

CHAPTER 3

PG&E's Upper North Fork Feather River Project

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Since October 31, 2004, Pacific Gas and Electric Company (PG&E) has been operating its Upper North Fork Feather River Hydroelectric Project (UNFFR Project) under annual licenses issued by the Federal Energy Regulatory Commission (FERC). This chapter provides an overview of the UNFFR Project (FERC Project No. 2105) as it is described in PG&E's application to FERC and in FERC's *Final Environmental Impact Statement for the Upper North Fork Feather River Project* (FERC EIS). This chapter also summarizes the measures identified in the Project 2105 Relicensing Settlement Agreement¹ (2004 Settlement Agreement) negotiated by the Project 2105 Licensing Group (2105 Collaborative). The purpose of this chapter is to provide background information and an overview of PG&E's UNFFR Project prior to the discussion of alternatives proposed by the State Water Resources Control Board (State Water Board) in Chapter 4, Project Alternatives.

PG&E's objectives for the UNFFR Project are to:

- continue generating electricity for the term of the new license to produce electric power from a renewable source for its customers.
- continue providing power to help meet both short- and long-term needs for power and ancillary services in PG&E's service area and within the California-Mexico Power Area.
- implement measures to conserve energy, mitigate damage to fish and wildlife (including related spawning grounds and habitat), provide recreational opportunities, and preserve other aspects of environmental quality.

3.1 Project History and Background

This section provides an overview of the UNFFR Project history, FERC relicensing process, and the collaborative process used by the 2105 Collaborative to reach the 2004 Settlement Agreement.

3.1.1 UNFFR Project History

Great Western Power Company, acquired by PG&E in 1930, began construction and operation of dams and powerhouses along the North Fork Feather River in the early 1900s, coinciding with construction of the Western Pacific Railroad in the Feather River Canyon (Zemke 2006). Some of the early hydroelectric developments included the Big Bend powerhouse (1908) and

¹ Upper North Fork Feather River Project, FERC Project No. 2105: Project 2105 Relicensing Settlement Agreement included as Appendix A. Executed on April 22, 2004 and signed by PG&E; United States Department of Agriculture, Forest Service; California Department of Fish and Wildlife (formerly known as the California Department of Fish and Game); American Whitewater; Plumas County; Chico Paddleheads; Shasta Paddlers; Mountain Meadows Conservancy; and California Sportfishing Protection Alliance.

Big Bend dam (1910), the Butt Creek powerhouse (dismantled in 1921) and the original Butt Valley dam (1912), the Big Meadows dam (now called Canyon dam) that created Lake Almanor (1914), and the Caribou powerhouse (1921). PG&E continued to construct and operate new hydroelectric projects in the North Fork Feather River watershed downstream of the UNFFR Project during the latter part of the 1900s.

The original license for the UNFFR Project (FERC Project No. 2105) was issued on January 24, 1955. This license consolidated two existing projects and two proposed projects. The existing projects were: (1) Lake Almanor and Caribou powerhouse; and (2) Butt Valley dam and reservoir. The proposed projects were: (1) Caribou No. 2 powerhouse; and (2) Belden forebay dam. The Caribou No. 2 powerhouse began operation in November 1958. Belden forebay dam was completed in the late 1950s. Since the 1960s, the UNFFR Project has provided power to PG&E customers throughout California and has played an integral role in power generation and transmission in California.

3.1.2 FERC Relicensing Process

PG&E's license to operate the UNFFR Project (FERC Project No. 2105) expired in October 2004. In accordance with the Federal Power Act (FPA) and FERC regulations, PG&E submitted an application to FERC for a new license on October 23, 2002 (Pacific Gas and Electric Company 2002). FERC has issued annual extensions since the license expired and will continue to issue extensions until a decision has been made on the new license.

In pursuing a new license to operate the UNFFR Project, PG&E followed FERC's Traditional Licensing Process (TLP). The TLP involves three basic stages: consultation; studies and draft application preparation; and application filing and acceptance by FERC. The TLP requires the licensee (PG&E) to work closely with federal, state, and local agencies, tribes, and the public to identify the environmental issues or concerns that may be addressed during the application process. These stakeholders have the opportunity to review and comment on the draft application. PG&E used a collaborative process to develop a 2004 Settlement Agreement that identifies measures that were evaluated by FERC in its Final EIS and may be incorporated into the new license. The preconsultation for the UNFFR Project involved a 3-month review period in fall 2003, during which several agencies, a tribal group, and the public submitted comments on the relicensing application. Agency comment letters included recommendations for protection, mitigation, and enhancement (PM&E) measures to include in the new license. Many of these measures were incorporated into the 2004 Settlement Agreement.

As part of its review of the PG&E application, FERC prepared an EIS under the National Environmental Policy Act (NEPA) to evaluate the environmental impacts of the UNFFR Project, including proposed measures from the 2004 Settlement Agreement and additional measures recommended by FERC. Public scoping was completed in summer 2003, and a Draft EIS was completed in fall 2004. The Final EIS was completed in December 2005. FERC has not made a decision on the relicensing, pending resolution of several outstanding issues, including water quality. Under the FPA, FERC cannot issue a new license unless the State Water Board has issued or waived water quality certification.

3.1.3 Settlement Agreement Process

As part of the licensing application process, PG&E entered into a collaborative process with stakeholders and interested parties, known as the 2105 Collaborative, to resolve issues and develop PM&E measures to be included in the new license. Participants in the 2105

Collaborative included: PG&E; the United States Department of Agriculture, Forest Service (USFS); United States Fish and Wildlife Service (USFWS); National Park Service; National Marine Fisheries Service (NMFS); California Department of Fish and Game (CDFW; now known as the California Department of Fish and Wildlife (CDFW)); Plumas County; a local 2105 Committee (composed of public citizens); American Whitewater; local recreation interests; California Sportfishing Protection Alliance; the Anglers Committee; Native American interest groups; and the California Hydropower Reform Coalition. State Water Board staff participated in the collaborative process in order to provide advice concerning the State Water Board's regulatory process, but the State Water Board was not a party to the 2004 Settlement Agreement and is not a signatory to it.

The 2105 Collaborative had a goal of reaching agreement on mutually acceptable PM&E measures for inclusion in a new license for the UNFFR Project. The collaborative process resulted in the 2004 Settlement Agreement. The purpose of the agreement was to resolve "all lake level and streamflow issues for ecological purposes, river-based recreational uses, and other 'resolved subjects' in support of the USFS issuing its mandatory 4(e) conditions and FERC issuing a New Project License" (Section 2.1 of the 2004 Settlement Agreement). While the 2004 Settlement Agreement included a wide range of measures, it did not resolve several fundamental issues, including water quality. On April 22, 2004, some of the stakeholders, including PG&E, signed the 2004 Settlement Agreement, which contained the PM&Es. The PM&Es were evaluated in the EIS prepared by FERC.

3.2 Project Location

The UNFFR Project boundary or area, as defined in the FERC EIS, encompasses more than 30,000 acres, including three reservoirs, part of a river, and part of a creek, in Plumas County, California (Figure 3-1). The three reservoirs are: Lake Almanor, created by Canyon dam on the North Fork Feather River; Butt Valley reservoir, created by Butt Valley dam on Butt Creek; and Belden forebay, created by Belden dam on the North Fork Feather River downstream of its confluence with Butt Creek. The North Fork Feather River within the UNFFR Project boundary consists of two reaches, the Seneca reach and the Belden reach. The Seneca reach extends from Canyon dam to Belden forebay, and the Belden reach extends from downstream of Belden dam to the tailrace of Belden powerhouse. The upper Butt Creek segment within the UNFFR Project boundary begins upstream of Butt Valley reservoir at the point where the bypass valve associated with the Butt Valley penstock discharges into Butt Creek and ends at Butt Valley reservoir. Lower Butt Creek flows downstream of Butt Valley dam and enters the North Fork Feather River between Canyon dam and Belden forebay. Transmission lines, powerhouses, other energy facilities, roads, and recreation facilities occur along the shores of the reservoirs and the banks of upper Butt Creek and the North Fork Feather River, as well as in the local vicinity.

3.3 Overview of PG&E's UNFFR Project

The UNFFR Project is one of the upstream-most projects in a series of water resource development and hydroelectric projects in the Feather River basin. PG&E owns and operates four other hydroelectric projects in the basin: Hamilton Branch Hydroelectric Project (unlicensed and currently exempt from FERC licensing requirements), Rock Creek-Cresta Hydroelectric Project (FERC Project No. 1962), Bucks Creek Hydroelectric Project (FERC Project No. 619), and Poe Hydroelectric Project (FERC Project No. 2107). These projects are upstream of the California Department of Water Resources' (DWR's) Oroville Facilities (FERC Project No.

2100), which includes hydroelectric generation facilities and a 3.5 million acre-foot (AF) storage reservoir. The UNFFR Project is operated in conjunction with PG&E's other projects to help meet the electricity demands and ancillary service needs of PG&E's customers and the state of California.

The UNFFR Project is a resource that is important to the operation of PG&E's Feather River hydroelectric system as a whole; it contributes to PG&E's resource diversity and plays a part in meeting the electrical generation capacity requirements of both PG&E and the state of California. The licensed nameplate capacity of the UNFFR Project is 342.6 megawatts (MW), and PG&E estimates that the dependable capacity (the amount that could be generated during a critical hydrologic period and at peak demand) is 362.3 MW (Federal Energy Regulatory Commission 2005). According to the FERC EIS, the UNFFR Project generates 1,171.9 gigawatt hours (GWh) of electricity per year on average.

3.3.1 Existing Facilities

The following section is based on information that PG&E submitted to FERC in its License Application for the UNFFR Project (Pacific Gas and Electric Company 2002). The UNFFR Project consists of the following existing facilities:

- three reservoirs with dams;
- five powerhouses;
- tunnels and penstocks connecting the reservoirs to the powerhouses; and
- transmission, recreation, operations and maintenance (O&M), and access facilities.

Reservoirs, Tunnels, and Penstocks

The three reservoirs are Lake Almanor, Butt Valley reservoir, and Belden forebay. These reservoirs provide regulated storage for controlled flow releases through the various powerhouses to generate electricity and support other uses, such as recreation.

Lake Almanor is the upstream-most reservoir on the North Fork Feather River within the UNFFR Project boundary and has the largest usable storage capacity (1,134,016 AF). The maximum water surface area is 27,000 acres, and the maximum normal water surface elevation is 4,494 feet (PG&E elevation datum). Lake Almanor is impounded by Canyon dam, an earth-filled structure that is 135 feet high by 1,400 feet wide at its base and 1,250 feet long across its crest. Canyon dam has an outlet tower with multiple outlets that deliver water to a tunnel capable of releasing up to 2,100 cubic feet per second (cfs) to the North Fork Feather River (Seneca reach) directly below the dam. In addition to the outlet structure, the dam has a concrete overflow spillway at an elevation of 4,500 feet (PG&E elevation datum). Water is also diverted from Lake Almanor through the Prattville intake, which conveys flow through the 10,899-foot-long Prattville tunnel No. 1A and the 5,568-foot-long Butt Valley penstock to the Butt Valley powerhouse. The combined operation of these intake structures allows PG&E to maintain the water surface elevations for Lake Almanor under the current license. In addition to providing the required flow releases to the Seneca reach of the North Fork Feather River, water can be released from the Canyon dam outlet tower in very wet years to control the level of Lake Almanor in order to avoid use of the spillway.

Butt Valley reservoir is south of Lake Almanor on Butt Creek, a tributary to the North Fork Feather River. In addition to inflow from the creek, Butt Valley reservoir receives flow from Lake Almanor through the Butt Valley powerhouse or, in some circumstances, via the bypass valve at

the downstream portal of the Prattville tunnel, upstream of Butt Valley powerhouse. Butt Valley reservoir has a usable storage capacity of 49,897 AF, a maximum water surface area of 1,600 acres, and a maximum normal water surface elevation of 4,132.1 feet (PG&E elevation datum). Butt Valley reservoir is impounded by Butt Valley dam, an earth-filled structure that is 74 feet high by 850 feet wide at its base and 1,350 feet long across its crest. The dam has no low-level outlet, but an ungated overflow spillway is capable of overflow releases at a crest elevation of 4,132.1 feet (PG&E elevation datum). This spillway has not been used since Butt Valley dam was substantially reconstructed in 1997. Water is diverted from the Butt Valley reservoir via the Caribou Nos. 1 and 2 intakes. Flow through the 9,776-foot-long tunnel No. 2 travels along the 2,222-foot-long Caribou No. 1 penstock to the Caribou No. 1 powerhouse. Flow through the 8,710-foot-long tunnel No. 2A travels along the 2,322-foot-long Caribou No. 2 penstock to the Caribou No. 2 powerhouse.

Belden forebay is on the North Fork Feather River, approximately 12 miles downstream of Lake Almanor and more than 1,150 feet in elevation below Butt Valley reservoir. In addition to flow from the Seneca reach of the river, it receives flow from the Caribou Nos. 1 and 2 powerhouses. Belden forebay has a usable storage capacity of 2,421 AF, a maximum water surface area of 42 acres, and a maximum normal water surface elevation of 2,975.0 feet (PG&E elevation datum). Belden forebay is impounded by Belden forebay dam, a rock-filled structure that is 152 feet high by 603 feet wide at its base and 500 feet long across its crest. The dam has a spillway with four radial gates and a siphon that activates if the reservoir exceeds 2,975.5 feet (PG&E elevation datum). Water is released from Belden forebay: (1) into the North Fork Feather River via the Oak Flat powerhouse; or (2) through tunnels and a siphon to the Belden powerhouse. When water is delivered to the Belden powerhouse it travels through the first Belden tunnel (23,637 feet long), then the Belden siphon (1,859 feet long), the second Belden tunnel (9,649 feet long), and into the 924-foot-long Belden penstock where water is delivered to the Belden powerhouse.

Powerhouses

The UNFFR Project includes five powerhouses, one at the upper end of Butt Valley reservoir (Butt Valley powerhouse), three in the immediate vicinity of Belden forebay (Oak Flat powerhouse, and Caribou No. 1 and No. 2 powerhouses), and one at the downstream end of the Belden reach near the mouth of Yellow Creek and the confluence of the North Fork Feather River and East Branch North Fork Feather River (Belden powerhouse). The powerhouses include eight hydroelectric generating units with a total nameplate capacity of 342.6 MW.

The Butt Valley powerhouse is immediately upstream of Butt Valley reservoir. The Butt Valley powerhouse consists of a single 55,000-horsepower vertical Francis turbine with a 13.8-kilovolt (kV) generator. It has a normal operating capacity of 41 MW. A 40,000-kilovolt-ampere (kVA) transformer bank steps up voltage from 13.8 kV to 115 kV for transmission.

The Caribou No. 1 and No. 2 powerhouses are located adjacent to Belden forebay, immediately downstream of the Seneca reach. Caribou No. 1 includes three 30,000-horsepower double overhung impulse turbines with 11.5-kV generators. The total combined output of the generators is 75 MW. The generating units are connected to a 90,000-kVA transformer bank that steps up voltage from 11.5 kV to 115 kV for transmission, and the output can also be tied to the Caribou No. 2 development through a 56,000-kVA autobank. Caribou No. 2 has two 76,000-horsepower, 6-jet vertical shaft impulse turbines with 13.8-kV generators. The total combined output of the generators is 120 MW. The generating units are connected to a 137,800-kVA transformer bank that steps up voltage from 13.8 kV to 230 kV for transmission.

The Oak Flat powerhouse, located at the base of Belden forebay dam, has a single 1,837-horsepower horizontal shaft Francis turbine with a 1,628-kVA generator. The Oak Flat powerhouse generates power from the minimum instream flow release and has a maximum capacity of 1.3 MW. The generating unit is connected to a 2,001-kVA transformer bank, which connects to a distribution line.

The Belden powerhouse is located at the downstream end of the UNFFR Project near the confluence with Yellow Creek. It contains a single 158,000-horsepower vertical shaft Francis turbine with a 13.8-kV generator. The generator has a capacity of 125 MW. The generating unit is connected to a 131,000-kVA transformer bank that steps up voltage from 13.8 kV to 230 kV for transmission.

Transmission Facilities

Three transmission lines convey power generated by the five powerhouses to substations in the area. A 7.4-mile-long line from Butt Valley to the Caribou powerhouses has capacity for transmitting 230 kV, but it currently operates at 115 kV. A 12-kV tap line carries power from the Oak Flat powerhouse to a local distribution line. The third line is a 115-kV transmission circuit extending 38.2 miles from the Caribou powerhouses to the Big Bend substation.

Recreation Facilities

PG&E manages a number of recreation facilities associated with the UNFFR Project, including facilities on USFS lands, which are maintained by PG&E under a special use permit from the USFS. The USFS also manages other recreation facilities in the vicinity of the UNFFR Project. PG&E-managed recreation facilities include:

Lake Almanor:

- Lake Almanor Campground – Loops 1, 2, and 3
- Camp Connery Group Camp
- Canyon Dam Day Use Area
- Almanor Scenic Overlook
- Eastshore Day Use Area
- Last Chance Campground and Group Camp
- Rocky Point Campground and Day Use Area

Butt Valley Reservoir:

- Ponderosa Flat Campground
- Alder Creek Day Use Area and Boat Launch
- Cool Springs Campground

Belden Forebay to Belden Powerhouse:

- North Fork Fishing Trail
- Belden Rest Stop on State Route 70

3.3.2 Overview of Operations

The UNFFR Project is operated to maintain water levels in Lake Almanor and release flows for power generation at the UNFFR Project powerhouses and other hydroelectric projects downstream, including PG&E's Rock Creek-Cresta Hydroelectric Project and Poe Hydroelectric

Project and DWR's Oroville Facilities. Water levels in Lake Almanor are maintained by releases through the Prattville intake, which conveys flows to the Butt Valley reservoir, and through the multi-level outlet structure at Canyon dam, which releases flows into the Seneca reach of the North Fork Feather River. Lake levels are regulated throughout the year by controlled releases during the summer and fall and reduced releases during winter and spring to allow the lake to refill. These releases are closely coordinated with the unregulated flows of the East Branch of the North Fork Feather River and downstream hydroelectric projects to avoid spilling water past the downstream powerhouses during high flows. Lake Almanor is usually at its highest level by early June, which coincides with the peak recreation period. Lake levels also fluctuate in response to increased (or decreased) energy demands and hydrologic conditions. Since 2004, under annual licenses, the minimum streamflow released from Canyon dam into the Seneca reach of the North Fork Feather River is 35 cfs year-round.

Downstream water storage impoundments—Butt Valley reservoir and Belden forebay—are operated to meet power system needs and manage water surface elevations on a daily basis. Butt Valley reservoir water levels typically fluctuate about 1 foot on a daily basis and 3 to 5 feet on a weekly basis. Spill at Butt Valley dam is rare due to the high hydraulic capacity of the Caribou powerhouses. Belden forebay can fluctuate 5 to 10 feet during a 24-hour period in response to fluctuating power demands and the need to maintain instream flow releases to the Belden reach. Under the current annual license, the minimum flow released from Belden forebay into the North Fork Feather River is 140 cfs during the fishing season (last Saturday in April to Labor Day) and 60 cfs during the remainder of the year. Spill at Belden forebay dam is infrequent due to PG&E's ability to regulate flows delivered to the Belden powerhouse.

The five powerhouses have automatic or semi-automatic controls and are operated by the Caribou switching center at the Caribou No. 1 powerhouse. The maximum regulated flow (i.e., hydraulic capacity) at each powerhouse is:

- Butt Valley: 2,118 cfs
- Caribou No. 1: 1,114 cfs
- Caribou No. 2: 1,464 cfs
- Oak Flat: 140 cfs
- Belden: 2,410 cfs

3.4 Overview of Other Hydroelectric Projects

PG&E operates a series of hydroelectric projects in the North Fork Feather River basin (see Figure 3-2 for a schematic diagram of the projects and Figure 3-3 for the locations of the projects). The upstream-most project is the Hamilton Branch Hydroelectric Project, which generates power through a small powerhouse on the eastern shore of Lake Almanor from water diverted from Mountain Meadows reservoir upstream of Lake Almanor. The downstream projects include the Rock Creek–Cresta Hydroelectric Project (FERC Project No. 1962), Bucks Creek Hydroelectric Project (FERC Project No. 619), and Poe Hydroelectric Project (FERC Project No. 2107).

3.4.1 Hamilton Branch Hydroelectric Project

Because of its size (4.8 MW) and its age (pre-1950), the Hamilton Branch Hydroelectric Project is exempt from FERC license requirements. This project consists of the Mountain Meadows reservoir, a diversion and canal system with pumping stations, and the 4.8-MW Hamilton Branch powerhouse on the eastern shore of Lake Almanor. Water from Mountain Meadows

reservoir is released into the Hamilton Branch, and a pipeline conveys water to the Hamilton Branch powerhouse along the eastern shore of Lake Almanor. The Hamilton Branch powerhouse can discharge up to 200 cfs, although mean monthly outflows are generally less than 100 cfs from August to December.

3.4.2 Bucks Creek Hydroelectric Project

The Bucks Creek Hydroelectric Project is operated by PG&E in cooperation with the City of Santa Clara and is located on Grizzly Creek, a tributary to the North Fork Feather River downstream of Yellow Creek. This project uses water tunneled from Three Lakes, Bucks Creek, Bucks diversion, and Grizzly forebay and conveys the flows to the North Fork Feather River upstream of Cresta reservoir and the Rock Creek powerhouse.

3.4.3 Rock Creek–Cresta Hydroelectric Project

The Rock Creek–Cresta Hydroelectric Project consists of the Rock Creek and Cresta reservoirs, dams, and powerhouses. Water released from Belden reservoir coupled with water conveyed through the Belden powerhouse enters Rock Creek reservoir, along with the natural flow of the East Branch North Fork Feather River. At Rock Creek reservoir, water is diverted through a tunnel to two parallel penstocks that serve the Rock Creek powerhouse. The combined flow from the Rock Creek and Bucks Creek facilities, along with the flow from several small tributaries along the North Fork Feather River, enter the Cresta reservoir. Water is diverted through a tunnel to two parallel penstocks that serve the Cresta powerhouse. Water released from the Cresta powerhouse enters the Cresta reach upstream of Poe reservoir.

3.4.4 Poe Hydroelectric Project

The Poe Hydroelectric Project includes the Poe diversion dam, the Poe reservoir, a reinforced concrete powerhouse, the Big Bend dam, and the Poe afterbay reservoir on the North Fork Feather River. Poe reservoir has a maximum surface area of approximately 53 acres. Flow from the Poe powerhouse is returned to the North Fork Feather River several miles upstream of Lake Oroville, a component of DWR's Oroville Facilities.

3.5 Proposed UNNFR Project

The Proposed UNFFR Project is composed of the elements of PG&E's application to FERC along with modifications made in accordance with the 2004 Settlement Agreement, mandatory conditions, and the FERC staff alternative, as described in this section.

3.5.1 PG&E's Application to FERC

On October 22, 2002, PG&E submitted an application to FERC for renewal of its license for the existing UNFFR Project. PG&E did not propose any large-scale capital improvements, construction, or operational changes to the UNFFR Project in its application, but it did identify numerous PM&E measures in response to correspondence with resource agencies, tribes, and other interested parties. Some of these measures were modified by FERC during its environmental review process (see the Final FERC EIS, Federal Energy Regulatory Commission 2005).

PG&E's application included the following PM&E measures:

1. Use the upper-level gates in the Canyon dam outlet tower for releases to the Seneca reach beginning in September and continuing until at least mid-October.
2. Continue to implement the road maintenance agreement between PG&E and Plumas National Forest.
3. Operate and maintain the existing gages to determine river stage and minimum streamflow below Canyon dam at the NF-2 stream gage (United States Geological Survey (USGS) gage No. 11399500) and Belden forebay dam at the NF-70 stream gage (USGS gage No. 11401112) under the supervision of the USGS.
4. Prepare annual water quality report(s) that contains elements consistent with reporting requirements from the Water Quality Monitoring Program as outlined in the 2004 Settlement Agreement.
5. Develop an odor and metals monitoring program to evaluate the effectiveness of seasonal switching of the Canyon dam outlet tower gates used.
6. Develop a monitoring program to determine if the elevated dissolved cadmium and specific conductance levels recorded within the UNFFR basin during 2002 and 2003 were caused by the UNFFR Project and potential solution(s) if they are UNFFR Project effects.
7. Develop a monitoring program to document long-term water quality conditions in Lake Almanor under altered UNFFR Project operations for the new license.
8. Develop a monitoring program to assess potential bioaccumulation of methylmercury, silver, and polychlorinated biphenyls (PCBs) in catchable-sized fish in the UNFFR Project area.
9. Develop a bacteriological monitoring program, using a methodology appropriate to determine compliance with state water quality standards.
10. Provide minimum streamflows to the Seneca and Belden reaches, as measured at gages NF-2 and NF-70, in accordance with Tables A-1 and A-2 in the 2004 Settlement Agreement. Minimum streamflows would commence within 60 days of issuance of the new license, unless facility modifications are required.
11. Maintain existing streamflow in lower Butt Creek; no action would be taken to reduce dam leakage, tunnel leakage, spring, or other natural flows that currently provide inflow to Butt Creek below the Butt Valley dam.
12. Provide one pulse flow release from both Canyon dam (Seneca reach) and Belden dam (Belden reach) in each of January, February, and March if the forecasted water year type for that month indicates that the water year is anticipated to be either normal or wet; no pulse flows are proposed in months where the water year type forecast for that month indicates that the water year would be dry or critically dry.
13. Develop a monitoring plan to evaluate movement of sediment that occurs during scheduled pulse flow events and other flows of a similar magnitude as scheduled pulse

flows. Emphasis would be placed on monitoring the movement of spawning-sized gravel and recruitment of similar-sized materials into the Belden and Seneca reaches. This plan would be developed after consultation with the resource agencies. If it is determined that the pulse flows appear to have a detrimental effect on the availability and distribution of spawning-sized gravel or it appears that a pulse flow of a different magnitude or duration would be beneficial, the pulse flow schedule would be altered to achieve the desired results.

14. Implement a ramping rate of 0.5 foot per hour, in all months, at Canyon dam, measured at gage NF-2, and at Belden dam, measured at gage NF-70, when the ramping rate can be controlled.
15. Block load² at the Belden powerhouse at times when the Rock Creek dam is spilling water in excess of the minimum streamflow required under the license for the Rock Creek-Cresta Hydroelectric Project but less than 3,000 cfs.
16. Rehabilitate and maintain an existing streamflow gaging station on lower Butt Creek designated as NF-9 and read the gage four times a year.
17. Develop a monitoring plan in lower Butt Creek to: (a) determine if the weir for gage NF-9 is acting to block upstream fish passage; and (b) evaluate habitat quality at intervals of three to five years.
18. If determined to be necessary based on the results of the monitoring program in lower Butt Creek, provide pulse flows in lower Butt Creek via use of the Butt Valley reservoir spillway or an acceptable alternative.
19. Develop an aquatic monitoring plan in the Seneca and Belden reaches that includes monitoring of fish and benthic macroinvertebrates in at least three sites in each reach.
20. Maintain Lake Almanor water levels as follows (lake level is defined as the water surface elevation, expressed in PG&E datum, which is 10.2 feet lower than the USGS datum):
 - Wet and Normal Water Years—By May 31, the water surface elevation would be at or above 4,485.0 feet (908,000 AF) and from June 1 through August 31, at or above 4,485.0 feet (908,000 AF);
 - Dry Water Years—By May 31, the water surface elevation would be at or above 4,483.0 feet (859,000 AF) and from June 1 through August 31, at or above 4,480.0 feet (787,000 AF);
 - Critically Dry Water Years—By May 31, the water surface elevation would be at or above 4,482.0 feet (835,000 AF) and from June 1 through August 31, the water surface elevation is at or above 4,480.0 feet (787,000 AF); and

² Block loading is a sub-component of the base load operation designed to respond to fluctuating seasonal demand. Block load operations commence when the maximum impoundment storage level is attained and ceases operation when the impoundment is drawn down to a certain level. When operating in block load, a facility is not attempting to maximize the revenue-generating aspects of hydropower.

- Multiple Dry Water Years—In the event of multiple, sequential dry or critically dry water years, decreases in surface water elevations below those specified above would be allowed, as well as the current minimum elevations specified for the Butt Valley and Belden reservoirs. By March 10 of the second or subsequent dry or critically dry water year and the year following the end of a sequence of dry or critically dry water years, notify the State Water Board, USFS, CDFW, and Plumas County of drought concerns. By May 1 of these same years consult with representatives from these agencies and other parties to discuss operational plans to manage the drought conditions.
21. Take such reasonable actions as may be prudent to prevent the water surface elevation in Lake Almanor from exceeding an elevation of 4,494.0 feet unless a higher level is approved by FERC and DWR's Division of Safety of Dams.
 22. Operate Butt Valley forebay so that the minimum water surface elevation from June 1 through September 30 is at or above 4,120.0 feet (32,000 AF) and from October 1 through May 31 at or above 4,115.0 feet (24,500 AF).
 23. Continue to operate Belden reservoir so that the minimum water surface elevation is 2,905.0 feet (300 AF), year round.
 24. Forecast the water year type on or about January 10; notify the resource agencies and Plumas County within 15 days; and operate for the remainder of that month and until the next forecast, based on that January forecast. New forecasts would be made on or about the tenth of February, March, April, and May, after snow surveys are completed, and operations would be changed as appropriate. The May forecast would be used to establish the water year type for the remaining months of the year and until the following January 10, when forecasting should begin again.
 25. Remove the Gansner Bar fish barrier on the Belden reach.
 26. Design a wildlife habitat enhancement plan, within one year of license issuance.
 27. Develop an amphibian monitoring plan for USFS-sensitive species for the Seneca, Butt Creek, and Belden bypass reaches.
 28. Continue to comply with measures protecting bald eagles according to existing nesting territory management plans.
 29. Finalize and implement the UNFFR Project recreation resource management plan (RRMP) that includes the following elements:
 - a recreation facilities development program;
 - a recreation O&M program;
 - an interpretation and education program, including the development of a bathymetric map of Lake Almanor;
 - a recreation monitoring program;
 - a resource integration and coordination program; and
 - a RRMP review and revision program.

30. Implement recreational facility enhancement measures (part of the recreation facilities development program) at Lake Almanor, Butt Valley reservoir, Belden forebay, and the bypass reaches based on target completion dates and monitoring triggers (standards) in the RRMP.
31. Provide the USFS with matching funds up to a maximum of \$5,000,000 (2004 dollars) to construct recreation improvements at USFS-owned recreation facilities.
32. Assume responsibility for operational maintenance and heavy maintenance of the following USFS facilities prior to the start of the first recreation season following license issuance: the Dyer View day use area; the Canyon dam boat launch and day use area; and the Almanor boat launch. As each recreation facility is individually constructed, assume operational maintenance and heavy maintenance responsibility for the southwest shoreline access zone facilities. Within six months of completion of construction of the recreation improvements planned for the Almanor family campground and amphitheater, the Almanor group campground, and the Almanor beach, apply to FERC to incorporate these additional USFS facilities within the UNFFR Project boundary and include these facilities in the O&M program.
33. If a decision is made to proceed with recreation river flow releases, upon USFS request, provide up to a maximum of \$125,000 (2005 dollars) to the USFS for construction of non-UNFFR Project river access to the lower Belden reach.
34. Provide up to \$50,000 (2004 escalated dollars) to: (1) reimburse CDFW for stocking approximately 5,000 pounds of catchable trout per calendar year in the waters of the North Fork Feather River between its confluence with the East Branch of the North Fork Feather River and the Belden diversion dam; and (2) augment CDFW's existing Lake Almanor fisheries program.
35. Provide up to \$25,000 (2004 dollars) to the USFS by March 1 of each year of the new UNFFR Project license to assist in funding a river ranger position to provide additional light maintenance, visitor information/assistance, user safety, and law enforcement presence in the UNFFR Project's bypass river reaches.
36. Coordinate with the USFS, Plumas County, and California Department of Transportation to develop a memorandum of understanding to produce a Belden interagency recreation river flow management plan.
37. Establish a recreation river flow technical review group within six months of issuance of a new license for the purpose of consulting with PG&E in the design of recreation and resource river flow management and monitoring plans, reviewing and evaluating recreation and resource data, and in developing possible recreation river flows in the Belden reach.
38. Implement the recreation flow implementation plan as described in the 2004 Settlement Agreement.
39. Implement the recreation river flow schedule and other provisions as presented in the 2004 Settlement Agreement.

40. Post, through a third party or other mechanism, an annual recreation flow calendar scheduling the initial recreation flow day per month.
41. Conduct an annual planning meeting each year in March to discuss expected water year type, results of monitoring efforts, PG&E maintenance needs that may conflict with recreation flow releases, and other relevant issues.
42. During scheduled recreation river flows, count observed boater use in number of boats per day to determine whether recreation flow release days should be added or subtracted. If the number of boats per day on the first recreation river flow day for a month exceeds 100 boats per day, one day of recreation river flow would be added to the recreation river flow schedule in that month the next year. If the number of boats per day is less than 100 boats per day for both the recreation river flow releases in one month, one day of recreation river flow would be subtracted from the recreation river flow schedule for the that month in the next year.
43. Develop and implement a visitor survey for up to three years to determine if visitors would choose to return to recreate on the Belden reach based on their experience related to the number of boats encountered on the river.
44. Apply the basic ramping rates when implementing recreation river flows.
45. Create a calendar that lists the dates of the March pulse flow in the Seneca reach and any scheduled pulse flow or recreation river flow releases in the Belden reach, and make that calendar available on the Internet through a third party or other mechanism.
46. Meet annually with a committee appointed by the Plumas County Board of Supervisors between March 15 and May 15 to inform the committee about the water elevation levels of Lake Almanor predicted to occur between May 1 and September 30. Schedule an additional meeting with the committee if forecasts show that PG&E's obligation to deliver water to the state of California and the Western Canal Water District pursuant to the January 17, 1986, agreement would require it to deviate from the Lake Almanor water elevation levels previously predicted.
47. Modify the UNFFR Project boundary to include approximately 34 additional acres of the Plumas National Forest at Caribou and Belden dam for the purposes of penstock maintenance and spoil management.
48. Apply to FERC within one year of license issuance to adjust the UNFFR Project boundary to include all recreation improvements covered by the 2004 Settlement Agreement at PG&E facilities as well as the following USFS facilities located on the Plumas and Lassen National Forests: Canyon dam boat launch and day use area; Dyer View day use area; and Almanor boat launch.
49. Apply to FERC to adjust the UNFFR Project boundary as needed to incorporate the Almanor family campground and amphitheater, the Almanor group campground, and the Almanor beach, six months after the USFS has completed construction of all of the recreation improvements it has planned for each of these facilities.
50. Within one year of license issuance, file with FERC a USFS-approved road traffic survey plan for roads used for UNFFR Project purposes located on USFS lands. The traffic

survey plan would include provisions for monitoring traffic every six years when monitoring recreation use in accordance with FERC Form 80 requirements.

51. Within two years of license issuance, implement aesthetic improvement measures and develop USFS-approved visual management plans.
52. Within 30 days of license issuance, implement the amended Lake Almanor shoreline management plan included in the final license application for the UNFFR Project.
53. Conduct an annual meeting with the USFS, CDFW, and Plumas County to coordinate ongoing UNFFR Project-related land management activities.
54. Preserve the historic features and character of the clubhouse, houses, and grounds at Camp Caribou and consult with the USFS when planning maintenance and repair activities at this facility.
55. Finalize and implement the Historic Properties Management Plan (HPMP).

3.5.2 Modifications to Applicant's Original Proposal

Project 2105 Relicensing Settlement Agreement

The 2004 Settlement Agreement contains measures agreed to by the signatories of the agreement. Although development of the 2004 Settlement Agreement involved a concerted effort of a broad-based group of resource agencies, public entities, and non-governmental organizations, some members of the 2105 Collaborative did not sign the agreement.

The following issues were considered resolved by the signatories to the 2004 Settlement Agreement:

- a. Streamflows for PM&E of fish, wildlife, and other aquatic biota in UNFFR Project-affected stream reaches.
- b. Streamflows for stream channel maintenance in UNFFR Project-affected stream reaches.
- c. Streamflows for whitewater boating and other river-based recreation on the Belden and Seneca reaches.
- d. Water quality associated with UNFFR Project operations and facilities, excluding erosion and water temperature.
- e. Streamflow fluctuations from UNFFR Project operations, including ramping rates.
- f. Streamflow gaging for compliance monitoring.
- g. Stream ecology monitoring.
- h. Streamflow information for use by the public.
- i. Facility modifications to implement the PM&E measures.

- j. Administration of 2004 Settlement Agreement.
- k. River sediment management.
- l. UNFFR Project reservoir operation and lands management principles.
- m. Recreation facilities development during the term of the new UNFFR Project license.

The 2004 Settlement Agreement resolved these issues by including measures pertaining to minimum streamflows, pulse flows, ramping rates, recreation flows, reservoir operations, water quality monitoring, wildlife habitat enhancement, fish stocking, recreation facilities development, maintenance and monitoring, adjustments to the UNFFR Project boundary, an interpretation and education program, and land management and visual resources. FERC considers the 2004 Settlement Agreement to represent additional PM&E measures proposed by PG&E and the other signatory parties to the agreement, sometimes replacing previous recommendations made by these respective entities where applicable. Since PG&E submitted its application to FERC, PG&E has constructed the Marvin Alexander day use area to increase public recreation opportunities at Lake Almanor in response to the current demand (letter dated July 12, 2005, to Magalie Roman Salas, FERC).

Proposed changes to the minimum streamflows in the Seneca and Belden reaches from the 2004 Settlement Agreement are identified in Tables 3-1 and 3-2.

Table 3-1. Proposed Minimum Streamflow Releases (in cfs) from Canyon Dam

WATER YEAR TYPE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Critically Dry	75	75	90	90	90	80	75	60	60	60	60	70
Dry	90	100	110	110	110	110	80	70	60	60	60	75
Normal	90	100	125	125	125	125	90	80	60	60	60	75
Wet	90	100	125	150	150	150	95	80	60	60	60	75

Table 3-2. Proposed Minimum Streamflow Releases (in cfs) from Belden Dam

WATER YEAR TYPE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Critically Dry	105	130	170	180	185	90	80	75	75	75	85	90
Dry	135	140	175	195	195	160	130	110	100	100	110	115
Normal	140	140	175	225	225	225	175	140	140	120	120	120
Wet	140	140	180	235	235	225	175	140	140	120	120	120

Section 18 of the Federal Power Act – Authority to Require Fishways

In a letter dated November 26, 2003, NMFS provided a fishway prescription conditioned on the passage of anadromous fishes at one or more unspecified dams below the UNFFR Project area. In a subsequent letter, dated March 14, 2005, NMFS provided a modified fishway prescription for the UNFFR Project, conditioned on the implementation of a successful trap and transfer program for adult anadromous salmonids at DWR's Oroville Facilities. Additionally, NMFS stated that it reserved its authority to prescribe fishways under Section 18 of the FPA.

Section 4(e) Conditions

Since the UNFFR Project occupies national forest system lands managed by the Lassen and Plumas National Forests, the USFS has the authority to impose mandatory conditions under Section 4(e) of the FPA. In a letter dated November 4, 2004, the USFS provided 47 final 4(e) conditions for the UNFFR Project.

USFS Conditions 1 through 24 are standard conditions that require USFS approval on final UNFFR Project design and any changes, yearly consultation with the USFS to ensure the protection and development of natural resources, restrictions and protective measures that should be in place, and UNFFR Project O&M procedures that would enable continued UNFFR Project operations to be consistent with applicable provisions of the Lassen and Plumas National Forests' Land and Resource Management Plans. Conditions 31, 32, 33, 34, 42, and 43 relate to the development of plans for the use of USFS-managed lands (including spoil pile, habitat, recreation, traffic, visual, and cultural resource management). Conditions 25, 27, 28, and 30 pertain to establishing and publicizing reservoir water levels and flow regimes in the UNFFR Project reaches. Conditions 41, 44, 45, 46, and 47 pertain to consultation with the USFS on USFS special-status species and invasive weeds. Conditions 26, 29, 31, 32, 35, 36, 37, 38, 39, and 40 concern the monitoring of water quality, water temperature, plants, fish, macroinvertebrates, wildlife, recreational use, and UNFFR Project lands and facilities to serve as a basis for adaptive management decisions and allow the USFS to take appropriate corrective actions. Many of these conditions are identical to terms that are specified in the 2004 Settlement Agreement. The complete USFS final 4(e) conditions are available as Appendix B of FERC's Final EIS.

FERC Staff's Alternative

After evaluating PG&E's proposal and the recommendations of the resource agencies and other interested parties, FERC staff considered what additional PM&E measures, if any, would be necessary or appropriate with the continued operation of the UNFFR Project. In addition to, or in lieu of, PG&E's proposed measures, the FERC staff alternative would include the following additional environmental measures:

1. Develop a plan, including a schedule, for using the Canyon dam outlet upper-level gates to alleviate heavy metal concentrations and odors associated with late-summer and fall releases from Canyon dam.
2. File with FERC a spoil disposal plan within 6 months of issuance of a new license and at least 60 days prior to any ground-disturbing or soil producing or piling activity.
3. Develop a water level and flow gaging plan.
4. Develop a monitoring program to document water quality trends in Lake Almanor under a new license and UNFFR Project operations.
5. Develop a bacteriological monitoring program for the first three years after license issuance, using a methodology appropriate to determine compliance with state water quality standards.

6. Use existing water temperature models to assess the effects of operating the UNFFR Project to meet flow and lake level requirements of a new license, while being consistent with the Rock Creek-Cresta Hydroelectric Project Ecological Resources Committee and USFS determination for modifying the Prattville intake and implementing other temperature control measures.
7. Develop a plan to monitor dissolved oxygen concentrations in Lake Almanor and Butt Valley reservoir.
8. Revise the draft Shoreline Management Plan and implement the revised plan.
9. For any recommended new recreational facilities, develop site-specific plans to control erosion and prevent potential adverse effects on water quality. These plans would be included in the recreation facilities development program of the RRMP.
10. Provide a pulse flow of 700 cfs in the Seneca reach and in the Belden reach in March of water years classified as dry, unless the water temperature exceeds 10°C for two consecutive days in March and a flow of this magnitude (700 cfs) was not measured in the preceding January or February at NF-4 (Seneca) and NF-7 (Belden).
11. Develop an aquatic resources monitoring plan for the Seneca and Belden reaches. Periodically monitor fish populations (in a manner consistent with data presented in pre-filing study reports) and benthic macroinvertebrates in the Seneca and Belden reaches, as recommended in the 2004 Settlement Agreement. Initiate monitoring during years four and five of the new license. After this two year monitoring period, the frequency of surveys could be reduced to every fifth year to evaluate long-term responses to measures implemented in the new license and any subsequent modifications that are made.
12. Implement one mid-term geomorphological evaluation in UNFFR Project reaches to assess the response of channel processes to the recommended flow schedule.
13. As part of the proposed coarse sediment management plan, develop specific contingency actions for the enhancement of substrate distribution and abundance in bypass reaches.
14. Delay implementation of recreational flow releases for a period of six years to allow the riverine aquatic biota to respond to a new minimum and pulse flow schedule.
15. Develop a woody debris management plan.
16. Develop an adaptive management plan that addresses the results of all monitoring and special studies conducted on water temperature, water quality, flow, macroinvertebrates, gravel, woody debris, fisheries, amphibian populations and habitat, and vegetation.
17. Develop and implement, within one year of license issuance, a vegetation and invasive weed management plan that incorporates protection and management of valley elderberry longhorn beetle (VELB) habitat for all UNFFR Project lands.
18. Develop a plan for the protection of threatened, endangered, proposed for listing, and sensitive species.

19. Incorporate the determination of the California red-legged frog (CRLF) habitat into the amphibian monitoring plan.
20. Develop a peregrine falcon monitoring plan within one year of license issuance.
21. Develop an interagency bald eagle management plan within one year of license issuance.
22. Develop a fire prevention and response plan within one year of license issuance.
23. Implement the measures outlined in the Programmatic Agreement³ (PA).
24. Consult with the USFS, Plumas County, and the Maidu community to more fully investigate the possibility of providing seed funds for a curation facility or interpretive center, and provide the results of this consultation in the HPMP.
25. Invite the USFS, Plumas County and the United States National Park Service to attend future Cultural Resources Working Group meetings.
26. Provide Plumas County with copies of all requested cultural resources reports, including the non-confidential volume of the ethnographic study, if Plumas County agrees not to make the reports available to the public, in compliance with Section 304 of the National Historical Preservation Act.
27. Include, as part of the HPMP: (1) the details of PG&E's employee and public education and interpretive program; (2) site-specific treatment measures for historic archaeological sites and standing structures that FERC, in consultation with the California State Historic Preservation Officer, has determined are eligible for the National Register; and (3) protocols for PG&E to consult and work with the Greenville Rancheria, Susanville Indian Rancheria, and other interested Maidu groups.

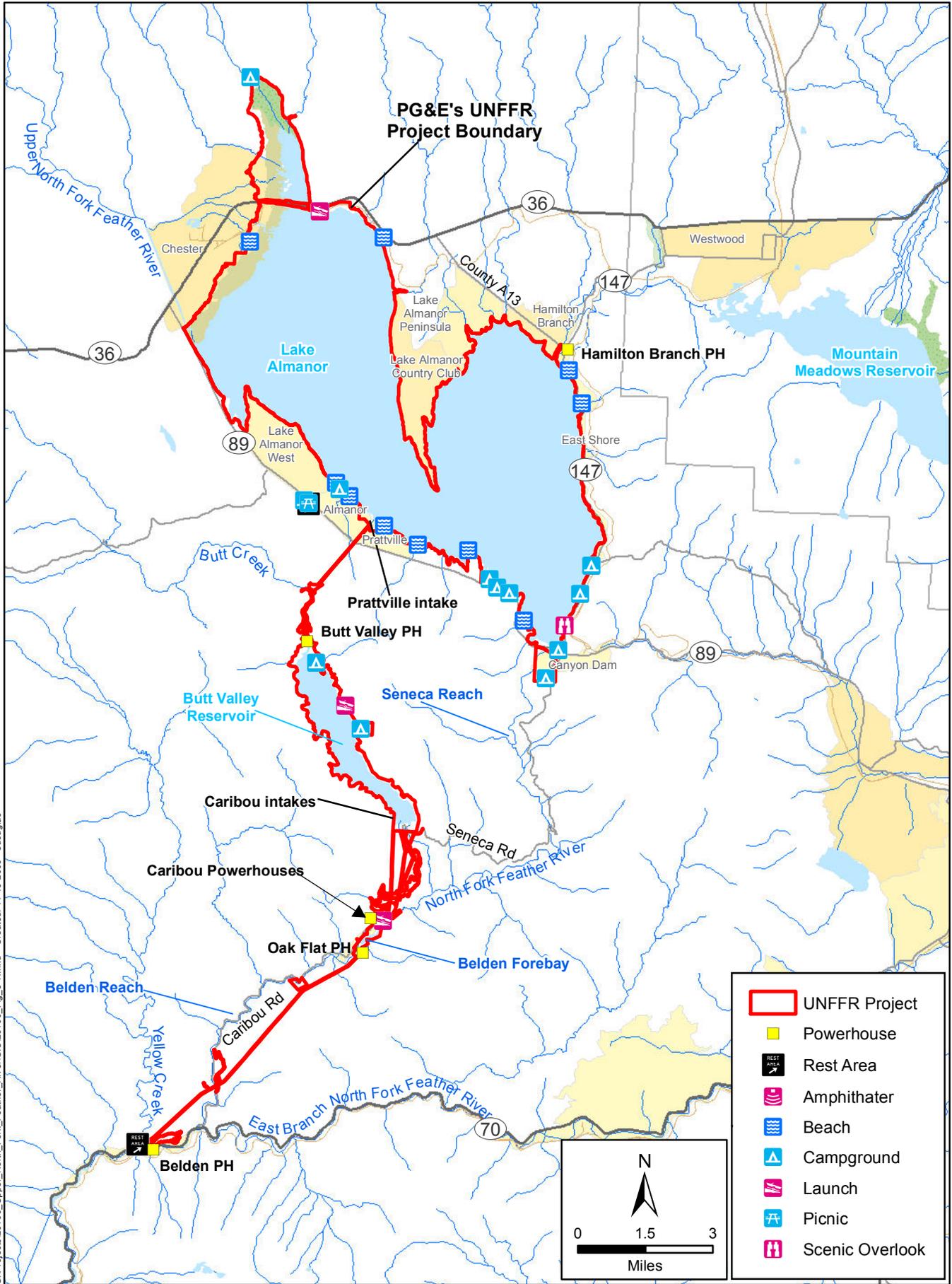
3.5.3 Evaluation of the Proposed Project

The 2004 Settlement Agreement measures lacking enough detail for project-level analysis in this EIR include recreation facility development, recreation O&M, recreation monitoring program, recreation plan review and revision, resource integration, and interpretation and education programs at PG&E and USFS facilities around Lake Almanor and Butt Valley reservoir and along the North Fork Feather River. Before implementing the recreation improvements and within one year of license issuance, PG&E would finalize its RRMP in consultation with the USFS and Plumas County. The RRMP would describe the details of each recreation improvement.

In the interest of providing the State Water Board decision-makers and the public with as much information as possible about the potential recreation improvements, a general discussion of the

³ As part of the relicensing process, PG&E has developed an agreement titled *Programmatic Agreement among the Federal Energy Regulatory Commission, the Advisory Council on Historic Preservation, and the California State Historic Preservation Officer for Managing Historic Properties That May Be Affected by a License Issuing to Pacific Gas & Electric Company for the Continued Operation of the Upper North Fork Feather River Project (FERC Project No. 2105) in Plumas County, California*.

types of environmental effects that could result from implementation of the recreation improvements and the types of measures that could reduce their environmental effects is provided as Appendix C (Recreation Improvements). Some of the recreation improvements may require additional project-level environmental review under CEQA or NEPA prior to their implementation.



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**Figure 3-1
Upper North Fork Feather River Project Location**

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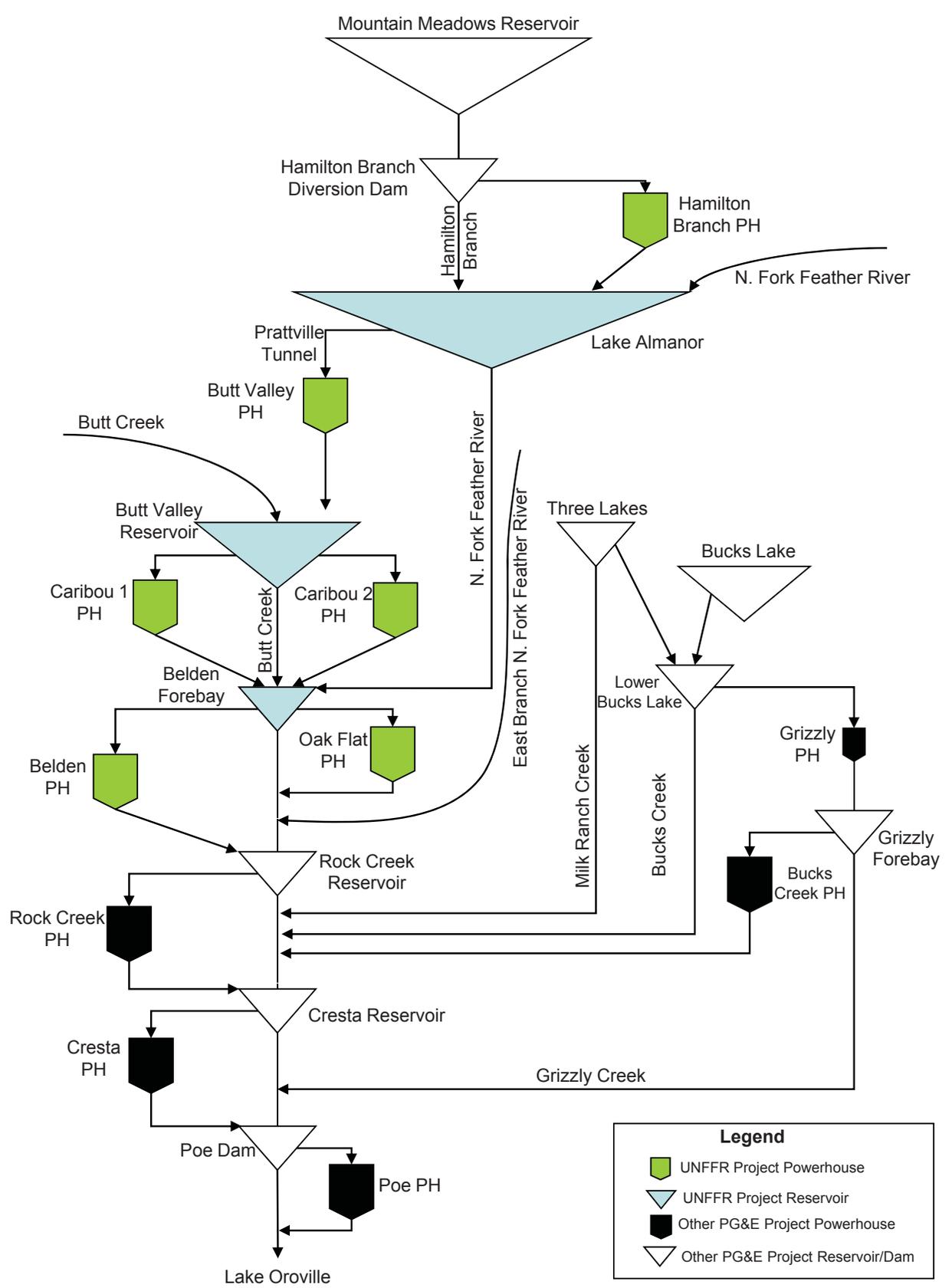
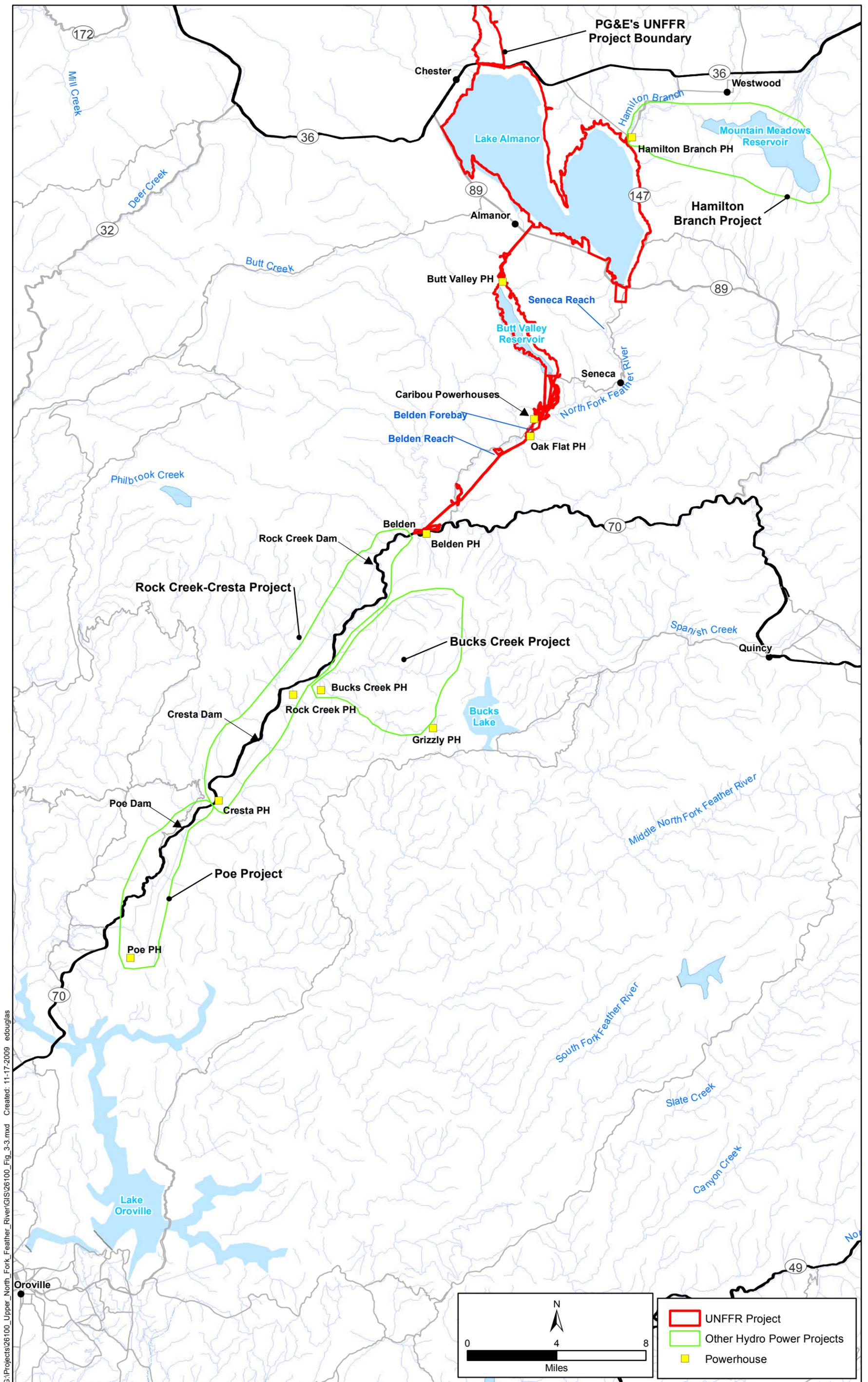


Figure 3-2
Schematic Diagram of Flow



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Upper North Fork Feather River Hydroelectric Project

Figure 3-3
Hydroelectric Projects on North Fork Feather River