



**Federal Energy
Regulatory
Commission**

**Office of
Energy
Projects**

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Draft Environmental Impact Statement

Section 2 – Proposed Action and Alternatives



South Feather Power Project FERC Project No. 2088-068, California

**Federal Energy Regulatory Commission
888 First Street N.E.
Washington, DC 20426**

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

Under the no-action alternative, the South Feather Power 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

The South Feather Power Project is a water supply/power project constructed in the late 1950s/early 1960s. The project is composed of four developments: Sly Creek, Woodleaf, Forbestown, and Kelly Ridge, each of which is described below. The project can store about 172,000 acre-feet of water (gross storage) and has generated an average of about 514.1 gigawatt-hours of power annually for the past 20 years, since the addition of Sly Creek powerhouse. The locations of the various facilities are presented in figure 2-1.

Sly Creek Development

Sly Creek development generation facilities include:

- *Little Grass Valley dam* - a 210-foot-high, 840-foot-long, rock-filled dam on the SFFR with a crest elevation of 5,052 feet msl and with a 180-foot-long spillway controlled by two, 14-foot-high by 40-foot-long steel radial gates that forms a 89,804 acre-feet storage reservoir covering 1,650 acres at a maximum water surface (flood level) elevation of 5,047 feet msl. Little Grass Valley dam reduces flows in the 9.1-mile-long Little Grass Valley dam reach, which terminates at the normal high water line of the South Fork diversion impoundment;
- *South Fork diversion dam* - a 60-foot-high, 167-foot-long, concrete overflow arch dam on the SFFR with a crest elevation of 3,557 to 3,559 feet msl and with four uncontrolled overflow spillway sections that forms an 87 acre-feet diversion impoundment covering about 9 acres at a normal maximum water surface elevation of 3,557 feet msl;
- *South Fork diversion tunnel* - a 2.7-mile-long, 11-foot-diameter concrete lined and unlined horseshoe unpressurized tunnel controlled by two, 6-foot-high by 4-foot-long electric hoist slide gates that diverts up to 600 cubic feet per second (cfs) of water from the South Fork diversion dam to Sly Creek reservoir. This diversion reduces flows in the 9.4-mile-long South Fork diversion dam reach, which ends at its confluence with Lost Creek;

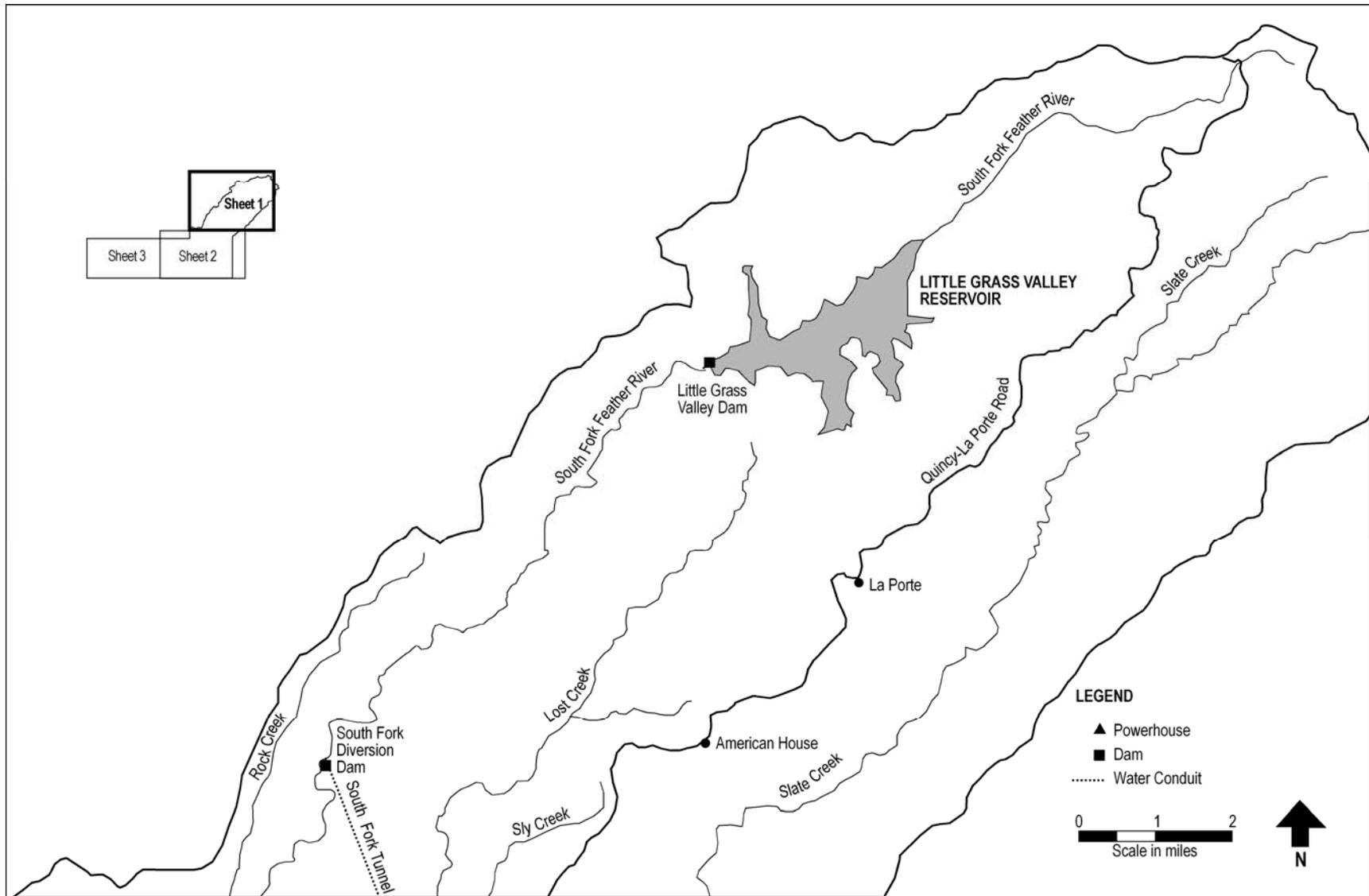


Figure 2-1. South Feather Power Project, system map (sheet 1 of 3). (Source: South Feather, 2007, as modified by staff)

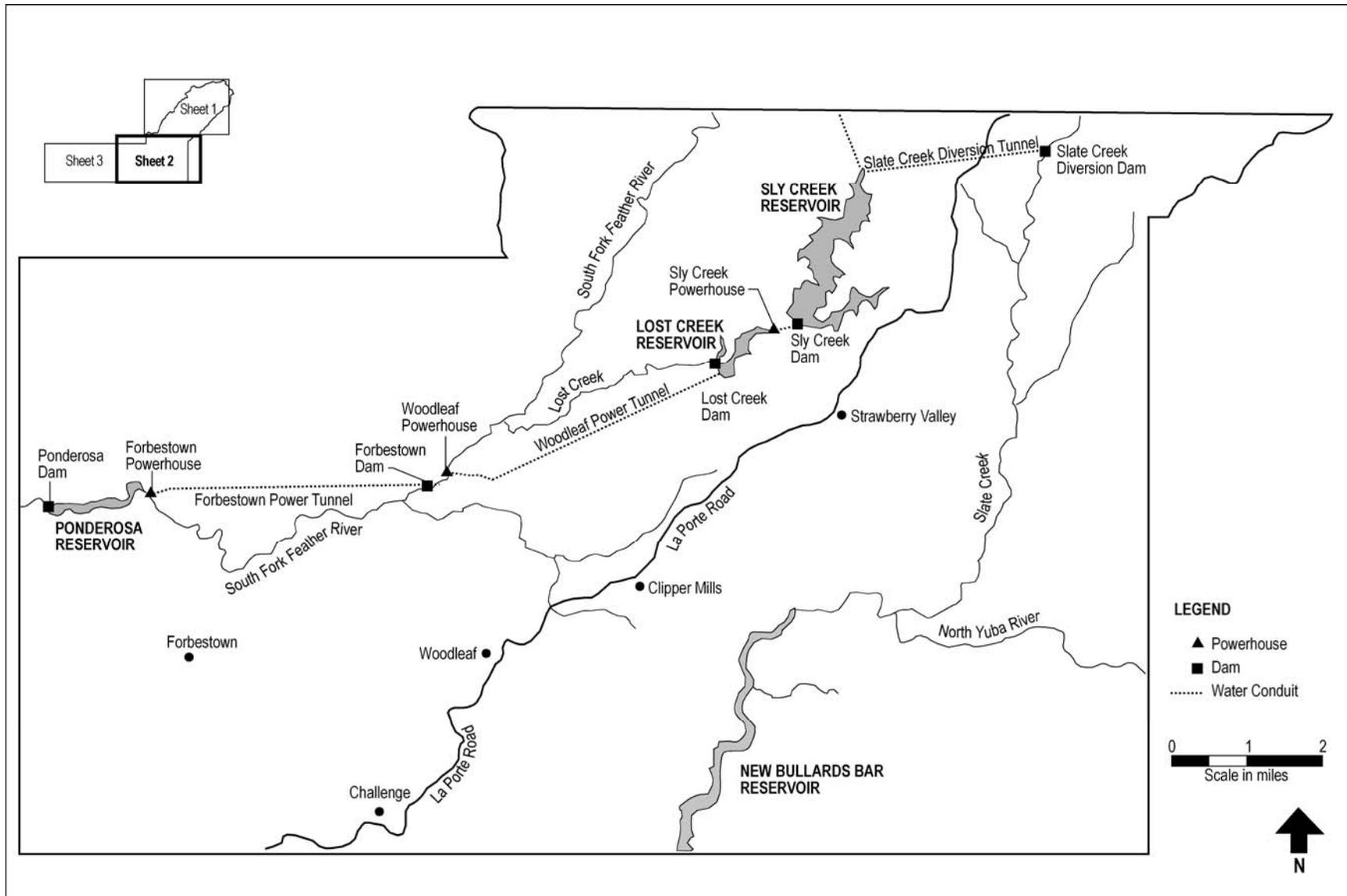


Figure 2-1. South Feather Power Project, system map (sheet 2 of 3). (Source: South Feather, 2007, as modified by staff)

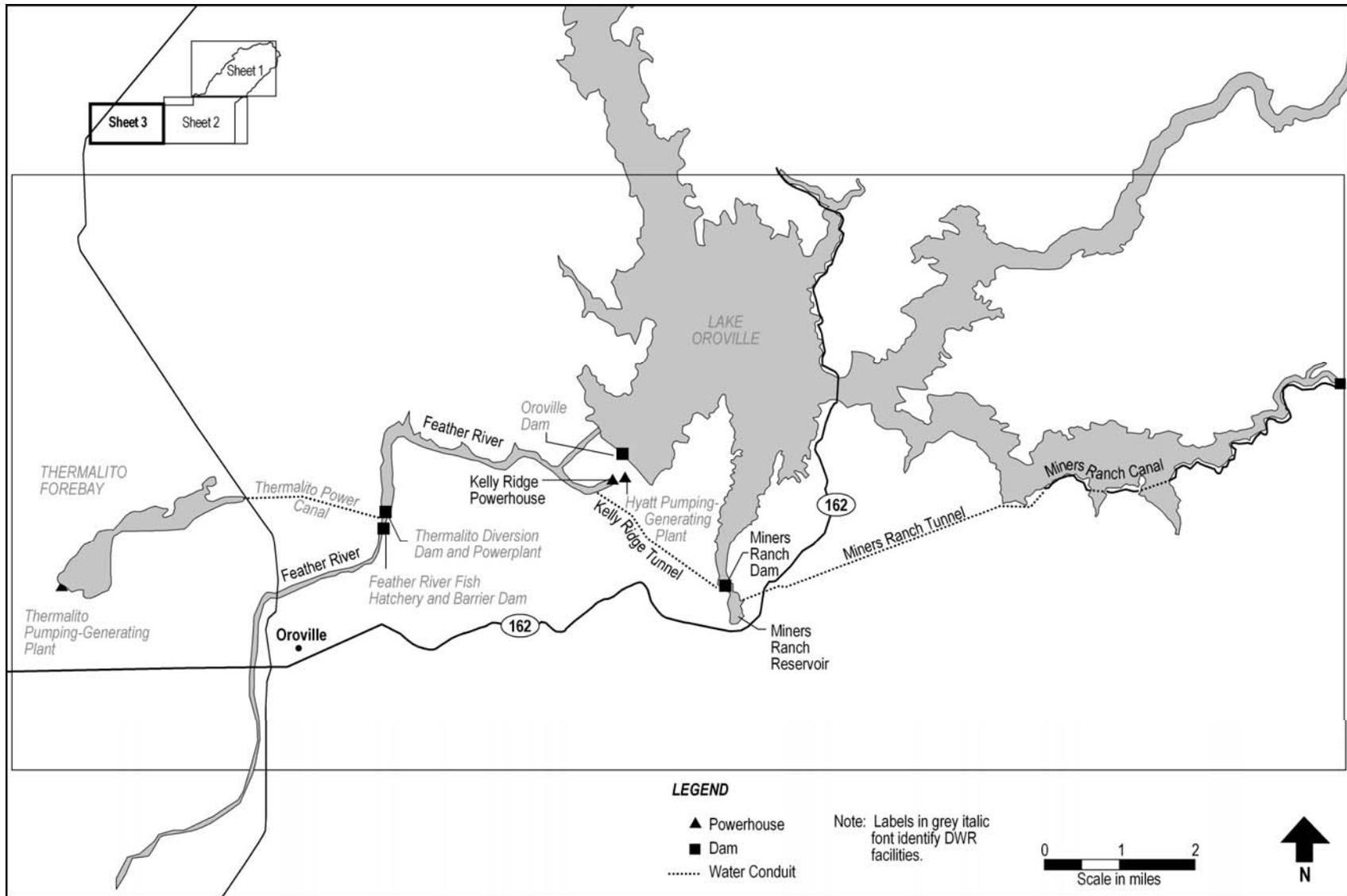


Figure 2-1. South Feather Power Project, system map (sheet 3 of 3). (Source: South Feather, 2007, as modified by staff)

- *Slate Creek diversion dam* - a 62-foot-high, 223.5-foot-long, concrete overflow arch dam on Slate Creek (a tributary of the North Yuba River) with a crest elevation of 3,552 to 3,554 feet msl and with three uncontrolled overflow spillway sections that forms a negligible diversion impoundment due to sediment accumulation;
- *Slate Creek diversion tunnel* - a 2.5-mile-long, 11-foot-diameter, concrete lined and unlined horseshoe unpressurized tunnel controlled by two, 8-foot-high by 6-foot-long manual slide gates that diverts up to a maximum flow capacity of 848 cfs of water (though water rights limit flows to 600 cfs and at times flows are limited to 500 cfs due to high water elevation in the receiving reservoir) from the Slate Creek diversion dam (Yuba River basin) to Sly Creek reservoir (Feather River basin);
- *Sly Creek dam* - a 289-foot-high, 1,200-foot-long, zoned earth-filled dam on Lost Creek with a crest elevation of 3,536 feet msl and with a 649-foot-long spillway controlled by one, 16-foot-high by 54-foot-long steel radial gate that forms a 64,338 acre-feet storage reservoir covering 619 acres at a maximum water surface (flood level) elevation of 3,531 feet msl with the spill gates closed;
- *Sly Creek penstock* - a 1,100-foot-long, 90-inch-inside-diameter, steel penstock enclosed in the former outlet tunnel that delivers water to Sly Creek powerhouse;
- *Sly Creek powerhouse* - a semi-outdoor, reinforced concrete, above ground powerhouse that releases water to Lost Creek reservoir and that contains one reaction turbine rated at 13.2 MW directly connected to a 13,500-kilovolt-ampere (kVA) generator;
- *Sly Creek powerhouse switchyard* - a switchyard adjacent to the Sly Creek powerhouse that contains one 16,000-kVA transformer;

Power generated at Sly Creek powerhouse is delivered from the switchyard to the grid via Pacific Gas and Electric Company's 115-kV Sly Creek Tap and Woodleaf-Kanaka Junction transmission line (FERC Project No. 2281).

Sly Creek development recreation facilities (for location, see figure 3-13) include:

- *Little Grass Valley reservoir recreation facility* - the Little Grass Valley reservoir recreation facility includes Little Beaver, Red Feather, Running Deer, Horse Cam campground p, Wyandotte, Peninsula Tent, Black Rock Tent, Black Rock RV, and Tooms RV campgrounds; Black Rock, Tooms, and Maidu boat launch areas; Pancake Beach and Blue Water Beach day-use areas; Maidu Amphitheater; and Little Grass Valley dam ADA-accessible fishing trail at Little Grass Valley reservoir; and

- *Sly Creek reservoir recreation facility* - the Sly Creek recreation facility includes two campgrounds (Strawberry and Sly Creek), Strawberry car-top boat launch, Mooreville boat ramp and Mooreville day-use area on Sly Creek reservoir.

The Sly Creek development does not include any roads except for the portions of the roads within the project boundary that cross Little Grass Valley dam (FS Road 22N94) and Sly Creek dam (FS Road 21N16).

Woodleaf Development

The Woodleaf development includes:

- *Lost Creek dam* - a 122-foot-high, 486-foot-long, concrete overflow arch dam on the Lost Creek with a crest elevation of 3,279.05 feet msl and with a 251-foot-wide spillway controlled by 4-foot-high by 8-foot-long flashboards that forms a 5,361 acre-feet storage reservoir covering 137 acres at a normal maximum water surface elevation of 3,283 feet msl with the flashboards installed;
- *Woodleaf power tunnel* - a 3.5-mile-long, 12-foot-diameter, concrete lined and unlined horseshoe pressurized tunnel controlled by one 6-foot-high by 12-foot-long electric hoist slide gate that diverts up to 620 cfs of water from Lost Creek reservoir to the Woodleaf penstock. This diversion reduces flows in the 3.9-mile-long Lost Creek dam reach, which terminates at Lost Creek's confluence with the South Fork Feather River;
- *Woodleaf penstock* - a 3,519-foot-long, 97-inch reducing to 78-inch-inside-diameter, exposed steel penstock that delivers water to Woodleaf powerhouse;
- *Woodleaf powerhouse* - a semi-outdoor, reinforced concrete, above ground powerhouse that releases water to the Forbestown diversion dam impoundment on the SFFR and that contains one 6-jet vertical shaft impulse Pelton turbine rated at 60 MW directly connected to a 65,500-kVA generator; and
- *Woodleaf powerhouse switchyard* - a switchyard adjacent to the Woodleaf powerhouse that contains one 70,000-kVA transformer.

Power generated at Woodleaf powerhouse is delivered from the switchyard to the grid via Pacific Gas and Electric Company's 115-kilovolt (kV) Woodleaf-Kanaka Junction transmission line. The Woodleaf development does not include any recreation facilities or roads.

Forbestown Development

The Forbestown development includes:

- *Forbestown diversion dam* - a 80-foot-high, 256-foot-long, concrete overflow arch dam on the SFFR with a crest elevation of 1,783 feet msl and with five 46-foot-wide uncontrolled overflow spillway sections with a combined width of approximately 240 feet that forms a 352 acre-foot diversion impoundment covering about 12 acres at a normal maximum water surface elevation of 1,783 feet msl;
- *Forbestown power tunnel* - a 18,388-foot-long, 12.5-foot by 11-foot-diameter, concrete lined and unlined horseshoe pressurized tunnel that diverts up to 660 cfs of water from the Forbestown diversion impoundment to the Forbestown penstock. The tunnel reduces flows in the 5.5-mile-long Forbestown diversion dam reach of the South Fork Feather River;
- *Forbestown penstock* - a 1,487-foot-long, 97-inch reducing to 83-inch-inside-diameter exposed steel penstock that delivers water to Forbestown powerhouse;
- *Forbestown powerhouse* - a semi-outdoor reinforced concrete above-ground powerhouse that releases water to Ponderosa reservoir on the SFFR and that contains one vertical reaction Francis turbine rated at 41 MW directly connected to a 40,500-kVA generator; and
- *Forbestown powerhouse switchyard* - a switchyard adjacent to the Forbestown powerhouse that contains one 35,200-kVA transformer.

Power generated at Forbestown powerhouse is delivered from the switchyard to the grid via Pacific Gas and Electric Company's 115-kV Woodleaf-Kanaka Junction transmission line.

The Forbestown development does not include any recreation facilities or roads.

Kelly Ridge Development

The Kelly Ridge development includes:

- *Ponderosa dam* - a 160-foot-high, 650-foot-long, earth-filled dam with a crest elevation of 985 feet msl and with a 352-foot-long spillway⁷ controlled by two 7 foot 7.5-inch-high by 51 feet-long steel gates that forms a 4,178 acre-feet storage reservoir covering 103 acres at a normal maximum water surface elevation of 960 feet msl;

⁷Spill flows from Ponderosa dam discharge into the 3.6 million acre-foot Lake Oroville, part of DWR's Feather River Project (also known as the Oroville Project), FERC Project No. 2100.

- *Ponderosa diversion tunnel* - a 516-foot-long, 10-foot by 9-foot-diameter concrete lined and unlined horseshoe unpressurized tunnel controlled by one 6-foot-high by 8-foot-long hydraulic gate that diverts up to 300 cfs of water from Ponderosa reservoir to Miners Ranch conduit;
- *Miners Ranch canal (also known as Miners Ranch conduit)* - a 6.1-mile-long, 10-foot-wide concrete or gunite-lined canal and concrete or bench flume that includes two siphon sections across the McCabe and Powell creek sections of Lake Oroville and that diverts water from the Ponderosa diversion tunnel to the Miners Ranch tunnel;
- *Miners Ranch tunnel* - a 4.5-mile-long, 10-foot by 9-foot-diameter, concrete lined horseshoe un-pressurized tunnel that diverts up to 300 cfs of water from the Miners Ranch conduit to Miners Ranch reservoir;
- *Miners Ranch dam* - a 55-foot-high, 1,650-foot-long, earth-filled off-stream dam with a crest elevation of 895 feet msl and with an 1,175-foot-long uncontrolled spillway that forms a 896 acre-foot storage reservoir covering 48 acres at a normal maximum water surface elevation of 890 feet msl;
- *Kelly Ridge power tunnel* - a 1.3-mile-long, 9-foot by 8-foot-diameter, pressurized tunnel controlled by one 4-foot-high by 8-foot-long fixed wheel gate that diverts up to 260 cfs of water from Miners Ranch reservoir to Kelly Ridge penstock;
- *Kelly Ridge penstock* - a 1.1-mile-long 69-inch reducing to 57-inch-inside-diameter, exposed steel penstock that delivers water to Kelly Ridge powerhouse;
- *Kelly Ridge powerhouse* - a semi-outdoor reinforced concrete above ground powerhouse that releases water to DWR's Thermalito diversion pool just downstream of Oroville dam and its Hyatt powerhouse (FERC No. 2100) and that contains one vertical reaction Francis turbine rated at 13 MW directly connected to a 11,000-kVA generator; and
- *Kelly Ridge powerhouse switchyard* - a switchyard adjacent to the Kelly Ridge powerhouse that contains one 11,000-kVA transformer.

Power generated at the Kelly Ridge powerhouse is delivered from the switchyard to the grid via Pacific Gas and Electric Company's 60-kV Kelly Ridge-Elgin Junction transmission line.

The Kelly Ridge development does not include any recreation facilities or roads.

Existing Project Boundary

The existing project boundary, consisting of lands necessary for the safe operation and maintenance of the project and other purposes, such as recreation,

shoreline control, and protection of environmental resources, encompasses approximately 3,838.8 acres of land in Plumas, Butte and Yuba counties, California.

The current project boundary encloses the project facilities associated with the four developments (Sly Creek, Woodleaf, Forbestown, and Kelly Ridge) along the South Fork Feather River and Slate Creek, a tributary to the North Yuba River, and lands within the Plumas National Forest. 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 includes land adjacent to project features; the width of these zones varies depending on the feature.

Approximately 51.2 percent of the land (1,977.12 acres) within the project boundary is owned by the United States and is managed by the Forest Service as part of the Plumas National Forest and another 10.57 acres is United States-owned land managed by the BLM. About 2.2 percent of the land in the project boundary is state-owned land adjoining Lake Oroville. The licensee owns 38.9 percent of the land within the project boundary, and does not propose any modifications to the current project boundary.

2.1.2 Existing Project Operation

Little Grass Valley and Sly Creek reservoirs are large storage reservoirs that are operated to capture rain and snowmelt during the spring, and are slowly drawn down through summer and fall releasing water for power generation, irrigation, and consumptive purposes. The Lost Creek, Forbestown, Ponderosa, and Miners Ranch reservoirs contain less storage capacity and are operated as re-regulating reservoirs: these reservoirs do not have an annual refill or draw down cycle. Due to the small size of Slate Creek and the South Fork diversion dam impoundments, storage-capacity curve data do not exist for these two minor impoundments and South Feather maintains only periodic water surface records at these locations.

The Kelly Ridge powerhouse is operated as a base loaded plant. The Woodleaf and Forbestown powerhouses are operated in tandem with one another as base loaded plants with some peaking capacity. Sly Creek powerhouse is operated in tandem with Woodleaf and Forbestown, but due to its relatively small output does not provide peaking capacity.

South Feather is permitted under California Division of Safety of Dams to store 171,986 acre-feet of runoff from the watersheds of the SFFR and the North Yuba River in six reservoirs: Little Grass Valley, Sly Creek, Lost Creek, Forbestown, Ponderosa, and Miners Ranch. Prior to the South Feather Power Project, South Feather's average annual diversion for irrigation and domestic purposes was 29,000 acre-feet. South Feather has the contractual rights to 3,720 acre-feet of water through the Forbestown

ditch and 29,439 acre-feet through Miners Ranch reservoir for consumptive purposes. However, South Feather's contract with Pacific Gas and Electric Company requires payment by South Feather for water diverted in excess of these quantities for consumptive purposes. The current contract with Pacific Gas and Electric Company also provides Yuba County Water District with 3,700 acre-feet (April 15 to October 15) from the Forbestown ditch, 4,500 acre-feet (April 15 to November 1) from Miners Ranch reservoir, and 10,500 acre-feet (November 1 to April 15) at Miners Ranch reservoir. However, a May 2005 contract, which supplants and supersedes previous contracts between South Feather and Yuba County Water District, allows Yuba County Water District to consume up to 23,700 acre-feet from the project, subject to compensation for lost power value.

2.1.3 Existing Environmental Measures

The current license for the project includes the following minimum flow requirements:

- Little Grass Valley dam reach: 10 cfs from May 1 to October 31; 5 cfs November 1 to April 30 in Normal and Wet water years; and 5 cfs at all times in Dry years.⁸
- South Fork diversion dam reach: 10 cfs from May 1 to October 31; 5 cfs November 1 to April 30 in Normal and Wet water years; and 5 cfs at all times in Dry years.
- Slate Creek diversion dam reach: 10 cfs year-round or natural inflow, whichever is less.
- Forbestown diversion dam reach: 10 cfs from May 1 through October 31; 5 cfs November through April 30; and 5 cfs at all times in Dry water years.
- Lost Creek dam reach: 8 cfs from April 1 through October 31 and 5 cfs from November 1 through March 31.

The current license for the project also provides that a flow of at least 390 cfs be provided for a period of 24 hours or longer in Lost Creek at least once every 4 years to minimize fine sediment accumulation in Lost Creek downstream of Lost Creek dam.

South Feather maintains bridges and escape ramps to allow wildlife to cross and minimize wildlife mortality at the Miners Reach canal.

South Feather maintains two developed recreation areas. The Little Grass Valley reservoir recreation area has nine campgrounds, three boat ramps, two day-use areas,

⁸Dry years are defined as 50 percent or less of average annual discharge of South Fork Feather River (117,000 acre-feet).

and three trails. The Sly Creek reservoir recreation area includes two campgrounds, two boat ramps/launches, and a day-use area.

2.2 APPLICANT'S PROPOSAL

2.2.1 Proposed Project Facilities

South Feather does not propose any changes to generation facilities or other major project features, or to the project boundary. South Feather does propose to construct a multi-use trail below Little Grass Valley dam, to replace or rehabilitate all existing recreational facilities, and provide for new facilities as user demand increases.

2.2.2 Project Safety

The South Feather Power Project has been operating for more than 49 years under the existing license 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 adequacy of the proposed project facilities under a new license.

2.2.3 Proposed Project Operation

Future operation will be generally consistent with existing operation. A significant change in future operation is related to minimum flow releases, as described below (measure 39). South Feather proposes to maintain water levels in Little Grass Valley reservoir to no lower than elevation 5,023 feet msl through September 15 to facilitate the use of boat launch facilities (measure 49), release recreational flows below Little Grass Valley dam, South Fork diversion dam, and the Forbestown diversion dam (measures 50, 51 and 52), and to provide supplemental stream flows in Lost Creek to minimize sediment accumulation in Lost Creek (measure 57).

2.2.4 Proposed Environmental Measures

In its new license application, South Feather proposed the following additional protection and enhancement measures:

General

- Conduct annual employee awareness training to familiarize staff with special-status, aquatic, wildlife, and plant species, including noxious weeds/non-native invasive plants, as well as sensitive locations including protected activity centers (PACs), potential erosion areas, and cultural sites to allow avoidance/minimization of impacts. (Measure 33)

- Consult with the Forest Service annually to coordinate Project and Forest Service activities. (Measure 34)

Geology and Soils

- Return large woody debris to the stream below Little Grass Valley and Lost Creek dams. (Measure 56)
- Provide supplemental streamflows in Lost Creek for geomorphic purposes. Where facility modifications are needed to release the proposed flows, complete such modifications as soon as reasonably practicable, but within 3 years. In the interim, make a good faith effort to release the proposed flows within the capabilities of the existing facilities. (Measure 57)
- Continue Slate Creek sediment pass-through program. File report, including recommendations, with Commission within 2 years of license issuance. (Measure 58)

Aquatic Resources

- Determine water year type annually and apply to appropriate minimum flow release schedule and other measures that are dependent on water year type. (Measure 36)
- Install and maintain a gaging station, monitor water temperature, and cease diversions at Slate Creek diversion dam when mean daily water temperature reaches 20 degrees Celsius (°C) to protect downstream cold freshwater habitat. (Measure 37)
- Implement a minimum flow release schedule for the Little Grass Valley dam, South Fork diversion dam, Forbestown diversion dam, Lost Creek dam, and Slate Creek diversion dam reaches. Where facility modifications are needed to release the proposed flows, complete such modifications as soon as reasonably practicable, but within 3 years. In the interim, make a good faith effort to release the proposed flows within the capabilities of the existing facilities. (Measure 39)

Terrestrial Resources

- Annually review with the Forest Service the list of species within the project area that are formally proposed for listing or are listed under federal or state endangered species acts or are Forest Service Sensitive, Watch List, or Management Indicator Species. If an added species has the potential to be adversely affected by the project, prepare a study plan to reasonably assess the effects of the project on the species, recommend reasonable resource management measures, and provide an

implementation schedule, where appropriate. Annually consult with Forest Service regarding planned operation and maintenance projects on National Forest System lands and Forest Service activities that might affect the project. (Measure 35)

- Except for the Little Grass Valley dam reach, as part of normal operation and maintenance activities, avoid high flow releases from project dams associated with sediment pass-through, valve exercises, or supplemental flow releases for channel maintenance or recreational purposes during critical periods for foothill yellow-legged frog (roughly April 15 - October 31, annually). (Measure 40)
- Prepare, file, and implement a vegetation and invasive weed management plan. (Measure 41)
- Retain a qualified bat exclusion contractor when replacing or retrofitting any bat exclusion devices. Maintain all bat exclusion devices in proper functioning condition. (Measure 42)
- Consult with Cal Fish & Game prior to replacing or retrofitting Miners Ranch conduit wildlife bridge crossings and deer escape facilities. (Measure 43)

Recreational Resources

- Develop and implement a master plan to replace/rehabilitate existing recreational facilities, including modification and adaptation to meet the changing needs of the recreating public and physical environment. For the Little River Grass Valley reservoir recreation area, the facility master plan would be filed with the Commission within 1 year of license issuance. For the Sly Creek reservoir recreation area, the facility site master plan would be filed with the Commission within 3 years of license issuance. Obtain Forest Service approval of all plans before filing these plans with the Commission. The plan would include a description of the pertinent management objectives for the site, existing conditions survey, a schedule for completion, a statement of responsibility, and a statement of operation and maintenance. (Measure 45, as modified October 8 and October 12, 2007)
- Develop a Little Grass Valley and Sly Creek reservoir recreation area routine maintenance and operating plan. Provide a draft of the plan to the Forest Service for a 60-day review period, and file the final plan, including evidence of consultation, with the Commission within 6 months of license issuance. Implement the plan following Commission approval. (Measure 46, as modified October 8, 2007)

- Monitor recreation, file 6-year recreation report and provide for additional in-kind recreation facilities when demand exceeds supply. (Measure 47)
- Survey users, prepare user survey report, and provide out-of-kind recreation facilities if warranted by increased demand. (Measure 48)
- Maintain Little Grass Valley reservoir at a usable elevation for boat launches through September 15. (Measure 49)
- Provide supplemental streamflow in Little Grass Valley dam reach for recreational boating after September 15 of each year. Where facility modifications are needed to release the proposed flows, complete such modifications as soon as reasonably practicable, but within 3 years. In the interim, make a good faith effort to release the proposed flows within the capabilities of the existing facilities. (Measure 50)
- Provide supplemental streamflow in South Fork diversion dam reach in spring in Above Normal and Wet water years (see measure 36) for recreational boating. Make a good faith effort to provide public notification of the flow. Where facility modifications are needed to release the proposed flows, complete such modifications as soon as reasonably practicable, but within 3 years. In the interim, make a good faith effort to release the proposed flows within the capabilities of the existing facilities. (Measure 51)
- Provide supplemental flow in Forbestown diversion dam reach in spring in Above Normal and Wet water years (see measure 36) for recreational boating. Make a good faith effort to provide public notification of the flow. Where facility modifications are needed to release the proposed flows, complete such modifications as soon as reasonably practicable, but within 3 years. In the interim, make a good faith effort to release the proposed flows within the capabilities of the existing facilities. (Measure 52)
- Make streamflow information available to the public. (Measure 53)
- Seasonally install and maintain public safety buoys. (Measure 54)

Cultural Resources

- Upon issuance of license, implement the Historic Properties Management Plan included in the license application. (Measure 44)

Land Use

- Develop and implement a hazardous materials management plan to reduce the potential effects of hazardous materials spills. (Measure 38)

- Prepare, file and implement a fire prevention and response plan, including fuels treatment/vegetation management, prevention, emergency response preparedness, reporting, fire control/extinguishing. (Measure 55)

2.2.5 Modifications to the Applicant’s Proposal—Mandatory Conditions

The following mandatory conditions have been provided or will be provided and, if provided, are evaluated in this document.

2.2.5.1 Water Quality Certification

Under section 401 of the Clean Water Act (CWA), a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the CWA. On May 16, 2008, South Feather filed an application for water quality certification with the Water Board. The Water Board documented receipt of the request for water quality certification on May 16, 2008, and agency action is due by May 16, 2009.

2.2.5.2 Section 18 Fishway Prescriptions

Section 18 of the FPA states that the Commission is to require construction, maintenance, and operation by a licensee of such fishways as the secretaries of Commerce and Interior may prescribe. In its April 14, 2008, filing, the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) reserved its authority to prescribe fishways project for the South Feather Power Project.

2.2.5.3 Section 4(e) Federal Land Management 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 adequate protection and use of the reservation. The South Feather Power Project occupies 1,977.1 acres of federal lands administered by the Plumas National Forest and 10.6 acres of federal lands administered by the U.S. Bureau of Land Management.

In an April 14, 2008, filing with the Commission, the Forest Service submitted preliminary terms and conditions pursuant to section 4(e) of the FPA, including 17 standard Forest Service Conditions and 11 project-specific resource protection conditions. On May 13, 2008, the Forest Service revised three of the specific conditions in whole or in part.⁹

⁹In its May 29, 2008, reply comments on recommended terms and conditions, South Feather stated that it fully supports the revised 4(e) conditions, and we consider them as part of the applicant’s proposal.

Of the Forest Service's 28 preliminary conditions, we consider the 17 standard conditions (condition nos. 1 through 17) to be administrative or legal in nature and not specific environmental measures. With the exception of Condition No. 3, *Consultation*, we do not analyze these conditions in this EIS. We analyze conditions that we consider to be environmental measures in section 3, and we summarize our analysis of these measures in section 5.4.2, *Forest Service 4(e) Conditions*.

The preliminary and revised preliminary 4(e) conditions filed by the Forest Service that we analyze in this document are:

- Consult with the Forest Service on measures needed to ensure protection and utilization of the National Forest resources affected by the project. [revised Condition No. 3]
- Maintain minimum streamflows in project reaches specified in tables A-1 through A-5 of their filing. The minimum instantaneous 15-minute streamflow must 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% of the prescribed mean daily flow for those minimum streamflows required to be greater than 10 cfs. [Condition No.18, part 1]
- Determine the water year type for minimum flow compliance based on the DWR Bulletin 120 water year forecast except for the months of October through January, which should be based on the Department of Water Resources' Full Natural Flow record for the Feather River at Oroville. The water year types are defined as follows: Wet = greater than or equal to 7.1 MAF; Above Normal = greater than or equal to 4.0 MAF but less than 7.1 MAF; Below Normal = greater than 2.4 MAF or equal to but less than 4.0 MAF; and Dry = less than or equal to 2.4 MAF. [revised Condition No. 18, part 2]
- Develop an operating plan to manage drought conditions when they occur. [revised Condition No. 18, part 3]
- Operate, maintain, and modify (if necessary) gages needed to determine river stage and minimum streamflows. [Condition No. 18, part 4]
- Develop and implement ramping rates that meet Forest Service targets for water velocity and stage changes to protect FYLF egg masses and tadpoles. [revised Condition No. 18, part 5]
- Develop and implement a wild fish supplementation program to enhance fisheries in the South Fork Feather River, Slate Creek, and in Sly Creek and Lost Creek reservoirs. [revised Condition No. 18, part 6]
- Develop and implement a fish population monitoring plan at eight of the locations previously established during the relicensing. [revised Condition No. 19, part 1]

- Develop a FYLF monitoring plan including annual monitoring of FYLF adult, tadpole, and egg mass numbers for the first 10 years after relicensing, and every 5 years thereafter for the remainder of the license. [Condition No. 19, part 2.1]
- Develop a FYLF population model, a population viability model, a 2-D habitat model, a temperature monitoring protocol, and a geomorphology and riparian encroachment monitoring protocol. [Condition No. 19, part 2.2 through 2.4]
- Treat and monitor selected areas between the South Fork diversion dam and Ponderosa reservoir to reduce riparian encroachment. [Condition No. 19, part 3]
- Develop and implement a benthic macroinvertebrate monitoring plan for affected bypassed reaches to be conducted in the same years as fish population monitoring, unless an alternative monitoring schedule is agreed upon with the agencies. [revised Condition No. 19, part 4]
- Prepare a recreation facility master plan and site plans to include provisions to hold annual coordination meetings, to ensure consistency with other management plans, for re-vegetation measures for disturbed vegetation, for improvement of interpretive signage and kiosks, and to explore opportunities to extend paved or native trails to increase pedestrian connectivity. [Condition No. 20, part 1 and 2]
- Prepare, file and implement a fire prevention, response and investigation plan, including fuels treatment/vegetation management, prevention, emergency response preparedness, reporting, fire control/extinguishing. [Condition No. 21]
- Develop and implement a fuel treatment/vegetation management plan. [Condition No. 22]
- Develop and implement a Heritage Properties Management Plan (HPMP), approved by the Forest Service, for the purpose of protecting and interpreting heritage resources. [Condition No. 23]
- Annually review the current list of special status plant and wildlife species and implement a study on effects of the project on any newly added species if suitable habitat for the species is likely to occur on National Forest System lands and identify and implement resource measures where appropriate. [Condition No. 24]
- Prepare a Biological Evaluation before taking actions that may affect Forest Service special status species on National Forest System lands, update and implement the Bald Eagle Management Plan, and develop and implement a bat management plan. [Condition No. 25]

- Prepare and implement an invasive weed management plan to address both aquatic and terrestrial invasive weeds within the project boundary and adjacent to project features directly affecting National Forest System lands including, roads, and distribution and transmission lines. [Condition No. 26]
- Develop and implement a visual management plan within 60 days prior to any ground-disturbing activity on National Forest System lands. [Condition No. 27]
- Develop and implement a road management plan after Forest Service approval of the plan. [Condition No. 28]

2.2.5.4 Alternative 4(e) Conditions Pursuant to the Energy Policy Act of 2005

The Energy Policy Act of 2005 (EPAAct) provides parties to this licensing proceeding the opportunity to propose alternatives to preliminary mandatory conditions. On May 14, 2008, South Feather filed alternatives to two of the Forest Service's 4(e) conditions:

- Condition No. 18, part one (minimum streamflows); and
- Condition No. 19, part 2 (FYLF monitoring plan).

We evaluate both these alternative 4(e) measures in sections 3 and 5 of this EIS.

2.3 STAFF ALTERNATIVE

After evaluating South Feather'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 South Feather's proposal as well as NMFS' reservation of authority to prescribe fishways under section 18 and some of the Forest Service's section 4(e) and South Feather's alternative section 4(e) conditions, section 10(j) recommendations, section 10(a) recommendations, and measures developed by the staff.

The staff alternative incorporates South Feather's proposed environmental measures (see section 2.2.3), as modified by staff:

General

- Measure 34 – modified to include annual consultation regarding the status of measure implementation, the results of monitoring studies, discussion of both routine and non-routine maintenance, foreseeable changes in project facilities, review of any necessary revisions or modification of plans included in the project license, and discussion of

any measures needed to protect sensitive species or changes to existing management plans. Also modified to require that FWS, Cal Fish & Game, and the Water Board be afforded the opportunity to participate in the consultation meeting and included in the distribution of all monitoring reports and correspondence relating to the meeting, and that recommendations by these agencies be included in the record of the meeting.

Aquatic Resources

- Measure 36 – water year type to be determined using the methodology described in Forest Service’s revised Condition No.18, part 2.
- Measure 39 – replaced by the minimum flow regime described in tables 3-10 to 3-14 under South Feather’s alternative to Forest Service Condition No. 18, part 1.

Terrestrial Resources

- Measure 41 – the invasive weed management plan is modified to: (1) address both aquatic and terrestrial invasive weeds; (2) include protocols for locating, monitoring, and controlling weed populations; (3) include a public education program and facilities for public use to reduce the spread of aquatic weed species; and (4) provide information on noxious weed populations in a data format compatible with the Forest Service GIS database (per Forest Service Condition No. 26).
- Measure 43 - modified to include maintenance and operation of all devices and measures necessary for the protection of wildlife along the Miners Ranch conduit deemed necessary by Cal Fish & Game and FWS (per Cal Fish & Game Condition No. 9).

Recreational Resources

- Measure 47 – modified to require filing of the recreational use survey report every 12 years.
- Measure 49 – modified to specify that the restriction to maintain water levels in Little Grass Valley reservoir above elevation 5,023 feet msl applies only from May 21 through September 15, and does not apply in drought years if the reservoir does not fill to elevation 5,023 feet msl.
- Measure 51 – modified to discontinue supplemental streamflows in the South Fork diversion dam reach if water temperature rises to 12.0°C or higher.

- Measure 52 – modified to discontinue supplemental streamflows in the Forbestown diversion dam reach if water temperature rises to 12.0°C or higher.

Cultural Resources

- Measure 44 – modified to include Commission staff measures in addition to implementation of the HPMP in consultation with the SHPO, Forest Service, participating Tribes, and the Commission. [Forest Service Condition No. 23]

In addition to the foregoing measures proposed by South Feather, the staff alternative also includes the following additional measures identified by staff based on agency, tribal, and non-governmental organization recommendations and our analysis:

Aquatic Resources

- Implement a maximum ramping rate of 0.5 foot per hour when making any controlled increases or decreases in flow releases into the Little Grass Valley dam, South Fork diversion dam, Lost Creek dam, and the Woodleaf diversion dam reaches.
- Operate, maintain, and modify (if necessary) gages needed to determine river stage and minimum streamflows downstream of Little Grass Valley dam, South Fork diversion dam, Forbestown diversion dam, Lost Creek dam, and Slate Creek diversion dam reaches. [Forest Service Condition No. 18, part 4 and Cal Fish & Game recommendation No. 7, part 6]
- Develop an operating plan to manage drought conditions when they occur. [Forest Service Condition No. 18, part 3]
- Develop and implement a plan, in consultation with Cal Fish & Game, NMFS and DWR to monitor the effects of flow releases on water temperatures in the Little Grass Valley dam, South Fork diversion dam, Lost Creek dam, and the Woodleaf diversion dam reaches, and to provide real-time information on the temperature of water discharged from the Kelly Ridge powerhouse. [Staff-developed measure]
- Develop and implement a wild fish supplementation program to augment fish populations, when warranted, in the South Fork Feather River, Slate Creek, and in Sly Creek and Lost Creek reservoirs. [Forest Service revised Condition No. 18, part 6]
- Develop and implement a fish population monitoring plan in affected project reaches to monitor fish species composition and relative abundance, including data on species size/age distributions and condition factors at eight of the locations previously established during the relicensing. Surveys would be conducted in two successive years and

begin in the fifth full year after implementation of new license streamflows or at a frequency jointly agreed to by the agencies. [Forest Service revised Condition No. 19, part 1]

- Develop and implement a benthic macroinvertebrate monitoring plan affected project to be conducted in the same years as fish population monitoring, unless an alternative monitoring schedule is agreed upon with the agencies. [Forest Service revised Condition No. 19, part 3]
- Reserve NMFS authority to prescribe fishways. [NMFS section 18]

Terrestrial Resources

- Monitor selected areas between the South Fork diversion dam and Ponderosa reservoir for riparian encroachment, and treat if warranted based on FYLF monitoring results. [Forest Service Condition No. 19, part 3, and Cal Fish & Game Condition No. 7, part 3]
- Prepare a Biological Evaluation before taking actions that may affect Forest Service special status species on National Forest System lands, update and implement the Bald Eagle Management Plan, and develop and implement a bat management plan. [Forest Service Condition No. 25]
- Conduct surveys for FYLF over the full length of the South Fork Feather River/Lost Creek reach, Forbestown diversion dam reach, and the Slate Creek diversion dam reaches in years 1-5 and every 10 years thereafter, supplemented by representative surveys in years 6-10 and every 10 years thereafter, to assess effectiveness of measures implemented to protect FYLF. [Staff-developed measure]

Recreational Resources

- Incorporate several additional measures specified by the Forest Service for the facility master plans, including:
 - provisions in the master plan for the annual coordination meeting to review the status of the implementation of the master plan;
 - provisions to ensure consistency with other management plans, including measures associated with potential effects of the proposed recreation rehabilitation on cultural resources within the project;
 - incorporation of provisions for re-vegetation measures for disturbed vegetation associated with the proposed rehabilitation and enhancement measures at the recreation sites as part of the facility master plans; and

- provisions to improve interpretive signage and kiosks, if needed, as part of the individual site plans. [Forest Service Condition No. 20, part 1 and 2]

Land Management and Aesthetics

- Develop and implement a fuel treatment/vegetation management plan as part of South Feather’s fire prevention and response plan. File the plan with the Commission within 1 year of license issuance. [Forest Service Condition No. 22]
- Develop and implement a road management plan for roads needed for project purposes and access. File with the Commission within 1 year of license issuance a road management plan after Forest Service approval of the plan. [Forest Service Condition No. 28]
- Develop and implement a visual management plan within 60 days prior to any ground-disturbing activity on National Forest System lands. [Forest Service Condition No. 27]

2.4 Staff Alternative with Mandatory Conditions

The Forest Service specified two preliminary 4(e) conditions (described in section 2.2.5, *Modifications to Applicant’s Proposal—Mandatory Conditions*) which we do not include in the staff alternative: (1) maintain minimum streamflows in project reaches specified for each reach by the Forest Service; and (2) develop a FYLF monitoring plan (including annual monitoring of FYLF adult, tadpole, and egg mass numbers for the first 10 years after relicensing followed with similar surveys every 5 years for the remainder of the license), a population model, a population viability model, a 2-D habitat model, a temperature monitoring protocol, and a geomorphology and riparian encroachment monitoring protocol.

We recognize that the Commission is required to include valid section 4(e) conditions in any license issued for the project. The staff alternative with mandatory conditions includes staff-recommended measures along with the mandatory conditions that we did not include in the staff alternative: (1) the Forest Service’s specified minimum flow regime and (2) the Forest Service’s FYLF monitoring plan.

Incorporation of these mandatory conditions into a new license would cause us to modify or eliminate some of the environmental measures that we include in the staff alternative. The minimum flows specified by the Forest Service would replace the minimum flows that we recommend (South Feather’s alternative 4(e) flows), and the FYLF monitoring plan specified by the Forest Service would replace the staff-developed monitoring plan that we recommend.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER 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

Retiring the project would require denying South Feather's license application and require the surrender and termination of the existing license with any necessary conditions. The project would no longer be authorized to generate power. Retiring the project would involve significant cost, would forego an average annual production of 477,125 MWh of clean, renewable energy, and would foreclose any opportunity to add environmental enhancements to the existing South Feather Power Project. For these reasons, we do not consider project retirement to be a reasonable alternative.

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