facilities (i.e., camping road spurs, vault toilets, campfire rings, picnic tables, trash collection, host, etc.).

**Response:** Subsequent to receipt of this comment dated September 24, 2010, the Forest Service filed its modified conditions by letter dated November 29, 2010 which clarified its modified 4(e) conditions. The EIS has been revised, under section 3.3.5.2, *Environmental Effects, Iron Canyon Reservoir Recreation Facilities*, and section 5.2.1, *Discussion of Key Issues, Recreation Resources, Recreation Management Plan, Iron Canyon Reservoir*, to analyze the modified conditions related to recreation at Iron Canyon reservoir.

**Comment:** The Forest Service disagrees with the Commission that the duties of the project patrol should be addressed by state and county agencies, and does not ask that PG&E provide a law enforcement person. The Forest Service states that project patrol contacts law enforcement if project patrol comes across a situation that requires legal

enforcement; the duties of the project patrol are to assure compliance with various aspects of the license including protection of cultural resource and project facilities, and public contact management.

The Pit River Tribe agrees with the above statement by the Forest Service.

The Hearst Corporation states that disbursed camping has been identified in relicensing studies as creating resource damages. The Hearst Corporation feels that project patrols and campground hosts would provide a step towards internalizing the externalities resulting from the project; project patrols would encourage compliance and improve safety.

**Response:** Although more visible patrol or law enforcement may help reduce conflicts between recreation users and improve visitor safety, the state and county are responsible for law enforcement activities at public recreation sites, including those within the project area. Further, the Commission has no way of ensuring that the hiring of a patrol person would actually accomplish a project purpose or ameliorate a project effect. There would be no indication that existing recreation conflicts would be reduced through the proposed measure; therefore, we continue to not recommend that PG&E provide a project patrol or funding for a law enforcement position.

**Comment:** PG&E clarifies that the phrase “temporary bridges” refers to the fishing bridges that the McCloud River Club installs for access to its privately owned fishing trails along the river. PG&E notes that these bridges are located on private land and are not project features.

**Response:** The EIS has been revised in section 2.2.3, *Proposed Environmental Measures, Aquatic Resources*, to clarify that “temporary bridges” are located on private lands and are not project facilities.

**Comment:** The Center for Water Advocacy suggests that analyses of McCloud River Preserve, Iron Canyon Creek and Pit 6 and Pit 7 reservoirs should include the following specifications: (1) all visitors should be asked to register when they arrive at the McCloud River Preserve; and (2) each angler who fishes the preserve should record fishing data (i.e., number of hours fished, size, species, and number of trout caught). In addition, the Center for Water Advocacy recommends that angler and visitor use surveys under the draft EIS should include: (1) total number of visitors who use the river for fishing; (2) number of anglers reporting fishing results and what percentage of fisherman this represents; (3) variations in reporting rate monthly, including which seasons contain the lowest points; (4) monthly number of anglers, hikers, number of angler surveys completed (with reporting rate), hours fished, and hours fished per angler; (5) total number of anglers, hours fished, and hours fished per angler; (6) monthly numbers of rainbow and brown trout caught; (7) total number and percentage of rainbow and brown trout caught; (8) variations in susceptibility to capture of each species; (9) number and species of fish caught by size class; (10) number of brown trout caught by size class; and (11) catch rate (fish/hr) by month of rainbow, brown and all trout caught.

**Response:** The McCloud River Preserve is not located inside the project boundary and not part of the McCloud-Pit Project. This preserve is located on private property downstream of the project and does not serve a project purpose nor does it provide direct access to the project.

Although the relicensing studies have been completed, recreation monitoring would be conducted at the project concurrent with preparing information for the recreation Form 80 reporting (every 6 years). The recreation monitoring would include consultation with the Forest Service, appropriate agencies, and interested parties to review and adjust project-wide recreation management objectives, if needed. Additionally, the annual Recreation Management Plan meetings would be an appropriate venue to discuss additional information needs at the project.

**Comment:** The Forest Service feels it should be clarified in the final EIS that blocking of non-NFS routes will not eliminate all concerns associated with dispersed camping.

**Response:** The EIS has been modified, under section 3.3.5.2, *Environmental Effects, Dispersed Use and OHV Use*, to clarify that closing non-NFS routes would not eliminate all concerns associated with dispersed camping.

**Comment:** The Forest Service states that if agreement cannot be reached at the Star City Creek site within 1 year of license acceptance, the Forest Service will specify that overnight camping be accommodated along the Tarantula Gulch inlet. Due to the small size of a limited area for recreational vehicle and/or tent camping at the area, the Forest Service would not support a host occupying one of the limited spaces, should this alternative be implemented.

**Response:** The EIS has been revised, under section 3.3.5.2, *Environmental Effects, McCloud Reservoir Recreation Facilities*, and section 5.2.1, *Discussion of Key Issues, Recreation Resources, Recreation Management Plan, McCloud Reservoir*, to acknowledge that if PG&E is unable to secure the use of the land at the Star City Creek site, we would require a proposal for a similar recreation area that provides camping at McCloud reservoir. PG&E can file a plan with the Commission for approval for a different campground location at McCloud reservoir at that time.

**Comment:** The Forest Service comments that if developed overnight camping is provided at Star City Creek or Tarantula Gulch, the Forest Service will complete a Civil Rights Impact Analysis and Forest Order to accompany the Commission's final EIS analysis and close the NFS lands around McCloud reservoir to dispersed camping. If overnight facilities are not developed, the Forest Service will continue to allow dispersed camping to accommodate the demand, with additional mitigations by PG&E that should assist in addressing the current concerns at Star City Creek. The Forest Service recommends that the final EIS provide additional analysis related to the closure of NFS lands around Iron Canyon and McCloud reservoirs to dispersed camping.

The Hearst Corporation is concerned that the EIS does not make a recommendation regarding The Hearst Corporation's request that a "Forest Order" be issued to allow for

enforcement action and states that this is an important and basic measure which should be dealt with during the licensing process.

**Response:** The EIS includes the analysis to meet the Commission’s purposes and to allow us to recommend a formal campground at McCloud reservoir. If additional analysis is needed for the Forest Service to issue a Forest Order, it is the responsibility of the Forest Service to perform that analysis.

The Commission does not have authority over the Forest Service or NFS lands.

**Comment:** California Trout, Trout Unlimited, and the Northern California Council, Federation of Fly Fishers comments that, given that the Forest Service lands provide the only public access for anglers, boaters, and other recreationists along the Lower McCloud River, it is important that road access is open and available so recreationists can access the project released minimum instream flows, especially in late spring.

The Forest Service supports the development of an angling access route along the Lower McCloud River between Ash Camp and Ah-Di-Na instead of access at Iron Canyon Creek, where a user-created trail and angling pressure currently exists, and the Land and Resource Management Plan supports development of a trail.

The Forest Service supports access for both angling and boating opportunities (and the associated day-use and camping support facilities for these uses) and would support Commission language specifying that road access (including snow plowing) and facilities for both uses should be provided by PG&E such that each activity can occur when flows are “optimal” for the use.

American Whitewater and Friends of the River comment that it is imperative that access be provided to Ah-Di-Nah whenever boating flows are available. American Whitewater and Friends of the River state that the Commission’s recommendation to only provide put-in access for boating below McCloud dam will limit boating opportunity to only the most skilled boaters; the upper segment is not suitable for the intermediate level boaters and far less suitable for rafts. American Whitewater and Friends of the River state that, in contrast, the run from Ah-Di-Nah provides an intermediate level trip suitable for kayakers, rafters, and rafting based anglers, as well as disabled persons that have no other way to see this river in its entirety. American Whitewater and Friends of the River state that currently, the road to Ah-Di-Nah campground is often impassable due to snow during this period and that it is unacceptable to relegate boating opportunity to this particular season and not provide access.

**Response:** A discussion of recreational access to the Lower McCloud River has been added to the final EIS in section 3.3.5.2, *Environmental Effects, Recreational Access to Lower McCloud River Flows*, and section 5.2.1, *Discussion of Key Issues, Recreation Resources, Recreational Access to Lower McCloud River Flows*, to address comments on the draft EIS because this issue was not analyzed in the draft EIS. Except for the area immediately below McCloud dam, no project lands are located along the Lower McCloud River. Although we agree that flow regulation at McCloud dam affects

recreational opportunities, Ash Camp and Ah-Di-Na Campground and the trail that connects them are not project facilities. We are recommending that PG&E provide, at the project, an access site at the base of McCloud dam that would accommodate fishing and boating access at the Lower McCloud River. Because PG&E would be providing access to the Lower McCloud River from the project, it is not necessary for PG&E to also provide access to the Lower McCloud River outside the project boundary at Ash Camp or Ah-Di-Na Campgrounds.

Ash Camp (FR U38N11Y) and Ah-Di-Na (FR 38N53) roads provide access to these campgrounds located outside the project boundary that are not used for project purposes, therefore, they do not meet the Commission's criteria for project roads. Therefore, PG&E would not be responsible for maintaining these roads, including snow plowing, under the project license.

**Comment:** The Hearst Corporation strongly disagrees with the conclusion that fire rings would reduce the threat of wildland fire at Star City. Instead, The Hearst Corporation recommends proper signage, information, and enforcement to prevent the use of open campfires. The Hearst Corporation would also support the use of supervised cooking grills as an alternative to fire rings.

**Response:** Fire rings in addition to the development of a Fire Prevention and Response Plan that would increase preparedness of fire responders and minimize damage to natural resources in the area, could greatly reduce the threat of wildfires. Cooking grills could also meet the needs of overnight users at the proposed developed campground. Although we have revised the EIS, under section 3.3.5.2, *Environmental Effects, McCloud Reservoir Recreation Facilities*, and section 5.2.1, *Discussion of Key Issues, Recreation Resources, Recreation Management Plan, McCloud Reservoir*, to not specifically recommend fire rings at Star City, we acknowledge that including fire rings at Star City could help reduce the threat of wildfires at Star City. The specific details of the Star City campground facilities would be included in the proposed Recreation Management Plan that would be developed in consultation with the Forest Service, California Fish and Game, California Water Board, and other interested parties. We agree that proper signage and information would also help reduce the threat of wildfire.

**Comment:** The Forest Service suggests that within 2 years of plan approval seems more appropriate timeframe to construct recreation improvements (i.e., facilities), rather than the 5 years that that Commission suggests.

PG&E comments that the time estimates to construct new facilities also include significant design work and that the 5-year window cited in the draft EIS more accurately captures these constraints.

**Response:** We maintain in section 3.3.5.2, *Environmental Effects, Recreation Management Plan, Recreation Facility Design Standards*, that PG&E's estimates for construction of these facilities within 5 years of Commission approval of the plan are reasonable due to the significant design work that is anticipated.

**Comment:** The Forest Service states that it and PG&E have collaboratively developed a draft Recreation Development and Management Plan which will be filed with the final 4(e) conditions and that this draft plan should be finalized within 1 year after license acceptance.

PG&E comments that after license application submittal, the Forest Service created its own version of a Recreation Plan and invited PG&E to attend meetings and discuss the content of its plan, but FERC should not interpret this interaction to mean that PG&E agrees with the content of any plan submitted by the Forest Service. PG&E indicates that it has not reviewed what the Forest Service has written in the plan that it is submitting with its final 4(e) conditions.

**Response:** Subsequent to these comments, the Forest Service filed modified 4(e) conditions on November 29, 2010, that included a draft Recreation Management Plan. This plan and PG&E's recreation proposals are analyzed in this final EIS and we note that the draft Recreation Plan submitted with the modified 4(e) condition was considered in the final EIS to be part of the Forest Service's 4(e) conditions and not a joint Forest Service-PG&E document.

## **CULTURAL RESOURCES**

**Comment:** The Pit River Tribe supports the Forest Service's comment that botanical surveys have not yet been completed within the expanded APE for the Winnemem Wintu Tribe along the Lower McCloud River. The Pit River Tribe notes that this information will be necessary in order to identify culturally significant plants associated with TCPs along this alignment and complete Study Plan CR-S2.

**Response:** PG&E has informed the Commission that a botanical survey was completed within the APE. Data are still forthcoming from the Winnemem Wintu TCP study that will identify culturally significant plants to the tribal members.<sup>46</sup> These data will be incorporated into the final HPMP with an amendment. Botanical surveys related to culturally significant plants are addressed further under Terrestrial Resources.

**Comment:** The Forest Service clarifies that "Native American properties" should be more appropriately referred to as "traditional cultural properties."

The Pit River Tribe also notes that "Native American Properties" (as defined in the draft EIS) should be identified as "Traditional Cultural Properties."

**Response:** The Commission agrees, and where appropriate, will substitute the term "traditional cultural properties" for "Native American Properties."

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<sup>46</sup> On January 3, 2010, PG&E filed a revised appendix D associated with Study Report CR-S2: Traditional Cultural Properties: Pit River Tribe.

**Comment:** The Forest Service clarifies that a limited site survey was conducted on NFS lands, where a site (Site #10 – Old Bridge Site –F.S. 05-14-61-601) (P-45-003194) was recorded.

**Response:** The EIS (table 3-32) recognizes this as a newly recorded site.

**Comment:** The Center for Water Advocacy states that the draft EIS fails to correctly apply the National Historic Preservation Act (NHPA). For example, the Winnemem Wintu Tribe representative could not participate in fieldwork because the crew allegedly did not check with him to ensure that he did not have conflicts prior to scheduling the fieldwork. The Center for Water Advocacy suggests that the APE be revised to address impacts on cultural resources as identified by the Tribes including the Winnemem Wintu Tribe. The Center for Water Advocacy feels that the license should not be granted until the APE is changed as requested by the Winnemem Wintu Tribe.

**Response:** The APE was developed in consultation with the California State Historic Preservation Office and was approved by the Commission in 2008. At this time, we find no compelling reasons to expand the APE. However, as stated in the draft EIS, section 3.3.6.2, *Environmental Effects, Cultural Resource Management, Our Analysis*, if there is a future need expand the APE, the APE can be expanded according to the mechanism provided in the Historical Properties Management Plan (section 5.15). The final Programmatic Agreement (PA) would also allow for the final HPMP to be amended and provides a dispute resolution process. Additionally, although the NHPA does not specifically require the presence of tribal representatives during fieldwork, we find that there remains ample opportunity for Winnemem Wintu Tribe representatives to continue to participate in the identification and protection of cultural resources, as detailed in section 5.71 of the HPMP.

**Comment:** Additionally, the Winnemem Wintu Tribe states that the Commission has limited the scope of the APE without determining whether the project may impact cultural sites outside of its proposed APE. The Tribe feels that the Commission has improperly put off its duty to examine the potential impacts of its actions on the Tribe's cultural resources before they are approved, by allowing any management measures related to the Tribe's cultural resources be deferred to an amendment to the HPMP. For example, the Tribe states that the draft EIS fails to examine any impacts posed by the proposed McCloud reservoir powerhouse, increased recreational facilities and access, and operations undertaken to mitigate other project impacts along the McCloud River, on the Tribe's TCPs and other cultural resources. In addition, without an adequate understanding of the planned transmission route, powerhouse location and size, and extent of additional ground-disturbing activities associated with its installation, the Commission lacks the ability to determine that the powerhouse will have no unavoidable impacts on cultural resources. The Tribe states that PG&E's current route for the transmission line has the potential to impact significant tribal resources, but that such impacts are ignored in the draft EIS. The Tribe notes that ground disturbing activities involving the construction phases associated with the new proposed facilities would have

the potential to directly affect archaeological sites and TCPs. The Tribe is not assured that the Commission has made an informed decision regarding the project's potential impacts to cultural resources, and whether appropriate alternatives exist to mitigate or avoid such impacts.

**Response:** The Commission approved the APE for the project in 2008, after considering the scale and nature of the project and its potential for direct and indirect effects on cultural resources. The APE was developed in consultation with the California State Historic Preservation Office. No change is anticipated in its scope as we find that consideration of these effects on identified resources has been adequately addressed in the HPMP. We agree that the effects of the project on TCPs associated with the Winnemem Wintu Tribe have yet to be so treated; however, section 5.2 of the HPMP provides a mechanism for conducting additional field studies related future construction activities such as the proposed transmission line and powerhouse, and appropriate treatment measures can be amended to the final HPMP, that would in the future assure that such resources are adequately protected. The APE may be modified as a result of ongoing or future studies if we determine in the future that a historic property outside of the current APE may be affected by the project. We also note, as previously stated, that PG&E's proposed McCloud powerhouse remains just a proposal. At this time the Commission does not have enough information from PG&E to make a recommendation regarding whether the proposed powerhouse should be included in any license issued for the project.

**Comment:** The Forest Service notes that in the third paragraph, "Hoken" should be spelled "Hokan." In addition, the Forest Service does not support the description which states the Winnemem Wintu and Pit River groups migrated from Asia.

The Pit River Tribe agrees with the aforementioned statement. They claim ties to the 100 square mile boundary since time immemorial, and request this to be noted in the draft EIS.

**Response:** The spelling for "Hokan" and the text concerning the Tribes' origins have been amended in the EIS, in section 3.3.6.1, *Affected Environment, Cultural History Overview*.

**Comment:** The Forest Service disagrees that 14 sites are located on lands that were inaccessible during surveys. It states that access was provided to a site on NFS lands (Site #10 – Old Bridge Site [F.S. 05-14-61-601] [P-45-003194]) and was subsequently recorded. In addition, the Forest Service provided PG&E with a November, 2008 California State University Chico Foundation site record for the portion of this site on the adjacent private lands.

The Pit River Tribe agrees with the Forest Service's statement above.

**Response:** The HPMP lists 14 sites located on McCloud River Club land that were inaccessible for study purposes. It also notes that a portion of the referenced site on Shasta-Trinity National Forest lands was recorded as ALB-12 [FS 05-04-61-601]. The

portion on the McCloud River Club remained inaccessible. We have revised the number of sites that were identified on lands that were inaccessible during field surveys, in EIS section 3.3.6.1, *Affected Environment, Identified Resources*. The site located by Chico State personnel in 2008 is included in the HPMP as ALB-12 [P-45-003194; FS05-04-61-601].

**Comment:** The Forest Service recognizes 11 newly identified/recorded sites in the project—in combination with 23 previously recorded sites, this brings the total to 34 sites.

**Response:** The Commission finds that there are nine newly identified sites within the project APE and 24 previously recorded sites. However, two of the 24 were treated as newly recorded (ALB-12[FS 05-04-61-601] and ALB-1[FS 05-04-61-600]) as they did not receive state trinomial numbers when they were first identified. There is a total of 33 sites and 22 isolated finds. Thus, the cultural resource inventory as described in the EIS is correct.

**Comment:** The Forest Service states that the Commission fails to note that the Forest Service located a new site near the confluence of the Lower McCloud River and Squirrel Creek.

**Response:** The cultural resources information in the EIS is based on the final HPMP data. A site recorded after its publication may not be reflected in the cultural resources inventory. The Forest Service would need to provide site data and report citations for new sites located after 2009. The final HPMP also provides a provision where such new data could be incorporated and addressed if necessary.

**Comment:** The Forest Service disagrees that there is only one potentially eligible site currently affected by project operations, and concludes that there are as many as four eligible or potentially eligible sites that are currently being adversely affected by project operations (this number does not include the Iron Canyon Reservoir sites which are project-affected, and may also be eligible). The Pit River Tribe also agrees with the Forest Service's above statements that there are as many as four eligible or potentially eligible sites that are currently being adversely affected by project operations. This number does not include the Iron Canyon Reservoir sites which are project-affected.

**Response:** The HPMP identified types of project-related effects for project area archaeological and historic-era resources and provided analysis of potential effects on the cultural resources within the APE. Fourteen sites were identified as having project-related effects. One of these is an eligible site and the remainder are undetermined in terms of their National Register of Historic Places (National Register) eligibility. As stated in the final HPMP, all sites that are being adversely affected by the project will be evaluated for National Register eligibility within a year after license issuance.

**Comment:** Of the 34 archaeological sites, the Forest Service considers 2 eligible for the National Register, and one potentially eligible (F.S. 05-14-61-33 [CA-SHA-33]) within

the Lower McCloud River area. Additional sites are also potentially eligible within the Iron Canyon Reservoir area.

**Response:** The EIS identifies 2 sites as eligible in the McCloud River Area and noted CA-SHA-688 (F.S. 05-14-61-33) as undetermined in its eligibility. The final EIS has been revised to state this site is recommended as potentially eligible by the Forest Service. No Iron Canyon sites were identified as eligible or potentially eligible in the HPMP. Nevertheless, and as stated in the final HPMP, all sites that are being adversely affected by the project will be evaluated for National Register eligibility with a year after license issuance.

**Comment:** The Forest Service identified 17 (not 14) of the 34 sites that have project-related effects. The Pit River Tribe is very concerned that 17 (not 14) of the 34 sites have project-related effects. The additional three sites that the Forest Service and Pit River Tribe consider to have project-related effects are CA-SHA-246, CA-SHA-686, and CA-SHA-687.

**Response:** We acknowledge the Forest Service and Pit River Tribe's comments regarding sites they identified as having project-related effects; however, we do not find that those three sites are being affected by the project. In the October 2010 final HPMP, PG&E identifies erosion at site CA-SHA-246 which it considers not to be project-related due to the location of this site. PG&E also addresses recreation-related effects at sites CA-SHA-686 and CA-SHA-687 that it considers not to be project-related due to a lack of project nexus for these effects. Additionally, PG&E notes that it would address potential management and mitigation actions for sites CA-SHA-686 and CA-SHA-687 under a Settlement Agreement with the Forest Service, if PG&E were to assume responsibility for management of Ah-Di-Na and Ash Camp Campgrounds. Finally, if additional sites are identified or become adversely affected by the project, section 5.15 of the final HPMP includes provisions to address such sites. As stated in EIS section 5.2, *Comprehensive Development and Recommended Alternative*, we consider the October 2010 HPMP filed by PG&E to be a final document and we agree with the findings contained in that document regarding these three sites.

**Comment:** The Pit River tribe also agrees with the Forest Service that PG&E should not wait to add a later amendment to the HPMP for Pit River Tribe TCPs.

**Response:** The HPMP has been finalized with the provision that an amendment(s) may be made to treat new information that needs to be considered in project development.

**Comment:** The Winnemem Wintu Tribe states that the draft EIS fails to adequately study the ongoing and future impacts of the project, including its impacts to the Tribe's cultural resources and the McCloud River's aquatic resources. Since the Tribe's historical and traditional cultural sites may be eligible for inclusion in the National Register, the Tribe states that the Commission must consider the impacts of the project on these sites.

**Response:** The HPMP, which is a management tool, has been finalized to move the project forward with the recognition that new data will come forward that needs to be

considered in project development. The HPMP will be amended in those circumstances and the receipt of the Winnemem Wintu Tribe TCP study is an important example of such a circumstance.

**Comment:** The Forest Service clarifies that it considers the HPMP a draft document at this time and feels there are further edits that need to be incorporated. For example, the draft HPMP does not contain complete study results, fails to incorporate previous input from the Forest Service, has not yet included formal consultation with Tribal Governments, and does not include collaborative development of project-specific mitigations based on study results and other necessary components. The Forest Service notes that PG&E has not attended a meeting to discuss the HPMP in over a year, and that when meetings were held, there were no collaborative discussions of development of site-specific treatment measures as proposed in PG&E's draft HPMP (table 6.1.0-1). The Forest Service has requested PG&E to participate in meetings and provide comments/feedback to the Forest Service and the Tribe, to discuss specific treatment measures that can be taken to protect identified sites. PG&E has declined to attend (it has not attended a meeting since July 2009).

The Forest Service further clarifies that the HPMP should be finalized and implemented after license acceptance, and that the plan should be labeled as a draft document until approved by the Forest Service, Tribes, and the Commission. The Forest Service original condition 34 specifies that the final HPMP shall be completed within 1 year after license issuance. This will be modified in the modified 4(e) conditions to license acceptance (not issuance). This would give PG&E more time to have discussions regarding the proposed treatment measures.

**Response:** The Commission directed PG&E to revise and finalize the HPMP by October 26, 2010, and PG&E complied with that directive. We consider the HPMP filed with the Commission in October 2010 a final document. The final document addresses: the final results of Study Report CR-S1, Archaeological and Historic-Era Properties; the final results of Study Report CR-S2, Traditional Cultural Properties, undertaken in consultation with the Pit River Tribe; USFS preliminary 4(e) conditions filed January 29, 2009, including comments on the July 2009 HPMP; comments on the July 2009 HPMP received from the Pit River Tribe; Commission requirements for HPMP revision provided in its July 30, 2010, draft EIS; and comments submitted to the Commission on its draft EIS that relate to the HPMP. Additionally, PG&E recognizes that there may be additional items raised by the Forest Service that may need to be addressed after license issuance, and as a result, PG&E has added a provision in its final HPMP that such investigations would be completed with 1 year of license issuance.

Finally, the final HPMP provides a process for additional amendments to be added to the document, and any such new information provided by the Forest Service, Pit River Tribe, or Winnemem Wintu Tribe can be accommodated in such a manner.

**Comment:** The Forest Service states that the Pit River Tribe portion of CR-S2 is currently complete and should be integrated into the HPMP, regardless of the current

status of the Winnemem Wintu portion of the CR-S2. Otherwise the Commission reaches conclusions that are based on an incorrect interpretation of the Forest Service's 4(e) and PG&E alternative license condition documents.

**Response:** It is our understanding that the final results of study report CR-S2, Traditional Cultural Properties, undertaken in consultation with the Pit River Tribe, were addressed in the final HPMP. PG&E has recently revised appendix D of study report CR-S2, Traditional Cultural Properties, to correct information about culturally significant plants and has submitted the revised appendix to the Pit River Tribe, State Historic Preservation Officer (SHPO), Forest Service, and Commission. Data that stem from the TCP study of the Winnemem Wintu Tribe, which was not completed in time for incorporation into the final HPMP, would be handled in an amendment to that document.

**Comment:** The Forest Service provides the following measures that should be included in the final HPMP (in addition to the four proposed by the Commission):

- (1) Specific Forest Service comments on the draft HPMP as provided on page 92 of Enclosure 2 of the Forest Service's original 4(e) conditions;
- (2) A study/evaluation of whether there is compelling evidence for a historic archaeological and ethnographic district on the Lower McCloud River within the expanded project APE;
- (3) Both studies (CR-S1 and CR-S2) for the Pit River Tribe ;
- (4) Winnemem Wintu Tribe studies (CR-S2 and also CR-S1);
- (5) Botanical surveys to identify culturally significant plants in the Lower McCloud River; and
- (6) A monitoring program with protection measures and/or management protocols for project-affected sites on Forest Service lands.

The Pit River tribe supports the comments of the Forest Service, as noted above.

**Response:** While the HPMP has been finalized, the Commission recognizes that additions may need to be made as more information becomes available. Such changes can be handled via amendments and through the addition of appendices if needed.

Below, we discuss the six measures the Forest Service requested be included in the HPMP

- (1) The final HPMP has addressed Forest Service original 4(e) conditions filed January 29, 2009, including comments on the July 2009 HPMP.
- (2) The Commission considers the evaluation of cultural resources to be complete, including district analysis.
- (3) PG&E has integrated the final results of both study reports (CR-S1 and CR-S2) into the final HPMP.

(4) The final results of the Winnemem Wintu Tribe study report on TCPs would also be incorporated into the final HPMP as an amendment.

(5) PG&E has completed a botanical survey within the project APE and has mapped out locations of culturally significant plants of importance to the Pit River Tribe (appendix D, Traditional Cultural Properties, CR-S2). A revised appendix D has recently been resubmitted to the Commission. An identical approach would be taken for culturally significant plants of importance to the Winnemem Wintu Tribe. When that study is complete, a similar appendix would be developed, and along with the study's final results, would be incorporated into the HPMP as an amendment.

(6) Section 3.3.6.2, *Environmental Effects, Cultural Resource Management*, of the final EIS provides a description of the proposed monitoring effort contained in section 5.7 of the HPMP for project-affected sites on Forest Service lands as well as other areas within the APE.

**Comment:** The Center for Water Advocacy recommends that the draft EIS should list the specific tribes, such as the Winnemem Wintu, Pit River, and other tribes that will be consulted in reference to cultural sites. The Center for Water Advocacy also feels that PG&E should plan consultations with other requirements beyond section 106 of the NHPA, such as the American Indian Religious Freedom Act.

**Response:** The EIS lists two tribes that were consulted in reference to cultural sites: the Pit River Tribe and the Winnemem Wintu Tribe. Section 106 of the NHPA is the relevant legislation as it requires federal agencies to consider the effects of their undertakings on historic properties. The application of the section 106 process for identifying TCPs of tribal significance effectively covers other sacred phenomena that are cited in other relevant statutes protecting native cultural resources.

**Comment:** PG&E clarifies that that if erosion is found to be project-related on National Register-eligible archaeological sites (instead of from natural high water flows), then appropriate protection measures would be developed in consultation with the Pit River Tribe and SHPO.

**Response:** The Commission agrees that appropriate protection measures would be developed in consultation with the California SHPO and the Tribes to treat any project-related effects on historic properties. This includes eligible TCPs associated with the Winnemem Wintu Tribe once the study is completed and the results of the study are incorporated as an amendment to the final HPMP.

**Comment:** The Winnemem Wintu Tribe is concerned regarding inappropriate disclosure of the sensitive and confidential information contained within the TCP report and states that PG&E does not respect this concern.

PG&E states that it has made numerous attempts to resolve the TCP confidentiality issue with the Winnemem Wintu Tribe with no success, and that is why the Commission was requested to help resolve the impasse.

**Response:** The Commission recognizes the Winnemem Tribe's concerns on the sensitivity of its tribal TCP information; however, in order to treat any effects from the proposed undertaking on the TCPs, certain information is needed. When the final results of the TCP study are provided to the Commission, the effects of the undertaking can be fully understood. This would be handled in an amendment to the final HPMP.

As discussed in final EIS section 5.2.1, *Discussion of Key Issues, Cultural Resources*, while the Commission itself is not the appropriate venue for resolving these issues, if both parties feel facilitation could assist in resolving their dispute, we can refer the parties to the Commission's Dispute Resolution Service.

**Comment:** The Winnemem Wintu Tribe maintains that the Commission must have access to an accurate and complete TCP report and must not make a final decision regarding the appropriate alternatives and mitigation measures associated with this project until the Tribe's TCP report is complete and submitted to the Commission. The Tribe states that the existing Project has already caused significant impacts to the Tribe's cultural resources. The Tribe states that by altering the natural flow of the McCloud River, the Project has flooded lands traditionally used by the Tribe, and has altered the nature of the McCloud River below the dam.

**Response:** As we state in final EIS section 5.2.1, *Discussion of Key Issues, Cultural Resources*, PG&E's final HPMP provides a process to incorporate the Winnemem Wintu TCP study and to protect or resolve project-related adverse effects to any TCP that is located within the project's APE. Amendments to the final HPMP can also be used to incorporate additional information and treatment measures for TCPs resulting from additional studies when they are completed. This course of action allows for project planning to move forward while providing a mechanism for the HPMP to be revised to fully treat the resource inventory within the project area.

**Comment:** The Forest Service asserts that it must be a signatory to the PA along with Commission and SHPO. The Forest Service states that it must be a signatory because: (1) only land managing agencies, such as the Forest Service, have jurisdiction to implement and enforce the Native American Graves Protection and Repatriation Act and Archaeological Resources Protection Act; (2) the Forest Service has sole authority to issue Archaeological Resources Protection Act permits to PG&E to conduct surveys or excavation of archaeological properties located on NFS land; (3) the PA will cover actions into the future that may include activities outside of the current project boundary on NFS lands, where the Forest Service would require a special use permit; and (4) decisions made by other parties on NFS lands may be counter to decisions the Forest Service would have made in fulfilling responsibilities under various legal mandates.

In addition, the Forest Service requests that it be identified as a signatory on PAs pertaining to projects that will be implemented on NFS lands for the following reasons: (1) failure to identify the Forest Service as a signatory on PAs may jeopardize the agency's ability to comply with the NHPA and other statutory requirements pertaining to NFS lands; (2) it is critical that the Forest Service makes decisions for actions that affect

NFS lands; (3) it would ensure the agency is involved with these decisions; (4) the Forest Service has no authority to abdicate all its responsibilities to another federal agency; and (5) assigning the Forest Service as a signatory member would not interfere with the Commission's ability to issue a license in a timely manner. The Forest Service also requests the addition of a stipulation to the PA to cite Forest Service responsibilities for issuing permits.

The Pit River Tribe requests that the Tribe be identified as a Signatory party rather than a concurring party in the PA.

**Response:** While the Commission appreciates the Forest Service and the Pit River Tribe's desire to be signatories for the PA, the Commission has elected to proceed with the PA as a two-party agreement between FERC and the California SHPO. The Commission notes that section 106 does not require the lead federal agency (i.e., agency official) to assign signatory status to any other involved parties to a PA, other than the SHPO or Advisory Council on Historic Preservation (see 36 CFR Part 800.6[c][1][i-iii]). Pursuant to the FPA, and in order for the Commission to issue hydropower licenses in a timely manner, the Commission, as the agency official, chooses to execute all hydropower PAs with either the SHPO, or with the SHPO and Council, when the Council chooses to participate in a particular PA. Furthermore, the PA stipulates that Forest Service has responsibilities for issuing permits under the Archaeological Resources Protection Act, and that the final HPMP provides the requisite protocols for PG&E to follow procedures involving the Archaeological Resources Protection Act and the Native American Graves Protection and Repatriation Act, that, in turn, are governed by the Forest Service on lands under its jurisdiction. Finally, executing the final PA between the Commission and California SHPO in no way jeopardizes the Forest Service's ability to carry-out its obligations under the Archaeological Resources Protection Act, Native American Graves Protection and Repatriation Act, or any other law that applies to its land management responsibilities.

**Comment:** The Winnemem Wintu Tribe notes that its traditional cultural resources at Star City Creek may be impacted by gravel excavation.

**Response:** On completion of the Traditional Cultural Properties Study, the possible effect of gravel extraction on resources at Star City Creek can be assessed and a treatment plan can be defined for inclusion in the HPMP.

## **LAND USE AND AESTHETIC RESOURCES**

**Comment:** The Forest Service specifies that its concerns with road access relate to the Hawkins Creek, Star City (FR 38N04Y) and Tarantula Gulch Boat Launch Roads near McCloud reservoir and Iron Canyon Loop Road (FR 37N78) around Iron Canyon reservoir.

The Forest Service clarifies that two (not three) additional road segments are proposed in the plan: Hawkins Creek Road Segment 1 (FR 38N11) and Iron Canyon Loop Road (FR 37N78). The Forest Service requests that the Commission review the project

infrastructure (existing and proposed) with the Technical Memorandum 22 results and the Commission's 2006 Policy Statement guidance. The Forest Service believes that these two roads meet the Commission's policy criteria as "primarily" for project use. The Forest Service clarifies that Hawkins Creek Road Segment 2 (FR 38N11) and the Ah-Di-Na Road (FR 38N53) were not proposed as project roads. The Forest Service clarifies that Oak Mountain Road does not provide access to Iron Canyon dam. The Forest Service notes that there is no table 3-40 in the draft EIS (see draft EIS p. 355).

The Forest Service notes that five additional segments are proposed for inclusion within a Memorandum of Understanding (MOU) that would be addressed outside of the project license: Ash Camp (U38N11Y), Ah-Di-Na (FR 38N53), Hawkins Creek Segment 2 (FR38N11), Fenders Ferry (34N17), and the Reynolds Basin road to the Hogback lookout turnoff (35N46).

**Response:** We have revised section 3.3.7.2, *Environmental Effects*, of the final EIS to clarify that the Forest Service proposes to include two additional road segments in the Road and Transportation Facilities Management Plan as project roads: Hawkins Creek Road Segment 1 (FR 38N11) and Iron Canyon Loop Road (FR 37N78).

FR 38N11 (segment 1) provides access to private lands, including The McCloud River Preserve, as well as National Forest destinations such as the Lower McCloud River, Bald Mountain, Cabin Creek Trail, Pacific Crest Trail, 4WD trails, and interconnections with other points south (e.g., Big Bend and Highway 299). Additionally, studies conducted during relicensing conclude that 35 percent of the traffic on FR 38N11 is not related to the project. Consistent with the Commission's October 3, 2008, study plan determination letter and based on information contained in Technical Memorandum 22, submitted as part of PG&E's license application, FR 38N11 does not meet the Commission's criteria for project roads used primarily for project purposes. Therefore, FR 38N11 is not included in the list of project roads (table 3-34 in the draft EIS) that PG&E is responsible for maintaining under the project license.

While the entire length of FR 37N78 is not necessary to access project infrastructure, a 0.7-mile section of FR 37N78 from FR 38N11 to Iron Canyon dam does meet the Commission's criteria for project roads (i.e. it is necessary for project purposes / access to the dam). In section 5.2, *Comprehensive Development and Recommended Alternative*, we propose to include this segment of FR37N78 within the project boundary.

We have also revised section 3.3.7.2, *Environmental Effects*, of the final EIS to clarify that the Forest Service is not proposing Hawkins Creek Road Segment 2 (FR38N11) and Ah-Di-Na Road (FR 38N53) as project roads.

We have revised section 3.3.7.2, *Environmental Effects*, of the final EIS to clarify that FR 37N34 (Oak Mountain Road) does not provide access to Iron Canyon dam. However, as discussed above, a 0.7-mile section of FR 37N78 (Iron Canyon Loop) provides access to Iron Canyon dam and should be included within the project boundary.

We have revised section 5.2.1, *Discussion of Key Issues*, of the final EIS to correct an incorrect table reference. The reference to table 3-40 in this section should be table 3-41, Project Roads.

We acknowledge that a MOU among PG&E, the Forest Service, and other interested parties would address shared road (non-project) management responsibilities. However, roads located outside of the project boundary are not subject to Commission jurisdiction or the terms and conditions of the project license.

**Comment:** The Forest Service states that the final EIS needs to address roads that are not currently in the NFS road system, but will be needed for project-associated recreational or public use as a result of license implementation. Specifically, these include: (1) Iron Canyon reservoir – road designation/development will be needed to access 3 new shoreline access sites, one new day-use area, and one new campground; (2) McCloud reservoir – road designation/development will be needed to access various sites for proposed recreational facilities; (3) Pit 7 reservoir and afterbay – road designation/development will be needed to access proposed recreational facilities.

**Response:** At this time, it is unclear what new recreation sites will be a requirement of the new license and where these sites will be located. In the final EIS, we recommend PG&E include all existing (at license issuance) project roads and recreation sites and facilities within the project boundary and to file a revised exhibit G. We also recommend PG&E file a revised exhibit G with the Commission subsequent to completing construction of new project generation and transmission facilities or recreation sites and facilities, to include any roads necessary for project purposes, which shall also be included in the project boundary.

**Comment:** The Forest Service states that no further evaluation of closing of the access roads at Iron Canyon Reservoir is needed. The Forest Service recommends that the following direction be ordered in the license and included in the Road and Transportation Facility Management Plan: “Following license acceptance, site-specific construction designs and plans will be developed. At that time location shifts in specific road development may be necessitated by topographic or other resource constraints. If so, all applicable resource mitigations (i.e., implementation plan requirements) will be employed for these locations and consultation with the Forest Service must occur for all roads on or affecting NFS lands.”

The Forest Service recommends that the project-action of blocking roads be addressed in the project-specific final EIS analysis in order to be implemented. The Forest Service states that the best means to ensure these closure actions occur is for the Commission to require the closure of these roads in the license order, and included as an activity in the Road and Transportation Facility Management Plan.

The Forest Service specifies that actions to close roads include: (1) removing/pulling culverts; (2) physically blocking the route with natural or man-made materials; (3) ripping roads with mechanized equipment to encourage natural establishment of

native species vegetation; (4) restoration of drainage channels to normal topography to allow for natural water drainage and prevent ponding; (5) re-contouring to conceal user-created route; (6) out sloping to allow water to run off the entire surface and not accumulate; (7) water bars, if necessary, to reduce erosion; (8) mulching of route surface; (9) seeding or revegetation if needed; and (10) other similar measures.

**Response:** We agree that no further analysis of the closing of the access roads at Iron Canyon reservoir is necessary. In the draft EIS, we analyzed the proposed Road and Transportation Facilities Management Plan, but specific details about the siting and design of roads, and actions to close roads were not included. We agree that these details should be included in the plan filed with the Commission for approval.

**Comment:** PG&E disagrees with designating the following roads as project roads: (1) Hawkins Creek Road (FR 38N11) extending from the Shasta-Trinity National Forest boundary to Hawkins Crossing spoil pile; and (2) Iron Canyon Loop Road (FR 37N78) extending from its northernmost intersection with FR 38N11 and proceeding west to Iron Canyon dam. PG&E believes that the Forest Service misinterprets FERC's project road policy to request that several general NFS roads be designated project roads because they are also the routes used to access project reservoirs and recreation areas.

PG&E notes that the Commission already determined that Segment 1 of Hawkins Creek Road is not a project road.

PG&E notes that the segment of Iron Canyon Loop Road between Deadlun Campground and the dam does not provide direct access to any existing or proposed project facilities. PG&E also notes that Iron Canyon Loop Road is clearly a component of the larger NFS road network that is used for multiple purposes, including timber harvest, access to private property fire prevention and suppression, and public recreational use beyond the project vicinity. PG&E agrees that Iron Canyon Loop Road extending from its southernmost intersection with FR 38N11 and proceeding west to Iron Canyon dam should be designated a project road.

PG&E agrees to consider the following non-project roads in an off-license agreement: (1) FR38N53 (Ah-Di-Na Road) extending between FR 38Naa and end of the road (T37N, R2W, Sec 5, NE ¼, MDM); (2) FR U38N11Y extending between FR38N11 and end of the road at Ash Camp; (3) FR 38N11 extending from the Hawkins Crossing spoil pile to the west abutment of the Kosk Creek bridge; (4) FR 34N17 (Fenders Ferry Road) extending from end of county road 6L005 (T34N, R1W, Sec 9, W ½, MDM) to 35N46 (Hogback Road); and (5) FR 35N46 (Reynolds Basin Road) extending from 34N17 (Fenders Ferry Road) to 35N93 (Hogback Mountain).

PG&E also reminds the Commission of comments on the Forest Service original 4(e) conditions from The Hearst Corporation, owner of most of the road segments, filed a letter with the Commission on March 16, 2010, which states:

[The USFS] proposes to reclassify our road system around the south end of the lake as "project roads" that would be included into the project area. All reconstruction and

replacement of facilities would be to a very high USFS recreational standard that is not needed for our land management use. The issue of concern is that we own the roads and currently have existing construction and easement agreements with PG&E and USFS for maintenance and use on these roads. We support the concept presented by the USFS of working with PG&E and USFS, outside of the licensing process, to develop a comprehensive road use agreement – if needed. We do not support the proposed expansion of the project boundary to the outside edge of the road system.

**Response:** We have revised section 3.3.7.2, *Environmental Effects*, of the final EIS to clarify that no portions of FR 38N11 (Hawkins Creek Road) meet the Commission’s criteria for project roads, and that a 0.7-mile portion of FR 37N78 from Hawkins Creek Road to Iron Canyon dam is necessary for project purposes and, therefore, is considered a project road.

We acknowledge that a MOU among PG&E, the Forest Service, and other interested parties would address shared road (non-project) management responsibilities.

**Comment:** The Forest Service provided the Record of Decision and final EIS for “Motorized Travel Management” and requested that FERC add this document to the list of comprehensive plans for the McCloud-Pit Project in the final EIS.

**Response:** The review of the Forest Service’s September 24, 2010, request that the Record of Decision and final EIS for “Motorized Travel Management” to be considered a comprehensive plan under section 10(a)(2)(A) of the FPA is pending at the Commission.

**Comment:** The Forest Service clarifies that Tarantula Gulch Boat Ramp is currently within the project boundary and a small boundary adjustment at Deadlun Campground would place the entirety of that facility within the project boundary. The Forest Service notes that the project boundary crosses over the Star City Creek Road (38N04Y) in several locations and that only portions of the road currently fall within the project boundary, not the entire road between McCloud dam and Star City Creek as was indicated. In addition, the access road to the proposed Red Banks day-use area is not currently included in the project boundary.

The Forest Service supports the Commission’s inclusion of new recreation sites in the FERC project boundary; however the Commission’s language does not specify when a revised Exhibit G would include these new facilities. The Forest Service feels that the draft EIS inadvertently omits some proposed and existing facilities from the project boundary, or does not require they be included in the project boundary prior to ground disturbing activities.

The Forest Service states it is best to have all proposed project-related actions authorized by the license order and included within the project boundary. In the cases where the exact location of a facility is unknown, the Forest Service states that Commission cannot include the proposed facility within the project boundary, and that once the location is known, the best action is for PG&E to request a license amendment to include the proposed facility within the boundary prior to any commencement of ground disturbance.

The amended license order will thus be the authorizing instrument, and there will be no need for the Forest Service to issue a Special Use Permit and complete a separate NEPA analysis. The Forest Service supports amending the project boundary closer to the time of activities that would expand the boundary, as long as that amendment(s) occurred prior to ground-disturbing activity.

The Forest Service states that because the license can only be used to authorize facilities and areas designated by the license and included within the project boundary, if an area or facility is not included within the project boundary and/or is not designated as a project facility, the Forest Service must issue a Special Use Permit to authorize the remaining occupancy.

The Hearst Corporation does not agree with the recommendation of expanding the project boundary between the reservoir and the outside right-of-way of FR 38N11 and FRN047 to ensure all new project recreation facilities are included within the project boundary. Hearst states that this expansion is broader than necessary to achieve its goals.

PG&E clarifies that Tarantula Gulch boat launch at McCloud reservoir is owned and operated by the Forest Service. PG&E restates its preference to include the facilities (i.e., Deadlun Campground and Tarantula Gulch boat ramp) in the project boundary when they are reconstructed. However, if the Commission requires PG&E to include these facilities in the project boundary as part of a new license, PG&E requests that FERC incorporate language about a grace period into any license article stating that until the facilities are reconstructed, PG&E will not be held in non-compliance because of the condition of the project recreation facilities.

PG&E will provide a revised Exhibit G (not E as stated in the draft EIS) to include the footprint of any new recreation site and facility within the project boundary, as well as any land necessary for access.

**Response:** The Forest Service filed modified 4(e) conditions with the Commission on November 29, 2010. In modified condition 30, the Forest Service specifies that project recreation facilities will be included inside the project boundary, prior to ground disturbing activities. The Forest Service specifies that project boundary adjustments are made at the point when the Recreation Development and Management Plan is approved by the Commission, in order that development of the facility is appropriately within the Commission's jurisdiction, and a separate Forest Service Special Use Permit is not required in order to proceed with development within the timeframes approved in the Recreation Development Management Plan.

In the final EIS, we recommend PG&E include all existing (at license issuance) project roads and recreation sites and facilities within the project boundary and to file a revised exhibit G. We also recommend PG&E file a revised exhibit G with the Commission subsequent to completing construction of new project generating and transmission facilities or recreation sites and facilities, to include any roads necessary for project purposes, which shall also be included in the project boundary.

The project boundary description in section 3.3.7.1, *Affected Environment, Land Use Resources, Project Boundary*, includes the existing Tarantula Gulch day-use area and boat launch and the existing Deadlun as currently within the project boundary. It is unclear if only portions of these sites are included in the existing project boundary. In section 3.3.5.2, *Environmental Effects, Recreation Facility Operation and Maintenance*, we propose including both of these sites in their entirety within the project boundary at license issuance, if they are not already.

We revised section 3.3.7.2, *Environmental Effects, Land Use Resources, Project Boundary, Our Analysis*, of the final EIS to clarify that the project boundary would be expanded between McCloud reservoir and the outside right-of-way of FR 38N11 (Hawkins Creek Road) and FR 38N047 (Star City Road) to include only the outermost limits of any new recreation site (i.e., only the area serving project purposes).

We have revised section 3.3.7.2, *Environmental Effects, Land Use Resources, Project Boundary, Our Analysis*, of the final EIS to correct an inaccurate reference to exhibit E. The correct reference is to exhibit G.

**Comment:** The Forest Service supports FERC in the clarification that only those private lands within the project boundary would be subject to access as a result of this license. The Forest Service notes that access to private lands outside of the project boundary is subject to the discretion of the landowner.

**Response:** Lands and facilities outside the project boundary are not subject to Commission jurisdiction or the terms and conditions of the project license.

**Comment:** The Forest Service notes that the Commission's assumption that its facilities predated the Forest Service's establishment of Forest Service Visual Quality Objectives (VQOs) for this area is incorrect. The Forest Service states that the Shasta-Trinity Land and Resources Management Plan does not address power generation and associated facilities and also that the PG&E facilities are inconsistent with the Retention VQO as per the definition of Retention within the Visual Management System. The Forest Service recognizes that on a project-specific scale these facilities are more appropriately classified as Modification VQO (i.e., man's activity may dominate the characteristic landscape but must at the same time utilize natural established form, line, color and texture). It is the opinion of the Forest Service that this better meets the needs of the existing and proposed hydroelectric and other project-related facilities. The Forest Service states that any future management activities within sight distance of the McCloud-Pit Project-related facilities would need to be in compliance with this Modification VQO. In addition, the Forest Service states that the Aesthetic Resources Assessment (AR-S1) did not focus on opportunities to help facilities meet scenic objectives, and this would be the focus of the proposed Visual Quality Management Objectives. Finally, the Forest Service states that its final 4(e) conditions will apply mitigation measures to all project-related facilities (not just the new facilities as suggested by the Commission).

The Forest Service states that there is an inaccurate assumption for project level NEPA analysis. The Aesthetic Resources Assessment (AR-S1) did not focus on opportunities to help facilities meet scenic objectives; this would be the focus of the proposed Visual Quality Management Objectives, to be filed with the Forest Service's 4(e) conditions.

**Response:** Studies conducted during relicensing did not identify any needed modifications to existing project facilities for visual quality purposes. Further, PG&E is not proposing any changes to the visual character of the existing Iron Canyon, Pit 6 and 7 dams, roads, intakes, penstocks, recreational facilities and transmission lines, so these facilities would continue as they appear today. PG&E does propose to construct a new powerhouse at the base of McCloud dam, a switchyard, transmission line, and office. We agree that the development and construction of these new project facilities should meet any applicable Forest Service VQOs.

The Forest Service filed modified 4(e) conditions with the Commission on November 29, 2010. Modified condition 32 specifies the development of tasks and a timeline to assure implementation of specific mitigation measures to improve the visual quality of project and project-affected NFS lands. Modified condition 32 is similar to condition 32, except that the Forest Service includes a draft document as an enclosure to the filing, which identifies specific mitigation actions.

In the November 29, 2010, filing, the Forest Service also clarifies that the current Shasta-Trinity Land and Resources Management Plan (1995) identifies two VQOs for lands within the project area. The final EIS summarizes (table 3-42) the VQO designations by general project area as either Retention or Partial Retention. The Forest Service discusses project facilities as most appropriately meeting the definition of Modification. The Forest Service plans to make this change to the Land and Resource Management Plan during a future scenery analysis and evaluation and subsequently revise the Land and Resource Management Plan. We have revised section 3.3.7.1, *Affected Environment*, and section 3.3.7.2, *Environmental Effects*, of the final EIS to clarify the applicable VQO designations in the project area and the Forest Service's intent to revise the Land and Resource Management Plan.

In the November 29, 2010, filing, the Forest Service also clarifies that existing facilities in good repair would only have mitigations applied as maintenance is needed.

We agree that this approach for mitigating impacts to aesthetic resources in the project area is reasonable. In the final EIS, we recommend that PG&E file visual quality management tasks and a timeline within 1 year of license issuance for Commission approval.

**Comment:** The Forest Service states that draft EIS p. 284, paragraph four, contains several inaccuracies regarding the current status of roads and spoil piles on the project. Contrary to PG&E statements, road spoil piles do occur on Forest Service lands along road alignments noted in the Commission's listing of roads, and on Forest Service lands near project infrastructure.

The Forest Service misunderstands PG&E's statements that there are no *tunnel* spoil piles on or affecting NFS lands to mean there are no *road* spoil piles. PG&E acknowledges the Forest Service has created road spoil piles along roads as part of its road maintenance practices. PG&E disagrees that it should be responsible to correct problems created by inadequate Forest Service maintenance practices.

**Response:** We have revised section 3.3.7.2, *Environmental Effects, Land Use Resources, Road and Transportation Facilities Management Plan, Our Analysis*, of the final EIS to clarify that there are road spoil piles along roads on NFS lands that may be within the project boundary. PG&E is responsible for any spoil piles created by PG&E within the project boundary and on NFS lands. The details about correcting problems created by these spoil piles (e.g., removal) should be included in the proposed Road and Transportation Facilities Management Plan, which would be filed with the Commission for approval.

**Comment:** The Forest Service agrees that the current Spill Prevention, Control, and Countermeasures Plan and Hazardous Materials Business Plan, in addition to existing law and regulation, are sufficient detail regarding hazardous substances and hazardous waste handling treatment.

The California Water Board states that the Hazardous Materials Business Plan needs to extend to the entire project and include Regional Water Quality Control Board approval.

The Center for Water Advocacy states that the draft EIS lacks even rudimentary containment capacity analysis of the facility in the event of a spill of oil or other toxic substances. The Center for Water Advocacy states that, in result, any spill would devastate the cultural resources and salmon fishery in the McCloud River since storm water drainage from upland areas of the facility would likely flow across the ground surface as sheet flow and eventually reach the river either overland or through ground water. The Center for Water Advocacy states that the Comprehensive Environmental Response, Compensation, and Liability Act provides that a "potentially responsible party" may be liable for damages to natural resources in addition to response costs. The Center for Water Advocacy states that a superfund action may also seek damages for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction or loss resulting from an actual or threatened release of hazardous substances (42 USC §9601(16)). The Center for Water Advocacy states that the draft EIS fails to discuss the impacts of potential spills to natural resources and what efforts would be made to limit such impacts and the resulting cultural and economic impacts to the Tribe, and that this omission is contrary to 42 USC § 9651(c)(2).

**Response:** Section 3.3.7.2, *Environmental Effects*, of the final EIS has been revised to clarify that the geographic scope of the Spill Prevention, Control, and Countermeasures Plan and Hazardous Materials Business Plan should encompass all the lands within the project boundary. The EIS has also been revised to recommend PG&E provide copies of the plan to not only the Commission and the Forest Service, but also the appropriate Regional Water Quality Control Board.

Section 3.3.7.2, *Environmental Effects*, of the final EIS has been revised to discuss the potential impacts of a PG&E spill on resources in the project area, to include an acknowledgement of PG&E's responsibility for such spills within the project boundary, and to identify acceptable prevention and mitigation measures (i.e., the plans). Under a new project license, PG&E would be required to file the existing Spill Prevention, Control, and Countermeasures Plan and Hazardous Materials Business Plan within 30 days of license issuance. Because the plans have not yet been filed with the Commission and the Commission is unaware of the details of the plans, it is premature to conduct any detailed analysis of the plans. The Commission will fully analyze the plans when they are filed with the Commission for approval.

**Comment:** The California Water Board states that the draft EIS does not adequately represent the authority and goals of the McCloud River Coordinated Resource Management Plan, an alternative to the Wild and Scenic River Act designation of the McCloud River. The California Water Board states that the Coordinated Resource Management Plan is intended to provide the same level of protection as designation under the Wild and Scenic Rivers Act. The California Water Boards states that the Forest Service reserves the authority to seek designation should the Coordinated Resource Management Plan fail to protect the values which render the river suitable for such designation.

American Whitewater and Friends of the River agree that the draft EIS fails to adequately characterize the purpose and goals of the Coordinated Resource Management Plan. American Whitewater and Friends of the River state that the description of the Coordinated Resource Management Plan should be adjusted accordingly and the proposed action should either include a statement on how the Wild & Scenic River protection standard is met or to be modified to ensure that this standard is met. American Whitewater and Friends of the River state that Forest Service 4(e) conditions must also meet this protection standard.

McCloud RiverKeepers comments that the Forest Service, as a signatory to the Coordinated Resource Management Plan, is obligated to follow the conditions of the Coordinated Resource Management Plan. McCloud RiverKeepers also expresses concern regarding the proposed project's potential effects on the McCloud River as a valued historic river and world-renowned trout fishery.

**Response:** We recognize the unique character of the McCloud River and acknowledge the Coordinated Resource Management Plan. We revised the EIS to further describe the purpose and goals of the Coordinated Resource Management Plan, in section 3.3.7, *Land Use and Aesthetic Resources*. Additionally, we note that the Coordinated Resource Management Plan is only one component we use to balance developmental values and environmental values, including waterway development for beneficial public purposes.

**Comment:** The McCloud River Club states that the draft EIS' analysis of fire hazard and other public safety hazards fails to serve NEPA's core purpose and is inadequate because it does not contain any analysis of what the project's impacts will be on fire

hazards, and does not specifically identify risk or contain the required analysis, disclosure, or discussion of potential mitigation measures. The McCloud River Club also states that a Fire Prevention and Response Plan should be required for NEPA analysis of impacts in an EIS and states that a future plan is not acceptable. In addition, the McCloud River Club finds it inconceivable that a budget of \$3,903 would be adequate to develop a comprehensive Fire Plan that could lead to a reduction in the occurrence and suppression of wildfires in the project area. The McCloud River Club recommends that the final EIS provide a detailed analysis of the project's potential impacts on fire hazards, public safety, and trespass. Based on that analysis, the McCloud River Club recommends that the final EIS also propose and discuss potentially feasible mitigation measures to address these impacts.

**Response:** We have revised section 3.3.7.1, *Affected Environment, Land Use Resources*, and 3.3.7.2, *Environmental Effects, Land Use Resources*, of the final EIS to further analyze the potential impacts of the project on the number and frequency of fire events in the area. We have also revised the EIS to include a discussion about how continued project operations and existing facilities (e.g., transmission lines, generators, construction equipment etc.), and increased recreational use over the term of the new license may contribute to fire danger in the project area. The EIS acknowledges that additional fires in the project area may, among other things, affect public safety, property, aesthetics, and air quality. To mitigate these potential affects, PG&E proposes and we recommend the development of a Fire Prevention and Response Plan, which would increase preparedness of fire responders and minimize damage to natural resources in the area. The plan would be filed with the Commission within 1 year of license issuance for approval.

In its FLA, PG&E estimates the one-time capital cost of developing a Fire Prevention and Response Plan to be \$10,000 (2009 \$) and assumes an annual expense of \$2,000 (2009 \$). We reviewed these cost estimates and find that they give a reasonable estimate of the cost of the measure. No commenting party has provided other estimates of these costs and the cost of the measure has a small effect on the overall economic benefits of the project. Therefore, we did not find it necessary to ask PG&E for a detailed breakdown of the cost. In the final EIS, (table C-1) we show the equivalent annual cost to develop and implement this plan \$3,903 (2009 \$).

**Comment:** The Forest Service suggests that the final EIS contain an analysis of the activity of timber removal from the NFS lands; this analysis will expedite approvals when needed. The Forest Service suggests that some topics that could be addressed in the final EIS are the following: (1) the need to remove timber; (2) agency requirements; (3) public safety/resource protection (i.e., compliance with/changes to clearance standards, natural hazards, and similar situations when removal of merchantable timber has a nexus to the project); (4) compensation (for the value of timber removed); and (5) timber removal process/protocols. In particular, the Forest Service recommends that the final EIS include a brief discussion stating that PG&E would be expected to comply with the land agency timber removal protocols (i.e., the draft protocol to be included in the Vegetation and Invasive Weed Management Plan). The Forest Service notes that

Forest Service regulations require Forest Service permission for cutting or removal of timber, including occupancy of a right of way or other authorized use of NFS land. Additionally, the Forest Service notes that the Commission requires Forest Service permission and sale of merchantable timber.

**Response:** The Commission is not aware of any PG&E proposal to remove timber from NFS lands inside the project boundary and therefore, there is no need to analyze this further. However, if PG&E proposes to remove timber from NFS lands within the project boundary, the activity must be permitted by the Forest Service, prior notice must be given to the Commission, and PG&E must comply with all applicable Forest Service plans and protocols. We have revised section 3.3.7.2, *Environmental Effects*, of the final EIS to include a discussion about timber removal on NFS lands within the project boundary.

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## **Appendix B**

### **McCloud-Pit Project Mitigation and Monitoring Summary**



| <b>Impact</b>   | <b>Mitigation</b>   | <b>Mitigation Implementation Duration</b>   | <b>Monitoring Duration</b>   | <b>Mitigation Responsibility</b> |                   |
|---|---|---|--|----------------------------------|-------------------|
|   |   | <b>One-time or Ongoing</b>  | <b>One-time or Ongoing</b>   | <b>Implementation</b>            | <b>Monitoring</b> |
| General – Potential project-related impacts on Forest Service lands | Consult with the Forest Service to present project O&M activities planned for the next calendar year [Measure 1 and Forest Service condition 1] | <b>Ongoing:</b> Annually; the date of the consultation meeting will be mutually agreed to by PG&E and the Forest Service. | <b>Ongoing:</b> Meeting would include review of all monitoring activities as well as any additional information that has been compiled for the project area, including progress reports on other resource measures | PG&E                             | PG&E              |

| <b>Impact</b>   | <b>Mitigation</b>  | <b>Mitigation<br/>Implementation<br/>Duration</b>  | <b>Monitoring Duration</b> | <b>Mitigation<br/>Responsibility</b> |                         |
|---|--|--|----------------------------|--------------------------------------|-------------------------|
|   |  | <b>One-time or<br/>Ongoing</b>   | <b>One-time or Ongoing</b> | <b>Implemen-<br/>tation</b>          | <b>Monitor-<br/>ing</b> |
| General –<br>Potential<br>effect of<br>project O&M<br>on sensitive<br>resources | Conduct annual employee<br>awareness training [Measure<br>2 and Forest Service<br>condition 1] | <b>Ongoing:</b> Annual<br>employee<br>awareness<br>training to<br>familiarize<br>staff with local<br>resource issues,<br>special status<br>species, noxious<br>weeds, procedures<br>for reporting to the<br>Forest Service, and<br>applicable Forest<br>Service orders, to<br>allow avoidance/<br>minimization of<br>impacts |                            | PG&E                                 |                         |

| <b>Impact</b>   | <b>Mitigation</b>   | <b>Mitigation Implementation Duration</b>  | <b>Monitoring Duration</b> | <b>Mitigation Responsibility</b> |                   |  |
|---|---|--|----------------------------|----------------------------------|-------------------|--|
|   |   | <b>One-time or Ongoing</b>   | <b>One-time or Ongoing</b> | <b>Implementation</b>            | <b>Monitoring</b> |  |
| General – Potential project-related impacts on Forest Service lands | Obtain Forest Service approval for all final design plans [Measure 3] | <b>Ongoing:</b> Prior to construction of any new project facilities on NFS lands, obtain prior written approval of the Forest Service for all final design plans |                            |                                  | PG&E              |  |

| <b>Impact</b>  | <b>Mitigation</b>  | <b>Mitigation Implementation Duration</b>  | <b>Monitoring Duration</b>   | <b>Mitigation Responsibility</b> |                   |
|--|--|--|--|----------------------------------|-------------------|
|  |  | <b>One-time or Ongoing</b>   | <b>One-time or Ongoing</b>   | <b>Implementation</b>            | <b>Monitoring</b> |
| General – Potential effect of project O&M on sensitive resources | Prepare and file a biological evaluation or assessment for newly added special status species [NMFS 10(j) recommendation 1B] | <b>Ongoing:</b> In consultation with the resource agencies, annually review the current list(s) of special status species that might occur in the project area directly affected by project operations. Prepare biological evaluation prior to construction of new project features or non-routine maintenance activities that may affect special status species or their habitats | <b>Ongoing:</b> Develop and implement a study plan in consultation with the resource agencies to assess the effects of the project on newly added special status species | PG&E                             | PG&E              |

| <b>Impact</b>  | <b>Mitigation</b>   | <b>Mitigation Implementation Duration</b>  | <b>Monitoring Duration</b> | <b>Mitigation Responsibility</b> |                         |
|--|---|--|----------------------------|----------------------------------|-------------------------|
|  |   | <b>One-time or Ongoing</b>   | <b>One-time or Ongoing</b> | <b>Implemen-<br/>tation</b>      | <b>Monitor-<br/>ing</b> |
| General – Potential effect of project O&M on sensitive resources | Prepare and submit a biological evaluation for Forest Service special status species or their critical habitat [Measure 15 and Forest Service condition 11]             | <b>Ongoing:</b> Before taking actions to construct new project features on NFS lands that may affect Forest Service special status species or their critical habitat, prepare and submit a biological evaluation for Forest Service approval |                            | PG&E                             |                         |
| General – Altered seasonal geohydrology                          | Determine water year type annually and apply to appropriate minimum flow release schedule and other measures dependent on water year type [Forest Service condition 19] | <b>Ongoing:</b> Annual determination of water year type and application of appropriate minimum flow release schedule   |                            | PG&E                             |                         |

| <b>Impact</b>                                       | <b>Mitigation</b>  | <b>Mitigation Implementation Duration</b>  | <b>Monitoring Duration</b>   | <b>Mitigation Responsibility</b> |                   |
|---|--|--|--|----------------------------------|-------------------|
|   |  | <b>One-time or Ongoing</b>   | <b>One-time or Ongoing</b>   | <b>Implementation</b>            | <b>Monitoring</b> |
| Geo/Soils – Blockage of downstream transport of LWD | Develop and implement an LWD Management Plan to facilitate placement of woody debris in Lower McCloud River downstream of McCloud dam [Measure 11 and Forest Service condition 21] | <b>One-time:</b> Within 1 year of license issuance, prepare LWD Management Plan<br><br><b>Ongoing:</b> Implement the approved plan through the term of the license | <b>Ongoing:</b> Monitor mobilization of LWD from augmentation site according to the frequency specified in the management plan | PG&E                             | PG&E              |

| <b>Impact</b>  | <b>Mitigation</b>   | <b>Mitigation Implementation Duration</b>  | <b>Monitoring Duration</b>  | <b>Mitigation Responsibility</b> |                   |
|--|---|--|---|----------------------------------|-------------------|
|  |   | <b>One-time or Ongoing</b>   | <b>One-time or Ongoing</b>  | <b>Implementation</b>            | <b>Monitoring</b> |
| Geo/Soils – Potential effects of project operations on erosion sites/other sediment sources and related effects on project infrastructure and sediment delivery to project streams | Develop and implement an Erosion and Sediment Control Management and Monitoring Plan [Measure 12 and Forest Service condition 22] | <p><b>One-time:</b> Within 1 year of license issuance, develop and file Erosion and Sediment Control Management and Monitoring Plan</p> <p><b>Ongoing:</b> Implement the approved plan through the term of the license</p> | <p><b>Ongoing:</b> Monitor project and project-related erosion and sedimentation sites at least once every 10 years during the term of the license and for 3 years after treatment at high priority sites</p> | PG&E                             | PG&E              |

| <b>Impact</b>   | <b>Mitigation</b>  | <b>Mitigation Implementation Duration</b>   | <b>Monitoring Duration</b>  | <b>Mitigation Responsibility</b> |                   |
|---|--|---|---|----------------------------------|-------------------|
|   |  | <b>One-time or Ongoing</b>  | <b>One-time or Ongoing</b>  | <b>Implementation</b>            | <b>Monitoring</b> |
| Geo/Soils – Obstruction of downstream gravel and coarse sediment transport by project dam | Develop and implement a Gravel and Coarse Sediment Management Plan [Forest Service condition 23] | <p><b>One-time:</b> Within 1 year of license issuance, develop and file a Gravel and Coarse Sediment Management Plan</p> <p><b>Ongoing:</b> Implement the approved plan through the term of the license</p> | <b>Ongoing:</b> Monitor mobilization and dispersal of coarse sediment | PG&E                             | PG&E              |

| <b>Impact</b>  | <b>Mitigation</b>  | <b>Mitigation Implementation Duration</b>  | <b>Monitoring Duration</b>  | <b>Mitigation Responsibility</b> |                   |
|--|--|--|---|----------------------------------|-------------------|
|  |  | <b>One-time or Ongoing</b>   | <b>One-time or Ongoing</b>  | <b>Implementation</b>            | <b>Monitoring</b> |
| Water – Potential effects of project operations and maintenance on water quality | Develop and implement a water quality and temperature monitoring [Forest Service condition 20] | <p><b>One-time:</b> Within 1 year of license issuance, develop and file water quality and temperature monitoring plan</p> <p><b>Ongoing:</b> Implement the approved plan through the term of the license</p> | <p><b>Ongoing:</b> Periodic monitoring of contaminants once every 5 years at all project reservoirs, periodic monitoring of DO at McCloud, Pit 6, and Pit 7 reservoirs, annual temperature monitoring for 10 years, continuous turbidity monitoring in the Lower McCloud River during fishing season, turbidity monitoring during construction, reconstruction, or other soil disturbing activities, continuous monitoring of turbidity for a minimum of 5 years in Iron Canyon Creek, and for an additional 5 years thereafter, if turbidity issues persist.</p> | PG&E                             | PG&E              |

| Impact  | Mitigation   | Mitigation Implementation Duration   | Monitoring Duration   | Mitigation Responsibility |            |
|---|--|--|---|---------------------------|------------|
|   |  | One-time or Ongoing  | One-time or Ongoing   | Implementation            | Monitoring |
| Aquatic – Potential impact on fish and aquatic invertebrate populations in project-affected reaches | Develop and implement an Aquatic Biological Management and Monitoring Plan in consultation with Forest Service and other interested parties and approved by the Forest [Forest Service condition 27] <sup>a</sup> <i>This measure is modified to remove the specification to monitor fish passage conditions and to remove specification to monitor fish populations in Pit 7 reservoir.</i> | <p><b>One-time:</b> Within 1 year of license issuance, develop and file an Aquatic Biological Management and Monitoring Plan, to the extent possible, consistent with standardized sampling and data protocols in relicensing studies</p> <p><b>Ongoing:</b> Implement the approved plan through the term of the license</p> | <p><b>Ongoing:</b> Monitor fish, benthic macroinvertebrates, and special status mollusks, and other special status species, and invasive aquatic species once every 3 years for the first 9 years and every 5 years thereafter. Annually review list of special status aquatic species. Assess threat of invasive mussels and implement prevention plan. Report all aquatic biological monitoring results within 1 year following completion of monitoring efforts.</p> | PG&E                      | PG&E       |

| <b>Impact</b>   | <b>Mitigation</b>  | <b>Mitigation Implementation Duration</b>                          | <b>Monitoring Duration</b> | <b>Mitigation Responsibility</b> |                     |
|---|--|--|----------------------------|----------------------------------|---------------------|
|   |  | <b>One-time or Ongoing</b>   | <b>One-time or Ongoing</b> | <b>Implemen- tation</b>          | <b>Monitor- ing</b> |
| Aquatic – Minimum flows downstream of McCloud dam     | Implement minimum flows at McCloud dam [Forest Service condition 19]             | <b>Ongoing:</b><br>Implement minimum flows at McCloud dam          |                            | PG&E                             |                     |
| Aquatic – Minimum flows downstream of Iron Canyon dam | Implement minimum flows at Iron Canyon dam [Forest Service 19]                   | <b>Ongoing:</b><br>Implement minimum flows at Iron Canyon dam      |                            | PG&E                             |                     |
| Aquatic – Minimum flows downstream of Pit 7 dam       | Implement minimum flows at Pit 7 dam [Measure 8 and Forest Service condition 19] | <b>Ongoing:</b><br>Implement minimum flows downstream of Pit 7 dam |                            | PG&E                             |                     |

| Impact  | Mitigation   | Mitigation Implementation Duration   | Monitoring Duration | Mitigation Responsibility |            |
|---|--|--|---------------------|---------------------------|------------|
|   |  | One-time or Ongoing  | One-time or Ongoing | Implementation            | Monitoring |
| Aquatic – Potential effects of downramping operations during spill events       | Downramp spill events controllable by valve operation at McCloud dam at a maximum rate of 150 cfs per 48 hours until the prescribed minimum instream flow is reached [Forest Service condition 19 and California Fish and Game 10(j) recommendation 1] | <b>Ongoing:</b><br>Implement downramping rates during spill events controllable by valve operation |                     | PG&E                      |            |
| Aquatic – Potential effects of upramping during operational controllable spills | Upramp operational controllable spills at a maximum rate of 200 cfs per 24 hours [Forest Service condition 19 and California Fish and Game 10(j) recommendation 1]   | <b>Ongoing:</b><br>Implement upramping rates during operational controllable spills                |                     | PG&E                      |            |

| Impact  | Mitigation  | Mitigation Implementation Duration   | Monitoring Duration  | Mitigation Responsibility |            |
|---|---|--|--|---------------------------|------------|
|   |   | One-time or Ongoing  | One-time or Ongoing  | Implementation            | Monitoring |
| Aquatic – Potential effects of uncontrollable spill events    | To extent possible, upramp water flows released at McCloud dam prior to the start of an uncontrolled spill event at a maximum target rate of 100 cfs per hour [Measure 9] | <b>Ongoing:</b> Implement upramping rate, if possible, prior to start of uncontrollable spill event                              |  | PG&E                      |            |
| Aquatic – Confirmation of compliance with minimum streamflows | Operate, maintain, and modify (if necessary) gages needed to determine river stage and minimum streamflows [Forest Service condition 19]                                  |  | <b>Ongoing:</b> Maintain and operate gages for term of license   |                           | PG&E       |
| Aquatic – Confirmation of compliance with minimum streamflows | Measure streamflow compliance at two points below McCloud dam [Forest Service condition 19]   | <b>Ongoing:</b> Use two compliance points below McCloud dam (MC-1 and MC-7) to ensure streamflows meet minimum flow requirements | <b>Ongoing:</b> Monitor flow compliance below McCloud dam at two compliance points for term of license | PG&E                      | PG&E       |

| <b>Impact</b>   | <b>Mitigation</b>  | <b>Mitigation Implementation Duration</b> | <b>Monitoring Duration</b>  | <b>Mitigation Responsibility</b> |                   |
|---|--|---|---|----------------------------------|-------------------|
|   |  | <b>One-time or Ongoing</b>                | <b>One-time or Ongoing</b>  | <b>Implementation</b>            | <b>Monitoring</b> |
| Aquatic – Confirmation of compliance with minimum streamflows | Measure and document all instream flow releases below McCloud dam, Pit 7 dam, and Iron Canyon dam in publicly available and accessible formats [Forest Service condition 19] |   | <b>Ongoing:</b> Measure instream flows below project-affected reaches and provide data in publically available and readily accessible format. Post real-time flow data for MC-1 online. |                                  | PG&E              |
| Aquatic – Potential effect of project dams on fish passage    | Reserve NMFS authority to prescribe fishways [NMFS 10(j)]  |   |   | PG&E                             |                   |

| Impact  | Mitigation  | Mitigation Implementation Duration  | Monitoring Duration  | Mitigation Responsibility |            |
|---|---|---|--|---------------------------|------------|
|   |   | One-time or Ongoing   | One-time or Ongoing  | Implementation            | Monitoring |
| Terrestrial – Potential construction-related effects on upland vegetation, riparian areas, and wetlands | Develop and implement a Vegetation and Invasive Weed Management Plan [Forest Service condition 25] <sup>a</sup> <i>This measure is modified to specify that PG&amp;E would inform managers of sensitive or rare species locations and to include monitoring of culturally significant plant species not associated with traditional cultural properties and implementation of BMPs to minimize effects on wetlands.</i> | <p><b>One-time:</b> Within 1 year of license issuance, file a Vegetation and Invasive Weed Management Plan</p> <p><b>Ongoing:</b> Implement the approved plan through the term of the license</p> | <p><b>Ongoing:</b> Monitor known populations of special status plant species, culturally significant plant species not associated with traditional cultural properties, other revegetation source populations, and essential wildlife habitat 1 year after plan approval and every 5 years thereafter; survey for new populations and new listings in project area beginning in first year after plan approval and every 10 years thereafter; implement pre-construction surveys; utilize operations map of special status and culturally significant species; implement BMPs for O&amp;M in riparian and wetland areas.</p> | PG&E                      | PG&E       |

| <b>Impact</b>  | <b>Mitigation</b>  | <b>Mitigation Implementation Duration</b>   | <b>Monitoring Duration</b>  | <b>Mitigation Responsibility</b> |                   |
|--|--|---|---|----------------------------------|-------------------|
|  |  | <b>One-time or Ongoing</b>  | <b>One-time or Ongoing</b>  | <b>Implementation</b>            | <b>Monitoring</b> |
| Terrestrial – Potential project related alteration of invasive plant populations | Develop and implement a Vegetation and Invasive Weed Management Plan [Forest Service condition 25] | <p><b>One-time:</b> Within 1 year of license issuance, file a Vegetation Management Plan</p> <p><b>Ongoing:</b> Implement the approved plan through the term of the license</p> | <p><b>Ongoing:</b> Monitor areas with ground disturbing activities annually for 3 years after disturbance; monitor selected known populations beginning in the first year after plan approval and annually thereafter; comprehensive surveys of selected weed species within 1 year of plan approval and every 5 years thereafter; control infestations of high-priority invasive species within 1 year of detection or as soon as practicable; adaptive management to prevent aquatic invasive weeds</p> | PG&E                             | PG&E              |

| Impact   | Mitigation   | Mitigation Implementation Duration  | Monitoring Duration   | Mitigation Responsibility |            |
|--|--|---|---|---------------------------|------------|
|  |  | One-time or Ongoing   | One-time or Ongoing   | Implementation            | Monitoring |
| Terrestrial – Potential project related effects on disturbed areas | Develop and implement a Vegetation and Invasive Weed Management Plan [Forest Service condition 25]   | <p><b>One-time:</b> Within 1 year of license issuance, file a Vegetation and Invasive Weed Management Plan</p> <p><b>Ongoing:</b> Implement the approved plan through the term of the license</p> | <p><b>Ongoing:</b> Monitor for 3 to 5 years after disturbance based on vegetative cover and implement standards of success and remediation measures</p> | PG&E                      | PG&E       |
| Terrestrial – pesticide and herbicide use                          | Restrict pesticide use on NFS lands and develop and implement a Vegetation and Invasive Weed Management Plan [Forest Service conditions 15 and 25] <sup>a</sup> <i>This measure is modified to include additional restrictions and guidelines for the use of pesticides and herbicides</i> | <p><b>One-time:</b> Within 1 year of license issuance, file a Vegetation and Invasive Weed Management Plan</p> <p><b>Ongoing:</b> Implement the approved plan through the term of the license</p> | <p><b>Ongoing:</b> Submit a request for approval of planned uses during annual consultation with the Forest Service</p>                                 | PG&E                      | PG&E       |

| Impact  | Mitigation   | Mitigation Implementation Duration  | Monitoring Duration   | Mitigation Responsibility |            |
|---|--|---|---|---------------------------|------------|
|   |  | One-time or Ongoing   | One-time or Ongoing   | Implementation            | Monitoring |
| Terrestrial – Potential impacts on northwestern pond turtle and foothill yellow-legged frog | Develop and implement an Aquatic Biological Monitoring Plan which includes a Foothill Yellow-Legged Frog Monitoring Plan [Forest Service 10(a) recommendation 1 and condition 27] <sup>a</sup> <i>This measure is modified to include monitoring periods as specified.</i> | <p><b>One-time:</b> Within 1 year of license issuance, submit an Aquatic Biological Monitoring Plan which includes a Foothill Yellow-Legged Frog Monitoring Plan</p> <p><b>Ongoing:</b> Implement the approved plan through the term of the license</p> | <p><b>Ongoing:</b> Monitor known populations of northwestern pond turtle within 1 year of plan approval and every 5 years thereafter. Conduct surveys for new populations of northwestern pond turtle and foothill yellow-legged frog in suitable habitat in the project area within 1 year of plan approval and every 10 years thereafter. Conduct pre-construction surveys for northwestern pond turtle. Implement Foothill Yellow-Legged Frog Monitoring Plan.</p> | PG&E                      | PG&E       |

| Impact  | Mitigation  | Mitigation Implementation Duration  | Monitoring Duration  | Mitigation Responsibility |            |
|---|---|---|--|---------------------------|------------|
|   |   | One-time or Ongoing   | One-time or Ongoing  | Implementation            | Monitoring |
| Terrestrial - Potential project related impacts on wildlife and avian species | Develop and implement a Terrestrial Biological Management Plan and ensure new and rebuilt power poles conform to APLIC standards for avian collision and electrocution hazards reduction<br>[Forest Service condition 26] <sup>a</sup> <i>This measure is modified to remove monitoring of the northwestern pond turtle, which is specified in Forest Service condition 27, and to include monitoring periods as specified.</i> | <b>One-time:</b> Within 1 year of license issuance, develop a Terrestrial Biological Management Plan<br><br><b>Ongoing:</b> Implement the approved plan through the term of the license | <b>Ongoing:</b> Monitor known populations within 1 year of plan approval and every 5 years thereafter for terrestrial mollusks, Shasta salamander, peregrine falcon, and special status bats, and annually for bald eagle; survey for new populations within 1 year then every 10 years for terrestrial mollusks, Shasta salamander, annually for bald eagle, and within 1 year and then every 5 years for peregrine falcon, willow flycatcher, and special status bats; conduct pre-construction surveys for terrestrial species or follow limited operating periods. | PG&E                      | PG&E       |

| Impact  | Mitigation  | Mitigation Implementation Duration   | Monitoring Duration | Mitigation Responsibility |            |
|---|---|--|---------------------|---------------------------|------------|
|   |   | One-time or Ongoing  | One-time or Ongoing | Implementation            | Monitoring |
| Land use – potential degradation of access roads needed to safely maintain project facilities | Road and Transportation Facilities Management Plan [Measure 18 and Forest Service condition 29] | <p><b>One-time:</b><br/>Develop and file a Road and Transportation Facilities Management Plan with the Commission within 1 year of license issuance</p> <p><b>Ongoing:</b><br/>Implement the approved plan through the term of the license</p> |                     | PG&E                      |            |

| <b>Impact</b>   | <b>Mitigation</b>   | <b>Mitigation Implementation Duration</b>   | <b>Monitoring Duration</b> | <b>Mitigation Responsibility</b> |                   |
|---|---|---|----------------------------|----------------------------------|-------------------|
|   |   | <b>One-time or Ongoing</b>  | <b>One-time or Ongoing</b> | <b>Implementation</b>            | <b>Monitoring</b> |
| Land use – project O&M-related effects on land management | Develop and implement a Fire Prevention and Response Plan [Forest Service condition 33] | <p><b>One-time:</b><br/>Develop and file a Fire Prevention and Response Plan with the Commission within 1 year of license issuance</p> <p><b>Ongoing:</b><br/>Implement the approved plan through the term of the license</p> |                            | PG&E                             |                   |

| <b>Impact</b>                                 | <b>Mitigation</b>   | <b>Mitigation Implementation Duration</b>   | <b>Monitoring Duration</b> | <b>Mitigation Responsibility</b> |                   |
|---|---|---|----------------------------|----------------------------------|-------------------|
|   |   | <b>One-time or Ongoing</b>  | <b>One-time or Ongoing</b> | <b>Implementation</b>            | <b>Monitoring</b> |
| Land use – oil and hazardous substances spill | Implement existing Spill Prevention, Control, and Countermeasures Plan and Hazardous Substance Management Plan <sup>a</sup> | <p><b>One-time:</b> File with the Commission the existing Spill Prevention, Control, and Countermeasures Plan and Hazardous Substance Management Plan and provide copies to the Forest Service and the Regional Water Quality Control Board within 30 days of license issuance</p> <p><b>Ongoing:</b> Implement the plans through the term of the license</p> |                            | PG&E                             |                   |

| <b>Impact</b>  | <b>Mitigation</b>   | <b>Mitigation Implementation Duration</b>  | <b>Monitoring Duration</b> | <b>Mitigation Responsibility</b> |                   |
|--|---|--|----------------------------|----------------------------------|-------------------|
|  |   | <b>One-time or Ongoing</b>   | <b>One-time or Ongoing</b> | <b>Implementation</b>            | <b>Monitoring</b> |
| Land use – maintenance of roads and recreational facilities providing access to project lands and waters | Revise project boundary and file a revised exhibit G <sup>a</sup> | <p><b>One-time:</b> Incorporate all existing project roads and recreation sites within the project boundary and file a revised exhibit G with the Commission within 1 year of license issuance</p> <p><b>Ongoing:</b> As new project facilities are constructed, including recreation sites, file revised exhibit maps with the Commission</p> |                            | PG&E                             |                   |

| <b>Impact</b>   | <b>Mitigation</b>  | <b>Mitigation Implementation Duration</b>  | <b>Monitoring Duration</b> | <b>Mitigation Responsibility</b> |                         |
|---|--|--|----------------------------|----------------------------------|-------------------------|
|   |  | <b>One-time or Ongoing</b>   | <b>One-time or Ongoing</b> | <b>Implemen-<br/>tation</b>      | <b>Monitor-<br/>ing</b> |
| Aesthetic resources – project facilities and operation may impact aesthetic resources in the project area | Develop and implement visual quality mitigation measures [Forest Service condition 32] | <p><b>One-time:</b><br/>Develop and file a description of specific visual quality mitigation measures and an associated timeline with the Commission within 1 year of license issuance</p> <p><b>Ongoing:</b><br/>Implement the measures through the term of the license</p> |                            | PG&E                             |                         |

| Impact   | Mitigation  | Mitigation Implementation Duration  | Monitoring Duration | Mitigation Responsibility |            |
|--|---|---|---------------------|---------------------------|------------|
|  |   | One-time or Ongoing   | One-time or Ongoing | Implementation            | Monitoring |
| Recreation-Potential effects of streamflow on recreation opportunities | Provide recreation flow information for Lower McCloud River [Measure 19, Forest Service condition 19, PG&E alternative condition 19] <sup>a</sup> <i>This measure is modified to also include providing real-time flow data for gage MC-7 via PG&amp;E's webpage on the internet.</i> | <b>Ongoing:</b><br>Implement by providing real-time flow data for gages MC-1 and MC-7 and drawdown information to the public via PG&E's webpage on the internet through the term of the license |                     | PG&E                      |            |

| Impact   | Mitigation  | Mitigation Implementation Duration   | Monitoring Duration | Mitigation Responsibility |            |
|--|---|--|---------------------|---------------------------|------------|
|  |   | One-time or Ongoing  | One-time or Ongoing | Implementation            | Monitoring |
| Recreation-potential increases in project-related recreation use | Recreation Development and Management Plan [Measure 19, Forest Service condition 30, PG&E alternative condition 30] <sup>a</sup> <i>This measure is modified to specify consultation with American Whitewater, Friends of the River, Native American representatives and conditioning agencies, submittal of final plan to Forest Service for review, PG&amp;E O&amp;M responsibility for all recreation facilities upon license issuance including Forest Service facilities, and removal of project patrol component.</i> | <p><b>One-time:</b><br/>Develop and file Recreation Plan with the Commission within 2 years of license issuance</p> <p><b>Ongoing:</b><br/>Implement the approved plan through the term of the license</p> |                     | PG&E                      |            |

| <b>Impact</b>  | <b>Mitigation</b>   | <b>Mitigation Implementation Duration</b>  | <b>Monitoring Duration</b> | <b>Mitigation Responsibility</b> |                   |
|--|---|--|----------------------------|----------------------------------|-------------------|
|  |   | <b>One-time or Ongoing</b>   | <b>One-time or Ongoing</b> | <b>Implementation</b>            | <b>Monitoring</b> |
| Recreation-Potential safety issues, provide public information | Develop and implement a Project Sign Plan [Forest Service condition 31] | <p><b>One-time:</b><br/>Develop and file Project Sign Plan with the Commission within 2 years of license issuance</p> <p><b>Ongoing:</b><br/>Implement the approved plan through the term of the license</p> |                            | PG&E                             |                   |

| <b>Impact</b>  | <b>Mitigation</b>   | <b>Mitigation Implementation Duration</b>   | <b>Monitoring Duration</b>                                | <b>Mitigation Responsibility</b> |                   |
|--|---|---|---|----------------------------------|-------------------|
|  |   | <b>One-time or Ongoing</b>  | <b>One-time or Ongoing</b>                                | <b>Implementation</b>            | <b>Monitoring</b> |
| Recreation-potential increases in project-related recreation use | Recreation Monitoring Plan/Component [Measure 19, Forest Service condition 30, and PG&E alternative condition 30] <sup>a</sup> <i>This measure is modified to include Forest Service review of report and boat use monitoring at the reservoirs..</i> | <p><b>One-time:</b><br/>Develop and file with Recreation Plan with the Commission within 2 years of license issuance</p> <p><b>Ongoing:</b><br/>Implement the approved plan through the term of the license</p> | <b>Ongoing:</b> Conduct boat use monitoring every 6 years | PG&E                             | PG&E              |

| Impact   | Mitigation   | Mitigation Implementation Duration  | Monitoring Duration | Mitigation Responsibility |            |
|--|--|---|---------------------|---------------------------|------------|
|  |  | One-time or Ongoing   | One-time or Ongoing | Implementation            | Monitoring |
| Recreation-- potential increases in project-related recreation use, potential public safety issues | Surface water management plan/component [Measure 19, Forest Service condition 30, and PG&E alternative condition 30] <sup>a</sup> <i>This measure is modified to include protocols, e.g., to prevent unapproved buoy courses, unauthorized access to project areas; approved use of docks; annual, or as needed, surface sweeps of McCloud and Iron Canyon reservoirs.</i> | <p><b>One-time:</b><br/>Develop and file with Recreation Plan with the Commission within 2 years of license issuance</p> <p><b>Ongoing:</b><br/>Implement the approved plan through the term of the license</p> |                     | PG&E                      |            |

| Impact   | Mitigation  | Mitigation Implementation Duration   | Monitoring Duration   | Mitigation Responsibility |            |
|--|---|--|---|---------------------------|------------|
|  |   | One-time or Ongoing  | One-time or Ongoing   | Implementation            | Monitoring |
| Recreation-- potential increases in project-related recreation use, potential public safety issues | Annually stock up to 60,000 pounds of trout at the project and develop and implement a fish stocking plan [California Fish and Game 10(j)] <sup>a</sup> <i>This measure is modified to include responsibility of PG&amp;E for fish stocking and developing a fish stocking plan to evaluate and monitor the amount of fish to be stocked every 6 years.</i> | <p><b>Ongoing:</b><br/>Annually stock 60,000 pounds of trout at the project and implement fish stocking plan</p> <p><b>One-time:</b><br/>Develop (for Commission approval) a fish stocking plan in consultation with California Fish and Game within 1 year of license issuance.</p> | <b>Ongoing:</b> Evaluate and monitor the amount of fish to be stocked every 6 years through the term of the license | PG&E                      | PG&E       |

| <b>Impact</b>  | <b>Mitigation</b>   | <b>Mitigation<br/>Implementation<br/>Duration</b>                  | <b>Monitoring Duration</b> | <b>Mitigation<br/>Responsibility</b> |                         |
|--|---|--|----------------------------|--------------------------------------|-------------------------|
|  |   | <b>One-time or<br/>Ongoing</b>                                     | <b>One-time or Ongoing</b> | <b>Implemen-<br/>tation</b>          | <b>Monitor-<br/>ing</b> |
| Recreation--<br>potential<br>public safety<br>issues and<br>resource<br>damage | At McCloud and Iron<br>Canyon reservoirs, assess and<br>implement closures of user-<br>created roads leading to the<br>shoreline of McCloud and<br>Iron Canyon reservoirs<br>[Measure 19 and PG&E<br>alternative condition 30] <sup>a</sup><br><i>This measure is modified to<br/>also include trail and<br/>dispersed use closure.</i> | <b>Ongoing:</b><br>Implement through<br>the term of the<br>license |                            | PG&E                                 |                         |

| <b>Impact</b>  | <b>Mitigation</b>   | <b>Mitigation Implementation Duration</b>   | <b>Monitoring Duration</b> | <b>Mitigation Responsibility</b> |                   |
|--|---|---|----------------------------|----------------------------------|-------------------|
|  |   | <b>One-time or Ongoing</b>  | <b>One-time or Ongoing</b> | <b>Implementation</b>            | <b>Monitoring</b> |
| Recreation-potential increases in project-related recreation use | Provide or reconstruct day-use facilities at Red Banks, Star City, Tarantula Gulch, Tarantula Gulch Inlet, base of McCloud dam, and Fenders Flat; and access areas at Battle Creek, East McCloud dam, West McCloud dam, Iron Canyon reservoir (three access points), and near the proposed Pit 7 afterbay powerhouse if the Pit 7 afterbay powerhouse is constructed [Measure 19, Forest Service condition 30, and PG&E alternative condition 30] | <b>One-time:</b><br>Construct facilities<br><br><b>Ongoing:</b> O&M of facilities |                            | PG&E                             |                   |

| Impact   | Mitigation  | Mitigation Implementation Duration   | Monitoring Duration | Mitigation Responsibility |            |
|--|---|--|---------------------|---------------------------|------------|
|  |   | One-time or Ongoing  | One-time or Ongoing | Implementation            | Monitoring |
| Recreation-potential increases in project-related recreation use | Conduct a site evaluation to determine feasibility of constructing a fishing/swimming platform at McCloud reservoir and construct this facility if a suitable location is found [Measure 19 and PG&E alternative condition 30] <sup>a</sup><br><i>This measure is modified for the site evaluation and report to be filed with the Commission within 2 years of license issuance for approval and construction of the platform.</i> | <b>One-time:</b> Site evaluation and filing report of results with the Commission within 2 years of license issuance and construction of the facility<br><br><b>Ongoing:</b> O&M of facility |                     |                           | PG&E       |

| Impact   | Mitigation  | Mitigation Implementation Duration  | Monitoring Duration | Mitigation Responsibility |            |
|--|---|---|---------------------|---------------------------|------------|
|  |   | One-time or Ongoing   | One-time or Ongoing | Implementation            | Monitoring |
| Recreation-potential increases in project-related recreation use | Provide or reconstruct boat ramps: Tarantula Gulch, Hawkins Landing, Iron Canyon dam (new boat ramp), and Fenders Flat [Measure 19, Forest Service condition 30, and PG&E alternative condition 30] <sup>a</sup><br><i>This measure is modified to include lighting at Tarantula Gulch boat ramp and the new Iron Canyon dam boat ramp.</i> | <p><b>One-time:</b><br/>Construct facilities</p> <p><b>Ongoing:</b> O&amp;M of facilities</p> |                     |                           | PG&E       |

| <b>Impact</b>  | <b>Mitigation</b>   | <b>Mitigation Implementation Duration</b>   | <b>Monitoring Duration</b> | <b>Mitigation Responsibility</b> |                   |  |
|--|---|---|----------------------------|----------------------------------|-------------------|--|
|  |   | <b>One-time or Ongoing</b>  | <b>One-time or Ongoing</b> | <b>Implementation</b>            | <b>Monitoring</b> |  |
| Recreation-potential increases in project-related recreation use | Provide snow removal at Iron Canyon dam boat ramp and access road when project operations require snow removal from Oak Mountain Road [PG&E alternative condition 30] | <b>Ongoing:</b> Snow removal at Iron Canyon dam boat ramp and access road when project operations require snow removal from Oak Mountain Road |                            |                                  | PG&E              |  |

| Impact  | Mitigation  | Mitigation Implementation Duration  | Monitoring Duration | Mitigation Responsibility |            |
|---|---|---|---------------------|---------------------------|------------|
|   |   | One-time or Ongoing   | One-time or Ongoing | Implementation            | Monitoring |
| Recreation-potential increases in project-related recreation use potential public safety issues and resource damage | Provide or reconstruct a campground at Star City, Gap Creek, Deadlun, and Hawkins Landing [Measure 19, Forest Service condition 30, and PG&E alternative condition 30] <sup>a</sup> <i>This measure is modified to include a campground at Gap Creek for single unit campsites, reconstruction of Deadlun Campground for double and triple campsites, and to remove the requirement for campground hosts.</i> | <p><b>One-time:</b><br/>Construct facilities</p> <p><b>Ongoing:</b> O&amp;M of facilities</p> |                     | PG&E                      |            |

| Impact   | Mitigation   | Mitigation Implementation Duration  | Monitoring Duration | Mitigation Responsibility |            |
|--|--|---|---------------------|---------------------------|------------|
|  |  | One-time or Ongoing   | One-time or Ongoing | Implementation            | Monitoring |
| Recreation-potential increases in project-related recreation use | Conduct site evaluation and construct a pedestrian shoreline access trail at the upper end of Pit 7 reservoir [Measure 19, Forest Service condition 30, and PG&E alternative condition 30] <sup>a</sup><br><i>This measure is modified to include construction of facilities and only one access trail and parking area.</i> | <b>One-time:</b><br>Construct facilities<br><b>Ongoing:</b> O&M of facilities   |                     |                           | PG&E       |
| Recreation-potential increases in project-related recreation use | Conduct site evaluation and construct a pedestrian shoreline access trail at the lower end of Pit 7 reservoir [Forest Service condition 30] <sup>a</sup> <i>This measure is modified to include the site evaluation and to not include a put-in or take-out for boats.</i>   | <b>One-time:</b><br>Conduct site evaluation within 2 years of license issuance and construct facilities within 5 years of license issuance<br><b>Ongoing:</b> O&M of facilities |                     |                           | PG&E       |

| <b>Impact</b>   | <b>Mitigation</b>   | <b>Mitigation Implementation Duration</b>   | <b>Monitoring Duration</b>   | <b>Mitigation Responsibility</b> |                   |
|---|---|---|--|----------------------------------|-------------------|
|   |   | <b>One-time or Ongoing</b>  | <b>One-time or Ongoing</b>   | <b>Implementation</b>            | <b>Monitoring</b> |
| Cultural Resources – project-related impacts to archaeological and historic era resources | Finalize and implement HPMP [Measure 22 and Forest Service condition 34] <sup>a</sup><br><i>This measure has been modified such that the final HPMP filed with the Commission in October 2010 would be implemented.</i> | <b>Ongoing:</b><br>Implement general and site specific treatment measures identified in the HPMP, to begin upon new license issue | <b>Ongoing:</b> Conduct long-term historic properties monitoring; baseline monitoring within 1 year following new license issuance, and annual monitoring thereafter | PG&E                             | PG&E              |

<sup>a</sup> Staff alternative: includes additional measures identified by staff based on agency and non-governmental organization recommendations

## **Appendix C**

### **Capital and Annual Costs of Measures for the McCloud-Pit Project**



Table C-1. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for the McCloud-Pit Hydroelectric Project. (Source: Staff)

| Measure  | Entity and Measure No.    | Staff Recommend? | Capital Cost (2009 \$) | Annualized Capital Cost (2009 \$) | Annual O&M Cost (2009 \$) | Annual Energy Costs (2009 \$) | Total Annualized Cost (2009 \$) | Comments  |
|--|---------------------------|------------------|------------------------|-----------------------------------|---------------------------|-------------------------------|---------------------------------|---|
| Consult with Forest Service annually regarding planned operation and maintenance activities on NFS lands | FS (4e #1), PG&E (#1)     | Adopt            | \$0                    | \$0                               | \$30,000                  | \$0                           | \$30,000                        |   |
| Provide annual employee training in coordination with the Forest Service                                 | FS (4e #1, 25), PG&E (#2) | Adopt            | \$0                    | \$0                               | \$60,000                  | \$0                           | \$60,000                        |   |
| Obtain Forest Service approval for all final design plans  | PG&E (#3)                 | Adopt            | \$0                    | \$0                               | \$0                       | \$0                           | \$0                             |   |
| Consult annually on newly added special status species   | NMFS (10(j) #1B)          | Adopt            | \$0                    | \$0                               | \$11,000                  | \$0                           |                                 | The cost for this measure is reflected in the cost (\$30,000) for FS condition 1. |
| Develop and implement gravel augmentation and amphibian indicator species monitoring                     | CF&G (10(a))              | Do not adopt     | \$0                    | \$0                               | \$75,000                  | \$0                           | \$75,000                        |   |

| <b>Measure</b>  | <b>Entity and Measure No.</b> | <b>Staff Recommendation?</b> | <b>Capital Cost (2009 \$)</b> | <b>Annualized Capital Cost (2009 \$)</b> | <b>Annual O&amp;M Cost (2009 \$)</b> | <b>Annual Energy Costs (2009 \$)</b> | <b>Total Annualized Cost (2009 \$)</b> | <b>Comments</b>  |
|---|-------------------------------|------------------------------|-------------------------------|--|--------------------------------------|--------------------------------------|--|--|
| Develop and implement gravel augmentation plan for listed salmonids                     | NMFS (10(j) #4A and B)        | Do not adopt                 | \$0                           | \$0                                      | \$100,000                            | \$0                                  | \$100,000                              | The cost of developing and implementing gravel augmentation plans that may be prescribed in the future cannot be estimated at this time. |
| Develop a plan for gravel and coarse sediment management                                | FS (4e #23)                   | Adopt                        | \$20,000                      | \$4,000                                  | \$75,000                             | \$0                                  | \$79,000                               |  |
| Maintain stream channel in McCloud River to minimize impacts on listed salmonid habitat | NMFS (10(j) #5)               | Do not adopt                 | \$0                           | \$0                                      | \$10,000                             | \$0                                  | \$10,000                               | The cost of mitigation plans that may be prescribed in the future cannot be estimated at this time.                                      |

| <b>Measure</b>  | <b>Entity and Measure No.</b>   | <b>Staff Recommendation?</b> | <b>Capital Cost (2009 \$)</b> | <b>Annualized Capital Cost (2009 \$)</b> | <b>Annual O&amp;M Cost (2009 \$)</b> | <b>Annual Energy Costs (2009 \$)</b> | <b>Total Annualized Cost (2009 \$)</b> | <b>Comments</b>   |
|---|---------------------------------|------------------------------|-------------------------------|--|--------------------------------------|--------------------------------------|--|---|
| Protect and enhance riparian habitat function for listed salmonids  | NMFS (10(j) #6)                 | Do not adopt                 | \$0                           | \$0                                      | \$0                                  | \$0                                  | \$0                                    | The cost of riparian protection and enhancement measures that may be prescribed in the future cannot be estimated at this time. |
| Move flow compliance gage from MC-1 to MC-7   | CF&G (10(j) #1), NMFS(10(j) #3) | Do not adopt                 | \$0                           | \$0                                      | \$60,000                             | \$0                                  | \$60,000                               |   |
| Monitor instream flow at two compliance points below McCloud dam  | FS (4e #19)                     | Adopt                        | \$0                           | \$0                                      | \$60,000                             | \$0                                  | \$60,000                               |   |
| Operate and maintain, and modify (if necessary) existing gages for determining streamflow and river stage | FS (4e #19)                     | Adopt                        | \$0                           | \$0                                      | \$120,000                            | \$0                                  | \$120,000                              |   |

| <b>Measure</b>   | <b>Entity and Measure No.</b>  | <b>Staff Recommendation?</b> | <b>Capital Cost (2009 \$)</b> | <b>Annualized Capital Cost (2009 \$)</b> | <b>Annual O&amp;M Cost (2009 \$)</b> | <b>Annual Energy Costs (2009 \$)</b> | <b>Total Annualized Cost (2009 \$)</b> | <b>Comments</b> |
|--|--|------------------------------|-------------------------------|--|--------------------------------------|--------------------------------------|--|-----------------|
| Provide real-time flow data for gage MC-1 on the California Data Exchange Center website or its successor.                               | FS (4e #19)  | Do not adopt                 | \$0                           | \$0                                      | \$2,000                              | \$0                                  | \$2,000                                |                 |
| Determine water year type  | FS (4e #19)  | Adopt                        | \$0                           | \$0                                      | \$5,000                              | \$0                                  | \$5,000                                |                 |
| Implement ramping rates during controllable spill events and valve testing   | FS (4e 19) CF&G (10(j) #1)   | Adopt                        | \$0                           | \$0                                      | \$0                                  | \$0                                  | \$0                                    |                 |
| Implement American Whitewater and Friends of the River alternative 4(e) ramping rates during controllable spill events and valve testing | American Whitewater and Friends of the River (Alternative to FS 4e#19) | Do not adopt                 | \$0                           | \$0                                      | \$0                                  | \$0                                  | \$0                                    |                 |
| Implement minimum flows proposed in FLA  | PG&E (#5, 7, 8)  | Do not adopt                 | \$0                           | \$0                                      | \$0                                  | \$10,703,000                         | \$10,703,000                           |                 |

| Measure  | Entity and Measure No.                          | Staff Recommendation? | Capital Cost (2009 \$)                         | Annualized Capital Cost (2009 \$) | Annual O&M Cost (2009 \$) | Annual Energy Costs (2009 \$) | Total Annualized Cost (2009 \$) | Comments   |
|--|---|-----------------------|--|-----------------------------------|---------------------------|-------------------------------|---------------------------------|--|
| Implement California Fish and Game's recommended minimum flows                           | CF&G (10(j) #1)                                 | Do not adopt          | \$300,000 for valve replacement at McCloud dam | \$57,000                          | \$0                       | \$15,852,000                  | \$15,910,000                    |  |
| Implement Forest Service's 4(e) minimum flows  | FS (4e #19)                                     | Adopt                 | \$300,000 for valve replacement at McCloud dam | \$57,000                          | \$0                       | \$14,393,000                  | \$14,451,000                    |  |
| Implement PG&E's alternative 4(e) flows below McCloud dam <sup>a</sup>                   | PG&E (Alternative to FS 4e #19)                 | Do not adopt          | \$0  | \$0                               | \$0                       | \$10,703,000                  | \$10,703,000                    |  |
| Implement NMFS minimum flows below McCloud dam to meet requirements for listed salmonids | NMFS (10(j) #3)                                 | Do not adopt          | \$0  | \$0                               | \$0                       | \$0                           | \$0                             | The cost of minimum instream flows that may be prescribed in the future cannot be estimated at this time |
| Implement McCloud RiverKeepers flows below McCloud dam                                   | McCloud RiverKeepers (Alternative to FS 4e #19) | Do not adopt          | \$0  | \$0                               | \$0                       | \$0                           | \$4,255,000                     |  |

| Measure  | Entity and Measure No.                          | Staff Recommendation? | Capital Cost (2009 \$) | Annualized Capital Cost (2009 \$) | Annual O&M Cost (2009 \$) | Annual Energy Costs (2009 \$) | Total Annualized Cost (2009 \$) | Comments   |
|--|---|-----------------------|------------------------|-----------------------------------|---------------------------|-------------------------------|---------------------------------|--|
| Implement Winnemem Wintu Tribe minimum flows below McCloud dam to meet requirements for listed salmonids         | Winnemem Wintu Tribe (Alternative to FS 4e #19) | Do not adopt          | \$0                    | \$0                               | \$0                       | \$0                           | \$0                             | The cost of minimum instream flows that may be prescribed in the future cannot be estimated at this time |
| Implement minimum flows below Iron Canyon dam <sup>a</sup>   | FS (4e#19) CF&G(10(j) 1)                        | Adopt                 | \$0                    | \$0                               | \$0                       | \$0                           | \$727,000                       |  |
| Implement McCloud dam up-ramping flows prior to uncontrolled spill events <sup>a</sup>                           | PG&E (#9)                                       | Adopt                 | \$0                    | \$0                               | \$0                       | \$0                           | \$0                             |  |
| Provide a recreation flow event from McCloud dam   | PG&E (#6)                                       | Do not adopt          | \$0                    | \$0                               | \$0                       | \$0                           | \$0                             |  |
| Upgrade gage MC-10   | PG&E (#7)                                       | Do not adopt          | \$41,000               | \$8,000                           | \$0                       | \$0                           | \$8,000                         |  |
| Develop and implement a water quality monitoring plan in consultation with applicable federal and state agencies | FS (4e #20), PG&E (#10)                         | Adopt                 | \$85,000               | \$16,000                          | \$70,000                  | \$0                           | \$86,000                        |  |

| <b>Measure</b>   | <b>Entity and Measure No.</b> | <b>Staff Recommendation?</b> | <b>Capital Cost (2009 \$)</b> | <b>Annualized Capital Cost (2009 \$)</b> | <b>Annual O&amp;M Cost (2009 \$)</b> | <b>Annual Energy Costs (2009 \$)</b> | <b>Total Annualized Cost (2009 \$)</b> | <b>Comments</b>   |
|--|-------------------------------|------------------------------|-------------------------------|--|--------------------------------------|--------------------------------------|--|---|
| Modify project structure and operations necessary to mitigate impacts of water quality and temperature to listed salmonids | NMFS(10(j) #7)                | Do not adopt                 | \$0                           | \$0                                      | \$0                                  | \$0                                  | \$0                                    | The cost of project mitigation plans that may be prescribed in the future cannot be estimated at this time. |
| Develop and implement a Large Woody Debris Management Plan   | FS (4e #21), PG&E (#11)       | Adopt                        | \$600,000                     | \$114,000                                | \$100,000                            | \$0                                  | \$214,000                              |   |
| Reserve authority to prescribe fishways  | NMFS/FWS (Section 18)         | Adopt                        | \$0                           | \$0                                      | \$0                                  | \$0                                  | \$0                                    | The cost of any fishways that may be prescribed in the future cannot be estimated at this time.             |

| <b>Measure</b>  | <b>Entity and Measure No.</b> | <b>Staff Recommendation?</b>   | <b>Capital Cost (2009 \$)</b> | <b>Annualized Capital Cost (2009 \$)</b> | <b>Annual O&amp;M Cost (2009 \$)</b> | <b>Annual Energy Costs (2009 \$)</b> | <b>Total Annualized Cost (2009 \$)</b> | <b>Comments</b>   |
|---|-------------------------------|--------------------------------|-------------------------------|--|--------------------------------------|--------------------------------------|--|---|
| Provide access to suitable habitat for anadromous fish and restore habitat conditions | NMFS(10(j) #2)                | Do not adopt                   | \$0                           | \$0                                      | \$0                                  | \$0                                  | \$0                                    | The cost of any fishways that may be prescribed in the future cannot be estimated at this time. |
| Develop and implement an Erosion and Sediment Monitoring and Control Plan             | FS (4e #22), PG&E (#12)       | Adopt                          | \$550,000                     | \$105,000                                | \$15,000                             | \$0                                  | \$120,000                              |   |
| Develop and implement a Vegetation Management Plan                                    | PG&E (#13)                    | Do not adopt                   | \$300,000                     | \$57,000                                 | \$275,000                            | \$0                                  | \$332,000                              |   |
| Develop and implement a Vegetation and Invasive Weed Management Plan                  | FS (4e #25)                   | Adopt with staff modifications | \$325,000                     | \$62,000                                 | \$275,000                            | \$0                                  | \$337,000                              |   |
| Prepare a biological evaluation to protect Forest Service special status species      | FS (4e #11), PG&E (#15)       | Adopt                          | \$0                           | \$0                                      | \$0                                  | \$0                                  | \$0                                    |   |

| <b>Measure</b>  | <b>Entity and Measure No.</b> | <b>Staff Recommendation?</b>   | <b>Capital Cost (2009 \$)</b> | <b>Annualized Capital Cost (2009 \$)</b> | <b>Annual O&amp;M Cost (2009 \$)</b> | <b>Annual Energy Costs (2009 \$)</b> | <b>Total Annualized Cost (2009 \$)</b> | <b>Comments</b> |
|---|-------------------------------|--------------------------------|-------------------------------|--|--------------------------------------|--------------------------------------|--|-----------------|
| Prepare and file a biological or assessment evaluation for newly added special status species | NMFS(10(j) #1B)               | Adopt                          | \$0                           | \$0                                      | \$0                                  | \$0                                  | \$0                                    |                 |
| Develop and implement a Foothill Yellow-Legged Frog Monitoring Plan                           | FS (10(a))                    | Adopt                          | \$0                           | \$0                                      | \$70,000                             | \$0                                  | \$70,000                               |                 |
| Develop and implement a Wildlife Management Plan  | PG&E (#14, 16)                | Do not adopt                   | \$310,000                     | \$59,000                                 | \$287,000                            | \$0                                  | \$346,000                              |                 |
| Develop and implement a Terrestrial Biological Management Plan                                | FS (4e #26)                   | Adopt with staff modifications | \$250,000                     | \$48,000                                 | \$150,000                            | \$0                                  | \$198,000                              |                 |
| Develop and implement an Aquatic Biological Management and Monitoring Plan                    | FS (4e #27)                   | Adopt with staff modifications | \$500,000                     | \$95,000                                 | \$100,000                            | \$0                                  | \$195,000                              |                 |

| Measure   | Entity and Measure No. | Staff Recommendation? | Capital Cost (2009 \$) | Annualized Capital Cost (2009 \$) | Annual O&M Cost (2009 \$) | Annual Energy Costs (2009 \$) | Total Annualized Cost (2009 \$) | Comments  |
|---|------------------------|-----------------------|------------------------|-----------------------------------|---------------------------|-------------------------------|---------------------------------|---|
| Submit biological evaluation or assessment for special status species protection or mitigation            | NMFS(10(j) #1)         | Do not adopt          | \$20,000               | \$4,000                           | \$2,000                   | \$0                           | \$6,000                         | Biological evaluation would be conducted under Terrestrial and Aquatic Biological Management Plans. |
| Create a Listed Salmonid Technical Integration Committee  | NMFS (10(j) #8)        | Do not adopt          | \$0                    | \$0                               | \$20,000                  | \$0                           | \$20,000                        |   |
| File reports with Commission regarding activities of existing Interagency Fish Passage Steering Committee | Staff                  | Adopt                 | \$0                    | \$0                               | \$1,000                   | \$0                           | \$1,000                         |   |
| Develop and implement avian hazard reduction measures   | PG&E (#16)             | Adopt                 | \$123,000              | \$23,000                          | \$0                       | \$0                           |                                 | The cost of this measure is reflected in the Terrestrial Biological Management Plan.                |

| <b>Measure</b>  | <b>Entity and Measure No.</b>                           | <b>Staff Recommend?</b>                        | <b>Capital Cost (2009 \$)</b> | <b>Annualized Capital Cost (2009 \$)</b> | <b>Annual O&amp;M Cost (2009 \$)</b> | <b>Annual Energy Costs (2009 \$)</b> | <b>Total Annualized Cost (2009 \$)</b> | <b>Comments</b> |
|---|---|--|-------------------------------|--|--------------------------------------|--------------------------------------|--|-----------------|
| Stock trout in McCloud and Iron Canyon reservoirs and Shasta Lake, as proposed in FLA   | PG&E (#17)  | Do not adopt                                   | \$0                           | \$0                                      | \$117,000                            | \$0                                  | \$117,000                              |                 |
| Stock up to 60,000 pounds of trout within project boundary annually   | CF&G (10(j) #3)   | Adopted with staff modifications               | \$0                           | \$0                                      | \$117,000                            | \$0                                  | \$117,000                              |                 |
| Provide at least \$5,000 annually for the monitoring and evaluation of fish stocking program or stocking of white sturgeon within Shasta Lake | CF&G (10(j) #3)   | Do not adopt                                   | \$5,000                       | \$1,000                                  | \$0                                  | \$0                                  | \$1,000                                |                 |
| Develop and implement a Road and Transportation Facility Management Plan  | FS (4e #29 & 30a), PG&E (#18, Alternative to FS 4e #29) | Adopt with incorporation of PG&E's alternative | \$15,500,000                  | \$2,950,000                              | \$1,000,000                          | \$0                                  | \$3,950,000                            |                 |

| <b>Measure</b>   | <b>Entity and Measure No.</b>                                    | <b>Staff Recommendation?</b>   | <b>Capital Cost (2009 \$)</b> | <b>Annualized Capital Cost (2009 \$)</b> | <b>Annual O&amp;M Cost (2009 \$)</b> | <b>Annual Energy Costs (2009 \$)</b> | <b>Total Annualized Cost (2009 \$)</b> | <b>Comments</b> |
|--|--|--|-------------------------------|--|--------------------------------------|--------------------------------------|--|-----------------|
| Develop and implement a Recreation Development and Management Plan in consultation with Forest Service, conditioning agencies, Native American representatives, and other interested parties | FS (4e #30 & 30a), PG&E (Alternative to FS 4e #30)               | Adopt with staff modifications and incorporation of PG&E's alternative | \$150,000                     | \$29,000                                 | \$0                                  | \$0                                  | \$29,000                               |                 |
| Develop and implement a Recreation Development and Management Plan in consultation with Forest Service, California Fish and Game, and California Water Board                                 | PG&E (#19)   | Do not adopt   | \$150,000                     | \$29,000                                 | \$0                                  | \$0                                  | \$29,000                               |                 |
| Provide recreation flow information for Lower McCloud River on website   | FS (4e #19, Part 2 and 31), PG&E (#19, Alternative to FS 4e #30) | Adopt with staff modifications   | \$0                           | \$0                                      | \$4,000                              | \$0                                  | \$4,000                                |                 |

| Measure   | Entity and Measure No.                            | Staff Recommendation?         | Capital Cost (2009 \$) | Annualized Capital Cost (2009 \$) | Annual O&M Cost (2009 \$) | Annual Energy Costs (2009 \$) | Total Annualized Cost (2009 \$) | Comments   |
|---|---|-------------------------------|------------------------|-----------------------------------|---------------------------|-------------------------------|---------------------------------|--|
| Develop and implement a Project Sign Plan as proposed in FLA  | PG&E (#19)  | Do not adopt                  | \$200,000              | \$38,000                          | \$0                       | \$0                           | \$38,000                        |  |
| Develop and implement a project Sign and Interpretive/Education Management Plan                         | FS (4e #31)                                       | Adopt with staff modification | \$314,000              | \$60,000                          | \$12,000                  | \$0                           | \$72,000                        | The cost of the Project Sign Plan is \$42,000 and the cost of the Interpretive and Education Component is \$30,000 |
| Develop and implement an Interpretive and Education Sign plan as proposed in FLA/component of Sign Plan | PG&E (#19)  | Do not adopt                  | \$94,000               | \$18,000                          | \$2,000                   | \$0                           | \$20,000                        |  |
| Develop and implement a recreation monitoring component   | FS (4e #30), PG&E (#19, Alternative to FS 4e #30) | Adopt                         | \$0                    | \$0                               | \$300,000                 | \$0                           | \$300,000                       |  |
| Develop a surface water and shoreline management plan   | PG&E (#19, Alternative to FS 4e #30)              | Do not adopt                  | \$0                    | \$0                               | \$10,000                  | \$0                           | \$10,000                        |  |

| <b>Measure</b>   | <b>Entity and Measure No.</b>                     | <b>Staff Recommendation?</b>   | <b>Capital Cost (2009 \$)</b> | <b>Annualized Capital Cost (2009 \$)</b> | <b>Annual O&amp;M Cost (2009 \$)</b> | <b>Annual Energy Costs (2009 \$)</b> | <b>Total Annualized Cost (2009 \$)</b> | <b>Comments</b> |
|--|---|--------------------------------|-------------------------------|--|--------------------------------------|--------------------------------------|--|-----------------|
| Develop and implement surface water management component | FS (4e #30)                                       | Adopt with staff modifications | \$0                           | \$0                                      | \$50,000                             | \$0                                  | \$50,000                               |                 |
| Provide McCloud dam recreation access                    | FS (4e #30), PG&E (#19, Alternative to FS 4e #30) | Adopt                          | \$413,000                     | \$79,000                                 | \$11,000                             | \$0                                  | \$90,000                               |                 |
| Provide Battle Creek day-use area                        | FS (4e #30), PG&E (#19, Alternative to FS 4e #30) | Adopt                          | \$216,000                     | \$41,000                                 | \$6,000                              | \$0                                  | \$47,000                               |                 |
| Provide East McCloud dam day-use area                    | FS (4e #30), PG&E (#19, Alternative to FS 4e #30) | Adopt                          | \$216,000                     | \$41,000                                 | \$6,000                              | \$0                                  | \$47,000                               |                 |
| Provide Red Banks day-use area                           | FS (4e #30), PG&E (#19, Alternative to FS 4e #30) | Adopt                          | \$783,000                     | \$149,000                                | \$21,000                             | \$0                                  | \$170,000                              |                 |
| Develop Star City day-use area and campground            | FS (4e #30), PG&E (#19, Alternative to FS 4e #30) | Adopt                          | \$2,646,000                   | \$504,000                                | \$67,000                             | \$0                                  | \$571,000                              |                 |

| <b>Measure</b>   | <b>Entity and Measure No.</b>                     | <b>Staff Recommendation?</b>                        | <b>Capital Cost (2009 \$)</b> | <b>Annualized Capital Cost (2009 \$)</b> | <b>Annual O&amp;M Cost (2009 \$)</b> | <b>Annual Energy Costs (2009 \$)</b> | <b>Total Annualized Cost (2009 \$)</b> | <b>Comments</b> |
|--|---|---|-------------------------------|--|--------------------------------------|--------------------------------------|--|-----------------|
| Reconstruct Tarantula Gulch boat launch and provide day-use area                         | PG&E (#19, Alternative to FS 4e #30)              | Adopt<br>PG&E's alternative with staff modification | \$4,456,000                   | \$848,000                                | \$88,000                             | \$0                                  | \$936,000                              |                 |
| Reconstruct Tarantula Gulch boat launch and provide day-use area                         | FS (4e #30)                                       | Do not adopt  | \$4,456,000                   | \$848,000                                | \$228,000                            | \$0                                  | \$1,076,000                            |                 |
| Provide Tarantula Gulch inlet day-use area   | FS (4e #30), PG&E (#19, Alternative to FS 4e #30) | Adopt   | \$188,000                     | \$36,000                                 | \$4,000                              | \$0                                  | \$40,000                               |                 |
| Provide West McCloud dam day-use area  | FS (4e #30), PG&E (#19, Alternative to FS 4e #30) | Adopt   | \$225,000                     | \$43,000                                 | \$6,000                              | \$0                                  | \$49,000                               |                 |
| Conduct site evaluation and provide three day-use parking areas at Iron Canyon reservoir | FS (4e #30), PG&E (#19, Alternative to FS 4e #30) | Adopt with staff modification                       | \$816,000                     | \$155,000                                | \$22,000                             | \$0                                  | \$177,000                              |                 |
| Construct new campground at Gap Creek site for single unit campsites                     | FS (4e #30)                                       | Adopt   | \$2,016,000                   | \$384,000                                | \$59,000                             | \$0                                  | \$443,000                              |                 |

| <b>Measure</b>   | <b>Entity and Measure No.</b>                     | <b>Staff Recommendation?</b>                       | <b>Capital Cost (2009 \$)</b> | <b>Annualized Capital Cost (2009 \$)</b> | <b>Annual O&amp;M Cost (2009 \$)</b> | <b>Annual Energy Costs (2009 \$)</b> | <b>Total Annualized Cost (2009 \$)</b> | <b>Comments</b> |
|--|---|--|-------------------------------|--|--------------------------------------|--------------------------------------|--|-----------------|
| Reconstruct Deadlun Campground to provide double and triple campsites                                      | FS (4e #30)                                       | Adopt  | \$2,016,000                   | \$384,000                                | \$59,000                             | \$0                                  | \$443,000                              |                 |
| Reconstruct/relocate Deadlun Campground  | PG&E (#19, Alternative to FS 4e #30)              | Do not adopt                                       | \$2,016,000                   | \$384,000                                | \$59,000                             | \$0                                  | \$443,000                              |                 |
| Reconstruct Hawkins Landing Campground and boat launch   | FS (4e #30), PG&E (#19, Alternative to FS 4e #30) | Adopt  | \$1,450,000                   | \$276,000                                | \$41,000                             | \$0                                  | \$317,000                              |                 |
| Design and construct Iron Canyon dam boat launch   | PG&E (#19, Alternative to FS 4e #30)              | Adopt<br>PG&E alternative with staff modifications | \$1,962,000                   | \$373,000                                | \$98,000                             | \$0                                  | \$471,000                              |                 |
| Design and construct Iron Canyon dam boat launch   | FS (4e #30)                                       | Do not adopt                                       | \$1,962,000                   | \$373,000                                | \$198,000                            | \$0                                  | \$571,000                              |                 |
| Evaluate feasibility and construct shoreline access trail (upper end of Pit 7), if suitable location found | PG&E (#19, Alternative to FS 4e #30)              | Adopt with staff modifications                     | \$70,000                      | \$13,000                                 | \$4,000                              | \$0                                  | \$17,000                               |                 |

| Measure  | Entity and Measure No. | Staff Recommendation? | Capital Cost (2009 \$) | Annualized Capital Cost (2009 \$) | Annual O&M Cost (2009 \$) | Annual Energy Costs (2009 \$) | Total Annualized Cost (2009 \$) | Comments  |
|--|------------------------|-----------------------|------------------------|-----------------------------------|---------------------------|-------------------------------|---------------------------------|---|
| Develop two surfaced parking areas with reservoir access trails below Pit 6 dam to provide fishing access and boating put-in onto the upper Pit 7 reservoir          | FS 4e #30              | Do not adopt          | \$140,000              | \$27,000                          | \$8,000                   | \$0                           | \$35,000                        | Recommend only one trail - adopt staff-modified measure "Evaluate feasibility and construct shoreline access trail (upper end of Pit 7)," in lieu of this measure |
| Develop road access to a surfaced parking area and short walkway to put-in/take-out onto the lower Pit 7 reservoir, either at Montgomery Creek or near the Pit 7 dam | FS (4e #30)            | Do not adopt          | \$125,000              | \$24,000                          | \$85,000                  | \$0                           | \$109,000                       |   |

| <b>Measure</b>   | <b>Entity and Measure No.</b>        | <b>Staff Recommendation?</b>  | <b>Capital Cost (2009 \$)</b> | <b>Annualized Capital Cost (2009 \$)</b> | <b>Annual O&amp;M Cost (2009 \$)</b> | <b>Annual Energy Costs (2009 \$)</b> | <b>Total Annualized Cost (2009 \$)</b> | <b>Comments</b> |
|--|--------------------------------------|-------------------------------|-------------------------------|--|--------------------------------------|--------------------------------------|--|-----------------|
| Conduct a site evaluation to determine the location of a pedestrian shoreline access trail at the lower end of Pit 7 reservoir, with paved parking. Once a suitable location is found, construct this facility within 5 years of Commission approval of the Recreation Plan. | Staff                                | Staff recommended alternative | \$70,000                      | \$13,000                                 | \$4,000                              | \$0                                  | \$17,000                               |                 |
| Evaluate feasibility and construct a boat put-in at Montgomery Creek (Pit 7 reservoir)   | PG&E (#19, Alternative to FS 4e #30) | Do not adopt                  | \$125,000                     | \$24,000                                 | \$85,000                             | \$0                                  | \$109,000                              |                 |
| Provide day-use site at Fenders Flat; maintain access to car-top boat launch; and provide restroom near Pit 7 afterbay car-top boat launch   | PG&E (#19)                           | Do not adopt                  | \$1,404,000                   | \$267,000                                | \$109,000                            | \$0                                  | \$376,000                              |                 |

| <b>Measure</b>   | <b>Entity and Measure No.</b>                | <b>Staff Recommendation?</b>   | <b>Capital Cost (2009 \$)</b> | <b>Annualized Capital Cost (2009 \$)</b> | <b>Annual O&amp;M Cost (2009 \$)</b> | <b>Annual Energy Costs (2009 \$)</b> | <b>Total Annualized Cost (2009 \$)</b> | <b>Comments</b> |
|--|--|--------------------------------|-------------------------------|--|--------------------------------------|--------------------------------------|--|-----------------|
| Reconstruct day-use site at Fenders Flat   | FS (4e #30), PG&E (Alternative to FS 4e #30) | Adopt                          | \$1,620,000                   | \$308,000                                | \$115,000                            | \$0                                  | \$423,000                              |                 |
| Close/rehabilitate/evaluate off-highway vehicle trails   | PG&E (#19, Alternative to FS 4e #30)         | Adopt with staff modifications | \$600,000                     | \$114,000                                | \$0                                  | \$0                                  | \$114,000                              |                 |
| Develop and implement plan to provide project-wide patrol  | FS (4e #30), PG&E (#20)                      | Do not adopt                   | \$0                           | \$0                                      | \$263,000                            | \$0                                  | \$263,000                              |                 |
| Provide project-wide patrol for project and project-affected NFS land  | PG&E (Alternative to FS 4e #30)              | Do not adopt                   | \$0                           | \$0                                      | \$263,000                            | \$0                                  | \$263,000                              |                 |
| Prepare a Fire Response Plan in consultation with the Forest Service, California Department of Forestry and Protection, and Big Bend Volunteer Fire Department | FS (4e #33), PG&E (#21)                      | Adopt                          | \$10,000                      | \$2,000                                  | \$2,000                              | \$0                                  | \$4,000                                |                 |
| Implement the HPMP included in the FLA   | PG&E (#22)                                   | Do not adopt                   | \$440,000                     | \$84,000                                 | \$200,000                            | \$0                                  | \$284,000                              |                 |

| <b>Measure</b>   | <b>Entity and Measure No.</b> | <b>Staff Recommendation?</b>  | <b>Capital Cost (2009 \$)</b> | <b>Annualized Capital Cost (2009 \$)</b> | <b>Annual O&amp;M Cost (2009 \$)</b> | <b>Annual Energy Costs (2009 \$)</b> | <b>Total Annualized Cost (2009 \$)</b> | <b>Comments</b>                                |
|--|-------------------------------|-------------------------------|-------------------------------|--|--------------------------------------|--------------------------------------|--|--|
| Additional measures likely to be required in an HPMP approved by the Forest Service  | FS (4e #34)                   | Do not adopt                  | \$440,000                     | \$84,000                                 | \$200,000                            | \$0                                  | \$284,000                              |  |
| Implement the final HPMP, filed with the Commission in October 2010  | NA                            | Staff recommended alternative | \$440,000                     | \$84,000                                 | \$200,000                            | \$0                                  | \$284,000                              |  |
| Develop and implement a plan to protect visual quality of project lands  | FS (4e #32)                   | Adopt                         | \$60,000                      | \$11,000                                 | \$0                                  | \$0                                  | \$11,000                               |  |
| File a plan approved by the Forest Service for oil and hazardous substances storage and spill prevention and cleanup.                              | NA                            | Staff recommended alternative | \$0                           | \$0                                      | \$0                                  | \$0                                  | \$0                                    |  |
| Investigate known safety and public access issues at the Pit 7 afterbay dam (with or without the proposed new powerhouse at the Pit 7 afterbay dam | FS (4e #30)                   | Do not adopt                  | \$0                           |  | \$0                                  |                                      |  | Not relicensing issue - referred to dam safety |

| <b>Measure</b>  | <b>Entity and Measure No.</b>                | <b>Staff Recommendation?</b>  | <b>Capital Cost (2009 \$)</b> | <b>Annualized Capital Cost (2009 \$)</b> | <b>Annual O&amp;M Cost (2009 \$)</b> | <b>Annual Energy Costs (2009 \$)</b> | <b>Total Annualized Cost (2009 \$)</b> | <b>Comments</b> |
|---|--|-------------------------------|-------------------------------|--|--------------------------------------|--------------------------------------|--|-----------------|
| Reconstruct the car-top boat launch near Fenders Flat | FS (4e #30), PG&E (Alternative to FS 4e #30) | Adopt                         | \$50,000                      | \$10,000                                 | \$4,000                              | \$0                                  | \$14,000                               |                 |
| Revise project boundary and file a revised exhibit G  | NA   | Staff recommended alternative | \$50,000                      | \$10,000                                 | \$0                                  | \$0                                  | \$10,000                               |                 |
| Total Applicant's Proposal                            |  |                               | \$35,866,000                  | \$6,827,000                              | \$3,362,000                          | \$1,566,000                          | \$10,189,000                           |                 |
| Staff Alternative                                     |  |                               | \$38,967,000                  | \$7,418,000                              | \$3,431,000                          | \$3,500,000                          | \$10,849,000                           |                 |
| Staff Alternative with 4(e) Mandatory Conditions      |  |                               | \$39,092,000                  | \$7,443,000                              | \$4,021,000                          | \$3,500,000                          | \$11,464,000                           |                 |

<sup>a</sup> This measure would be implemented even if there is no new powerhouse constructed. Annual energy cost would differ, however, if the new powerhouses are constructed.

Table C-2. Estimated capital and O&M costs of measures proposed by PG&E and recommended by staff and agencies for construction of new powerhouses and transmission lines at the McCloud-Pit Hydroelectric Project.  
(Source: Staff)

| Measure  | Entity and Measure No.           | Staff Recommend? | Capital Cost (2009 \$) | Annualized Capital Cost (2009 \$) | Annual O&M Cost (2009 \$) | Annual Energy Costs (2009 \$)            | Total Annualized Cost (2009 \$)          | Comments |
|--|----------------------------------|------------------|------------------------|-----------------------------------|---------------------------|--|--|----------|
| Obtain Forest Service approval for all final design plans              | PG&E (#3)                        | Adopt            | \$163,000              | \$31,000                          | \$17,000                  | \$0                                      | \$48,000                                 |          |
| Move flow compliance gage from MC-1 to MC-7                            | CF&G (10(j) #1), NMFS (10(j) #3) | Do not adopt     | \$0                    | \$0                               | \$0                       | \$0                                      | \$0                                      |          |
| Monitor instream flow at two compliance points below McCloud dam       | FS(4e #19)                       | Adopt            | \$0                    | \$0                               | \$0                       | \$0                                      | \$0                                      |          |
| Implement minimum flows proposed in FLA                                | PG&E (#5, 7, 8)                  | Do not adopt     | \$0                    | \$0                               | \$0                       | \$2,793,000 to \$5,890,000 <sup>a</sup>  | \$2,793,000 to \$5,890,000 <sup>a</sup>  |          |
| Implement California Fish and Game's recommended minimum flows         | CF&G (10(j) #1)                  | Do not adopt     | \$0                    | \$0                               | \$0                       | \$7,942,000 to \$11,040,000 <sup>a</sup> | \$7,942,000 to \$11,040,000 <sup>a</sup> |          |
| Implement Forest Service's 4(e) minimum flows                          | FS (4e #19)                      | Adopt            | \$0                    | \$0                               | \$0                       | \$6,483,000 to \$9,581,000 <sup>a</sup>  | \$6,483,000 to \$9,581,000 <sup>a</sup>  |          |
| Implement PG&E's alternative 4(e) flows below McCloud dam <sup>b</sup> | PG&E (Alternative to FS 4e #19)  | Do not adopt     | \$0                    | \$0                               | \$0                       | \$2,793,000 to \$5,890,000 <sup>a</sup>  | \$2,793,000 to \$5,890,000 <sup>a</sup>  |          |

| Measure  | Entity and Measure No.                          | Staff Recommend? | Capital Cost (2009 \$) | Annual-ized Capital Cost (2009 \$) | Annual O&M Cost (2009 \$) | Annual Energy Costs (2009 \$) | Total Annualized Cost (2009 \$) | Comments   |
|--|---|------------------|------------------------|------------------------------------|---------------------------|-------------------------------|---------------------------------|--|
| Implement NMFS minimum flows below McCloud dam to meet requirements for listed salmonids                 | NMFS (10(j) #3)                                 | Do not adopt     | \$0                    | \$0                                | \$0                       | \$0                           | \$0                             | The cost of minimum instream flows that may be prescribed in the future cannot be estimated at this time |
| Implement Winnemem Wintu Tribe minimum flows below McCloud dam to meet requirements for listed salmonids | Winnemem Wintu Tribe (Alternative to FS 4e #19) | Do not adopt     | \$0                    | \$0                                | \$0                       | \$0                           | \$0                             | The cost of minimum instream flows that may be prescribed in the future cannot be estimated at this time |
| Implement McCloud RiverKeepers flows below McCloud dam <sup>b</sup>                                      | McCloud RiverKeepers (Alternative to FS 4e #19) | Do not adopt     | \$0                    | \$0                                | \$0                       | \$0                           | \$0                             |  |
| Implement minimum flows below Iron Canyon dam <sup>b</sup>   | FS (4e#19) CF&G(10(j) 1)                        | Adopt            | \$0                    | \$0                                | \$0                       | \$0                           | \$0                             |  |

| Measure  | Entity and Measure No.   | Staff Recommend? | Capital Cost (2009 \$) | Annualized Capital Cost (2009 \$) | Annual O&M Cost (2009 \$) | Annual Energy Costs (2009 \$) | Total Annualized Cost (2009 \$) | Comments |
|--|--|------------------|------------------------|-----------------------------------|---------------------------|-------------------------------|---------------------------------|----------|
| Implement ramping rates during controllable spill events and valve testing   | FS (4e 19) CF&G (10(j) #1)   | Adopt            | \$0                    | \$0                               | \$0                       | \$0                           | \$0                             |          |
| Implement American Whitewater and Friends of the River alternative 4(e) ramping rates during controllable spill events and valve testing | American Whitewater and Friends of the River (Alternative to FS 4e#19) | Do not adopt     | \$0                    | \$0                               | \$0                       | \$0                           | \$0                             |          |
| Implement McCloud dam up-ramping flows prior to uncontrolled spill events <sup>b</sup>   | PG&E (#9)  | Adopt            | \$0                    | \$0                               | \$0                       | \$0                           | \$0                             |          |
| Prepare a biological evaluation before taking actions that may affect Forest Service special status species on NFS lands                 | FS (4e #11), PG&E (#15)  | Adopt            | \$310,000              | \$59,000                          | \$287,000                 | \$0                           | \$346,000                       |          |
| Provide Pit 7 afterbay powerhouse day-use area and parking area  | PG&E (#19, Alternative to FS 4e #30)                                   | Adopt            | \$141,000              | \$27,000                          | \$11,000                  | \$0                           | \$38,000                        |          |

<sup>a</sup> Costs based on estimated generation capacity of proposed McCloud and Pit 7 afterbay powerhouses.

<sup>b</sup> This measure would be implemented even if there is no new powerhouse constructed; capital and annual costs are included only in table C-1. Annual energy cost would differ, however, if the new powerhouses are constructed.

## **Appendix D**

### **Commission Staff Recommended License Conditions**



## I. MANDATORY CONDITIONS

On November 29, 2010, the United States Department of Agriculture - Forest Service (Forest Service) filed 32 section 4(e) conditions, 17 of which we consider pertinent to environmental resources (described in section 2.2.4.1 of the EIS and included in appendix E). In the staff alternative, we recommend 10 of the 17 conditions specified by the Forest Service. In addition, we recommend 7 of the specified conditions with modifications.<sup>1</sup> We recognize, however, that the Federal Energy Regulatory Commission (Commission) is required to include valid 4(e) conditions in any license issued for the project. As such, each of the measures that staff recommend be modified in the staff alternative (as discussed in section 5.0, *Comprehensive Development and Recommended Alternative*) would not be included in any license issued by the Commission. Instead, those conditions would be replaced with the Forest Service's corresponding conditions, as filed with the Commission.

## II. ADDITIONAL LICENSE ARTICLES RECOMMENDED BY COMMISSION STAFF

We recommend including the following license articles in any license issued for the project, in addition to the mandatory conditions.

Draft Article 4XX. *Reservation of Authority to Prescribe Fishways*. Authority is reserved for the Secretary of Commerce, through the National Marine Fisheries Service, to prescribe the construction, operation, and maintenance of fishways at the project, including measures to determine, ensure, or improve the effectiveness of such prescribed fishways, pursuant to section 18 of the Federal Power Act, as amended, during the term of the project license.

Draft Article 4XX. *Reservation of Authority to Prescribe Fishways*. Authority is reserved for the Department of Interior to prescribe the construction, operation, and maintenance of fishways at the project, including measures to determine, ensure, or improve the effectiveness of such prescribed fishways, pursuant to section 18 of the Federal Power Act, as amended, during the term of the project license.

Draft Article 4XX. *Aquatic Biological Management and Monitoring Plan*. Within 1 year of license issuance, the licensee shall file with the Federal Energy Regulatory Commission (Commission), for approval, an Aquatic Biological Management and Monitoring Plan consistent with United States Department of Agriculture – Forest

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<sup>1</sup> As explained in section 5 of the draft Environmental Impact Statement, of the 17 conditions, we recommend modifying the following 7 conditions: (1) vegetation and invasive weed management and monitoring (condition 25); (2) terrestrial biological management and monitoring (condition 26); (3) aquatic biological management and monitoring (condition 27); (4) road and transportation facility management (condition 29); (5) recreation development, management, and monitoring (condition 30); (6) project sign plan (condition 31); and (7) heritage resources management and monitoring (condition 34).

Service (Forest Service) 4(e) condition 27 (appendix E), except as noted herein. The Aquatic Biological Management and Monitoring Plan shall be modified to: (1) exclude fish population monitoring in Pit 7 reservoir; (2) exclude periodic monitoring of fish passage conditions at non-project road crossings at Iron Canyon reservoir; (3) require monitoring known populations of northwestern pond turtle within 1 year of plan approval and every 5 years thereafter, conducting surveys for new populations of northwestern pond turtle and foothill yellow-legged frog in suitable habitat in the project area within 1 year of plan approval and every 10 years thereafter, and conducting pre-construction surveys for northwestern pond turtle; and (4) exclude surveys for foothill yellow-legged frog from the Forest Service lands along the Lower McCloud River and include surveys for foothill yellow-legged frog in tributaries to the Pit 6 and Pit 7 reservoirs if the foothill yellow-legged frog becomes established in the Pit 5 reach.

The documentation and reporting component of Forest Service condition 27 shall also be modified to include a provision that a draft technical report of all aquatic biological monitoring components be prepared within 1 year following the completion of each sampling effort.

The licensee shall prepare the plan and all components after consultation with the Forest Service, California State Water Resources Control Board, United States Department of Interior – Fish and Wildlife Service, and California Department of Fish and Game. The licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan.

Draft Article 4XX. *Annual Report on Status of Reintroduction of ESA-listed Species.* By December 31 of each year following license issuance, the licensee shall file with the Commission a report on the status of reintroduction into the McCloud River of Endangered Species Act-listed species. The report shall include a discussion of the steps that have been taken to assist in the reintroduction process, provide a summary of the results of any studies that have been undertaken to benefit the reintroduction effort, and discuss the status of any reintroduction programs.

The licensee shall prepare the report and all components after consultation with the National Marine Fisheries Service, Bureau of Reclamation, United States Department of Interior – Fish and Wildlife Service, and California Department of Fish and Game.

The licensee shall include with the plan documentation of consultation, copies of comments on the completed report after it has been prepared and provided to the agencies and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the report with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the reporting requirements.

Draft Article 4XX. *Vegetation Management Plan.* Within 1 year of license issuance, the licensee shall file with the Federal Energy Regulatory Commission (Commission), for approval, a Vegetation Management Plan consistent with the United States Department of Agriculture - Forest Service (Forest Service) section 4(e) condition 25 (appendix E), except as noted herein. The Vegetation Management Plan shall be modified to include: (1) informing managers of sensitive or rare species locations to protect these species during project operation and maintenance; (2) monitoring of culturally significant plant species not associated with traditional cultural properties; (3) additional restrictions and guidelines for the use of pesticides and herbicides; and (4) implementation of best management practices to minimize effects on wetlands.

The licensee shall develop the plan in consultation with the Forest Service, the United States Department of Interior – Fish and Wildlife Service, and the California Department of Fish and Game. The licensee shall include with the plan copies of comments and recommendations made on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the consulted agencies to comment and make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that it has been approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 4XX. *Terrestrial Biological Management Plan.* Within 1 year of license issuance, the licensee shall file with the Federal Energy Regulatory Commission (Commission) for approval, a Terrestrial Biological Management Plan consistent with the United States Department of Agriculture - Forest Service (Forest Service) section 4(e) condition 26 (appendix E), except as noted herein. The Terrestrial Biological Management Plan shall be modified to include: (1) removal removal of the northwestern

pond turtle from the plan; (2) monitoring of known populations of terrestrial mollusks, Shasta salamander, peregrine falcon, and special status bats within 1 year of plan approval and every 5 years thereafter; (3) monitoring of known populations of bald eagle annually; (4) conducting surveys for new populations of bald eagle annually, and within 1 year and then every 5 years for peregrine falcon, willow flycatcher, and special status bats; (5) conducting only pre-construction surveys for northern goshawk or observe a limited operating period of February 1 through August 15; (6) conducting only pre-construction surveys for neotropical breeding birds or observe a limited operating period of April 1 through August 31; (7) conducting pre-construction surveys for willow flycatcher or observing a limited operating period of April 1 through August 31; and (8) conducting pre-construction surveys for northern spotted owl or observing a limited operating period of February 1 through July 9.

The licensee shall develop the plan in consultation with the Forest Service, United States Department of Interior – Fish and Wildlife Service, and the California Department of Fish and Game. The licensee shall include with the plan copies of comments and recommendations made on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies’ comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the consulted agencies to comment and make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee’s reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that it has been approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 4XX. *Special Status Species Review and Protection.* The special status species review and protection measures required by United States Department of Agriculture - Forest Service section 4(e) conditions 25, 26, and 27 (appendix E) shall apply to all accessible project lands and shall also include federal and state rare, candidate, threatened, and endangered species. The Federal Energy Regulatory Commission reserves the right to require additional measures to protect special status species.

Draft Article 4XX. *Streamflow Information.* Within 90 days of license issuance, the licensee shall provide the public access via its webpage on the internet, to reservoir drawdown information for McCloud and Iron Canyon reservoirs and real-time flow data for U.S. Geological Survey (USGS) Gage 11367760 (MC-7) and USGS Gage 11367800 (MC-1).

Draft Article 4XX. *Fish Stocking Plan.* Within 1 year of license issuance, the licensee shall file with the Federal Energy Regulatory Commission (FERC), the

Commission) for approval, a plan to evaluate and monitor the amount of fish to be stocked every 6 years in the reservoirs and affected stream reaches at the project. The licensee shall develop the plan after consultation with California Department of Fish and Game and include a description of the number, location, and species of fish to be stocked in McCloud, Iron Canyon, Pit 6 and Pit 7 reservoirs, and other affected stream reaches at the project and an implementation schedule. This stocking plan shall be included as a part of the recreation monitoring effort that shall occur concurrently with the FERC Form 80 schedule every 6 years after license issuance.

The licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the California Department of Fish and Game, and specific descriptions of how the agency's comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the California Department of Fish and Game to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that it has been approved by the Commission. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 4XX. Recreation Development and Management Plan. Within 2 years of license issuance, the licensee shall file with the Federal Energy Regulatory Commission (Commission) a Department of Agriculture – Forest Service (Forest Service)-approved Recreation Development and Management Plan consistent with Forest Service section 4(e) condition 30 (appendix E). The plan shall include provisions for operation and maintenance of project recreation facilities, recreation survey and monitoring, reservoir water surface management, and the specific recreation facilities to be reconstructed or constructed under the plan. The Recreation Development and Management Plan required by Forest Service condition 30 shall be modified to include: (1) monitoring of boat use during the recreation season as a part of recreation monitoring efforts every 6 years; (2) a reservoir water surface management component that includes protocols for preventing/removing unapproved buoy courses and approved use of docks, surface sweeps of McCloud and Iron Canyon reservoirs and boat ramps annually or as needed, and measures to prevent unauthorized access to project lands and waters, where necessary, to protect public safety; and (3) an evaluation and implementation schedule for road and trail closures, in coordination with the Forest Service, for the area inside the project boundary around both McCloud and Iron Canyon reservoirs.

During the development of the plan, the licensee shall also consult with the California Department of Fish and Game, American Whitewater, and Friends of the River. The licensee shall include with the plan copies of comments and

recommendations made on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the consulted entities to comment and make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that the plan has been approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 4XX. Recreation Facilities. The following existing facilities shall be operated and maintained for the term of the license: Tarantula Gulch Boat Launch, Star City dispersed area, Deadlun Campground, Hawkins Landing Campground and boat launch, and Fenders Flat Car-top boat launch.

Draft Article 4XX. Tarantula Gulch Boat Ramp. Upon reconstruction of Tarantula Gulch boat ramp in accordance with a Department of Agriculture – Forest Service (Forest Service)-approved Recreation Development and Management Plan prepared consistent with Forest Service section 4(e) condition 30 (appendix E) and any modifications to the plan made by the Federal Energy Regulatory Commission, the licensee shall extend the boat ramp with the toe of the ramp to an elevation no less than three vertical feet below minimum pool. The licensee shall also provide lighting, additional parking, and a day-use area at the reconstructed Tarantula Gulch boat ramp.

Draft Article 4XX. McCloud Reservoir Swimming/Fishing Platform. Within 2 years of license issuance, the licensee shall conduct a site evaluation to determine the location of a fishing/swimming platform on McCloud reservoir, and file a report containing the results of the evaluation and recommendations for the placement and construction of the platform with the Federal Energy Regulatory Commission (Commission), for approval. After Commission approval, the licensee shall construct the platform within 3 years of license issuance.

The licensee shall provide the report to the U. S. Department of Agriculture – Forest Service (Forest Service) for comment. The licensee shall include with the report copies of comments and recommendations made on the completed report after it has been prepared and provided to the Forest Service, and specific descriptions of how the agency's comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the Forest Service to comment and make recommendations before filing the report with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the report. The report shall not be implemented until the licensee is notified that it has been approved by the

Commission. Upon Commission approval, the licensee shall construct the platform with any modifications required by the Commission.

Draft Article 4XX. Iron Canyon Dam Boat Ramp. Upon construction of Iron Canyon dam boat ramp in accordance with a Department of Agriculture – Forest Service (Forest Service)-approved Recreation Development and Management Plan prepared consistent with Forest Service section 4(e) condition 30 (appendix E) and any modifications to the plan made by the Federal Energy Regulatory Commission, the licensee shall provide lighting at the Iron Canyon dam boat ramp. Upon construction of the Iron Canyon dam boat ramp, the licensee shall remove snow from the boat ramp, the access road to the boat ramp, and the parking area when project operations require snow removal from Oak Mountain Road.

Draft Article 4XX. Pit 7 Reservoir Fishing Access Trail. Within 2 years of license issuance, the licensee shall conduct a site evaluation to determine the location of a pedestrian shoreline fishing access trail at the lower end of Pit 7 reservoir, and file a report containing the results of the evaluation and recommendations for the location and construction of the trail with the Federal Energy Regulatory Commission (Commission), for approval. After Commission approval, the licensee shall construct the trail within 3 years of license issuance.

The licensee shall provide the report to the U. S. Department of Agriculture – Forest Service (Forest Service) for comment. The licensee shall include with the report copies of comments and recommendations made on the completed report after it has been prepared and provided to the Forest Service, and specific descriptions of how the agency’s comments are accommodated by the report. The licensee shall allow a minimum of 30 days for the Forest Service to comment and make recommendations before filing the report with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee’s reasons, based on project-specific information.

The Commission reserves the right to require changes to the report. The report shall not be implemented until the licensee is notified that it has been approved by the Commission. Upon Commission approval, the licensee shall construct the trail with any modifications required by the Commission.

Draft Article 4XX. Pit 7 Afterbay Powerhouse Access Area. Upon notifying the Federal Energy Regulatory Commission (Commission) of its plans to construct the Pit 7 afterbay powerhouse, the licensee shall file for approval by the Commission, a report containing the results of a site evaluation and recommendations for the placement and construction of a shoreline access area with parking for anglers in the vicinity of the Pit 7 afterbay powerhouse that is consistent with homeland security needs. After Commission approval, the licensee shall construct the access area with parking in accordance with the schedule identified in the report.

The licensee shall provide the report to the U. S. Department of Agriculture – Forest Service (Forest Service) for comment. The licensee shall include with the report copies of comments and recommendations made on the completed report after it has been prepared and provided to the Forest Service, and specific descriptions of how the agency’s comments are accommodated by the report. The licensee shall allow a minimum of 30 days for the Forest Service to comment and make recommendations before filing the report with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee’s reasons, based on project-specific information.

The Commission reserves the right to require changes to the report. The report shall not be implemented until the licensee is notified that it has been approved by the Commission. Upon Commission approval, the licensee shall construct the access area with any modifications required by the Commission.

Draft Article 4XX. Fire Prevention and Response Plan. Within 1 year of license issuance, the licensee shall file with the Federal Energy Regulatory Commission (Commission) a Department of Agriculture – Forest Service (Forest Service)-approved Fire Prevention and Response Plan consistent with Forest Service section 4(e) condition 33 (appendix E). During the development of the plan, the licensee shall also consult with the California Department of Forestry and Fire Protection and the Big Bend Volunteer Fire Department. The plan shall include provisions for fuels treatment/vegetation management, fire prevention, emergency response, preparedness, reporting, post-fire mitigations, and identifying fire control extinguishing locations within the project boundary.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that the plan has been approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 4XX. Road and Transportation Facilities Management Plan. Within 1 year of license issuance, the licensee shall file with the Federal Energy Regulatory Commission (Commission) a Road and Transportation Facilities Management Plan, as specified by United States Department of Agriculture – Forest Service section 4(e) condition 29 (appendix E), for all roads and transportation facilities within the project boundary. The plan shall address planning, operations, maintenance, construction and reconstruction, monitoring, and road use.

The Commission reserves the right to require changes to the plan. The plan shall not be implemented until the licensee is notified that the plan has been approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 4XX. Hazardous Substance Management Plan. Within 30 days of license issuance, the licensee shall file with the Federal Energy Regulatory Commission (Commission) copies of the existing Spill Prevention, Control, and Countermeasures Plan and Hazardous Materials Business Plan. The licensee shall also provide copies of the Spill Prevention, Control, and Countermeasures Plan and Hazardous Materials Business Plan to the U. S. Department of Agriculture – Forest Service and the Regional Water Quality Control Board.

The Commission reserves the right to require changes to the plans. The licensee shall continue to implement the plans throughout the term of the license, including any changes required by the Commission.

Draft Article 4XX. Visual Quality Mitigation Measures. Within 1 year of license issuance, the licensee shall file with the Federal Energy Regulatory Commission (Commission) a description of specific visual quality management measures and an associated timeline, prepared consistent with the Department of Agriculture – Forest Service (Forest Service) section 4(e) condition 32 (appendix E) and approved by the Forest Service. The management measures shall address the impact of any proposed project facilities or modifications to existing facilities, including but not limited to generating facilities, recreation sites and facilities, and spoil piles, on the aesthetics in the project area.

The Commission reserves the right to require changes to the management measures and timeline. The mitigation measures shall not be implemented until the licensee is notified that the measures have been approved by the Commission. Upon Commission approval, the licensee shall implement the measures, including any changes required by the Commission.

Draft Article 4XX. Programmatic Agreement and Historic Properties. The licensee shall implement the “Programmatic Agreement among the Federal Energy Regulatory Commission and the California State Historic Preservation Officer on Historic Preservation for Managing Historic Properties that may be Affected by Issuing a License to Pacific Gas & Electric for the Continued Operation and Maintenance of the McCloud-Pit Hydroelectric Project in Shasta County, California, (FERC No. 2106-059)” executed on (future date). Upon license issuance, and pursuant to the requirements of the (future date) Programmatic Agreement, the licensee shall implement the October 2010 Historic Properties Management Plan. In the event that the Programmatic Agreement is terminated, the licensee shall continue to implement the provisions of its approved Historic Properties Management Plan. The Commission reserves the authority to require changes to the Historic Properties Management Plan at any time during the term of the license.

Draft Article 4XX. Use and Occupancy. (a) In accordance with the provisions of this article, the licensee shall have the authority to grant permission for certain types of

use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Federal Energy Regulatory Commission (Commission) approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensee also shall have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for any interests that it has conveyed under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant or a conveyance made under the authority of this article is violated, the licensee shall take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The types of use and occupancy of project lands and waters for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 watercraft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee shall require multiple use and occupancy of facilities for access to project lands or waters. The licensee shall also ensure to the satisfaction of the Commission's authorized representative that the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee shall: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine if the proposed construction is needed and would not change the basic contour of the impoundment shoreline. To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69 kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project impoundment. No later than January 31 of each year, the licensee shall file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed. If no conveyance was made during the prior calendar year, the licensee shall so inform the Commission in writing no later than January 31 of each year.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 watercraft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is 5 acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 60 days before conveying any interest in project lands under this paragraph (d), the licensee must submit a letter to the Director, Office of Energy Projects, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked exhibit G map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Director, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

- (1) Before conveying the interest, the licensee shall consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.
- (2) Before conveying the interest, the licensee shall determine that the proposed use of the lands to be conveyed is not inconsistent with any approved report on recreational resources of an exhibit E; or if the project does not have an approved report on recreational resources, that the lands to be conveyed do not have recreational value.
- (3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; and (ii) the grantee shall take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project.
- (4) The Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised exhibit G drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project shall be consolidated for consideration when revised exhibit G drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article shall not apply to any part of the public lands and reservations of the United States included within the project boundary.

## **Appendix E**

### **Forest Service 4(e) Conditions**



**Conditions filed by the Forest Service on November 29, 2010, pursuant to section 4(e) of the Federal Power Act, for the new license for Project No. 2106**

**I. STANDARD PROVISIONS APPLICABLE TO ALL PROJECTS OCCUPYING NATIONAL FOREST SYSTEM LANDS**

Condition No. 1 - Consultation

The Licensee shall, beginning the first full calendar year after license acceptance, participate in annual meetings with the Forest Service to present Project operation and maintenance activities planned for the next calendar year. In addition, Licensee shall present results from current year monitoring of noxious weeds and special status species as well as any additional information that has been compiled for the Project area, including progress reports on other resource measures. The goals of this meeting are to share information, mutually agree upon planned maintenance activities, identify concerns that the Forest Service may have regarding activities and their potential effects on sensitive resources, and any measures required to avoid or mitigate potential effects.

The date of the consultation meeting will be between January 10 and March 15 of each year, as mutually agreed to by the Licensee and the Forest Service. Representatives from the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDF&G), State Water Resources Control Board (SWRCB), other interested agency representatives, and other interested parties concerned with operation of the Project may attend the meeting.

Consultation shall include, but not be limited to:

- A status report regarding implementation of license conditions;
- Results of any monitoring studies performed over the previous year in formats agreed to by the Forest Service and the Licensee during development of implementation plans;
- Review of any non-routine maintenance;
- Discussion of any foreseeable changes to Project facilities or features;
- Discussion of any necessary revisions or modifications to implementation plans approved as part of this license;
- Discussion of needed protection measures for species newly listed as threatened, endangered, or sensitive, or changes to existing management plans that may no longer be warranted due to delisting of species or, to incorporate new knowledge about a species requiring protection;
- Discussion of elements of current year maintenance plans, e.g. road maintenance; and
- Discussion of any planned pesticide use.

A record of the meeting shall be kept by the Licensee and shall include any recommendations made by the Forest Service for the protection of NFS lands and resources. The Licensee shall file the meeting record, if requested, with the Commission no later than 60 days following the meeting.

Copies of other reports related to Project safety and non-compliance shall be submitted to the Forest Service concurrently with submittal to the FERC. These include, but are not limited to: any non-compliance report filed by the Licensee, geologic or seismic reports, and structural safety reports for facilities located on or affecting NFS lands.

The Forest Service reserves the right, after notice and opportunity for comment, to require changes in the Project and its operation through revision of the Section 4(e) conditions to accomplish protection and utilization of NFS lands and resources.

Condition No. 2 – Approval of Changes

Notwithstanding any license authorization to make changes to the Project, when such changes directly affect NFS lands the Licensee shall obtain written approval from the Forest Service prior to making any changes in any constructed Project features or facilities, or in the uses of Project lands and waters or any departure from the requirements of any approved exhibits filed with the Commission. Following receipt of such approval from the Forest Service, and a minimum of 60- days prior to initiating any such changes, the Licensee shall file a report with the Commission describing the changes, the reasons for the changes, and showing the approval of the Forest Service for such changes. The Licensee shall file an exact copy of this report with the Forest Service at the same time it is filed with the Commission. This condition does not relieve the Licensee from the amendment or other requirements of Article 2 or Article 3 of this license.

Condition No. 3 – Maintenance of Improvements on or Affecting National Forest System Lands

The Licensee shall maintain all its improvements and premises on NFS lands to standards of repair, orderliness, neatness, sanitation, and safety acceptable to the Forest Service. Disposal of all materials will be at an approved existing location, except as otherwise agreed by the Forest Service.

Condition No. 4 – Existing Claims

The license shall be subject to all valid claims and existing rights of third parties. The United States is not liable to the Licensee for the exercise of any such right or claim.

Condition No. 5 – Compliance with Regulations

The Licensee shall comply with the regulations of the Department of Agriculture for activities on NFS lands, and all applicable Federal, State, county, and municipal laws, ordinances, or regulations in regards to the area or operations on or directly affecting

NFS lands, to the extent those laws, ordinances or regulations are not preempted by federal law.

Condition No. 6 – Surrender of License or Transfer of Ownership

Prior to any surrender of this license, the Licensee shall provide assurance acceptable to the Forest Service that Licensee shall restore any Project area directly affecting NFS lands to a condition satisfactory to the Forest Service upon or after surrender of the license, as appropriate. To the extent restoration is required, Licensee shall prepare a restoration plan which shall identify the measures to be taken to restore such NFS lands and shall include or identify adequate financial mechanisms to ensure performance of the restoration measures.

In the event of any transfer of the license or sale of the Project, the Licensee shall assure that, in a manner satisfactory to the Forest Service, the Licensee or transferee will provide for the costs of surrender and restoration. If deemed necessary by the Forest Service to assist it in evaluating the Licensee's proposal, the Licensee shall conduct an analysis, using experts approved by the Forest Service, to estimate the potential costs associated with surrender and restoration of any Project area directly affecting NFS lands to Forest Service specifications. In addition, the Forest Service may require the Licensee to pay for an independent audit of the transferee to assist the Forest Service in determining whether the transferee has the financial ability to fund the surrender and restoration work specified in the analysis.

Condition No. 7 – Protection of United States Property

The Licensee, including any agents or employees of the Licensee acting within the scope of their employment, shall exercise diligence in protecting from damage the land and property of the United States covered by and used in connection with this license.

Condition No. 8 – Indemnification

The Licensee shall indemnify, defend, and hold the United States harmless for:

- any violations incurred under any laws and regulations applicable to, or
- judgments, claims, penalties, fees, or demands assessed against the United States caused by, or
- costs, damages, and expenses incurred by the United States caused by, or
- the releases or threatened release of any solid waste, hazardous substances, pollutant, contaminant, or oil in any form in the environment related to the construction, maintenance, or operation of the Project works or of the works appurtenant or accessory thereto under the license.

The Licensee's indemnification of the United States shall include any loss by personal injury, loss of life or damage to property caused by the construction, maintenance, or operation of the Project works or of the works appurtenant or accessory thereto under the license. Indemnification shall include, but is not limited to, the value of

resources damaged or destroyed; the costs of restoration, cleanup, or other mitigation; fire suppression or other types of abatement costs; third party claims and judgments; and all administrative, interest, and other legal costs. Upon surrender, transfer, or termination of the license, the Licensee's obligation to indemnify and hold harmless the United States shall survive for all valid claims for actions that occurred prior to such surrender, transfer or termination.

Condition No. 9 – Damage to Land, Property, and Interests of the United States

The Licensee has an affirmative duty to protect the land, property, and interests of the United States from damage arising from the Licensee's construction, maintenance, or operation of the Project works or the works appurtenant or accessory thereto under the license. The Licensee's liability for fire and other damages to NFS lands shall be determined in accordance with the Federal Power Act and standard Form L-1 Articles 22 and 24.

Condition No. 10 – Risks and Hazards on National Forest System Lands

As part of the occupancy and use of the Project area, the Licensee has a continuing responsibility to reasonably identify and report all known or observed hazardous conditions on or directly affecting NFS lands within the Project boundary that would affect the improvements, resources, or pose a risk of injury to individuals. Licensee will abate those conditions, except those caused by third parties or not related to the occupancy and use authorized by the License. Any nonemergency actions to abate such hazards on NFS lands shall be performed after consultation with the Forest Service. In emergency situations, the Licensee shall notify the Forest Service of its actions as soon as possible, but not more than 48 hours, after such actions have been taken. Whether or not the Forest Service is notified or provides consultation, the Licensee shall remain solely responsible for all abatement measures performed. Other hazards should be reported to the appropriate agency as soon as possible.

Condition No. 11 – Protection of Forest Service Special Status Species

Before taking actions to construct new project features on NFS lands that may affect Forest Service special status species or their critical habitat, the Licensee shall prepare and submit a biological evaluation (BE) for Forest Service approval. The BE shall evaluate the potential impact of the action on the species or its habitat. In coordination with the Commission, the Forest Service may require mitigation measures for the protection of the affected species.

The biological evaluation shall:

- Include procedures to minimize adverse effects to special status species.
- Ensure project-related activities shall meet restrictions included in site management plans for special status species.
- Develop implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species.

Condition No. 12 – Access

Subject to the limitations set forth under the heading of “Road Use by Government” in Condition No. 29 hereof, the Forest Service reserves the right to use or permit others to use any part of the licensed area on NFS lands for any purpose, provided such use does not interfere with the rights and privileges authorized by this license or the Federal Power Act.

Condition No. 13 – Crossings

The Licensee shall maintain suitable crossings as required by the Forest Service for all roads and trails that intersect the right-of-way occupied by linear Project facilities (powerline, penstock, ditch, and pipeline).

Condition No. 14 – Surveys, Land Corners

The Licensee shall avoid disturbance to all public land survey monuments, private property corners, and forest boundary markers. In the event that any such land markers or monuments on NFS lands are destroyed by an act or omission of the Licensee, in connection with the use and/or occupancy authorized by this license, depending on the type of monument destroyed, the Licensee shall reestablish or reference same in accordance with (1) the procedures outlined in the "Manual of Instructions for the Survey of the Public Land of the United States," (2) the specifications of the County Surveyor, or (3) the specifications of the Forest Service. Further, the Licensee shall ensure that any such official survey records affected are amended as provided by law.

Condition No. 15 – Pesticide-Use Restrictions on National Forest System Lands

Pesticides may not be used on NFS lands or in areas affecting NFS lands to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, non-native fish, etc., without the prior written approval of the Forest Service. During the Annual Consultation Meeting described in Condition 1, the Licensee shall submit a request for approval of planned uses of pesticides for the upcoming year. The Licensee shall provide at a minimum the following information essential for review:

- whether pesticide applications are essential for use on NFS lands;
- specific locations of use;
- specific herbicides proposed for use;
- application rates;
- dose and exposure rates; and
- safety risk and timeframes for application.

Exceptions to this schedule may be allowed only when unexpected outbreaks of pests require control measures that were not anticipated at the time the report was submitted. In such an instance, an emergency request and approval may be made.

Pesticide use will be excluded from NFS lands within 500 feet of known locations of Shasta Salamanders, Northern Pond Turtles, Foothill Yellow Legged Frog, or known locations of Forest Service Special Status or culturally significant plant populations. Application of pesticides must be consistent with Forest Service riparian conservation objectives.

On NFS lands, the Licensee shall only use those materials registered by the U.S. Environmental Protection Agency and consistent with those applied by the Shasta-Trinity National Forest and approved through Forest Service review for the specific purpose planned. The Licensee must strictly follow label instructions in the preparation and application of pesticides and disposal of excess materials and containers. The Licensee may also submit Pesticide Use Proposal(s) with accompanying risk assessment and other Forest Service required documents to use pesticides on a regular basis for the term of the license as addressed further in Condition 25: Vegetation and Invasive Weed Management. Submission of this plan will not relieve the Licensee of the responsibility of annual notification and review.

Condition No. 16 – Modifications of 4(e) Conditions after Biological Opinion or Water Quality Certification

The Forest Service reserves the right to modify these conditions, if necessary, to respond to any Final Biological Opinion issued for this Project by the National Marine Fisheries Service, United States Fish and Wildlife Service; or any Certification issued for this Project by the State Water Resources Control Board.

Condition No. 17 – Signs

The Licensee shall consult with the Forest Service prior to erecting signs related to safety issues on NFS lands covered by the license. Prior to the Licensee erecting any other signs or advertising devices on NFS lands covered by the license, the Licensee must obtain the approval of the Forest Service as to location, design, size, color, and message. The Licensee shall be responsible for maintaining all Licensee-erected signs to neat and presentable standards.

Condition No. 18 – Ground Disturbing Activities

If the Licensee proposes ground-disturbing activities on or directly affecting NFS lands that were not specifically addressed in the Commission's NEPA processes, the Licensee, in consultation with the Forest Service, shall determine the scope of work and potential for Project-related effects, and whether additional information is required to proceed with the planned activity. Upon Forest Service request, the Licensee shall enter into an agreement with the Forest Service under which the Licensee shall fund a reasonable portion of Forest Service's staff time and expenses for staff activities related to the proposed activities.

## II. ADDITIONAL PROVISIONS

### Condition No. 19 – Streamflow

#### **Part 1. Minimum Streamflow Requirements and Measurement**

Licensee shall maintain specified minimum streamflows in project reaches in accordance with provisions described below. Minimum streamflows shall commence within 90 days of license issuance, unless facility modifications are required. License Condition 16 (Modification of 4(e) Conditions After Biological Opinion or Water Quality Certification) provides the opportunity to adjust these minimum streamflow requirements to comply with the NOAA Biological Opinion and the SWRCB 401 Water Quality Certificate, if needed.

Minimum streamflows for the Lower McCloud River and Iron Canyon Creek shall be measured in two ways: as the 24-hour average of the flow (mean daily flow), and as an instantaneous flow. Minimum streamflow measurement at Pit 7 shall be instantaneous flow. There is no minimum flow requirement for the Pit River below Pit 6 dam. The instantaneous flow is the flow value used to construct the average daily flow value and shall be measured in time increments of at least 15-minutes. The 24-hour average flow is the average of the incremental readings from midnight of one day, to midnight of the following day, or an alternate 24-hour period as agreed. Licensee shall record instantaneous 15-minute streamflow as required by US Geological Survey (USGS) standards at all gages. The minimum instantaneous 15-minute streamflow shall be at least 80% of the prescribed mean daily flow for those minimum streamflows less than or equal to 10 cubic feet per second (cfs), and at least 90% of the prescribed mean daily flow for those minimum streamflows required to be greater than 10 cfs.

Should the mean daily flow, as measured, be less than the required mean daily flow but more than the instantaneous flow, Licensee shall begin releasing the equivalent under-released volume of water within 7 days of discovery of the under-release. Credit for such additional releases will not exceed 20% of the instantaneous flow amount, when used to attain the equivalent of the under-released volume.

The Licensee shall schedule the timing of maintenance or other planned outages to avoid negative ecological effects from the resultant spills. The Licensee shall provide written notification to the USFS at least 90 days prior to any planned or scheduled maintenance outages that would affect streamflows in the Pit River, Lower McCloud River or Iron Canyon Creek reaches. Notification shall include a description of the project and coordinated measures the Licensee plans to take to minimize the magnitude and duration of spills into the Project reach. The Licensee shall not proceed with the planned maintenance outage without the formal written approval of the USFS and notification on Licensee's public Project website. The USFS will respond in a timely manner.

The Minimum Streamflow requirements are subject to temporary modification if required by equipment malfunction, as directed by law enforcement authorities, or in emergencies. An emergency is defined as an event that is reasonably out of the control of the Licensee and requires Licensee to take immediate action, either unilaterally or under instruction by law enforcement or other regulatory agency staff, to prevent imminent loss of human life or substantial property damage. An emergency may include, but is not limited to, natural events such as landslides, storms or wildfires, malfunction or failure of Project works, and recreation accidents.

If the Licensee temporarily modifies the requirements of these conditions, then the Licensee shall make all reasonable efforts to promptly resume performance of such requirements and shall notify the USFS and other interested or affected governmental agencies within 48 hours of the modification.

Where facility modification is required to implement the efficient release of Minimum Streamflows, the Licensee shall submit applications for permits within one year after license issuance, and complete such modifications and initiate minimum streamflows as soon as reasonably practicable but no later than two years after receipt of all required permits and approvals. Prior to completion of such required facility modifications, the Licensee shall make a good faith effort to provide the specified Minimum Streamflows within the capabilities of the existing facilities.

**a) Pit River below Pit 7 Dam**

The Licensee shall release instantaneous flow of 150 cfs in the Pit River below Pit 7 Dam as measured at USGS Gage 11365000 year round. Instantaneous flow is defined as the flow value used to construct the average daily flow value and shall be measured in time increments of at most 15-minutes.

**b) McCloud River below McCloud Dam**

The Licensee shall release mean daily flows of at least 175 cfs year round from the McCloud Dam such that the mean daily flow at USGS Gage 11367800 (MC-1) at Ah-Di-Na is at least 200 cfs. These flows shall be augmented during the period February 15 through August 31 according to the prescription shown below. Flows shall be measured for compliance at both USGS Gage 11367800 (MC-1) and either at Gage MC-7 or directly at McCloud Dam.

Beginning February 1, the Licensee shall consult Bulletin 120 published by the California Department of Water Resources (or its successor) and determine the “Percent of Average, April through July Forecast” for the McCloud River above Shasta Lake. That value shall be compared to values in Table 1-1 and the flow shall be modified as indicated. No ramping is required between semi-monthly increments.

Licensee shall downramp all spill events once controllable by valve operation (assumed to be at 1000 cfs). Down ramping shall proceed at an increment of 150 cfs decrease each 48 hour period until the prescribed minimum instream flow value is

reached. Operational controllable spills (e.g. valve testing for dam safety compliance) also shall be up ramped in increments not to exceed 200 cfs each 24 hour period.

**Table 1-1.** Flow Rule for McCloud River Instream Flow

| <i>If the February 1 McCloud Runoff % is:</i>   | <i>then for the period: February 15-29</i>     | <i>and for the period: March 1-15</i>        |
|---|--|--|
| 0-75  | No Change                                      | No Change                                    |
| 76-89   | No Change                                      | Increase flow by 50 cfs                      |
| 90-99   | Increase flow by 75 cfs                        | Increase flow by 50 cfs                      |
| 100-119   | Increase flow by 125 cfs                       | Increase flow by 100 cfs                     |
| 120+  | Increase flow by 175 cfs                       | Increase flow by 150 cfs                     |
| <b><i>If the March 1 McCloud Runoff percentage is:</i></b>  |  |  |
|   | <b><i>then for the period: March 16-31</i></b> | <b><i>and for the period: April 1-15</i></b> |
| 0-75  | No Change                                      | No Change                                    |
| 76-89   | No Change                                      | No Change                                    |
| 90-99   | Increase flow by 50 cfs                        | No Change                                    |
| 100-119   | Increase flow by 50 cfs                        | Increase flow by 50 cfs                      |
| 120+  | Increase flow by 150 cfs                       | Increase flow by 50 cfs                      |
| <p><b>If the release from McCloud Dam (MC-7) on April 15 is equal to or greater than 200 cfs:</b><br/> On each Friday after April 15, decrease the flow 50 cfs per week until the flow reaches 200 cfs, then maintain 200 cfs release at McCloud Dam (MC-7) through June 30<br/> July 1 through August 31: release 175 cfs at MC-7 but maintain at least 215 cfs at Ah-Di-Na (MC-1)<br/> Beginning September 1: Release 175 cfs at MC-7; but maintain at least 200 cfs at Ah-Di-Na (MC-1)</p> <p><b>If the release from McCloud Dam (MC-7) on April 15 is less than 200 cfs:</b><br/> Beginning April 16: Release 175 cfs at MC-7; but maintain at least 200 cfs at Ah-Di-Na (MC-1)</p> |  |  |

**c) Iron Canyon Creek below Iron Canyon Dam**

The Licensee shall release mean daily flows in Iron Canyon Creek below Iron Canyon Dam in accordance with the schedule shown below in Table 1-2 as measured at Gage MC-10.

**Table 1-2. Iron Canyon Creek**

| Month | Mean Daily Flow (cfs) by Water Year          |              |       |
|-------|--|--------------|-------|
|       | <i>Below Normal, Dry,<br/>Critically Dry</i> | Above Normal | Wet   |
| Oct   | 7  | 7            | 10    |
| Nov   | 7  | 7            | 10    |
| Dec   | 7  | 10           | 15    |
| Jan   | 7  | 10           | 15    |
| Feb   | 7  | 10           | 15    |
| Mar   | 10   | 15           | >20** |
| Apr   | 10   | 15           | >20** |
| May   | 7  | 10           | 15    |
| Jun   | 7  | 10           | 15    |
| Jul   | 7  | 7            | 10    |
| Aug   | 7  | 7            | 10    |
| Sep   | 7  | 7            | 10    |

\*\*In March and April of Wet Water Year Types, the Flow Control Valve on Iron Canyon Dam shall be fully opened. Mean Daily flow shall be at least 20 cfs during this period.

No ramping is required between monthly increments. Valve testing for dam safety compliance shall only occur between March 1 and 31. Up ramping to test flow valve (assumed 200 cfs maximum) shall occur in 20 cfs increments spaced at least 15-minutes apart. Down ramping shall occur in 20 cfs increments spaced at least 30-minutes apart.

The Licensee shall determine the water year type based on the forecast of unimpaired runoff as provided by the California Department of Water Resources (DWR) Bulletin 120 report of water conditions in California for the “Percent of Average, April through July Forecast” for the McCloud River above Shasta Lake. Critically Dry, Dry and Below Normal shall be defined as less than 100% of the average April-July forecasted runoff in Bulletin 120 for McCloud River at Shasta Lake for each respective month. Above Normal shall be defined as 100-119% of the average April-July forecasted runoff in Bulletin 120 for McCloud River at Shasta Lake for each respective month. Wet

shall be defined as 120% and greater of the average April-July forecasted runoff in Bulletin 120 for McCloud River at Shasta Lake for each respective month.

In January, February, March, and April the Licensee shall determine the water year type based on the DWR Bulletin 120 forecast and shall operate for that month based on that forecast. The May forecast shall be used to establish the water year type for the remaining months until the next January, when forecasting shall begin again.

Minimum Instream Flows (MIFs) triggered by water year type shall be implemented within 3 business days of the actual publication date of that month's DWR Bulletin 120, or as soon as permitted by weather and site accessibility. The previous month's flows may continue through the first several days of these months where forecasts are used to determine flows, until the new flow has been determined and the flow change made.

## **Part 2. Streamflow Measurement.**

For the purpose of determining the river stage and minimum streamflow on the Lower McCloud River below McCloud Dam, Pit River below the Pit 7 Dam, and Iron Canyon Creek below the Iron Canyon Dam, the Licensee shall operate and maintain the existing gages, consistent with all requirements of FERC and under the supervision of the USGS. Any modification of the gage facilities at any of these gages that may be necessary to measure the new Minimum Streamflow releases shall be completed within three years of issuance of the new Project license. Licensee shall install an instream measuring device either within or adjacent to the McCloud Dam to directly measure instream flow releases from McCloud dam.

The Licensee shall measure and document all instream flow releases in publicly available and readily accessible formats. Flow data at USGS Gage 11367800 (MC-1) shall be real-time data and posted on the California Data Exchange Center (CDEC) or its successor website. Flow data collected by Licensee from the stream gages will be reviewed by the Licensee's hydrographers as part of its quality assurance/quality control (QA/QC) protocol. Upon completion of the QA/QC process, the data will be catalogued and made available to USGS in annual hydrology summary reports. Licensee understands that the USGS will then complete their QA/QC review of the data and subsequently publish the data and post it within their electronic database that can be accessed via the internet. The flow values (generally 15-minute recordings) used to construct the 24-hour average flows will be available to the resource agencies from the Licensee upon request.

### Condition No. 20 – Water Quality and Temperature Monitoring

Within one year of license acceptance, and in consultation with applicable Federal and State agencies, the Licensee shall file with the Commission a Water Quality and Temperature Monitoring Plan (WQTMP) that is approved by the Forest Service, as it relates to aquatic habitats and water-based recreation on NFS lands. Upon Commission approval, Licensee shall implement the Plan. This plan shall include:

- Monitoring all project reservoirs every five years for contaminants at appropriate key recreation locations, e.g. boat ramps, day use areas, near campgrounds (including e. coli, to measure possible sanitation concerns);
- Periodic monitoring of dissolved oxygen at McCloud, Pit 6 and Pit 7 Reservoirs; and
- Temperature monitoring from May 1 through September 30 at a minimum, for a period of ten years following implementation of instream flow schedule. Monitoring to be conducted by Project segment (i.e. reservoirs and Project-affected rivers) subject to the following:
  - Permission to enter private lands during sensor installation/maintenance, as applicable;
  - Routine sensor maintenance or deployment in the spring may be delayed due to late snows or high flows and will be initiated as early in May as possible, subject to safety and access constraints; and
  - If monitoring indicates that temperatures above 20o C are occurring within the project reservoirs or downstream reaches, additional monitoring may be required;
- Continuous monitoring of turbidity for the term of the license in the Lower McCloud River (at MC-7 or MC-1) during fishing season (approximately April 25 to November 15) to record elevated turbidity for recreational use.
  - Routine sensor maintenance or deployment in the spring may be delayed due to late snows or high flows and will be completed prior to or as early in the fishing season as possible, subject to safety and access constraints.
  - Turbidity levels shall be available real-time during the fishing season on the Licensee's public Project website.
- Turbidity monitoring during construction, re-construction, or other soil disturbing activities to identify point source erosion that may require repair or stabilization;
- Continuous monitoring of turbidity for a minimum of five years after license acceptance in Iron Canyon Creek (at MC-10) to ensure that Licensee's repairs have reduced sedimentation into the creek below the dam. If elevated turbidity (above Basin Plan level) is still occurring after five years, continue monitoring for an additional five years until additional mitigations reduce turbidity to or below Basin Plan level. If, before the end of five years, the Licensee proposes and the USFS and other applicable conditioning agencies agree and approve that Licensee's erosion control repairs have effectively reduced sedimentation and turbidity below the dam, then turbidity monitoring at this location can cease.

- Implement “Best Management Practices” (BMP’s), or the most current USFS regulations, within the Project and Project-affected area that will satisfy the Aquatic Conservation Strategy Objectives within the Northwest Forest Planning area, and mitigate impacts from:
  - Project operation and maintenance activities;
  - Project construction, reconstruction and repair of Project sites;
  - Developed and dispersed recreation use;
  - Road use, routine maintenance, reconstruction and repair;
  - Vegetation manipulation;
  - Prescribed fire and wildland fire planning, and fire suppression; and
  - Watershed practices.

Condition No. 21 – Large Woody Debris

Within one year of license acceptance, Licensee shall, in consultation with the USFS, CDF&G, SWRCB, potentially affected tribes, and other interested parties, prepare a Large Woody Debris Plan approved by the USFS. The Plan shall include at a minimum the components included in Exhibit LWDP, Draft Large Woody Debris Plan, referenced by this condition, unless otherwise agreed to by the USFS during Plan finalization. The Plan shall provide an operating procedure to facilitate the capture and removal of woody debris from the surface of McCloud Reservoir, and the placement into the Lower McCloud River downstream of McCloud Dam. The Plan will specify: (1) size criteria, (2) storage and placement sites, (3) volume and frequency of placement, including monitoring procedures that assess the mobilization of Large Woody Debris (LWD) from the augmentation site. Upon Commission approval, Licensee shall implement the Plan.

Condition No. 22 – Erosion and Sediment Control and Management

Within one year of license acceptance, the Licensee shall file with the Commission an Erosion and Sediment Control Management Plan developed in consultation with Conditioning Agencies, and other interested parties, and approved by the USFS that will provide direction for treating erosion and controlling sedimentation within the Project and Project-affected NFS lands during the term of the new license. Upon Commission approval, Licensee shall implement the Plan.

The Plan shall include at a minimum the components included in Exhibit ESCMP, Draft Erosion and Sediment Control Management Plan, referenced by this condition, unless otherwise agreed to by the USFS during Plan finalization. Minimum components include, but may not be limited to:

**Erosion Control Guidelines for Existing Project-Affected Areas**

- Methods for initial and periodic inventory and monitoring of the entire Project area and Project-affected NFS lands to identify erosion sites and

assess site condition for each, using protocols established in relicensing study GS-S1 (Inventory and assessment of erosion and sediment from Project Construction, Operation, and Maintenance, Technical Memo-67). Periodic monitoring and inventory will include recording effectiveness of erosion treatment measures, and identification of new erosion sites for the term of the new license;

- Criteria for ranking and treating erosion sites including a risk rating and hazard assessment for scheduling erosion treatment measures and monitoring at each site using protocols developed in relicensing study GS-S1;
- Erosion control measures that incorporate current standards, follow Forest Service (USFS) regulations and guidance (e.g. LRMP, RMO's, BMP's ), are customized to site-specific conditions, and approved by the USFS;
- Develop and implement a schedule for treatment (e.g. repair, mitigate, monitor) of erosion sites, including a list of sites requiring immediate mitigation and schedule for their implementation. Priority will be placed on the 56 sites ranked as having high erosion potential in study results from Inventory and Assessment of Erosion and Sediment from Project Construction, Operation, and Maintenance (TM-67). All sites (high, moderate and low priority, and any new sites added as a result of periodic monitoring) will be scheduled as described in the Implementation Plan (Exhibit ESCMP).
- Effectiveness monitoring of completed erosion control treatment measures for a period of up to three years after treatment in order to determine if further erosion control measures are needed;
- Protocols for emergency erosion and sediment control; and
- Process for documenting and reporting inventory and monitoring results including periodic plan review and revision. Documentation shall include a USFS compatible GIS database for maps keyed to a narrative description of detailed, site-specific, erosion treatment measures and sediment monitoring results.

### **Erosion Control Guidelines for New Construction or Non-Routine Maintenance**

Licensee shall develop site-specific temporary erosion control measures for each project to be approved by the USFS. These temporary measures will prevent erosion, stream sedimentation, dust, and soil mass movement during the period of ground disturbance until replaced by permanent measures.

Condition No. 23 – Coarse Sediment Management Plan

Within one year of license acceptance, the Licensee shall develop, in consultation with the USFS, Conditioning Agencies, and other interested parties, and file with the Commission a Coarse Sediment Management Plan that is approved by the USFS. Upon Commission approval, Licensee shall implement the Plan.

The Plan shall include at a minimum the components included in Exhibit CSMP, Draft Coarse Sediment Management Plan, referenced by this condition, unless otherwise agreed to by the USFS during Plan finalization.

This Plan shall require the periodic addition of between of 150 to 600 tonnes of clean, rounded gravel, and associated coarse sediment ranging in size between 8-128 mm to the Lower McCloud River directly below the McCloud Dam spillway splash pool. The source of the coarse sediment will be coarse sediment deposits within McCloud Reservoir. At a minimum, the Coarse Sediment Management Plan shall:

- Identify the source(s) of coarse sediment;
- Identify the location(s) for coarse sediment introduction, and the facilities or improvements necessary for accessing the Lower McCloud River below McCloud Dam;
- Identify coarse sediment storage sites;
- Develop a schedule for coarse sediment placement; and
- Include an adaptive management component to allow non-delivery of coarse sediment in non-spill years or in years when spring flows are insufficient to mobilize the sediment from the placement site(s) or increased delivery above the minimum 150 tonnes if mobilization and dispersal monitoring results indicate capacity for greater quantities of coarse sediment.

During the Annual Consultation Meeting required by USFS License Condition No. 1, the USFS will review monitoring results and discuss any needed changes to the Coarse Sediment Management Plan. Any proposed changes shall require USFS approval.

Condition No. 25 – Coarse Sediment Management Plan

Within one year of license acceptance, the Licensee shall complete, in consultation with the USFS, appropriate County Agricultural Commissioner, California Department of Food and Agriculture, potentially affected tribes, and other interested parties, and approved by the USFS, a Vegetation and Invasive Weed Management Plan for all NFS lands potentially affected by the Project. Targeted invasive species will be those species defined by the California Department of Food and Agriculture (CDFA) code, the California Invasive Plant Council (Cal-IPC) rating system, or as USFS species of concern. The plan will address Special Status species, both aquatic and terrestrial invasive species, and Revegetation Source populations within the Project boundary and

adjacent to Project features directly affecting NFS lands including roads, distribution and transmission lines. Upon Commission approval, Licensee shall implement the plan.

The Plan shall include at a minimum the components included in Exhibit VIWMP Draft Vegetation and Invasive Weed Management Plan (referenced by this condition), unless otherwise agreed to by the USFS during Plan finalization. Minimum components include, but may not be limited to:

- Protection of Special Status and Revegetation Source populations.
- Invasive Species Management and Monitoring, including an adaptive management element to implement methods for prevention of aquatic invasive weeds, as necessary.
- Revegetation Implementation and Monitoring.
- Treatment protocols for vegetation management and hazard reduction for protection of Project facilities and Project-affected resources within the project-affected area.
- Pesticide/herbicide use approval and restrictions.
- Botanical enhancements for specific special-status wildlife species.

Condition No. 26 – Terrestrial Biological Management and Monitoring

Within one year of license acceptance the Licensee shall develop, in consultation with conditioning agencies, and other interested parties, and approved by the USFS, a Terrestrial Biological Management and Monitoring Plan, including USFS special status species (i.e. Forest Service Sensitive, survey and manage, and management indicator species) and specific California special status (i.e. endangered or fully protected) potentially affected by the Project on NFS lands. Upon Commission approval, Licensee shall implement the plan.

To the extent possible, this plan should be developed consistent with the survey protocol's developed and included in the biological implementation plan's from the recently relicensed Pit 3, 4 & 5 Project (FERC No. 233) to provide similar data collection protocol's for species that span both hydroelectric Project area's on adjacent NFS lands.

The Plan shall include at a minimum the component's included in Exhibit TBMP Draft Terrestrial Biological Management Plan (referenced by this condition), unless otherwise agreed to by the USFS during Plan finalization. Minimum component's shall include, but may not be limited to:

- periodic survey's (including pre-disturbance/pre-construction);
- occupation and population monitoring;
- species specific mitigation measures (including avian collision and electrocution hazard prevention measures); and
- GIS mapping and reporting.

Surveys shall follow the most current standard protocols as reviewed and approved by the USFS, or protocols collaboratively developed and approved by the USFS if no standard protocols exist at the time. Licensee shall observe Limited Operating Periods (LOP's) where required (LOP's do not apply to emergency situations). In the event emergency response is necessary to address an unanticipated, Project-related event (e.g. wildfire, dam breach, toxic spill) and with the potential to impact federally-listed species and/or critical habitat, PG&E will work with FERC to initiate emergency consultation with the USFWS as described in the Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act (Handbook) (USFWS and NMFS 1998) or the most current consultation protocol.

Species to be monitored include: terrestrial mollusks, shasta salamander, north-western pond turtles, northern goshawk, bald eagles, peregrine falcon, northern spotted owl, willow flycatcher, special status bats, neotropical birds, and forest carnivores. Additional species may be added in the future if required by law or regulation, and suitable habitat occurs within the Project or Project-affected area. Surveys for valley elderberry longhorn beetle occur under the Vegetation and Invasive Weed Management Plan and are habitat-only surveys.

Condition No. 27 – Aquatic Biologic Monitoring

Within one year of license acceptance, the Licensee shall develop, in consultation with the USFS, State Water Resource Control Board, CDF&G, potentially affected tribes, and other interested parties, and approved by the USFS, an Aquatic Biological Monitoring Plan, including USFS special status species (i.e. Forest Service Sensitive, survey and manage, and management indicator species) potentially affected by the Project on NFS lands. Upon Commission approval, Licensee shall implement the Plan.

The Plan shall include at a minimum the components included in Exhibit ABMP, Draft Aquatic Biological Monitoring Plan (referenced by this condition), unless otherwise agreed to by the USFS during Plan finalization. Minimum components include, but may not be limited to:

Fish population trend assessments in Iron Canyon Creek and the Lower McCloud River with monitoring at specific intervals;

Standardized sampling and data protocols consistent with relicensing studies, to the extent possible, to ensure comparability of survey results with existing data;

For Lower McCloud River and Iron Canyon Creek, periodic survey once every three years for the first nine years following the first full year of the new License required minimum instream flow, and then once every five years for the term of the license. For

Pit 7 Reservoir, periodic survey once every five years following License acceptance;

Benthic Macroinvertebrate (BMI) monitoring component using the SWAMP, or current protocol, including population heterogeneity, composition and trends;

Aquatic special status species (northwestern pond turtles, Foothill yellow-legged frog) protocol and schedule for monitoring within the Project waters and rivers;

Protocols to monitor for and prevent introduction of invasive aquatic species, consistent with SWRCB and CDF&G regulations;

Report of all aquatic survey and monitoring results within one year of data collection, with a Forest Service GIS compatible map that includes base data from all post-licensing surveys; and

Periodic monitoring of fish passage conditions at Gap Creek, Deadlun Creek and Cedar Salt Log Creek Road crossings around Iron Canyon Reservoir.

*Condition No. 29 – Road and Transportation Facility Management Plan*

Within one year of License acceptance, Licensee shall complete the Road and Transportation Facility Management Plan for protection and maintenance of Project Roads that are on or affect NFS lands. The Licensee shall consult with the USFS in the finalization of this Plan, and the final Plan shall be approved by the USFS. Upon Commission approval, Licensee shall implement the Plan.

The Plan shall include at a minimum the components included in Exhibit RTFMP, Draft Road and Transportation Facility Management Plan (referenced by this condition), unless otherwise agreed to by the USFS during Plan finalization. Minimum components include, but may not be limited to:

**Planning & Inventory:** A map(s) compatible with USFS Travel Management Routes and GIS database showing all Project Roads (shown in Table 1) and associated road signs within, adjacent, or specific to the Project Boundary.

**Operation, Maintenance, and Road-Associated Debris:** An annual road operation and maintenance (O&M) schedule for Project Roads that complies with USFS standards, Road Management Objectives (RMO's), Best Management Practices (BMP's), Limited Operating Periods (LOP's), and USFS Travel Management Rule.

**Construction and Reconstruction:**

Construction and reconstruction implementation schedule to bring existing roads and associated facilities into compliance with USFS standards (including RMO's and the USFS Travel Management Rule).

**Monitoring:** Conduct periodic traffic use surveys and periodic road capacity reviews. If the Forest Service determines roads no longer meet the RMO's, define actions and timelines to correct deficiencies.

**Road Use by Government:** The United States shall have unrestricted use of any road over which the Licensee has control within the Project area for all purposes deemed necessary and desirable in connection with the protection, administration, management,

and utilization of NFS lands or resources. When needed for the protection, administration, and management of NFS lands or resources the United States shall have the right to extend rights and privileges for use of the right-of-way and road thereon, to States and local subdivisions thereof, as well as to other users. The United States shall control such use so as not to unreasonably interfere with the safety or security uses, or cause the Licensee to bear a share of the costs disproportionate to the Licensee's use in comparison to the use of the road by others.

**Road Use by Licensee:** The Licensee shall confine all vehicles being used for Project purposes, including but not limited to administrative and transportation vehicles and construction and inspection equipment, to roads or specifically designated access routes. The Forest Service reserves the right to close any and all such routes where damage is occurring to the soil or vegetation, or, if requested by Licensee, to require reconstruction/construction by the Licensee to the extent needed to accommodate the Licensee's use. The USFS agrees to provide notice to the Licensee and the Commission prior to road closures, except in an emergency, in which case notice will be provided as soon as practicable.

**Table 1: Project Roads.**

| Road #   | Name  | Start                     | End                                       | Miles | USFS RMO |
|----------|---|---------------------------|---|-------|----------|
| 38N11    | <i>Hawkins Creek Road</i><br>FA11 (Segment 1) | <i>Siskiyou</i><br>MC1N01 | <i>Hawkins Creek Tunnel</i><br>Spoil Pile | 14.25 | 4/3      |
| 38N81    | <i>Tarantula Gulch Boat</i><br>Launch Road    | 38N11                     | Ramp/parking                              | 0.3   | 4        |
| 38N04Y   | Star City Road                                | 38N11                     | Bridge                                    | 2.5   | 3        |
| U38N11X  | McCloud Dam Road                              | 38N11                     | Base of McCloud Dam                       | 0.25  | N/A      |
| 37N78    | Iron Canyon Loop<br>Road                      | 38N11                     | (Oak Mtn Rd) 37N34                        | 8.54  | 3        |
| 37N27Y   | Deadlun CG                                    | 37N78                     | Campground                                | 0.34  | 3        |
| 37N66Y   | Hawkins Landing<br>Road                       | 38N11                     | Hawkins Boat Ramp                         | 0.56  | 3        |
| 37N78A   | MC-10 gage Road                               | 37N78                     | <i>Low Level outlet and</i><br>gage       | 0.28  | 2        |
| 37N34    | Oak Mountain Road                             | 38N11                     | Pit 5 Bridge                              | 7.71  | 3        |
| 37N93    | <i>Ridge Iron Canyon</i><br>Road              | 37N93A<br>37N93C          | Oak Mountain Road                         | 0.3   | 2        |
| 37N93A   | Ridge Road                                    | 37N93                     | pipeline                                  | 0.6   | 2        |
| 37N93C   | Willow Siphon                                 | 37N93                     | pipeline                                  | 0.5   | 2        |
| Pit 6 PH | Pit 6 Powerhouse Road                         | Cove Rd.                  | Pit 6 PH                                  |       | N/A      |
| 35N23    | Pit 7 Powerhouse Road                         | 34N17                     | Pit 7 Dam & PH                            | 1.79  | 3        |
| 35N66    | Fenders Flat Road                             | 35N23                     | Afterbay Dam                              | 0.57  | 3        |

Condition No. 30 – Road and Transportation Facility Management Plan

Within two years of license acceptance, Licensee shall complete the Recreation Development and Management Plan in consultation with the USFS, conditioning

agencies, Native American representatives, and other interested parties, and approved by the USFS, to address recreation resource needs associated with the Project. New and reconstructed Project recreation facilities on NFS lands will be included in the Project Boundary prior to ground disturbance, approved by the USFS and meet all USFS laws, standards and policy, such as protecting sensitive resources (e.g. cultural, wildlife, etc.) and meet USFS recreation design guidelines. Where design or site analysis constraints preclude specific developments stipulated in this License Condition, the USFS will review and approve modifications that meet the intent of this Condition. Upon Commission approval, Licensee shall implement the Plan.

The Plan shall include at a minimum the components included in Exhibit RDMP, Draft Recreation Development and Management Plan (referenced by this condition), unless otherwise agreed to by the USFS during Plan finalization. Minimum components include, but may not be limited to:

**Operation and Maintenance:** Develop and implement an Operation and Maintenance (O&M) component (including fee collection and retention) for all Project recreation facilities. Recognizing that the existing health and safety conditions at some of the Project recreation facilities are the result of previous operation and maintenance practices, Licensee will not be held responsible for the conditions of the Project recreation facilities until they are reconstructed.

**Recreation Survey and Monitoring:** Develop and implement a periodic Recreation Survey and Monitoring component with Report that is filed with the Commission after USFS approval.

**Project Patrol:** Develop and implement a Project Patrol Plan for Project and Project-affected NFS lands. Annually, the Licensee shall coordinate with the agencies and interested parties to review information from the prior season and plan any adjustments for the next high use season (April through November). This position may be either a Licensee employee, or equivalent funding provided to an appropriate Federal, State, or local agency. This component shall outline duties to implement on a year-round basis. The Plan shall include at a minimum the components included in Exhibit PPP Draft Project Patrol Plan (referenced by this condition), unless otherwise agreed to by the USFS during Plan finalization.

**Reservoir Water Surface Management:** Develop and implement a Reservoir Water Surface Management component that addresses recreation user safety (including surface debris capture), discourages travel onto adjacent private lands, and displays County code and contact information to Project users on each Reservoir surface (McCloud, Iron Canyon, Pit 6 and Pit 7).

**McCloud Reservoir Facilities:** Construct day use areas at Tarantula Gulch inlet, Red Banks and Star City Creek (including surfaced parking, and vault toilets), and lake access sites at Battle Creek and both sides of McCloud Dam (including surfaced parking and trail). Reconstruct Tarantula Gulch Boat Ramp to Cal Boating standards for a 2-lane

ramp with boarding dock and sidewalk. Licensee shall acquire rights, by any means necessary, but not including by condemnation pursuant to Section 21 of the Federal Power Act or any other law, for the purpose of overnight public recreational use, a portion of the Star City Creek parcel located in the SE ¼ of Section 15, Township 38 North, Range 2 West, M.D.B.M. (included as a portion of APN's 015-040-035, 015-190-002). After acquisition, Licensee will construct overnight camping facility (including parking, vault toilet, and a minimum 50 PAOT capacity) at Star City. If Star City cannot be acquired as described above, Licensee shall instead construct overnight camping facilities on NFS lands near Tarantula Gulch within the Project boundary.

**Lower McCloud River:** Construct a Day Use Area with trail at the base of McCloud Dam. Trail shall be designed to accommodate both fishing and boating access. Trail access could be by road, if developed for other needs. If McCloud Dam site is infeasible due to operational constraints, develop facilities at Ash Camp Campground and include in Project boundary or Settlement Agreement.

**Iron Canyon Reservoir:** Construct a single lane boat ramp with boarding dock to Cal Boating standards at Iron Canyon Dam. Provide a minimum of total 200 PAOT's for overnight camping around Reservoir. Reconstruct Hawkins Campground to existing capacity. Reconstruct Hawkins Landing Boat Launch and construct parking area. Reconstruct Deadlun Campground to provide for double and triple campsites. Construct new campground at Gap Creek site for single unit sites. Construct three additional lake access sites (including surfaced parking and trail to Reservoir) around the shoreline of Iron Canyon Reservoir.

**Pit 6 and Pit 7 Reservoirs and Afterbay:** Develop two surfaced parking areas with Reservoir access trails (approx. 1 mile apart) below Pit 6 Dam to provide fishing access and boating put-in onto the upper Pit 7 Reservoir. Develop road access to a surfaced parking area and short walkway to put-in/take-out onto the lower Pit 7 Reservoir, either at Montgomery Creek or near the Pit 7 Dam.

Licensee shall investigate known safety and public access issues at the Pit 7 Afterbay Dam (with or without the proposed new hydroelectric generation facility at the Pit 7 Afterbay Dam). This analysis will develop alternatives to address safety while considering current and needed public access in this flat and easily accessible location adjacent to the Pit River. Alternatives may include safety items collaboratively developed and implemented (e.g. reinforced fencing, patrols, signs, physical barriers, information on safety hazards, including website information) by the Licensee under the existing license between the time of Final 4(e) Condition filing and license acceptance. Alternatives will include hydrologic analysis that may result in structural modification or relocation, public use data, and other pertinent existing literature. Each alternative will include a cost estimate for comparison purposes. Implement a solution after consultation with the Forest Service, other Conditioning Agencies, and approved by the Forest Service and FERC.

Re-construct the car-top boat launch at the current Pit 7 Afterbay Dam location, and construct a day use area near the reservoir high-water line in the vicinity of the boat launch.

Condition No. 31 – Sign and Interpretive/Education Management Plan

Within two years of license acceptance, the Licensee shall complete, in consultation with and approved by the USFS, a Sign and Interpretive/Education (S&I/E) Plan for all non-traffic signs within the Project. This includes existing signs potentially affected by the Project, and new signs at Project locations on NFS lands where interpretation or information would support or enhance visitor experiences. Upon Commission approval, Licensee shall implement the plan.

The Plan shall include at a minimum the components included in Exhibit SIEMP, Draft Sign and Interpretive/Education Management Plan (referenced by this condition), unless otherwise agreed to by the USFS during Plan finalization. Minimum components include, but may not be limited to:

- Inventory of all existing informational, FERC, safety, directional, recreation, interpretive and education (all non-road or traffic) signs within the Project Area or associated with Project facilities
- Collaborative development of standards, designs, and locations for all Project-Related Signs (existing and new), including web media.
- Protocols for installing, maintaining, and monitoring Project-Related Signs for the life of the license.

Condition No. 32 – Visual Quality Management

Within one year of License acceptance, Licensee shall develop, for USFS approval and filing with the Commission, tasks and timeline, to assure implementation of specific mitigation measures to provide for improved visual quality of Project and Project-affected NFS lands. Upon Commission approval, Licensee shall implement the mitigations.

The mitigations shall include, at a minimum, the components included in Exhibit VQM, Draft Visual Quality Management (referenced by this condition), unless otherwise agreed to by the USFS during Plan finalization. Minimum components include, but may not be limited to:

- Operation and Maintenance activities at existing facilities
- Reconstruction or repair of existing facilities
- Construction of new facilities
- Key Observation Point (KOP) Monitoring

Condition No. 33 – Fire and Fuels Management Plan

Within one year of license acceptance, the Licensee shall complete, in consultation with the USFS, Cal Fire, potentially affected Tribes, and other interested parties, and approved by the USFS, a Fire and Fuels Management Plan (FFMP). The plan shall set forth in detail the Licensee's responsibility for the prevention (including fuels treatment), reporting, emergency response, and investigation of fires related to Project operations. Upon Commission approval, Licensee shall implement the Plan.

The Plan shall include at a minimum the components included in Exhibit FFMP, Draft Fire and Fuels Management Plan (referenced by this condition), unless otherwise agreed to by the USFS during Plan finalization. Minimum components include, but may not be limited to:

- Fuels Treatment
- Prevention and Response
- Access and Safety
- Emergency Response Preparedness
- Reporting and Response
- Investigation of Project Related Fires
- Post-Fire activities

Condition No. 34 – Historic Properties Management and Monitoring

Within one year of license acceptance, Licensee shall file with the Commission a Historic Properties Management Plan (HPMP) that has been amended from the October 26, 2010 version, incorporates collaborative input from the Forest Service, Licensee, and potentially affected Tribes, and is approved by the Forest Service. The Forest Service will consider this filing of the HPMP as the final. The HPMP will be tiered to an anticipated Programmatic Agreement (PA), to which the Forest Service has requested to be a signatory, as defined by 36 CFR 800, and implements regulations of the National Historic Preservation Act. The Licensee shall consult with the State Historic Preservation Officer (SHPO), applicable Native American Tribes, Forest Service, and other applicable agencies during the finalization of the HPMP. Consultation for the finalization of the HPMP shall consist of field (as appropriate) and office meetings.

The final HPMP shall include, but is not limited to:

1. Integrate CR-S1 and CR-S2 study results into individual reports (in confidential appendices to the HPMP) for the Pit River and Winnemem Wintu Tribes. CR-S2 results are available for the Pit River Tribe, but are at an impasse for the Winnemem Wintu Tribe. If the current CR-S2 ethnographic Winnemem Wintu study is not completed prior to HPMP finalization (i.e. within one year of license acceptance) the Final HPMP will instead incorporate currently available data. Sources of these data

should include, but are not limited to: the Harrington notes, research by: McTavish, Kardell/Dotta, Thoedoratus, Bauman, Curtin, and Merriam, and historic maps. If the Winnemem Wintu CR-S2 study component is completed after HPMP finalization, the HPMP will be revised or amended at that time.

2. A detailed table and description defining the schedule for site monitoring and HPMP implementation, including: reports, revisions, consultation, site-specific treatment measures, and others.
3. For Iron Canyon Reservoir, complete National Register evaluations, in accordance with the Commission's August 27, 2010 directive, within one year of license acceptance, on all cultural resources on NFS lands that are currently, or in the future will be, adversely affected by Project-related erosion (including frequent and large magnitude reservoir fluctuations), siltation, and site exposure that could induce looting. Where sites have been affected, consultation with the Commission, SHPO, Forest Service, and Tribes shall occur to determine if any evaluations may require archaeological test excavation. In addition for sites determined eligible, perform monitoring, on a frequency to be developed during collaborative discussion.
4. The Forest Service has determined current Project affects to historic properties have not been entirely acknowledged in the HPMP. To correct this, collaboratively develop site-specific detailed mitigation measures for adverse effects from Project operations on historic properties.
5. The Forest Service believes there is merit for consideration of a historic district along the APE for the Lower McCloud River. The HPMP shall complete an in-depth analysis to determine if there is compelling evidence for a historic archaeological and ethnographic district. This analysis shall cross-walk ethnographic sources (Item 1, above) with archaeological site data.

If, prior to, or during ground-disturbing activities, or as a result of Project operations, items of a potential cultural, historical, archeological, or paleontological character are reported or discovered, or a known deposit of such items is disturbed on NFS lands or on Licensee's adjoining fee title property when such properties extend onto NFS lands, the Licensee shall immediately cease work in the area so affected. The Licensee shall then notify the Forest Service and shall not resume work on ground-disturbing activity until it receives written approval from the Forest Service. If it deems it necessary, the Forest Service may require the Licensee to perform recovery, excavation, and preservation of the site and its artifacts at the Licensee's expense through provisions of an Archaeological Resources Protection Act permit issued by the Forest Service. The Licensee shall implement the Plan upon approval by the Commission.