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Draft Environmental Impact Statement

Section 5 – Staff Conclusions



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

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

5.0 STAFF'S CONCLUSIONS

5.1 COMPARISON OF EFFECTS OF PROPOSED ACTION AND ALTERNATIVES

In this section, we compare the developmental and non-developmental effects of South Feather's proposal, South Feather's proposal as modified by staff (staff alternative), staff alternative with mandatory conditions, and the no-action alternative.

We estimate the annual net benefits of operating and maintaining the South Feather Power Project under the four alternatives identified above. Our analysis shows that the annual net benefit would be \$27,095,100 for the proposed action; \$25,912,200 for the staff alternative; \$25,281,100 for the staff alternative with mandatory conditions; and \$28,403,000 for the no-action alternative.

We summarize the environmental effects of the different alternatives in the following section.

Geology and Soils—Under South Feather's proposal: (1) large woody debris would be passed downstream of the Little Grass Valley, Sly Creek, and Lost Creek reservoirs, enhancing downstream aquatic habitat; (2) supplemental stream flows would continue to be passed into Lost Creek to cleanse accumulated fine sediment from spawning gravels, reduce encroachment of riparian vegetation, and enhance geomorphic characteristics in Lost Creek; and (3) sediment pass-through measures at the Slate Creek diversion would restore sediment transport processes and improve the reliability of minimum flow releases and diversion operations by preventing sediment accumulation upstream of the dam.

With our modifications to South Feather's proposal and under the staff alternative with mandatory conditions, development and implementation of soil erosion control and revegetation plans during construction of any facilities would ensure that native species revegetate disturbed areas and minimize any potential adverse effects from erosion or sediment deposition.

Aquatic Resources—Under South Feather's proposal: (1) minimum instream flows in project-affected reaches would be increased to benefit trout and other aquatic biota, but would cause a minor reduction in water levels in Little Grass Valley reservoir; (2) streamflows and habitat for trout in Slate Creek would be enhanced during critical high temperature periods; (3) a wild trout supplementation program would enhance trout populations in reaches where recruitment does not meet fisheries objectives; and (4) fish and invertebrate populations would be monitored to assess trends and guide adaptive management under the new project operating regimes.

With our modifications to South Feather's proposal: (1) minimum instream flows and trout habitat in project-affected reaches would be further enhanced, but would cause a slight additional reduction in water levels in Little Grass Valley reservoir; (2) ramping rates would be implemented to reduce stranding mortality of trout and invertebrates; (3)

streamflow measurement capabilities would be ensured for the term of the license; and (4) real-time water temperature information would be provided to DWR to assist it with meeting water temperature objectives to protect anadromous fish downstream of Lake Oroville.

Under the staff alternative with mandatory conditions, the amount of physical trout habitat in project-affected reaches would be slightly enhanced as a result of higher minimum instream flows, but water temperatures would become less suitable (colder than optimal) for trout spawning and rearing in the reaches downstream of Little Grass Valley and Lost Creek dams, and for hardhead in the Forbestown bypassed reach. Similarly, higher summer flow releases required downstream of Little Grass Valley and Lost Creek dams would likely reduce invertebrate diversity and production due to the influence of coldwater outflows and increased thermal stability. In addition, higher minimum flows would cause a greater reduction in water levels in Little Grass Valley reservoir, which would cause some minor adverse effects on reservoir fish habitat.

Terrestrial Resources—Under South Feather’s proposal, annual training of employees, consultation with the Forest Service, and vegetation and invasive weed management plans would further the protection of sensitive areas and species and help to control the spread of noxious weeds; controllable pulse flows that could adversely affect FYLF would be avoided; and the effectiveness of wildlife crossings and escape facilities would be maintained when they are replaced or retrofitted through design consultation with Cal Fish & Game.

With our modifications to South Feather’s proposal, ramping rates developed to protect FYLF would minimize adverse effects on reproduction, FYLF surveys would allow the effects of operation on FYLF to be monitored and the need for any additional studies or measures to be identified and implemented, and South Feather would be required to maintain all wildlife crossings and escape facilities that are necessary to protect wildlife.

Under the staff alternative with mandatory conditions, the higher flows specified by the Forest Service in the South Fork diversion dam and Forbestown diversion dam reaches would likely reduce habitat suitability for FYLF by reducing water temperatures below levels required for breeding and by providing less stable flows. Additional studies specified by the Forest Service, including habitat, population, and viability models, and physiological studies related to water temperature, would increase biological knowledge of the species and could enhance conservation efforts for FYLF.

Threatened and Endangered Species—Although no threatened or endangered species are known to or are likely to occur in the project area, the presence of the valley elderberry longhorn beetle and the California red-legged frog can not be ruled out. Therefore, we conclude that the alternatives considered in this EIS may affect, but are unlikely to adversely affect, these threatened and endangered species.

Recreation—Under South Feather’s proposal, South Feather would be responsible for the following measures to maintain and enhance recreational opportunities: (1) operation and maintenance of recreational facilities; (2) rehabilitation of existing recreational facilities; (3) construction of a new multi-use trail below Little Grass Valley dam to improve access to the SFFR for recreational boating and angling; (4) management of reservoir levels to facilitate recreational use while achieving project purposes; (5) provision of whitewater boating flows in the Little Grass Valley dam reach during the fall in all water years; (6) provision of whitewater boating flows in the spring in Above Normal and Wet water years in the South Fork diversion dam and Forbestown diversion dam reaches; (7) provision of flow information for whitewater boating to the public; and (8) maintenance and enhancement of public safety by installation of safety buoys each year in Little Grass Valley and Sly Creek reservoirs.

With our modifications to South Feather’s proposal, higher minimum flow releases would cause some adverse effects on reservoir recreation by increasing the drawdown of Little Grass Valley reservoir, and would reduce the amount of water that is available for whitewater releases.

Under the staff alternative with mandatory conditions, the adverse effects of drawdown on reservoir recreation would be increased, and the amount of water available for whitewater releases would be further reduced.

Cultural Resources—Under South Feather’s proposal, cultural resources would be protected under provisions specified in the HPMP included in South Feather’s license application.

With our modifications to South Feather’s proposal, additional measures would be incorporated into the HPMP that would provide a higher level of assurance that important cultural resources are adequately protected.

Land Use and Aesthetics Resources—Under South Feather’s proposal, public safety would be maintained and enhanced by developing and implementing a fire prevention, response, and investigation plan.

With our modifications to South Feather’s proposal, fire risk would be further reduced by developing and implementing a fuel treatment/vegetation management plan, road management would be improved throughout the project vicinity, and aesthetics would be protected and improved by implementing a visual management plan that would bring project facilities into compliance with land resource management plan direction.

General—With our modifications to South Feather’s proposal, annual consultation with the management agencies would assist with interpretation of monitoring results and adaptive management.

Under the no-action alternative, environmental conditions would remain the same, and there would not be any enhancement of environmental resources.

5.2 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located. When we review a hydropower project, recreation, fish, wildlife, and other non-developmental values of the waterway are given equal consideration with the project's electric energy and other developmental values. In deciding whether, and under what circumstances, a hydropower license should be issued, the Commission must weigh the various economic and environmental tradeoffs involved in that decision. This section contains the basis for, and a summary of, our recommendations for relicensing the South Feather Power Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review and evaluation of the environmental and economic effects of the proposed action, the staff alternative, the staff alternative with mandatory conditions, and no-action, we recommend the staff alternative as the preferred alternative for the South Feather Power Project.

We recommend this alternative because (1) issuing a new license would allow South Feather to continue operating the project as a beneficial, dependable source of water and electric energy; (2) the project, with a total installed capacity of 104 MW may eliminate the need for an equivalent amount of fossil fuel-produced energy, which helps conserve these non-renewable resources and limits atmospheric pollution; (3) our recommended environmental measures would protect water quality and quantity, enhance fish and wildlife resources, protect cultural resources; and improve public use of the project's recreational facilities and resources; and (4) the public benefit of these measures would exceed those of the other alternatives.

In the staff alternative, we include the following environmental measures proposed by South Feather, based on our analyses included in sections 3 and 4. In some cases (*italicized*), we modified or supplemented South Feather's proposed measures.

Geology and Soils

- Annually return large wood to the SFFR downstream of Little Grass Valley dam and to Lost Creek downstream of Lost Creek dam by allowing the large wood to pass through the Little Grass Valley, Sly Creek, and Lost Creek dam spillways during spill periods. Large wood, as used in this measure, refers to downed, dead, or dying wood at least 20 feet long. If spills are not adequate to pass the large wood and large wood is collected from Little Grass Valley, Sly Creek, and Lost Creek reservoirs, consult with the Forest Service concerning alternative means and a schedule to return the large wood to the river.
- Provide a supplemental streamflow below Lost Creek dam, as needed, to ensure that a flow of at least 390 cfs (measured as the average flow over

any continuous 24-hour period as measured at USGS gage 11396000) occurs at least once every 4 years.

- Within 2 years of license issuance, file a report on measures implemented to pass sediment at Slate Creek diversion dam. The report must describe the results of procedures used to determine whether smaller flow releases and releases timed to occur on the ascending limb of the hydrograph would allow accumulated sediment to pass through Slate Creek diversion dam more frequently, and include recommendations for future operations. The report must document consultation with the Forest Service, U.S. Army Corps of Engineers, Water Board, and Cal Fish & Game on the methods used to pass sediments, and these agencies must be allowed 90 days to review and comment on the report. The filed report must include comments received and the draft report from these agencies and describe how these comments were addressed in the report.

Aquatic Resources

- Determine water year type as described in the Forest Service's revised Condition No.18, part 2, annually and apply to appropriate minimum flow release schedule and other measures that are dependent on water year type.
- Install and maintain a gaging station, monitor water temperature, and cease diversions at Slate Creek diversion dam when mean daily water temperature reaches 20°C to protect downstream cold freshwater habitat.
- 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. *This measure is modified to incorporate the streamflows identified for each reach in South Feather's alternative to the Forest Service's preliminary Condition No. 18, part 1,, shown in tables 3-10 through 3-14.*
- When drought conditions may require deviation from minimum flows or other license conditions, consult with the Forest Service and other agencies to develop and implement an operating plan to manage drought conditions.
- 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.
- Develop and implement a fish population monitoring plan approved by the Forest Service describing sampling to be conducted in the project-affected bypassed 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. Monitoring will be conducted in years 5, 6, 11, 12, 17, 18, 23,

24, and 29 in each survey reach, or at a frequency jointly agreed to by the agencies. If sampling is scheduled in years with high peak flows, the survey may be postponed by 2 years to avoid confounding effects of high peak flows on fish recruitment and populations.

- Develop and implement a benthic macroinvertebrate monitoring plan approved by the Forest Service describing sampling to be conducted in the project-affected bypassed reaches. Monitoring will be conducted in the same years that fish population monitoring is conducted.

Terrestrial Resources

- 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 PACs, potential erosion areas, and cultural sites to allow avoidance/minimization of impacts.
- Prepare and implement an invasive weed management plan. *This measure is modified to address both aquatic and terrestrial invasive weeds; include protocols for locating, monitoring, and controlling weed populations; include a public education program and facilities for public use to reduce the spread of aquatic weed species; and provide information on noxious weed populations in a data format compatible with the Forest Service GIS database.*
- 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.²⁸
- Maintain all bat exclusion devices in proper working condition.
- Consult with Cal Fish & Game and FWS prior to replacing or retrofitting Miners Ranch conduit wildlife bridge crossings and deer escape facilities.

²⁸In addition, South Feather plans to avoid high flow releases from project dams (with the exception of the Little Grass Valley dam) associated with sediment pass-through, valve exercises, or supplemental flow releases for channel maintenance or recreational purposes during critical periods for FYLF (roughly April 15 - October 31, annually).

This measure is modified to require that South Feather maintain and operate all devices and measures necessary for the protection of wildlife along the Miners Ranch conduit.

Recreational Resources

- Develop and implement facility master plans that illustrate the layouts, locations, sizes, shapes, and relationships between existing and proposed improvements for the Little Grass Valley reservoir recreation area and the Sly Creek reservoir recreation area.
- Develop and implement individual site development plans for each existing recreation facility on Forest Service lands within the existing project boundary.
- Within 3 years of license issuance and after consultation with the Forest Service, construct a multi-use trail below Little Grass Valley dam to provide better access to the SFFR, primarily for recreational boating and angling.
- Finalize and implement a Little Grass Valley and Sly Creek reservoir recreation area routine maintenance and operating plan.
- Every 6 years file a report on recreational use at the developed recreational facilities at Little Grass Valley and Sly Creek reservoir recreation areas.
- Every 18 years file a report on recreational user surveys at developed recreational facilities at Little Grass Valley and Sly Creek reservoir recreation areas. *This measure is modified to require the filing of the report every 12 years.*
- Maintain the water level at Little Grass Valley reservoir no lower than elevation 5,023 feet msl through September 15 in all water years, except Dry water years,²⁹ to facilitate the use of Little Grass Valley boat launch facilities. *This measure is modified to specify that the restriction 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.*
- Provide supplemental streamflow in Little Grass Valley dam reach for recreational boating from September 16 of each year until the date that Little Grass Valley reservoir elevation is 5,017.00 feet msl. In August of each year, South Feather would consult with the Forest Service, Water Board, American Whitewater, and other interested parties to set the target streamflow between 230 and 460 cfs for the upcoming September. The

²⁹In Dry water years, South Feather indicates that it will maintain the water level in Little Grass Valley reservoir as high as possible through Labor Day weekend.

actual streamflow may vary from the target streamflow by up to 15 percent but may not be less than 230 cfs.

- Provide a supplemental streamflow in the spring of Above Normal and Wet water years downstream of the South Fork diversion dam for recreational purposes. A continuous flow of at least 190 cfs but not more than 700 cfs will be released for two consecutive weekend days between April 1 and June 15, as measured at USGS gage 11395200. A continuous water temperature monitor will be installed near the Woodleaf powerhouse, and the supplemental streamflows will be discontinued if the water temperature reaches 13°C. *This measure is modified to require that supplemental streamflows be discontinued if the water temperature reaches 12°C.*
- Provide supplemental streamflow in the spring during Above Normal and Wet water years at Forbestown diversion dam reach to improve opportunities for Class IV and V whitewater boating in the spring. A continuous flow of at least 215 cfs but not more than 400 cfs will be released for two consecutive weekend days between April 1 and June 15, as measured at USGS gage 11395200. A continuous water temperature monitor will be installed near the Forbestown powerhouse, and the supplemental streamflows will be discontinued if the water temperature reaches 13°C. *This measure is modified to require that supplemental streamflows be discontinued if the water temperature reaches 12°C.*
- Provide streamflow information to the public within 1 year of license issuance, to include the anticipated dates and magnitude of recreational streamflow releases.
- Install public safety buoys in Little Grass Valley and Sly Creek reservoirs as soon as practical after access roads are clear of snow, and maintain the buoys through September 15 of each year.

Cultural Resources

- Upon issuance of license, finalize and, following Commission approval, implement the HPMP included in the application. *This measure is modified to implement the HPMP provided in the application, with staff's additional measures.*

Land Use

- Prepare, file with the Commission within 1 year of license issuance, and implement a fire prevention and response plan.
- Develop and implement a hazardous materials management plan to reduce the potential effects of hazardous materials spills.

General

- Consult with the Forest Service annually to coordinate project and Forest Service activities. *This measure is 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. This measure is further 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.*

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

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.
- 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 and quantity of water discharged from the Kelly Ridge powerhouse.
- Reserve NMFS authority to prescribe fishways.

Terrestrial Resources

- 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.

- Using methodologies specified by the Forest Service, map FYLF habitat and develop stage-discharge curves for each reach under conditions representative of each water-year type. Develop ramping rates for each reach and water-year type that would meet Forest Service-specified stage and velocity requirements to protect FYLF.
- Conduct surveys for FYLF egg masses, tadpoles, yearlings, and habitat over the full length of the SFFR/Lost Creek, Forbestown diversion dam, 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.
- Provide Forest Service and Cal Fish & Game video footage of helicopter flights along the South Fork diversion dam and Forbestown diversion dam project reaches so the agencies can identify areas where riparian vegetation is encroaching into the stream channel. If FYLF monitoring indicates that riparian encroachment is adversely affecting FYLF, treat selected segments to remove riparian vegetation and monitor effects on FYLF habitat.

Recreational Resources

- Incorporate several additional measures specified by the Forest Service for the facility master plans including:
 - provisions in the master plan for an 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 to re-vegetate 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 features for the public, i.e., kiosks or trail placards, as part of the individual site plans.

Land Use 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.
- Develop and implement a road management plan for roads within the project boundary that are used primarily for project purposes, including access to project facilities and recreational facilities. File with the

Commission within 1 year of license issuance and after Forest Service approval of the plan.

- Develop and implement a visual management plan within 60 days prior to any ground-disturbing activity (including the construction or new facilities or modification of existing facilities, which could affect visual aesthetics) on National Forest System lands.

5.2.1 Discussion of Key Issues

The following paragraphs describe the basis for staff-recommended measures as well as for not recommending measures recommended by other entities. Under each major issue, we discuss our recommendations for the South Feather Power Project.

Geology and Soils

Large Woody Debris

Because LWD can benefit fish habitat, South Feather proposes to make a reasonable effort to annually return LWD that collects in the Little Grass Valley, Sly Creek, and Lost Creek reservoirs to the river below each reservoir. LWD contributes to productive aquatic ecosystems, and is an important component in the formation of complex aquatic habitat units and channel maintenance. Although much of the steep and confined channel network in the project area offers limited opportunity for LWD retention, it may be retained locally in lower gradient areas or where valley and/or channel width narrows. Compared to reference reaches upstream of the impoundments, the number of LWD pieces per mile was considerably lower in the reaches downstream of Little Grass Valley dam on the SFFR and below Sly Creek dam on Lost Creek. Passing LWD that accumulates in the Little Grass Valley and Sly Creek reservoirs to downstream reaches would increase the abundance of LWD in these reaches and provide a substantial benefit to trout habitat in areas where LWD is retained within the active stream channel. We estimate that passing LWD that accumulates in these reservoirs into downstream reaches would have an annualized cost of \$5,300. Because increasing the amount of LWD in downstream reaches could provide a substantial benefit to fish habitat at a reasonable cost, we recommend adopting this measure.

Lost Creek Geomorphic Flows

Lack of seasonal high flow events may contribute to the accumulation of fine sediment in spawning gravels, which may adversely affect trout spawning and incubation success and contribute to the encroachment of riparian vegetation into the stream channel. Although most of the project reaches have limited potential to retain fine sediments, Lost Creek is a reach that can retain fine sediment that originates below Lost Creek dam (i.e., a response reach), and this sediment may affect aquatic habitat. Based on a study conducted in 1991, the current project license stipulates that flushing flows between 390 and 740 cfs be released from Lost Creek dam at least once every 4 years.

South Feather has studied the effects of these flushing flows to evaluate its effect on the reach as a continuation of the 1991 study, and found that the reach benefits from these geomorphic flow releases. South Feather therefore proposes to continue flushing flows in Lost Creek by spilling flows of at least 390 cfs for a period of 24 hours at least once every 4 years. Continuing these periodic flushing flows would serve to enhance geomorphic characteristics in Lost Creek and protect aquatic habitat, and we recommend that this measure be continued. Because these flow releases are stipulated in the current license, continuation of the measure would have no incremental cost.

Sediment Pass-Through at Slate Creek

Accumulation of sediment upstream of the Slate Creek diversion dam interferes with operation of the low-level outlet used to release minimum instream flows, affects the operation of the diversion tunnel, and impedes the transport of spawning gravel into the reach downstream of the diversion. South Feather is currently testing alternative methods of operation to facilitate the passage of sediment past the dam, and within 2 years of license issuance, proposes to file a report with the Commission that would describe the results of ongoing testing.

Until 1986, the Slate Creek diversion dam was operated to allow sediment to pass through a low-level outlet during high flows. Sediment pass-through activities were suspended from 1986 to 2002 because of resource agency concerns about effects on water quality from toxins that may have collected in the accumulated sediment, although, as discussed in section 3.3.1.2, sampling of sediments and water demonstrated that this contamination had not occurred. South Feather attempted to resume sediment pass-through activities in 2002. It was unsuccessful because of the armored sediment accumulation that had built up against the outlet's trashrack. In 2005, South Feather removed 500 cubic yards of the accumulated sediments by manual excavation, and sediment was successfully passed through the structure, but testing was suspended because of concerns about abrasion damage to the diversion's outlet works. South Feather is currently testing new procedures to determine whether smaller flow releases would allow accumulated sediment to pass through Slate Creek diversion dam more frequently, and is assessing the size of storm events (rainfall amount and rate) that result in Slate Creek flows more than 1,000 cfs, so that sediment pass-through can be timed to occur on the ascending limb of the hydrograph, to allow both coarse and fine materials to be carried into the downstream reaches and enhance aquatic habitat.

South Feather's proposal to file a report 2 years after new license issuance would allow the Commission to review the results of the current sediment pass-through efforts and any proposed modifications to the sediment pass-through program. Continuing sediment pass-through and refining successful procedures would enhance downstream habitat by restoring sediment transport processes, and would improve the reliability of minimum flow releases and diversion operations by preventing further accumulation of sediment upstream of the dam. We estimate that the annualized cost of preparing the proposed sediment pass-through report would be \$5,700. Because the report would help

to determine the success of and develop effective sediment pass-through procedures, and would benefit aquatic habitat at a minimal cost, we recommend that this measure be adopted.

Water and Fisheries Resources

Minimum Flows and Reservoir Levels

Flow regulation at Little Grass Valley and Sly Creek reservoirs and diversion of water to the project powerhouses affect aquatic biota and recreational opportunities in five riverine reaches. These reaches are the Little Grass Valley dam, South Fork diversion dam, and Forbestown diversion dam reaches of the SFFR; Slate Creek below the Slate Creek diversion dam; Lost Creek below Lost Creek reservoir; and the SSFR/Lost Creek reach (downstream of the confluence of Lost Creek with the SSFR). Flows released into downstream reaches also affect water levels in project impoundments, especially in the Little Grass Valley and Sly Creek reservoirs, which provide seasonal storage.

In its final license application, South Feather proposed a minimum flow regime for each of the project reaches³⁰ that varies by month for four water year types. In all cases the proposed flows are equal to or greater than the flows that are required in the current project license. Cal Fish & Game also filed a 10(j) recommendation and the Forest Service filed a preliminary 4(e) condition specifying seasonal flow regimes for each reach and water year type. South Feather also filed an alternative 4(e) condition specifying minimum flows that were in some cases consistent with the Forest Service's 4(e) flows, but in most cases were intermediate between the flows proposed in the license application and the Forest Service's 4(e) flows.

South Feather also proposes that instantaneous flows be allowed to deviate below the specified minimum flow releases by up to 10 percent or 3 cfs, whichever is less. The Forest Service specifies that the instantaneous flow be at least 80 percent of the specified mean daily flow for minimum flows less than or equal to 10 cfs, and at least 90 percent of the specified mean daily flow for minimum flows greater than 10 cfs. Cal Fish & Game did not state whether any short-term deviations would be allowed from its recommended minimum flows.

To develop the flows that it proposed in its license application, South Feather used a defined process that included establishing a target habitat value based on fish population studies, determining an initial flow to achieve the target habitat value based on habitat time series analysis, and refining the flow proposal as necessary based on the results of other studies. South Feather's approach to developing these seasonal flow

³⁰Although flows in the SFFR/Lost Creek reach are not specified, the reach would receive the combined minimum flows from the South Fork diversion dam and Lost Creek reaches, plus accretion.

regimes ensured that its proposed flows would, at minimum, maintain at least 100 percent of the trout habitat that is available under current operation and at least 70 percent of unregulated habitat³¹ in each month for each water year type, while also taking into account the needs of special status aquatic species. More stringent criteria of 75 and 80 percent of unregulated habitat were applied to reaches where trout populations were not considered to be robust, to provide additional enhancement to habitat in these reaches.

The minimum flows specified by the Forest Service are generally similar to or higher than South Feather's proposed flows during the fall and winter months, but in most cases are substantially higher than South Feather's proposed flows from March through June. The process that Forest Service used to develop its flow regimes appears to be somewhat more qualitative and less well defined than the approach used by South Feather, and its filing does not provide a specific justification or methodology that it used to determine the flows specified for each reach, month, and water year type. Differences in the approach described by the Forest Service include the use of a wetted perimeter approach to determine minimum streamflows during the summer months in most reaches, attempting to achieve 100 percent of the maximum WUA for rainbow trout spawning and rearing habitat in the spring and summer, and not accounting for the effect of accretion flows that occur within each reach.

Flows recommended by Cal Fish & Game are the same as the Forest Service-specified flows in the Little Grass Valley dam reach and in Slate Creek, and are generally similar to the Forest Service-specified flows during the fall and winter in the other reaches. Like the Forest Service, Cal Fish & Game did not provide a specific rationale or description of the methodology that it used to develop its flow recommendations.

South Feather's alternative 4(e) flows are in most cases higher than the flows proposed in South Feather's license application and would provide substantial increases in trout habitat in most months and water year types, compared to the flows proposed in the license application. South Feather's alternative 4(e) flows are the same as the Forest Service-specified flows for all water year types in Slate Creek and for wet water years in the South Fork diversion dam reach. South Feather's alternative 4(e) flows are considerably lower than the Forest Service 4(e) flows from April through June in other water year types in the South Fork diversion dam reach and in all water year types in the other three reaches, where they are generally between 30 and 50 percent of the flows specified by the Forest Service and recommended by Cal Fish & Game. Although the Forest Service and Cal Fish & Game flows would generally provide more trout habitat than South Feather's alternative 4(e) flows, in most cases the increase is relatively minor. South Feather's alternative 4(e) flows in Lost Creek would actually provide more WUA for spawning rainbow trout (94 to 96 percent of maximum) compared to the Forest

³¹We used the term "unregulated habitat" to represent the amount of habitat that would occur without the influence of South Feather Power Project operations.

Service-specified flow condition (58 to 84 percent of maximum) during the key spawning period of March through May.

In its filing of its alternative 4(e) conditions, South Feather noted that the higher flows specified by the Forest Service during the spring months would depress water temperatures in Lost Creek to levels that are below optimum levels for rainbow trout spawning and for FYLF breeding. Temperature monitoring conducted by South Feather in 2004 and 2005 indicates that water temperatures directly below Lost Creek dam did not rise to levels within the 9 to 14°C range identified by the Forest Service as being optimal for rainbow trout spawning until May in both years. Water temperatures directly downstream of the dam did not rise above the 12°C threshold that is considered to be required for FYLF breeding in any month during 2004, and did not rise above 12°C until August in 2005. Because higher flows would reduce the extent of warming that occurs as water passes downstream through the reach, it is likely that the higher flows specified by the Forest Service would delay the attainment of water temperatures that are suitable for rainbow trout spawning and for FYLF breeding. South Feather's alternative 4(e) flows for Lost Creek in the spring and summer months are about 10 to 60 percent less than the Forest Service and Cal Fish & Game's flows, and would therefore have a smaller effect on the rate that water temperatures rise in the spring, and have less potential to adversely affect the suitability of water temperatures for rainbow trout spawning and FYLF breeding.

Higher flows specified by the Forest Service in the South Fork diversion dam and Forbestown diversion dam reaches would likely reduce habitat suitability for FYLF by reducing water temperatures and providing less stable flows, and also could reduce the length of the Forbestown diversion dam reach that is suitable for hardhead, which prefer water temperatures between 17 and 28°C. Similarly, higher summer flow releases required downstream of each of the project's larger storage reservoirs (i.e., Little Grass Valley and Sly Creek reservoirs) under the Forest Service-specified flows would likely increase the length of the reaches below each reservoir in which invertebrate diversity and production is reduced by the influence of coldwater outflows and increased thermal stability. This would likely have an adverse effect on trout production in the reaches downstream of Little Grass Valley and Lost Creek reservoirs. South Feather's alternative 4(e) flows in the South Fork diversion dam and Forbestown diversion dam reaches are generally between 30 and 60 percent lower than Forest Service and Cal Fish & Game's flows during the spring and summer months, and would therefore have a proportionately smaller effect on spring and summer water temperatures, and less potential to adversely affect FYLF breeding and habitat for hardhead.

The higher minimum flows specified by the Forest Service and recommended by Cal Fish & Game for the reach below Little Grass Valley dam would cause Little Grass Valley reservoir to be drawn down to lower levels in the summer and to not fill to as high a level as currently occurs, particularly during Below Normal and Dry water years. Similar effects on reservoir surface area also would be apparent. These reductions in water level and surface area could cause some adverse effects on bald eagle foraging,

boat ramp access, sheltered boating opportunities in Pancake Bay, and aesthetics. South Feather's alternative 4(e) flows in the Little Grass Valley dam reach are generally between 30 and 80 percent less than the Forest Service and Cal Fish & Game's flows during the spring and summer months, and as a result would have a proportionately smaller effect on drawdown levels. To minimize potential adverse effects on reservoir-based recreation, South Feather also proposes to maintain water surface elevations in Little Grass Valley reservoir above 5,023 feet msl through September 15, which is a 1-foot increase over existing conditions. Although the peak recreation season extends from about May 21 through October 15 at Little Grass Valley reservoir, use decreases after the Labor Day weekend, so South Feather's proposed measure should minimize adverse effects on recreation during the period of highest use.

Finally, no party has provided a basis for including a provision to allow for the under-release of minimum flows. Without such a basis, we see no need to include this provision, and recommend that compliance be based upon meeting the instantaneous and daily average flow volumes identified in South Feather's alternative 4(e). If some variation in flow release is anticipated, this is normally accommodated by providing a slight over-release, and if releases are found to be non-compliant, the licensee is usually required to notify the Commission of the violation, and to take immediate action to return to compliance.

We recommend including South Feather's alternative 4(e) flows in the staff alternative for the following reasons: (1) substantial increases in habitat for adult trout in all reaches compared to the flows proposed in the license application; (2) lower potential for causing adverse temperature effects on rainbow trout spawning, hardhead rearing, and FYLF breeding than the higher Forest Service and Cal Fish & Game flows; and (3) lower potential for adverse effects on recreation use and bald eagle foraging from low water levels in Little Grass Valley reservoir than the higher Forest Service and Cal Fish & Game flows.

We estimate that the flow regime proposed by South Feather in its license application would reduce the average annual power generated at the project by 8,685 MWh and would reduce the annual net benefit of the project by \$587,200 compared to current operation, while the flow regime defined in South Feather's alternative 4(e) condition would reduce the average annual power generated at the project by 22,139 MWh and would reduce the annual net benefit of the project by \$1,558,700 compared to current operations. Due to the substantial improvement that would be provided to trout habitat in a total of 38 miles of stream in six stream reaches, we conclude that the benefit of implementing the alternative 4(e) flows is worth its costs. We estimate that implementing the minimum flows specified by the Forest Service and recommended by Cal Fish & Game would reduce average annual project generation by 28,192 and 33,636 MWh, respectively, and would reduce the annual net benefit by \$2,031,900 and \$2,432,300, respectively. Because of their additional cost and because the higher flows included in these proposals would have substantial potential to cause adverse temperature effects on trout and aquatic productivity in the Little Grass Valley dam and Lost Creek

dam reaches, on hardhead in the Forbestown diversion dam reach, on FYLF habitat in several reaches, and on water levels and recreation use at Little Grass Valley reservoir, we conclude that the Forest Service and Cal Fish & Game flow recommendations are not warranted, due to these negative impacts and higher costs.

Ramping Rates

Rapid changes in streamflow have the potential to strand and kill young fish and macroinvertebrates, and may cause adverse effects on amphibians including FYLF. Because each of the powerhouses discharge into reservoirs or diversion pools, peaking operation of the South Feather Power Project does not cause flows or water levels in riverine reaches to fluctuate. However, rapid flow changes in riverine reaches would occur occasionally during spills and when high flow releases are made from project dams for geomorphic purposes or to support whitewater recreation. Cal Fish & Game recommends that ramping rates be limited to a maximum of 0.5 foot per hour to minimize fish stranding. Because whitewater flow releases would occur only once per year in each reach and the release of geomorphic flows into Lost Creek would occur only once every 4 years, the cost associated with implementing this ramp rate in the Little Grass Valley dam, South Fork diversion dam, Lost Creek dam, and Forbestown diversion dam reaches is negligible, and we conclude that the benefits to fish populations are worth its cost. Because implementing ramping constraints at Slate Creek could limit the effectiveness of sediment pass-through activities, we do not recommend that ramping rate restrictions be imposed in this reach. Also, because the rate of flow change during naturally occurring spills at project dams is not controllable, the ramp rate should be applied only to flow changes that are controllable by South Feather.

Flow Monitoring and Water Management during Extended Drought Conditions

South Feather proposes to monitor compliance with its proposed minimum flows using existing USGS flow gages in each reach. Cal Fish & Game recommended and Forest Service specified that South Feather operate, maintain, and modify (if needed) existing gages that are needed to determine the river stage and minimum streamflow in each project-affected reach. The Forest Service also filed preliminary and revised 4(e) conditions specifying the methodology that would be followed to determine the water year type that would guide the implementation of minimum flows, and to consult with stakeholders to develop an operating plan to manage flows during drought conditions. South Feather indicated in its reply comments that it did not object to the revised 4(e) measures.

Continued operation of the USGS gages in each of the affected reaches, including any modifications that may be required to accurately measure minimum flows or ramping rates that are included in a new license, would help to ensure that these gages remain functional and can be used to effectively monitor compliance with flow-related measures included in the license. The gages also would help to ensure that flow data continues to be available to other water users in the basin and to the general public. Provision of flow

data recorded at 15-minute intervals to the agencies upon request would help to verify compliance with any instantaneous flows and ramping rates that are included in the license. We estimate that funding the continued operation of the USGS gages would have an annualized cost of \$20,000. Because continued operation of these gages is needed to verify license compliance and to ensure that the benefits of implementing minimum flows to the project-affected reaches are realized, we conclude that the benefits of this measure are worth its costs.

Yuba River Reopener

Diversion of water from Slate Creek to Sly Creek reservoir reduces the volume of water that is contributed to the Yuba River via Slate Creek. The Yuba County Water Authority recommends that the Commission reserve authority to require South Feather to make reasonable provisions for modifying project facilities or operation as necessary to mitigate or avoid cumulative effects identified in any environmental analysis of the Yuba River Project (FERC No. 2246). They indicate that this reservation would be applicable in the context of any relicensing or license amendment proceeding involving the downstream Yuba River Project.

We include analysis in this document of the cumulative effects of relicensing the South Feather Power Project on water resources, and adopt several measures that we consider to be appropriate to address the project's contribution to cumulative effects on water resources in the Yuba River basin. If additional measures are needed because of proposed changes in the operation of the Yuba River Project, it would be appropriate to consider the need to mitigate for the effects of those changes in the proceeding that would implement those changes. For this reason, and because we cannot assess the benefits and the costs of what measures might be required under the proposed Yuba River reopener, we do not recommend that it be adopted.

Water Temperatures Downstream of Kelly Ridge Powerhouse

The release of warm water from the Kelly Ridge powerhouse has the potential to increase water temperatures in the Feather River downstream of Lake Oroville, and may contribute to exceedance of DWR's water temperature targets established in the Oroville Settlement Agreement to protect anadromous fish broodstock that are collected at the fish barrier dam for the Feather River fish hatchery, which is located about 5 miles downstream from the Kelly Ridge powerhouse. The hatchery was built as mitigation for the effects of the construction of the Oroville Project on anadromous fishes. DWR, Cal Fish & Game, NMFS, and SWC/MWD recommend that South Feather be required to curtail or cease power generation at the Kelly Ridge powerhouse when the temperature of waters released from the powerhouse exceed specified values.

Implementation of these recommendations could assist DWR with meeting its temperature objectives identified in the settlement agreement, and could thus benefit anadromous fish by reducing the potential for stress and mortality of adult broodstock, eggs, or juvenile salmon and steelhead caused by exposure to high water temperatures.

However, whether or not downstream temperature objectives are met ultimately depends on DWR's operation of the Oroville Project. When DWR is generating at its Hyatt powerhouse, releases from Kelly Ridge powerhouse have a minimal effect on downstream water temperatures due to the higher volume of flows that are released from the Hyatt powerhouse, which has a typical generation flow range of 4,000 to 8,000 cfs and a minimum generating flow of 2,400 cfs. If South Feather shut down the Kelly Ridge powerhouse completely, DWR still may not meet its temperature objectives during hot weather conditions if the Hyatt powerhouse is not generating. Conversely, under the same hot weather conditions, if the Hyatt powerhouse is generating the Kelly Ridge powerhouse could be operated at full capacity and DWR could meet its downstream temperature objectives. Compliance with the temperature objectives in the Oroville Settlement Agreement, which DWR agreed to and to which South Feather is not a party, is clearly within their ability to control. We estimate that the annualized cost of curtailing or ceasing operation of the Kelly Ridge powerhouse according to the temperature criteria proposed by these parties would reduce the average annual generation by about 9,541 to 15,696 MWh and reduce the annual benefit of the project by about \$615,100 to \$1,002,000 per year. Because these downstream temperature targets have been agreed to by DWR to enhance operation of its fish hatchery, and because achievement of the targets depends primarily on Oroville Project operations, we see no reason why South Feather should be required to bear the costs of this measure. As a result, we do not recommend that any limitation on the quantity or temperature of water that can be discharged from the Kelly Ridge powerhouse be included in the license.

Water Temperature Monitoring

South Feather proposes to install and maintain a continuous water temperature monitor at USGS gage 11413300 (RM 9.1) downstream of the Slate Creek diversion dam and to cease diversions from Slate Creek whenever the mean daily water temperature is greater than 20°C for three consecutive days between June 1 and September 15. South Feather also proposes to install continuous temperature monitors in the downstream ends of the South Fork diversion dam reach near the Woodleaf powerhouse (RM 7.9) and in the Forbestown diversion dam reach near the Forbestown powerhouse (RM 1.8) to provide information needed to ensure that whitewater flow releases do not occur during the FYLF breeding season. South Feather also monitors water temperatures at the Miners Ranch water treatment facility on Miners Ranch reservoir.

Cal Fish & Game recommends that South Feather monitor water temperatures in the SFFR immediately above the fish passage barrier (RM 3.7) in the Forbestown diversion dam reach to demonstrate whether the recommended flows in the reach are adequate to reduce temperatures below 20°C. Cal Fish & Game recommends that South Feather also install and maintain continuous water temperature monitors at RM 8.9 on Slate Creek, at RM 28.3 on the Little Grass Valley dam reach of the SFFR, at RMs 8.1 and 9.1 on the South Fork diversion dam reach, and in the Kelly Ridge powerhouse. The monitors would be used to record water temperatures at 1-hour intervals from May 1

through September 15 annually, and the data would be provided to Cal Fish & Game and other interested agencies in a technical report within 6 months following completion of each sampling effort.

NMFS recommends that South Feather maintain a temperature monitoring station in Miners Ranch reservoir at the Kelly Ridge intake and provide temperature data at 15-minute intervals in a format that is available to the public.

Water temperature data collected from the proposed monitoring site on Slate Creek would provide information that would be needed to implement South Feather's proposed flow regime for Slate Creek, which includes shutdown when daily average water temperatures exceed 20°C for three consecutive days. We estimate that monitoring Slate Creek water temperatures would have an annualized cost of \$5,700. Although we are not able to estimate the generation that would be foregone due to cessation of diversions from Slate Creek, South Feather stated that the volume of water diverted during the summer is small, and the amount of lost generation would be minor. Ceasing diversions from Slate Creek when average water temperatures exceed 20°C would benefit trout populations in Slate Creek downstream of the diversion, and would ensure the project has no adverse effects on the beneficial use of supporting coldwater aquatic life, and we conclude that these benefits outweigh the costs of this measure. Installing the temperature monitor at the USGS gage, as proposed by South Feather, would provide a secure location for temperature data to be collected and transmitted in real-time to inform the project operators when diversions should be discontinued and resumed. We see no substantial advantage of installing the temperature monitor at the location recommended by Cal Fish & Game, 0.2 mile downstream of the gage, where a secure mounting location and data telemetry system would be more costly and would involve placement of a small structure that would adversely affect the aesthetics of the stream environment.

Cal Fish & Game's proposal to monitor water temperature data at five additional locations, and to provide annual technical reports summarizing monitoring results would help to document any changes in water temperatures that occur under the minimum flow regimes that are implemented in a new license, and NMFS' proposal to monitor water temperatures at the Kelly Ridge powerhouse would help to identify time periods when project operations may be adversely affecting water temperatures downstream of the powerhouse. The temperature data, along with flow information could help DWR to manage its operation to achieve the temperature objectives specified in the Oroville Settlement Agreement, while meeting system needs concerning the quantity and timing of hydroelectric generation and consumptive water supply.

We recommend that South Feather consult with Cal Fish & Game, NMFS, and DWR to develop a water temperature monitoring plan designed to determine the effects of the implemented flow regime on water temperatures in each reach and the temperature of water discharged from the Kelly Ridge powerhouse. Consultation with DWR would ensure that the monitoring data is collected at locations and in a manner that will be useful to DWR, including the collection frequency, data format, and months when data will be

collected. We estimate the annualized cost of developing and implementing such a temperature monitoring plan to be \$8,700, and because it would help to ensure the effective use of the hydropower facilities in the basin to meet regional energy demands, we conclude that the measure is worth its cost.

Selective Withdrawal

Flows released from Little Grass Valley reservoir are drawn from deep in the reservoir, resulting in cool water temperatures in the SFFR downstream from the reservoir. Cal Fish & Game recommends that South Feather develop and implement a plan to allow water to be selectively withdrawn from the entire water column in Little Grass Valley reservoir so that the water temperature of release flows can be more closely matched to the optimum temperatures for trout.

Although water temperatures in the Little Grass Valley reservoir reach are below the optimum range identified in the literature for growth of rainbow trout, we note that rainbow trout populations prosper in habitats that include a very wide range of temperature regimes, and that fish population sampling conducted by South Feather indicates that trout populations downstream from Little Grass Valley reservoir are in very good condition. We also note that releasing warmer water from Little Grass Valley reservoir would contribute to high water temperatures further downstream in the Forbestown diversion dam reach of the SFFR, and could adversely affect trout populations in that reach. We estimate that the annualized cost of implementing selective withdrawal at Little Grass Valley reservoir would be about \$73,800. Because the available data indicate that the low temperature of water released from Little Grass Valley reservoir is not having a substantial adverse effect on trout populations in downstream reaches, we conclude that the benefits of this measure are not worth its costs.

Fish Entrainment

Entrainment of fish into project intakes removes fish from upstream populations, and may cause injury or mortality to a portion of the fish that would otherwise be recruited to downstream populations. South Feather evaluated the potential for fish entrainment at project intakes in its license application, concluded that effects of the project on trout populations were likely to be minor, and did not propose any measures to reduce or mitigate for fish entrainment. Cal Fish & Game recommends that South Feather develop and implement a plan to screen the intakes at the South Fork diversion dam, Slate Creek diversion dam, and the Woodleaf powerhouse intake in Lost Creek reservoir with fish screens acceptable to Cal Fish & Game and in accordance with their screening criteria. The Forest Service specifies, in its revised 4(e) conditions, that South Feather develop and implement a wild fish supplementation program to mitigate for lost fish resources in the SFFR, in Slate Creek, and in Sly Creek and Lost Creek reservoirs. The basis for determining the number of fish to be planted would be determined by reviewing age class distributions of rainbow trout in the Little Grass Valley dam and the upper Slate Creek diversion dam reaches, and estimating the numbers of fry that are

needed to attain density and biomass levels observed in streams surrounding the project area.

South Feather developed and implemented a study in consultation with the agencies to assess the potential for entrainment losses to affect fish populations in the project area. The study focused on rainbow and brown trout, and included a literature review, a review of the likelihood of entrainment based on the physical characteristics of each intake, and an assessment of trout populations upstream and downstream of each intake. Although it is likely that some fish are entrained into each of the intakes and that some fish are killed during turbine passage, the results of South Feather's literature review and analysis indicate that entrainment potential at two of the three intakes may be limited. The entrainment potential at the Sly Creek reservoir power tunnel intake is probably reduced by the depth of the intake, and the potential for entrainment into the intake to the Woodleaf power tunnel in Lost Creek reservoir is limited by the relatively low water velocity at the trashrack. Although the Forbestown power tunnel intake may have a greater potential to entrain fish than the intakes in Sly Creek and Lost Creek reservoirs, the relatively high average biomass of trout in the SFFR/Lost Creek reach upstream of the Forbestown diversion indicates that entrainment is not having a substantial adverse effect on the trout population upstream of the diversion.

Construction of effective fish screening facilities at each diversion as recommended by Cal Fish & Game would minimize entrainment mortality, and would likely provide some benefit to trout populations. However, construction of an effective screening facility at Slate Creek is probably not feasible given the stream's high sediment load, which has filled in the diversion pool.

While we recognize the limited entrainment potential at the project intakes, implementing the wild fish supplementation program specified by the Forest Service and supported by South Feather would serve to augment fish populations in any reaches where entrainment losses may be limiting recruitment to levels that are not adequate to meet the carrying capacity of available habitat. Using population assessment data to guide the stocking program would ensure that stocking only occurs in reaches and years when trout populations have been affected. We also recommend that South Feather file annual reports on its stocking program. The report should include the population data that is used to assess stocking needs and the numbers of fish stocked at each location. We estimate that screening the project diversions as recommended by Cal Fish & Game would have an annualized cost of about \$3,041,100, while implementing the Forest Service's revised 4(e) measure would provide a comparable benefit to trout populations with an annualized cost of \$15,900. Because it would provide a comparable benefit at a much lower cost, we recommend implementing the wild trout stocking measure specified by the Forest Service.

Fish Monitoring

The Forest Service filed revised 4(e) conditions specifying that, within 1 year after license issuance, South Feather develop a plan a plan to monitor fish populations at eight sites in the project-affected bypassed reaches, in consultation with the Forest Service and other interested governmental agencies. Fish surveys would be conducted in two successive years and begin in the fifth full year after implementation of new license streamflows. Fish surveys would be conducted in years 5, 6, 11, 12, 17, 18, 23, 24, and 29 in each survey reach, or at a frequency jointly agreed to by the agencies. If sampling is scheduled in years with high peak flows, the survey may be postponed by 2 years to avoid confounding effects of high peak flows on fish recruitment and populations. South Feather indicated in its reply comments that it fully supports all of the Forest Service revised 4(e) conditions, including the fish monitoring plan. Cal Fish & Game filed a similar plan, but did not include a provision to defer sampling in high flow years, and included monitoring at all 11 sites that were sampled during South Feather's licensing studies.

Monitoring fish populations would assist with determining the effects of any changes in operation or other measures that are implemented in the new license, and with assessing whether any modifications or additional measures are needed. South Feather's analysis of fish population data indicates that fish populations can be substantially reduced during and following severe flood events. Postponing sampling by up to 2 years after a flood event as specified by the Forest Service would improve data consistency, which would help to identify population effects associated with the measures or operational changes that are implemented in the new license.

In its reply comments, South Feather indicates that the smaller number of study sites specified by the Forest Service is more appropriate than the 11 sites recommended by Cal Fish & Game. South Feather reports that the sites that are not included in the Forest Service-specified plan include two sites that are dominated by warmwater fish, which are not an agency management priority, and one Lost River site that has been affected by local site disturbance and excessive angling pressure.

We estimate the annualized cost of the Forest Service and Cal Fish & Game fish monitoring plans at \$35,300 and \$48,500, respectively. Because fish monitoring would help to document the effectiveness of the new flow regime and whether or not it is having the intended effects on aquatic resources, we conclude that fish monitoring is worth the cost. Because deferring sampling in high flow years would provide a better assessment of the response of fish populations to the new flow regime and because of the limited benefit that would be provided by sampling at the three additional sites included under Cal Fish & Game's monitoring plan, we recommend implementing the Forest Service's fish monitoring plan.

Benthic Macroinvertebrate Monitoring

The Forest Service filed revised 4(e) conditions specifying that, within 1 year after license issuance, South Feather develop a plan, in consultation with the Forest Service and other interested governmental agencies, to monitor benthic macroinvertebrates in affected bypassed reaches. South Feather indicated in its reply comments that it fully supports all of the Forest Service revised 4(e) conditions, including the benthic macroinvertebrate monitoring plan. The plan specified by the Forest Service would involve conducting surveys in the same years as fish population monitoring (years 5, 6, 11, 12, 17, 18, 23, 24, and 29).

Cal Fish & Game recommends a benthic macroinvertebrate monitoring plan that is identical to the Forest Service plan, except that sampling would be conducted in years 1 through 4 and in years 8, 12, 16, and 24, unless an alternative monitoring schedule is approved in consultation with the agencies. In addition, Cal Fish & Game recommends that South Feather follow the most recent Cal Fish & Game protocols for sampling benthic macroinvertebrate species composition and abundance.

We estimate the annualized cost of the Forest Service and Cal Fish & Game benthic macroinvertebrate monitoring plans at \$23,500 and \$44,700, respectively, assuming that both plans would include monitoring the same number of sites that each agency recommended for fish monitoring (8 sites for the Forest Service and 11 sites for Cal Fish & Game). Similar to fish monitoring, benthic macroinvertebrate monitoring would assist with determining the effectiveness of measures implemented in the new license for enhancing trout populations, and we conclude that the benefits of implementing a benthic invertebrate monitoring plan are worth its costs. Sampling benthic macroinvertebrates in the same years as fish population monitoring would help to identify relationships between fish populations and the abundance of the aquatic macroinvertebrate prey base, which would improve understanding of the effects of implemented measures on aquatic productivity. Using the same sampling procedures over time would ensure that comparable data are collected over the period of monitoring, and would avoid any confounding effects that may result from any changes in Cal Fish & Game's sampling protocols. Because of these added benefits, we recommend adopting the plan as specified by the Forest Service.

Terrestrial Resources

Noxious Weeds

Project operation may potentially affect vegetation through the introduction and spreading of noxious weed species. Any O&M activities that disturb soil or remove existing vegetation could increase the spread of noxious weeds and would have a direct effect on vegetation. Potential indirect project effects could come from recreational users that spread noxious weed seeds or other regenerative plant materials from colonized to non-colonized areas.

South Feather proposes several measures to prevent and control the spread of noxious weeds on National Forest System lands within the project boundary. South Feather also would implement control measures where contiguous populations continue on National Forest System lands outside of the project boundary, as long as the majority of the treated area is on project lands. The measures proposed by South Feather include training staff to recognize noxious species, monitoring populations, sharing information on new populations with the Forest Service, and implementing several best management practices aimed at reducing the spread of noxious weeds.

The Forest Service filed a preliminary 4(e) condition that is consistent with South Feather's proposed plan but also would require South Feather 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 species; and (4) provide information on noxious weed populations in a data format compatible with the Forest Service GIS database.

Implementing South Feather's proposed invasive weed and vegetation management plan would help to control current populations and future infestations of noxious weeds on project lands. The additional measures specified by the Forest Service would provide a more comprehensive level of control, help to address the spread of noxious weeds by recreational users, and improve information-sharing on the occurrence and spread of noxious weeds. We estimate that South Feather's proposed plan would have an annualized cost of \$7,600, and that the expanded plan specified by the Forest Service would have an annualized cost of \$9,800. Because it would improve the control of noxious weeds at a reasonable cost, we recommend adopting the plan as specified by the Forest Service.

Foothill Yellow-legged Frog (FYLF)

South Feather proposes several measures to minimize effects on FYLF including implementing minimum flows that take into consideration FYLF habitat needs and avoiding high pulse flows during critical time periods. South Feather proposes to avoid the release of controlled high flows during the FYLF breeding season, which it defines as starting on April 15 or when water temperatures reach 13°C (whichever is later) and extending until October 31.

The Forest Service specifies that ramping rates be developed to meet Forest Service targets for water velocity and stage changes to protect FYLF egg masses and tadpoles. The Forest Service developed these targets based on empirical data presented in Kupferberg et al. (2008) and Lind et al. (2008). These targets would limit water velocities to 0.8 foot per second or less where egg masses are located and would limit stage reductions to dewater no more than 20 percent of egg masses, and would limit changes in water velocity to no more than 0.4 foot per second per hour, with velocities not to exceed 1.0 foot per second at locations where tadpoles and juvenile FYLF occur.

The Forest Service methodology would identify velocity and stage-discharge relationships, and map available habitat at FYLF study sites for different water year types to determine appropriate ramping rates between low and high flows.

The Forest Service specifies and Cal Fish & Game recommends that South Feather develop a FYLF monitoring plan that would include annual monitoring surveys 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. Cal Fish & Game also recommends that, after 5 years of monitoring, South Feather develop and implement ramping rates that would protect FYLF egg masses and tadpoles in all reaches where they occur.

The Forest Service specifies and Cal Fish & Game recommends that South Feather conduct video surveys to identify areas of vegetation channel encroachment in the fourth year after license issuance to be repeated every 10 years. South Feather would conduct the surveys by helicopter along the South Fork diversion dam and Forbestown diversion dam reaches and identify up to three segments within the South Fork diversion dam reach and up to five segments in the Forbestown reach where vegetation is encroaching into the channel. South Feather would then treat these reaches with vegetation removal measures, and evaluate the effectiveness of the treatments every 5 years to determine if conditions would warrant another treatment. In addition, the Forest Service specifies the development of a population model, a population viability model, a 2-D habitat model, and monitoring of water temperatures along stream margins, and changes in geomorphology and riparian encroachment.

South Feather filed an alternative 4(e) condition that would include both full reach and representative surveys to determine whether FYLF populations change as a result of proposed changes in project operations. The full reach surveys would be conducted in the first year after relicensing and then every 10 years, and would include all reasonably accessible FYLF habitat in the SFFR/Lost Creek, Forbestown, and Slate Creek reaches. Representative surveys would be conducted at one site within each of the three reaches once every 10 years starting on the fifth year after relicensing.

The survey methods described in South Feather's alternative 4(e) condition would be similar to those used for the re-licensing studies. South Feather's proposed survey methods would be similar to those used for the re-licensing studies. The surveys would consist of visual encounter surveys for counts of egg masses, tadpole groups, and young-of-year frogs. The full reach surveys would document the overall distribution of FYLF in each reach and detect shifts in the spatial distribution of FYLF in relation to project effects.

Based on the results of these surveys, South Feather would evaluate project effects on FYLF. If adverse project-related effects are evident, South Feather would recommend studies targeted on ramping rates, water temperatures, population viability, or other appropriate studies to determine the mechanisms of these adverse effects. South Feather

would then use the results of these targeted studies to identify appropriate mitigation measures.

The increased flows specified by the Forest Service and proposed by South Feather are designed to improve trout habitat and provide for whitewater recreation. On the other hand, these flows also have the potential to affect FYLF by reducing water temperature and changing channel morphology. Proposed flow increases would alter the existing hydrograph in stream channels downstream from project facilities. Low flows reduce available habitat and can increase mortality of egg masses and tadpoles stranded in dry areas, while high flows and rapid changes in flow can wash egg masses, tadpoles, and adults downstream to unsuitable habitat.

The flows proposed by South Feather in its license application and in its alternative 4(e) measure are not as high as the Forest Service specifications, and therefore would have less potential to disrupt FYLF habitat and breeding patterns. South Feather's proposal to avoid high flow releases during FYLF breeding periods would reduce the potential displacement of egg masses, tadpoles, and adults to unsuitable habitat. Following the Forest Service-specified methodology to map suitable habitat and identify appropriate ramping rates for each water year type also would reduce the potential for displacement during flow increases and reduce the potential for stranding during flow decreases.

While these protection measures are expected to limit effects on FYLF, continued monitoring is required to ensure they are effective and that new project operations do not detrimentally affect this species. We consider South Feather's approach outlined in its alternative 4(e) condition of combining full-reach and representative reach surveys to be sound. However, because increased minimum flows and whitewater flow releases could change the location of preferred breeding areas, we conclude that conducting full-reach surveys in each of the first 5 years would allow for more accurate determination of current FYLF distribution and detection of any shifts in distribution that occur as a result of project operations. These initial full reach surveys would also provide for a more accurate selection of representative reaches. Surveys of representative reaches would be conducted in years 6 to 10, and then continuing with South Feather's 10-year cycle of alternating full reach and representative sampling with surveys every 5 years. This approach would provide detailed information on the distribution and response of FYLF populations to the new flow regime that occurs over the first 5 years, and would provide a sufficient amount of sampling over the rest of the license term to assess longer-term changes in habitat and breeding success. If short- or long-term effects are detected, the implementation of additional studies targeted on identifying the mechanism of such effects and developing mitigation measures, as South Feather includes in its alternative 4(e) condition, would be appropriate at that time. With our recommended change in survey frequency, we consider the FYLF monitoring program that we recommend to be consistent with the FYLF monitoring surveys specified by the Forest Service and recommended by Cal Fish & Game.

The studies specified by the Forest Service, including habitat, population, and population viability models, as well as physiological studies related to water temperature and monitoring of changes in geomorphology are not necessary to determine the presence of project-related effects. We consider South Feather's approach to be more cost-effective, in that targeted studies would be conducted if and only if ongoing adverse effects are identified. Additionally, South Feather's riparian encroachment study indicates that riparian vegetation is present within the active channel in some locations, but is limited in extent. The studies indicate the timing and intensity of high flows over the time frame of the current project license have largely controlled vegetation encroachment through channel scour. As such, we conclude that implementing treatments to remove riparian vegetation as specified by the Forest Service would be premature. We conclude, however, that helicopter surveys over the South Fork diversion dam and Forbestown diversion dam reaches, as recommended by Cal Fish & Game and specified by the Forest Service, would assist with identifying areas of potential riparian encroachment and with guiding ground-level assessment of effects of encroachment on FYLF habitat, and should be incorporated into the FYLF survey protocol. If monitoring results indicate that encroachment is affecting FYLF, then treatment to remove riparian vegetation may be considered at that time.

Although the Forest Service and Cal Fish & Game do not specifically state whether the surveys conducted in each year would involve monitoring the full length of each stream reach, our recommended approach is consistent with their objective to determine project effects on FYLF. We estimate that this approach would have an annualized cost of \$66,900, as compared to \$24,900 for the monitoring regime outlined in South Feather's alternative 4(e) condition. Because our recommended approach would assist with determining the effectiveness of measures implemented to protect FYLF and with refining these measures, if needed, we conclude that these benefits warrant the costs of this measure. We estimate that the annualized cost of the additional population and habitat modeling, physiological studies, and monitoring of changes in geomorphology specified by the Forest Service would be \$157,900. As discussed above, the need to conduct additional targeted studies should be determined based on monitoring results, and we conclude that the cost of the additional studies prescribed by the Forest Service is not warranted at this time.

Controlling the rate of flow and stage changes during critical time periods would limit the potential for mortality of early life stages of FYLF. South Feather has proposed to stop the release of high pulse flows during periods of FYLF breeding activity. In addition, we recommend that South Feather implement the methodology specified by the Forest Service to identify appropriate ramping rates to protect FYLF. The Forest Service methodology would identify velocity and stage-discharge relationships, and map available habitat at FYLF study sites for different water year types to determine appropriate ramping rates between low and high flows. We estimate that implementing the Forest Service's approach would have an annualized cost of \$10,200, and conclude that the benefits of this measure are worth this modest additional cost.

Recreation Resources

Replace and Rehabilitate Existing Recreation Facilities

South Feather proposes to develop and implement conceptual facility master plans for Little Grass Valley and Sly Creek reservoir recreation areas comprising an overall conceptual plan that illustrates the layouts, locations, and relationships between existing facilities and proposed improvements. In addition, South Feather proposes to develop and implement individual site development plans and proposes site rehabilitation measures for each existing recreation facility within the existing project boundary, as discussed in section 3.3.5, *Recreation Resources*. South Feather's proposal would allow the Forest Service and other stakeholders to have input in the development of these plans and would ensure the proposed measures would be implemented in a manner consistent with the Forest Service's management goals and other resource management plans at the project. Although coordination among the licensee, governmental agencies, and interested stakeholders is encouraged in developing and implementing the proposed recreation measures, the licensee is ultimately responsible for the construction, operation, and maintenance of the project's recreation facilities.

In addition to the facility master plans and individual site plans described above, South Feather's proposed capital improvements, including constructing a recreation access trail below Little Grass Valley dam and minor maintenance measures, such as replacing fire rings and improving parking, would improve existing facilities and increase public access at the project.

We estimate the annualized cost associated with implementing the facility master plans, the individual site rehabilitation measures, the minor maintenance measures, and the access trail (capital improvement) at \$78,000. Given the benefits identified above, we conclude that these benefits are worth the costs.

South Feather's proposed development of facility master plans and individual site plans are consistent with the Forest Service's specified conditions, except they do not propose the additional Forest Service components of conducting an annual coordination meeting with the Forest Service, measures for public interpretive facilities, and measures to develop and implement a re-vegetation plan that would be submitted within 5 years of license issuance for all developed recreation facilities within the project boundary. The Forest Service also specifies that South Feather consult with the Forest Service and other appropriate agencies to ensure that the recreation rehabilitation and enhancements are consistent with the overall goals of other resource conditions and management plans required under the FERC license.

The annual coordination meeting with the Forest Service would help to ensure that the proposed recreation rehabilitation measures would be implemented in a manner consistent with the goals and objectives of the Plumas National Forest. The re-vegetation plan would help to ensure that any disturbed areas resulting from implementation of the recreation enhancements are adequately mitigated through reestablishment of vegetation

as necessary. Implementation of interpretive features would help to provide the means to enhance the public's knowledge and use of the recreation resources at the project. Therefore, we recommend these measures be adopted. The Forest Service additional measures would have an additional annualized cost of \$50,000, and we conclude that the benefits exceed the costs.

The Forest Service specified several additional capital improvement measures, including constructing a groundwater potable water well and providing a horse watering system at Horse Camp campground. Currently, there is no groundwater well at the project and no water for drinking or for horses at Horse Camp campground. Although South Feather proposes to upgrade the water systems, the Forest Service's proposed improvements to construct a groundwater well and implement a horse watering supply and distribution system would further improve existing facilities by providing a reliable source for drinking water to all recreation sites, including Horse Camp campground. Therefore, we recommend these measures be adopted. We find that addition of these components would result in a negligible increase in the cost of South Feather's proposed water system upgrades.

The Forest Service also specified measures involving an OHV facility development. The proposed OHV site amenities would be associated with a potential new facility located near the Sly Creek Campground that is under consideration, but yet to be developed. Further, OHV use at the project is low and future demand is low for this type of activity. Therefore, we do not recommend these additional OHV measures specified by the Forest Service.

O'Rourke Outdoor Adventures recommends that South Feather implement rehabilitation and enhancement measures at several boat ramps and campgrounds at Little Grass Valley reservoir, as well as road maintenance measures around the project. South Feather's proposal to enhance and rehabilitate project recreation facilities includes all of O'Rourke Outdoor Adventures recommendations, with the exception of extending the boat ramps. Combined with its recent upgrades at the boat ramps, we feel that South Feather's proposal would adequately improve existing facilities and access to the project. In addition, the proposed road maintenance measures are located either on roads that are already maintained on a regular basis or are outside of the project boundary. Therefore, we do not see the need for the additional boat ramp enhancement measures or road maintenance recommended by O'Rourke Outdoor Adventures.

Maintenance and Operation of Recreation Facilities

South Feather's proposed draft operation plan for Little Grass Valley and Sly Creek reservoir recreation facilities provides specific guidelines for the operation and daily and annual maintenance of these project facilities. Implementation of the proposed plan would provide measures to help ensure that these facilities are adequately maintained over the term of a new license. We estimate the annualized cost of

implementation of the proposed operation plan at \$278,700 and conclude the benefits are worth the costs.

Monitoring Recreation Use

South Feather's proposed recreation report, to be filed concurrently with the FERC Form 80 filings every 6 years, would provide periodic review of recreation facilities at the project. The FERC Form 80 already requires facility capacity and demand to be reported every 6 years; however, South Feather's additional recreation report would determine trends of use, condition of facilities, parking capacity, and whether or not resources damage is occurring. South Feather proposes to conduct the recreation user survey every 18 years (every third filing of the Form 80) and recreation user preferences could change significantly over an 18-year timeframe. Conducting the recreation user survey every 12 years (every other filing of the Form 80) would provide the means for periodic review in a shorter timeframe, which would allow for enhanced assessment of the adequacy of public recreation facilities and access at the project. South Feather's proposed recreation monitoring measures and associated recreation reports are consistent with the Forest Service's specified condition that South Feather file a recreation use and facilities condition report.

Both the recreational use report and the recreation user preference report would be submitted to the Commission for review and approval, which would provide the mechanism to help ensure that recreation facilities are provided to meet project needs and purposes over the term of a new license. Therefore, we are recommending South Feather's proposed measures for monitoring and reporting recreation use, with the modification of conducting the recreation user survey every 12 years, instead of 18 years. We estimate that the annualized costs for the recreation report that would be filed every 6 years to be \$10,000 and that the annualized cost of the recreation user survey monitoring would be \$5,600, and consider the benefits of these measures to be worth the costs.

Whitewater Boating Flows

South Feather proposes to provide a supplemental recreation streamflow into the Little Grass Valley dam reach, in all water years, from September 16 of each year until the date that Little Grass Valley reservoir elevation is drafted to 5,017 feet msl. We estimate the annualized cost of this measure to be \$13,000. South Feather also proposes to provide a supplemental streamflow, in the spring of Above Normal and Wet water years, downstream of the South Fork diversion dam for recreational purposes and to install a continuous water temperature monitor near the Woodleaf powerhouse that would allow flow releases to be stopped before the start of the foothill yellow-legged frog breeding (water temperature 13°C). We estimate the annualized cost of this measure to be \$54,300, including an average annual reduction in power generation of 620 MWh. Similarly, South Feather proposes a supplemental streamflow in the spring during Above Normal and Wet water years at Forbestown diversion dam reach to improve opportunities for Class IV and V whitewater boating in the spring and proposes to install a continuous

water temperature monitor near the Forbestown powerhouse. We estimate the annualized cost for this measure would be \$34,600, including an average annual reduction in power generation of 308 MWh.

South Feather's proposed supplemental streamflows would provide for enhanced whitewater boating opportunities in project reaches during a time of year when whitewater boating is in high demand. The provision of supplemental flows in the fall season at Little Grass Valley dam reach would provide opportunities for increased whitewater boating during a period when alternative whitewater boating opportunities within the region are scarce. We conclude that the benefits associated with these measures outweigh the costs and recommend implementation of these measures. To ensure that adverse effects on FYLF breeding are avoided, we recommend that releases in the South Feather diversion dam and Forbestown diversion dam reaches be discontinued when water temperatures rise to 12°C.

Provision of Streamflow Information

Accurate and timely stream flow information is valuable information for recreational visitors planning water-related visits to the project. South Feather's proposed provision of streamflow information to the public would provide the means for the public to gain information regarding streamflow for specific stream reaches. This would allow the public to take better advantage of opportunities for public recreational use of these stream reaches; therefore we recommend implementation of this measure. We estimate the annualized cost for this measure to be \$2,500, and conclude that the benefits outweigh the costs.

Public Safety

Public information at key locations on Little Grass Valley and Sly Creek reservoirs provides area users with information on acceptable and prohibited activities, as well as dangerous or restricted areas. South Feather took over responsibility for installing safety buoys from the local county sheriff departments in 2002, and proposes to continue to install and maintain these buoys. This measure would continue to provide recreation visitors at the reservoirs with warnings regarding boat speed, dangerous areas, and other safety information, and would help to protect the safety of the public at Little Grass Valley and Sly Creek reservoirs. We recommend implementation of this measure and conclude the benefits are worth the estimated annualized cost of \$11,600.

Cultural Resources Management

Continued operation of the South Feather Power Project without adequate protection measures could adversely affect properties that are eligible for listing on the National Register. South Feather filed a Heritage (Historic) Properties Management Plan (HPMP) for the purpose of protecting and interpreting historic properties with its license application. The Forest Service filed a preliminary 4(e) condition specifying that South Feather file a Forest Service-approved HPMP with the Commission within 1 year of

license issuance. The HPMP would take into account project effects on National Register-eligible properties located on Forest Service lands, provide measures to mitigate effects, and provide for a monitoring program and management protocols.

We find the HPMP adequately identifies the APE, describes the cultural resources inventories that were conducted within the APE, identifies existing project-related effects that could occur on potentially significant cultural resources, and provides general management measures to resolve such effects. The HPMP also provides procedures for handling unanticipated discoveries and the proper treatment of human remains and sacred objects--if they are encountered. The HPMP provides protocols for emergency undertakings, periodic reporting and meetings, and appropriate review and revisions of the HPMP based upon changing conditions over the period of a new license. However, our review of the HPMP reveals that it does not provide enough site-specific measures to ensure that project-related adverse effects on historic properties resulting from operation, maintenance, recreational, or other activities would be adequately addressed over the term of the new license.

We recommend that the HPMP include the following additional measures:

- a report on archaeological surveys conducted in the six project stream reaches within the APE;
- National Register evaluations on archaeological sites that have been or are being adversely affected by project-related erosion, especially the 10 archaeological sites located at the Little Grass Valley reservoir, but including any discovered during survey of the stream reaches;
- a provision for evaluation of project features that may become eligible for listing on the National Register during the term of any new license issued for the project; and
- a detailed discussion of Lost Creek dam, including a description of the activities that led to prior Historic American Buildings Survey/Historic American Engineering Record documentation and any SHPO consultation/concurrence regarding the structure's current National Register status.

Implementation of the HPMP, with staff's additional measures, would ensure that adverse effects on historic properties as a result of project operation, maintenance, recreational, or other project-related activities would be addressed over the term of the new license. We anticipate that any new license issued for the project would include a condition to implement a PA executed among the Commission, the SHPO, and the Advisory Council, should the Council choose to participate. South Feather, the Forest Service, and others would be invited to sign the PA as concurring parties. The PA would include a measure to implement the HPMP.

We estimate that implementation of the protective measures proposed in South Feather's HPMP would have an annualized cost of \$20,300. We estimate that the additional measures that we list above would increase the annualized cost of measures included in the HPMP to \$59,100. Considering the extent of cultural heritage that is present in the project area, we consider the benefits to cultural resources to be worth the costs.

Land Use and Aesthetic Resources

Fire Prevention and Response Plan

The development of a fire prevention, response, and investigation plan as proposed by South Feather and specified by the Forest Service, as well as the fuel treatment/vegetation management plan specified by the Forest Service, would provide the means for South Feather to develop and coordinate fire management and prevention strategies with the Forest Service. The fire management and response plan also would provide the means for coordinating emergency response preparedness, reporting measures associated with fire management, and the investigation of fires on project lands. We estimate that that developing a fire prevention, response, and investigation plan would have an annualized cost of \$1,100, and that development of a fuel/vegetation management plan would have an annualized cost of \$2,100. Given the benefits of improved public safety and reduced potential damage to property and natural resources, we conclude that the benefits of these measures are worth their costs.

Road Management

Some of the roads used to access project facilities for operation and maintenance purposes are Forest Service roads that are also used by the Forest Service for land management, and by the public for recreation. The road management plan specified by the Forest Service would help to improve road management throughout the project vicinity, protect natural resources, provide reasonable public access, clearly define maintenance responsibilities, assess road conditions, and enable an annual survey process. In addition, the road management plan would identify measures to ensure that safety, maintenance, and rehabilitation measures associated with project roads are addressed in a consistent manner and so as not to adversely affect environmental resources. We note that it is the Commission's practice to include in the project boundary only those roads used primarily for project purposes. Therefore, the road management plan should clearly identify the roads either already within or proposed to be included in the project boundary that are necessary to access project facilities, including recreational facilities, and limit South Feather's responsibilities to those access roads or portions of roads that are used primarily for project purposes. We estimate that the annualized cost of developing and implementing the road management plan would be \$3,500, and we conclude that the benefits of this measure warrant the costs.

Visual Management Plan

Aesthetic resources can be affected by project facilities and operation. Recreation facilities and project facilities, such as project powerhouses and substation facilities, can dominate views, creating contrast with the natural landscape. The development and implementation of a visual resource protection plan, as specified by the Forest Service, prior to ground-disturbing activities on project lands located within the Plumas National Forest would help to ensure such activities would not adversely affect aesthetic resources within the Plumas National Forest. We estimate an annualized cost of \$2,200 and recommend implementation of this measure.

General

Annual Consultation

The Forest Service specifies that South Feather consult with the Forest Service each year with regard to measures that are needed to ensure protection and utilization of the National Forest resources affected by the project. The date of the consultation meeting would be mutually agreed to by South Feather and the Forest Service but in general would be held 60 days prior to the beginning of the recreation season, and representatives from other interested agencies would be able to request to attend the meeting. The meeting would include: (1) the review of a status report regarding implementation of license conditions; (2) results of any monitoring studies performed over the previous year in formats agreed to by the Forest Service and South Feather during development of study plans; (3) review of any non-routine maintenance; (4) any foreseeable changes to project facilities or features; (5) any necessary revisions or modifications to plans approved as part of this license; (6) needed protection measures for species newly listed as threatened, endangered, or sensitive or, changes to existing management plans that may no longer be warranted due to delisting of species or, to incorporate new information about a species requiring protection; and (7) discussion of elements of current year maintenance plans, such as those for road maintenance.

Cal Fish & Game recommends that South Feather, in consultation with the agencies, develop and implement an adaptive management plan that would allow Cal Fish & Game and other interested agencies to recommend changes to project operation during the license term based on the results of biological monitoring. The plan would include a process for identifying whether changes to project operation including, but not limited to, operation of fish screens, operation of a thermal control device, riparian vegetation management, ramping rates, and the amount and timing of flow releases from project features are required, and a mechanism for implementing those changes.

We estimate that implementing the Forest Service and the Cal Fish & Game measure would both have an annualized cost of \$30,000. As we discuss in section 3.3.2, *Aquatic Resources*, conducting annual meetings to review the results of monitoring reports and to consider any need to modify project operation or environmental measures would help to ensure that National Forest System lands and important environmental

resources are protected, and we conclude that the benefits of this consultation would be worth its costs. Opening the meeting to all interested agencies and other parties would assist with interpretation of monitoring results, ensure that the full range of effects of any changes in operation or measures are fully considered, and accomplish the goals of Cal Fish & Game's adaptive recommended adaptive management plan. Any changes to license conditions that are warranted based on monitoring results could be implemented via the Commission's standard license amendment or reopener processes.

5.3 UNAVOIDABLE ADVERSE EFFECTS

The continued operation of the project would result in some minor unavoidable adverse effects on geologic, soil, and geomorphic resources. These could include some minor continued erosion associated with project operation and renovation of recreational facilities and interruption of sediment transport at project reservoirs. Most of these effects would be reduced by proposed resource enhancement measures, including (1) preparation and implementation of an erosion and sediment control plan, (2) passage of LWD at Lower Grass Valley and Sly Creek dams, (3) provision of geomorphic flows in the Lost River below Sly Creek dam, and (4) sediment pass-through activities at Slate Creek diversion dam.

Under the proposed action, the continued operation of the project would continue to adversely affect some archaeological sites. The execution of a PA and implementation of the final HPMP with staff's additional measures would ensure proper protection and management of significant cultural resources within the project's APE and also would provide satisfactory resolution of any project-related adverse effects.

We have identified no other unavoidable adverse effects on resources influenced by project operation.

5.4 SUMMARY OF SECTION 10(J) RECOMMENDATIONS AND 4(E) CONDITIONS

5.4.1 Recommendations of Fish and Wildlife Agencies

Section 10(j) of the FPA requires the Commission to include license conditions, based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project. Section 10(j) of the FPA states that, whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of the agency. If the Commission still does not adopt a recommendation, it must explain how the recommendation is inconsistent with Part I of the FPA, or other applicable law and how the conditions imposed by the Commission adequately and equitably protect, mitigate damages to, and enhance fish and wildlife resources.

In response to the Commission’s ready for environmental analysis notice, issued February 14, 2008, Cal Fish & Game and NMFS filed letters providing comments and terms and conditions for the South Feather Power Project, pursuant to section 10(j). Table 5-1 summarizes the agency recommendations made under section 10(j), as well as whether the recommendations are adopted under the staff alternative.

Table 5-1. Analysis of fish and wildlife agency section 10(j) recommendations for the South Feather Power Project. (Source: Staff)

Recommendation	Agency	Within Scope of 10(j)?	Annual Cost	Staff Recommending?
1. Implement Cal Fish & Game’s recommended minimum flows	Cal Fish & Game	Yes	\$2,432,300	No, adopt South Feather’s alternative 4(e) flows instead
2. Develop ramping rates to protect FYLF within 5 years after license issuance	Cal Fish & Game	Yes	\$10,200	Yes
3. Implement selective withdrawal at Little Grass Valley reservoir	Cal Fish & Game	Yes	\$73,800	No, trout populations not adversely affected
4. Screen diversions at the South Fork diversion, Slate Creek diversion, and the Woodleaf powerhouse intake	Cal Fish & Game	Yes	\$3,041,100	No, adopt Forest Service’s wild fish stocking program instead

Recommendation	Agency	Within Scope of 10(j)?	Annual Cost	Staff Recommending?
5. Take all reasonable actions to assure conformance with water temperatures specified in the Oroville Settlement Agreement	Cal Fish & Game	Yes	\$606,400	No, recommend developing plan in consultation with DWR, NMFS, and Cal Fish & Game to monitor and provide information on water temperatures, flows, and reservoir levels to assist DWR with flow management decisions
6. Maintain water levels in Little Grass Valley and Sly Creek reservoirs as high as possible to protect beneficial uses of the reservoirs, while recognizing the need for protection of ecological resources, power production, and consumptive water supply	Cal Fish & Game	No, not a specific fish and wildlife measure; measure is intended to provide boating access	\$0	Yes, the minimum flow regime adopted by staff maintains Little Grass Valley reservoir at levels equal to or higher than Cal Fish & Game's proposed flow regime
7. Develop and implement an aquatic biological monitoring plan	Cal Fish & Game	Yes	\$30,000	Yes
8. Monitor fish populations in 2 successive years every 5 years in all affected bypassed reaches	Cal Fish & Game	Yes	\$48,500	No, we adopt the monitoring plan specified by the Forest Service instead

Recommendation	Agency	Within Scope of 10(j)?	Annual Cost	Staff Recommending?
9. Develop and implement a FYLF monitoring plan	Cal Fish & Game	Yes	\$66,900	Yes
10. Monitor benthic macroinvertebrates in affected bypassed reaches in years 1 through 4 and every 4 years thereafter	Cal Fish & Game	Yes	\$44,700	No, we adopt the monitoring plan specified by the Forest Service instead
11. Monitor water temperatures at seven locations and provide monitoring results in a technical report within 6 months following each monitoring season	Cal Fish & Game	Yes	\$8,700	Yes, but we recommend that the specific sites to be monitored by selected in consultation with DWR, NMFS, and Cal Fish & Game
12. Riparian vegetation monitoring and treatment	Cal Fish & Game	Yes	\$2,400	Yes, but treatment would be implemented only if warranted based on the results of FYLF monitoring
13. Develop and implement a bat management plan	Cal Fish & Game	Yes	\$1,000	Yes
14. Monitor and maintain in functioning condition bridges, culverts, and exit ramps designed to provide wildlife crossing points or escape from the above-ground portion of the Miners Ranch conduit twice annually prior to the spring and fall migration season for local deer populations	Cal Fish & Game	Yes	\$10,500	Yes

Recommendation	Agency	Within Scope of 10(j)?	Annual Cost	Staff Recommending?
15. Implement ramping rate of 0.5 foot/hour	Cal Fish & Game	Yes	\$0	Yes
16. Monitor water temperatures at the Kelly Ridge Power Plant intake and cease operation when temperatures exceed specified targets	NMFS	Yes	\$1,002,000	No, recommend developing a plan in consultation with DWR, NMFS, and Cal Fish & Game to monitor and provide information on water temperatures, flows and reservoir levels to assist DWR with flow management decisions

The Commission staff makes a preliminary determination that six of the recommendations by Cal Fish & Game and one recommendation by NMFS may be inconsistent with the purpose and requirements of the FPA or other applicable law. We also consider one of Cal Fish & Game’s recommendations to be outside of the scope of section 10(j) of the FPA.

We do not recommend adopting Cal Fish & Game’s recommended minimum flow regimes for the Little Grass Valley dam, South Fork diversion dam, Slate Creek diversion dam, Lost Creek dam, and Forbestown diversion dam reaches. Cal Fish & Game did not provide any information on how it developed its recommended flow regime, and our analysis in sections 3.3.2.2 and 5.2 indicate that South Feather’s alternative 4(e) flows, which we adopt in the staff alternative, would provide a similar level of increase in trout habitat at a substantially lower cost. We also identified several potential adverse effects associated with the higher minimum flows recommended by Cal Fish & Game, including increased drawdown of Little Grass Valley reservoir, reduced physical habitat for rainbow trout spawning in Lost Creek, and reduced suitability of water temperatures for FYLF in the South Fork diversion dam and Lost Creek dam reaches and for hardhead in the Forbestown diversion dam reach. Lastly, we estimate that implementing the

minimum flows recommended by Cal Fish & Game would cost approximately \$2,432,300 per year, \$873,600 more than the flows that we adopt in the staff alternative. Based on this information, we find that Cal Fish & Game's recommended minimum flows may be inconsistent with the comprehensive planning standard of section 10(a) and the equal consideration provision of section 4(e) of the FPA.

We do not recommend adopting NMFS's recommendation to cease power generation at Kelly Ridge powerhouse when the temperature at Kelly Ridge powerhouse exceeds 56°F from October 1 to May 15, 63°F from May 16 to August 31 or 58°F from September 1 to September 30, or Cal Fish & Game's recommendation that South Feather take all reasonable actions (including curtailing releases from the Kelly Ridge powerhouse) to assure conformance with water temperatures specified in the Oroville Settlement Agreement. Our analysis in section 3.3.2 suggests that, under some circumstances, these measures could help DWR comply with downstream temperature objectives established in the settlement agreement to protect anadromous fish. Under other circumstances these measures may be unnecessary or would not by themselves necessarily achieve the desired outcome. It is clear that DWR has several options for meeting its obligations under the settlement agreement through changes in Oroville Project operations including releasing more cold water from Lake Oroville or limiting pumpback operations. However, knowing the temperature and quantity of water passing through Kelly Ridge powerhouse could help DWR to determine the most efficient means to meet its temperature objectives. Accordingly, we adopt a recommendation that South Feather consult with NMFS, DWR, and Cal Fish & Game to develop a temperature monitoring plan. We do not consider it to be reasonable to require South Feather to curtail its operations when there is no guarantee that such a curtailment would result in attainment of downstream water temperature targets, since that is dependent on Oroville Project operation. Therefore, we have determined that NMFS and Cal Fish & Game's recommendations, which we estimate would have an annualized cost of \$1,002,000, and \$606,400, respectively, may be inconsistent with the comprehensive planning standard of section 10(a) and the equal consideration provision of section 4(e) of the FPA.

We do not recommend adopting Cal Fish & Game's recommendation to implement selective withdrawal to control the temperature of water that is released from Little Grass Valley reservoir to more closely match the optimum temperatures for trout. Although our analysis in section 3.3.2 suggests that water temperatures below Little Grass Valley reservoir are below the optimum range identified in the literature for growth of rainbow trout, we noted that rainbow trout populations prosper in habitats with a very wide range of temperature regimes, and that fish population sampling conducted by South Feather indicates that trout populations downstream from Little Grass Valley reservoir are in very good condition. Releasing warmer water from Little Grass Valley reservoir also would contribute to high water temperatures further downstream in the Forbestown diversion dam reach, which could adversely affect trout populations in that reach. Lastly, we estimate that implementing selective withdrawal at Little Grass Valley reservoir would cost approximately \$73,800 per year. Based on this information, we find

that Cal Fish & Game's recommendation to implement selective withdrawal may be inconsistent with the comprehensive planning standard of section 10(a) and the equal consideration provision of section 4(e) of the FPA.

We do not recommend adopting Cal Fish & Game's recommendation to install fish screens at the intakes at the South Fork diversion dam, Slate Creek diversion dam, and the Woodleaf powerhouse intake in Lost Creek reservoir. Our analysis in section 3.3.2 suggests that the number of fish entrained at the Sly Creek reservoir power tunnel intake is probably low due to the depth of the intake, and that the potential for entrainment into the intake to the Woodleaf power tunnel in Lost Creek reservoir is limited by the relatively low water velocity at the trashrack. Although the Forbestown power tunnel intake may have a greater potential to entrain fish than the intakes in Sly Creek and Lost Creek reservoirs, we concluded that the relatively high average biomass of trout in the SFFR/Lost Creek reach upstream of the Forbestown diversion indicates that entrainment is not having a substantial adverse effect on the trout population upstream of the diversion. We also conclude that construction of an effective screening facility at Slate Creek is probably not feasible given the stream's high sediment load, which has filled in the diversion pool. Lastly, implementing Cal Fish & Game's recommendation to screen the project intakes would cost approximately \$3,041,100, about 200 times more than the estimated annual cost of \$15,900 to implement the Forest Service's revised 4(e) specification for a wild fish supplementation plan, which we conclude would provide a similar benefit. Based on this information, we find that Cal Fish & Game's recommendation to install fish screens at project intakes may be inconsistent with the comprehensive planning standard of section 10(a) and the equal consideration provision of section 4(e) of the FPA.

We do not recommend adopting Cal Fish & Game's recommendation to conduct fish population monitoring at 11 sites in years 5, 6, 11, 12, 17, 18, 23, 24, and 29 in each survey reach. Based on our analysis in section 3.3.2, we adopt the monitoring plan specified by the Forest Service instead, which would monitor 8 sites and defer sampling by up to 2 years after major flood events. Deferring sampling after a flood would provide better data on long-term population trends by avoiding sampling when populations may be depressed following severe high flow events. In its reply comments, South Feather indicated that the smaller number of study sites specified by the Forest Service is more appropriate than the 11 sites recommended by Cal Fish & Game, which included two sites dominated by warmwater fish, which are not an agency management priority, and one Lost River site that has been affected by local site disturbance and excessive angling pressure. Lastly, implementation of Cal Fish & Game's recommendation would cost approximately \$48,500, or \$13,200 more than the annualized cost of the monitoring plan specified by the Forest Service. Based on this information, we find that Cal Fish & Game's recommended fish monitoring plan may be inconsistent with the comprehensive planning standard of section 10(a) and the equal consideration provision of section 4(e) of the FPA.

We do not recommend adopting Cal Fish & Game's recommendation to conduct benthic macroinvertebrate monitoring, using its latest sampling protocols, at all affected reaches in years 1 through 4 and in years 8, 12, 16, and 24. Based on our analysis in section 3.3.2, we adopt the monitoring plan specified by the Forest Service instead, which would conduct monitoring in the same years and locations where fish population monitoring is conducted, and provide better information on the relationship between the abundance of benthic macroinvertebrates and the health of fish populations. In addition, using the same sampling protocol in all years would provide comparable data among years. Lastly, implementation of Cal Fish & Game's recommendation would cost approximately \$44,700, or \$21,200 more than the annualized cost of the monitoring plan specified by the Forest Service. Based on this information, we find that Cal Fish & Game's recommended benthic macroinvertebrate monitoring plan may be inconsistent with the comprehensive planning standard of section 10(a) and the equal consideration provision of section 4(e) of the FPA.

5.4.2 Forest Service 4(e) Conditions

In section 2.2.5.3, *Section 4(e) Federal Land Management Conditions*, we note that section 4(e) of the FPA, 16 U.S.C. §797(e), provides that any license issued by the Commission for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. Thus, any 4(e) condition that meets the requirements of the law may be included in a license issued by the Commission, regardless of whether we include the condition in our staff alternative.

In section 2.2.5.3 we identify seven Forest Service preliminary 4(e) conditions that we consider to be administrative or legal in nature and not specific environmental measures. We therefore do not analyze these seven conditions in our EIS. Table 5-2 summarizes our staff conclusions with respect to the 4(e) conditions that we consider to be environmental measures. Of the twenty 4(e) conditions that we do not consider to be administrative or legal in nature, we include in the staff alternative all but two of these conditions. Our reasons for not including measures in the staff alternative are summarized in table 5-2 and are discussed in more detail in section 5.2, *Discussion of Key Issues*.

Table 5-2. Forest Service preliminary 4(e) conditions for the South Feather Power Project.

Condition	Annualized Cost	Adopted?
<p>1. Consult with the Forest Service on measures needed to ensure protection and utilization of the National Forest resources affected by the project. To include discussion of the status of measure implementation, the results of monitoring studies, 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 that are needed to protect sensitive species or changes to existing management plans. [revised Condition No. 3]</p>	\$30,000	<p>Yes, modified to require consultation with FWS, Cal Fish & Game, the Water Board and any other interested agencies</p>
<p>2. Maintain minimum streamflows in project reaches specified in tables A-1 through A-5 provided in the Forest Service filing. The minimum instantaneous 15-minute streamflow shall be at least 80 percent of the prescribed mean daily flow for those minimum streamflows less than or equal to 10 cfs and at least 90% of the prescribed mean daily flow for those minimum streamflows required to be greater than 10 cfs. Should the mean daily flow as measured be less than the specified mean daily flow but more than the instantaneous flow, Licensee should begin releasing the equivalent under-released volume of water within 7 days of discovery of the under-release. [Condition No.18, part 1]</p>	\$2,031,900	<p>No, adopt South Feather’s alternative 4(e) flows instead</p>

Condition	Annualized Cost	Adopted?
<p>3. 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. Provide notice to the Forest Service, Commission, and other interested governmental agencies of the final water year type determination within 30 days of making the determination.</p> <p>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 18, part 2]</p>	\$5,000	Yes
<p>4. Develop an operating plan to manage drought conditions when they occur. [revised Condition No. 18, part 3]</p>	\$1,600	Yes
<p>5. Operate, maintain, and modify (if necessary) gages needed to determine river stage and minimum streamflows. [Condition No. 18, part 4]</p>	\$20,000	Yes
<p>6. Develop and implement ramping rates that meet Forest Service targets for water velocity and stage changes to protect FYLF egg masses and tadpoles. [Forest Service revised 4(e) No. 18, part 5]</p>	\$10,200	Yes

Condition	Annualized Cost	Adopted?
<p>7. 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. The basis for the amount of fish to be planted would be determined by reviewing age class distributions of rainbow trout in the Little Grass Valley dam and upper Slate Creek diversion dam reaches, estimating the numbers of fry needed to enhance rainbow trout production towards the density and biomass levels observed in streams surrounding the project area. [revised Condition No. 18, part 6]</p>	\$15,900	Yes
<p>8. 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. [revised Condition No. 19, part 1]</p>	\$35,300	Yes
<p>9. 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. [Forest Service Condition No. 19, part 2.1]</p>	\$66,900	Yes

Condition	Annualized Cost	Adopted?
10. 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. [Forest Service Condition No. 19, part 2.2 through 2.4]	\$157,900	No
11. Treat and monitor selected areas between the South Fork diversion dam and Ponderosa reservoir to reduce riparian encroachment. [Condition No. 19, part 3]	\$2,400	Yes, but treatment would be implemented only if warranted based on the results of FYLF monitoring
12. 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]	\$23,500	Yes
13. 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 improving interpretive signs & kiosks, and to explore opportunities to extend paved or native trails to increase pedestrian connectivity. [Condition No. 20, part 1 and 2]	\$78,000	Yes, except for OHV parking and off-loading ramps at Sly Creek campground
14. 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]	\$1,100	Yes

Condition	Annualized Cost	Adopted?
15. Develop and implement a fuel treatment/vegetation management plan. [Condition No. 22]	\$2,100	Yes
16. Develop and implement a Heritage Properties Management Plan, approved by the Forest Service, for the purpose of protecting and interpreting heritage resources. [Condition No. 23]	\$79,400	Yes
17. 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]	\$21,600	Yes
18. 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]	\$1,500	Yes
19. 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]	\$9,800	Yes
20. Develop and implement a visual management plan within 60 days prior to any ground-disturbing activity on National Forest System lands. [Condition No. 27]	\$2,200	Yes

Condition	Annualized Cost	Adopted?
21. Develop and implement a road management plan. File with the Commission within 1 year of license issuance a road management plan after Forest Service approval of the plan. [Condition No. 28]	\$3,500	Yes

5.5 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA requires the Commission to consider the extent to which a project is consistent with federal and state comprehensive plans for improving, developing, and conserving waterways affected by a project. Under this section, federal and state agencies filed numerous qualifying comprehensive plans, of which we identified 11 California and 6 federal that are applicable to the project. The continued operation of the South Feather Power Project as recommended in this EIS is consistent with the 17 state and federal plans listed below that are applicable to the project.

California Advisory Committee on Salmon and Steelhead Trout. 1988. Restoring the balance: 1988 annual report. Sausalito, CA.

California Department of Fish and Game, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and Bureau of Reclamation. 1988. Cooperative agreement to implement actions to benefit winter-run Chinook salmon in the Sacramento River basin. Sacramento, CA. May 20. 10 pp. and exhibit.

California Department of Fish and Game. Fish and steelhead restoration and enhancement plan. Sacramento, CA. May 20. 10 pp.

California Department of Fish and Game. 1990. Central Valley streams: a plan. Sacramento, CA. April. 115 pp.

California Department of Fish and Game. 1996. Steelhead restoration and management plan for California. February. 234 pp.

California – The Resources Agency. 1989. Upper Sacramento Fisheries and Riparian Habitat Management Plan. Sacramento, CA. January 1989.

California Department of Parks and Recreation. 1998. Public opinions and attitudes on outdoor recreation in California. Sacramento, CA. March.

California Department of Parks and Recreation. 1994. California outdoor recreation plan-1993. Sacramento, CA. March.

- California Department of Water Resources. 1983. The California water plan- 1993. Sacramento, CA. April. 154 pp. and appendices.
- California Department of Water Resources. 1994. California water plan update. Bulletin 160-83. Sacramento, CA. December. 268 pp. and attachments.
- California Regional Water Quality Control Board, Central Valley Region. 2007. The Sacramento River Basin and San Joaquin River Basin. Fourth Edition with Revised Amendments, October 2007.
- Forest Service. 1988. Plumas National Forest Land and Resource Management Plan. Department of Agriculture, Quincy, CA. August 26. 342 pp. and appendices.
- Forest Service. 1988. Plumas National Forest Land and Resource Management Plan. Department of Agriculture, Quincy, CA. Appendices and maps.
- Fish and Wildlife Service. 1992. Lassen National Forest Land and Resource Management Plan, including Record of Decision. Department of Agriculture, Susanville, CA. Appendices and maps.
- Fish and Wildlife Service and Canadian Wildlife Service. 1986. North American waterfowl management plan. U.S. Department of the Interior, Portland, OR. February. 102 pp.
- Fish and Wildlife Service. Undated. Fisheries U.S.A.: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, DC. 11 pp.
- National Park Service. 1982. The nationwide rivers inventory. U.S. Department of the Interior. Washington, DC. January. 432 pp.
- Plumas County. 1997. Plumas County General Plan. 2nd Edition, as amended. Plumas County Planning Department. Quincy, CA.