COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR THE BIG CREEK ALP PROJECTS
Docket Nos. P-67, 2175, 2085, and 120

Section 5
Conclusions and Recommendations
Pages 5-1 to 5-34
DEIS

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPARISON OF EEFECTS OF PROPOSED ACTION AND ALTERNATIVES

In this section, we compare the developmental and non-developmental effects of SCE's proposal, SCE's proposal as modified by staff, and the no-action alternative. We summarize the environmental effects of the different alternatives in the following section.

Aquatic Resources—Under SCE's and the staff alternatives: (1) habitat for trout and other aquatic biota would be enhanced by increased flows; (2) trout spawning and riparian habitat downstream of seven dams associated with the Big Creek Nos. 2A, 8, and Eastwood Project would be exposed to seasonal high flows that would flush sediment from gravel, thus enhancing potential for spawning success, and enhanced wildlife habitat from increased riparian vegetation regeneration; (3) the potential for inadvertent flow-related adverse affects on aquatic habitat from releases of inappropriate flows would be minimized by upgraded streamflow measurement capabilities; (4) habitat diversity would be increased, as would the amount of spawning gravel, by provisions to pass sediment downstream of project dams; (5) project diversions would be decommissioned, and the affected stream reaches returned to essentially natural flow and sediment transport conditions; and (6) aquatic habitat downstream of the Bear Creek diversion would be enhanced by passing large woody debris previously blocked by the diversion dam.

Terrestrial Resources—Under SCE's and the staff alternatives: (1) wildlife habitat would be enhanced; (2) bald eagle, mule deer, bats, and special status species of wildlife and their habitat would be protected; and (3) vegetation would be managed and the spread of noxious weeds controlled in accordance with a defined plan.

Threatened and Endangered Species—Under SCE's and the staff alternatives VELB habitat and mature elderberry shrubs would be protected and potential widespread loss of VELB habitat from brush fires would be reduced by vegetation maintenance adjacent to elderberry shrubs.

Recreation—Under SCE's and the staff alternatives: (1) operation, maintenance, and rehabilitation of existing recreation facilities would enhance the recreational experience of the public; (2) new recreational opportunities for the general public and people with disabilities would be created by the construction of new facilities, including accessible fishing platforms and boat loading platforms, and a day use area; (3) angling opportunities would be enhanced by stocking fish in project reservoirs and stream reaches; and (4) more water dependent recreational use at project reaches would likely occur because of whitewater boating releases and improved dissemination of flow information to the public.

Cultural Resources—Under SCE's and the staff alternatives, cultural resources would be protected under provisions specified in the finalized HPMP. There would also be increased awareness of cultural resources by the general public with the implementation of proposed environmental programs.

Land Use and Aesthetics Resources—Under SCE's and the staff alternatives: (1) project-related roads would remain functional and safe by clearly defining maintenance, monitoring, and rehabilitation responsibilities; (2) the experience of visitors to the area would be enhanced by the installation of interpretive signs at selected locations; and (3) certain project features would be less noticeable to the public by use of painting strategies defined in a Visual Resources Plan.

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 the power development purposes and to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife (including related spawning grounds and habitat); the protection of recreational opportunities; and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. This section contains the basis for and a summary of our recommendations to the Commission for relicensing the Big Creek ALP Projects. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency and public comments filed on the Big Creek ALP Projects and our review of the environmental and economic effects of the proposed projects and their alternatives, we selected the staff alternative as the preferred alternative. This alternative includes elements of the applicant's proposal, section 4(e) conditions, resource agency recommendations, and some additional measures. We recommend this alternative because (1) issuance of a new hydropower license by the Commission would allow SCE to operate the Big Creek ALP Projects as economically beneficial and dependable sources of electrical energy for its customers; (2) the 844,483-MW projects may eliminate the need for an equivalent amount of fossil-fuel derived energy and capacity, which helps conserve these nonrenewable resources and reduce atmospheric emissions; (3) the public benefits of this alternative would exceed those of the no-action alternative; and (4) the recommended measures would protect and enhance fish and wildlife resources and would provide improved recreational opportunities at the Big Creek ALP Projects.

We recommend approving most of the Settlement Agreement terms with some minor modifications and making these terms conditions of the license to be issued for the Big Creek ALP Projects. However, we recommend modifications and finalization of some of the plans as proposed in the Settlement Agreement. Any such modified or finalized plans would be filed with the Commission for approval. This would allow Commission staff to monitor compliance with the conditions of the license and review the results of many of the proposed studies and measures.

We evaluate numerous recommendations in the resource sections of this draft EIS and, given the environmental benefits, we recommend including the following measures that SCE proposes in any license issued by the Commission for the Big Creek ALP Projects. Our recommended modifications to SCE's proposed measures are *italicized*.

5.2.1 All Big Creek ALP Projects

- Implement the streamflow requirements including new MIF releases in the bypassed reaches of Rock Creek, Ross Creek, Lower Stevenson Creek, Balsam Creek (forebay to diversion), Upper Balsam Creek (diversion to Big Creek), Lower Big Creek (Dam 5 to San Joaquin River), Middle Big Creek (Dam 4 to Dam 5), Upper Big Creek (Huntington Lake to Dam 4), Ely Creek, North Fork Stevenson Creek, Pitman Creek, Bear Creek, Mono Creek, Bolsillo Creek, Camp 62 Creek, Chinquapin Creek, and Hooper Creek; the San Joaquin River, including Dam 6 to Redinger -"Stevenson Reach" and Mammoth Pool dam to Dam 6; and the South Fork San Joaquin River. (The Settlement Agreement also specifies proposed MIF releases for Camp 61 Creek, which is part of the Portal Project [No. 2174] and not a Big Creek ALP Project; we recommend the proposed MIFs be included in a license for the Portal Project).
- Implement the Temperature Monitoring and Management Plan in the San Joaquin River (Mammoth and Stevenson reaches), South Fork San Joaquin River, Big Creek, Florence Lake, Mammoth Pool reservoir, Mono Creek, and North Fork Stevenson Creek. (The Settlement Agreement also includes Camp 61 Creek in the Temperature Monitoring and Management Plan; we recommend this measure be included in a license for the Portal Project).
- Implement the Flow Monitoring and Reservoir Level Measurement Plan in the bypassed reaches of Rock, Ross, Stevenson, Balsam, Big, Ely, North Fork Stevenson, Pitman, Bear, Mono, Bolsillo, Camp 62, Chinquapin, and Hooper creeks; the San Joaquin River; the South Fork San Joaquin River; Mammoth Pool reservoir; and Huntington, Florence, and Shaver lakes and, as appropriate, adjust the minimum instream flows, many of which are based on water year types, based on the April 1 and May 1 water year forecasts if it is revised from the March 1 forecast. (The Settlement Agreement also includes Camp 61 Creek

in the Flow Monitoring and Reservoir Level Measurement Plan; we recommend this measure be included in a license for the Portal Project).

- Implement the Fish Monitoring Plan in the bypassed reaches of Big Creek downstream of Dams 4 and 5, Mono Creek, Bear Creek, North Fork Stevenson Creek, and Stevenson Creek; the San Joaquin River downstream of Mammoth Pool and downstream of Dam 6; South Fork San Joaquin River downstream of Florence dam; Mammoth Pool reservoir; and Huntington, Florence, and Shaver lakes at years 3, 8, 18, 28, and 38, if a 50-year license is granted.
- Attend annual consultation meeting for water and aquatic resources.
- Implement wildlife habitat enhancements.
- Implement the Bald Eagle Management Plan *but modify the plan to ensure that when investigating any raptor mortality that may be associated with a project transmission line, the most recent APLIC guidelines be used to assess potential corrective actions*.
- Implement the Vegetation and Integrated Pest Management Plan.
- Implement environmental programs for environmental training, avian protection, noxious weeds, environmental compliance, the Endangered Species Alert Program, and the Northern Hydro Special-Status Species Information Program.
- Attend annual consultation meeting for terrestrial resources.
- Prepare a report on recreational resources, *including information on reservoir elevations, boat ramp accessibility, and parking and campsite capacity*.
- Attend annual consultation meeting for recreational resources.
- Implement the proposed project boundary changes detailed in section 2.2.5, *Proposed Project Boundary*, and analyzed in section 3.3.6.2, *Project Boundary Revisions, with the exception of maintaining the Florence Lake day-use area within the project boundary and including portions of the recreational facilities that are partially outside of the existing project boundary inside the revised project boundary*.
- Implement the Transportation System Plan.
- *Develop a Sign Plan*.
- *Develop a Fire Management Plan*.
- *Develop a Spill Prevention and Countermeasure Plan*.
- Attend annual meeting for land management resources.
- Provide transportation system plan labor and equipment.

- Finalize and implement one HPMP for the Big Creek ALP Projects.
- Implement environmental programs for cultural resources awareness.
- Attend annual consultation meeting for cultural resources.

5.2.2 Big Creek Nos. 2A, 8, and Eastwood Project

- Implement the Channel Riparian Maintenance Flow Plan in South Fork San Joaquin River and in Bear, Bolsillo, Camp 62, Chinquapin, and Mono creeks. (The Settlement Agreement also includes Camp 61 Creek in the Channel Riparian Maintenance Flow Plan; we recommend this measure be included in a license for the Portal Project).
- Implement the Flow Monitoring and Reservoir Water Level Measurement Plan including installation of gaging equipment at Dam 5 and Mono Creek diversion and modifying MIF release facilities at the Bolsillo Creek and Camp 62 diversions.
- Implement temperature (telemetry) monitoring programs in the South Fork San Joaquin River, Big Creek, Florence Lake, and North Fork Stevenson Creek.
- Implement the Small Diversions Decommissioning Plan on Crater Creek, Tombstone Creek, North Slide Creek, South Slide Creek, Pitman Creek Domestic, and Snow Slide Creek Domestic diversions.
- Implement the Riparian Monitoring Plan at the South Fork San Joaquin River (Jackass Meadow Complex) and Mono creeks. (The Settlement Agreement also includes Camp 61 Creek in the Riparian Monitoring Plan; we recommend this measure be included in a license for the Portal Project).
- Implement the sediment management prescriptions at small diversions on Balsam, Bolsillo, Camp 62, Chinquapin, Hooper, Mono, and Pitman creeks.
- Implement the sediment management prescriptions at Dam 5, Portal, and Balsam Meadow forebays.
- *Monitor spawning gravel embeddedness after sediment pass-through at Dam 5.*
- Implement the Large Woody Debris Management License Article at the Bear Creek diversion.
- Implement the VELB Management Plan.
- Implement proposed license articles for mule deer, special-status species, and bats.
- Perform operation and maintenance of recreational facilities.

- Implement rehabilitation of existing recreation facilities, *but not including Dorabelle Campground located in the Sierra National Forest outside of the project boundary*.
- Construct new recreational facilities including an accessible fishing platform at Jackass Meadows and an accessible boat loading platform at Florence Lake.
- Provide maintenance of the accessible fishing platform.
- Manage reservoir water surface elevations at Florence and Shaver lakes.
- *Stock fish in project reservoirs and stream reaches.*
- *File an annual stocking report with the Commission.*
- Disseminate to the public flow information for whitewater boating.
- Install interpretive signs.

5.2.3 Big Creek Nos. 1 and 2 Project

- Install minimum flow devices and gaging equipment at Ely Creek diversion, Balsam Creek diversion, and Dam 4.
- Implement the sediment management prescriptions at Ely Creek diversion.
- Implement the sediment management prescriptions at Dam 4.
- *Remove Rancheria Creek from the Big Creek Nos. 1 and 2 Project license*.
- *Monitor spawning gravel embeddedness after sediment pass-through at Dam 4*.
- Implement proposed license articles for special-status species, bats, and bear-human interactions.
- Implement rehabilitation of existing recreation facilities, *but not including Upper Billy Creek, Catavee, and Kinnikinnick campgrounds located in the Sierra National Forest outside of the project boundary*.
- Construct new recreational facilities including a day-use area at Dam 3 and an accessible fishing platform.
- *Stock fish in project reservoirs and stream reaches.*
- *File an annual stocking report with the Commission.*
- Install interpretive signs.
- Implement the Visual Resources Plan.

5.2.4 Mammoth Pool Project

- Implement fishwater turbine upgrade.
- Install minimum flow devices and gaging equipment at Mammoth Pool dam and the Ross and Rock Creek diversions.
- Implement temperature (telemetry) monitoring programs in the San Joaquin River and Mammoth Pool reservoir.
- Implement the sediment management prescriptions at Ross and Rock creeks.
- Implement the sediment management prescriptions at Mammoth Pool reservoir.
- *Conduct a feasibility assessment to evaluate the effects of gravel augmentation into, or immediately below, the Mammoth Pool spillway channel on project facilities. (This measure was included in the Settlement Agreement but not to be included in a new license).*
- Implement the VELB Management Plan.
- Implement proposed license articles for mule deer, special-status species and bats.
- Implement rehabilitation of existing recreation facilities, *but not including Mammoth Pool Campground located in the Sierra National Forest outside of the project boundary.*
- *Stock fish in project reservoirs and stream reaches.*
- *File an annual stocking report with the Commission.*
- Disseminate flow information for whitewater boating.
- Provide pre-spill whitewater boating releases.
- Provide interpretive signs.
- Implement the Visual Resources Plan.

5.2.5 Big Creek No. 3 Project

- Install minimum flow devices and gaging equipment at Dam 6.
- Implement temperature (telemetry) monitoring programs in the San Joaquin River.

- Implement a supplemental fish, water temperature, and DO study in the San Joaquin River - Stevenson reach to evaluate use and importance of this reach for transitional zone fish species.

- Implement the sediment management prescriptions at Dam 6.

- *Monitor spawning gravel embeddedness after sediment pass-through at Dam 6*.

- Implement the VELB Management Plan.

- Implement proposed license articles for special-status species and bats.

- Attend annual consultation meeting for terrestrial resources.

- Implement rehabilitation of existing recreational facilities.

- Disseminate flow information for whitewater boating.

Our recommended measures include all but two *of the project-specific conditions specified by the Forest Service*: (1) manage reservoir surface elevations at Huntington Lake and Mammoth Pool in accordance with unspecified criteria during the summer recreational season; and (2) fund the rehabilitation of five campgrounds in the Sierra National Forest that are located entirely outside of any project boundary (Dorabelle, Upper Billy Creek, Cavatee, Kinnikinnick, and Mammoth Pool).

This section describes the rationale for some of our recommendations on measures that we conclude should be included as conditions of any licenses issued, as well as any measures that we do not recommend as license conditions. This section is arranged by major resource topic, and within each topic we discuss each of the Big Creek ALP Projects or provide our rationale for recommending or not recommending specific measures.

Aquatic Resources

Project operations could affect aquatic habitats and sediment transport in the stream reaches. The Settlement Agreement includes a set of measures (Proposed Articles 1.1.1 through 1.5) focused on the ecological health and suitability of reaches downstream of project dams to support native fish, amphibian, and reptile populations.

Minimum Instream Flows

Under Settlement Agreement measure A1.1.1, SCE proposes to implement increased MIFs in 21 of the bypassed reaches downstream of project diversion dams. In most cases, the MIFs vary by season and by water type, and include both minimum daily average and instantaneous minimum flows (see section 3.3.1.2 for the specific flows and our analysis of them). The Forest Service filed a 4(e) condition and Interior

filed a 10(j) recommendation for all four Big Creek ALP Projects that are consistent with this measure.

Many of the bypassed reaches were naturally fishless, but most currently support self-sustaining populations of introduced rainbow, brown, and/or brook trout because of stocking efforts by Cal Fish & Game. In many of the project reaches, low flows due to project operations create barriers to fish passage, limit the quantity of available fish habitat, and contribute to daily mean and maximum water temperatures that exceed optimal levels for trout growth.

SCE conducted a series of studies in collaboration with the agencies and other interested parties to identify limiting factors in each reach, including habitat surveys and fish population evaluations, habitat modeling to evaluate the effects of streamflow on fish habitat, evaluation of current and historic flow regimes, temperature monitoring, and evaluation of the effect of stream flows on fish passage at potential barriers to upstream migration. Based on this collaborative effort, specific resource objectives were developed for each reach, and the flow regimes included in the Settlement Agreement were designed to meet the resource objectives while minimizing reductions in hydropower generation.

Based on our analysis of the proposed flows in section 3.3.1.2, *General Streamflow Requirements*, we conclude that the proposed MIFs would enhance aquatic conditions and would benefit fisheries for naturally produced and stocked trout in each of the 21 reaches where MIFs would be implemented. Specific environmental benefits for each of the individual 21 reaches comparing baseline conditions to those under proposed MIFs are presented in section 3.3.1.2; however, overall these benefits would mainly improve conditions for cold water species such as brook, rainbow, brown, and rainbow x golden trout hybrids. Overall, the proposed MIFs would benefit these species by increasing rearing habitat, increasing spawning habitat, increasing invertebrate production, improving water temperatures, improving passage for spawning migrations, and improving habitat connectivity during the rearing season.

Camp 61 Creek currently does not have a MIF requirement under the Portal Project license (FERC No. 2174). To improve habitat access and increase the amount of spawning habitat during the brown trout spawning period, in the Portal Project final EA, Commission staff recommended, consistent with SCE's proposal, that during all water year types, a MIF of 1.0 cfs should be provided to Camp 61 Creek from March 1 through July 31 and a MIF of 0.5 cfs from August 1 through February. Commission staff further recommended that SCE should provide an additional 0.5 cfs during the period of October 1 through December 15. Commission staff concluded that its recommended flow regime in the Portal Project final EA would substantially improve aquatic habitat conditions in Camp 61 Creek for both brown trout and benthic macroinvertebrates, improve fish passage conditions, and improve water quality downstream of the Portal forebay.

MIFs proposed in the Settlement Agreement for Camp 61 Creek are slightly greater than those recommended by Commission staff in the Portal Project final EA, and are consistent with the Forest Service revised final 4(e)s filed for the Portal Project. For wet, above, and below normal water year types, the following MIFs would be released to Camp 61 Creek: October 1 through March 31, 2 cfs; April 1 through June 30, 4 cfs; July through September 30, 3 cfs; and during dry and critical water year types, 1.25 cfs would be released. Although, the MIFs proposed in the Settlement Agreement for Camp 61 Creek are slightly greater than those Commission staff recommended in the Portal Project final EA, we find that these additional flows proposed in the Settlement Agreement would provide an additional amount of wetted area and habitat for brown trout in Camp 61 Creek, provide conditions more conducive to fish passage, and decrease thermal warming in Camp 61 Creek, as further discussed in section 3.3.1.2. Therefore, we recommend the MIFs as proposed in the Settlement Agreement for Camp 61 Creek.

Collectively, implementation of the MIFs included in the Settlement Agreement would have an annualized cost of $9,944,490 (which also includes channel and riparian maintenance flows as discussed below), including a loss of 189,501 MWh of generation. Because the proposed MIFs would provide substantial benefits to recreational fisheries and to aquatic ecosystems and improve compliance with water temperature objectives in the basin plan, we conclude that these benefits warrant the cost of this measure.

We estimate that our recommended MIFs would decrease the annual benefit of the Portal Project by about $214,900, which is about $128,000 greater than the annualized cost of the MIFs that we recommended in the Portal Project final EA. However, we note that any flows diverted from the Portal Project into Camp 61 Creek would enter the South Fork of the San Joaquin River upstream of the Mammoth Pool Project. Consequently, much of this flow would be available for generation purposes at the Mammoth Pool Project and the net loss in generation and associated revenue would be minimal.

Removal of Adit 8 and Rancheria Creeks from the project licenses

The Forest Service specifies in its 4(e) conditions that Adit 8 and Rancheria creeks should be removed from the Big Creek Nos. 1 and 2 Project license. Interior, in its 10(j) recommendation 1.3 states that the current diversion at Adit 8 Creek is not to be used per the Settlement Agreement. No resource issues were identified with either Adit 8 or Rancheria creeks in SCE's study and neither the Forest Service nor Interior provides an explanation discussing why these creeks should be removed from the

Project license.[48] Interior's recommendation is not a specific measure to protect or enhance fish and wildlife, but we consider it under section 10(a) of the FPA.

In its response to the 4(e) conditions filed on April 9, 2008, SCE states that this 4(e) condition is not needed because in its license application, SCE does not propose to include Adit 8 and Rancheria creeks in the project boundary for the Big Creek Nos. 1 and 2 Project.

Because of the lack of identified aquatic issues in the reach and the fact that the diversion is infrequently if ever used, a decision to include or remove Adit 8 Creek and the Adit 8 Creek diversion from the Big Creek Nos. 1 and 2 Project license would have little if any effect on aquatic resources. Although the diversion on Adit 8 Creek has not been used for several decades, the dam gives SCE the flexibility to divert water from Tunnel 5 to Tunnel 2 in the event of an outage at Powerhouse 2A, which would help to avoid adverse effects associated with a large and sudden increase in flows in Stevenson Creek. For these reasons, we recommend that the Adit 8 Creek diversion dam remain within the project boundary.

Rancheria Creek conveys outflows from the Portal powerhouse and any flows that pass from the Portal surge chamber into Huntington Lake. Both of these facilities are part of the Portal Project. SCE proposes to take out of the project boundary the area surrounding Rancheria Creek from Portal powerhouse to the high water line of Huntington Lake (Portal tailrace). This reach is primarily affected by flow through the Ward Tunnel and is currently included in the project boundaries of two other FERC licensed projects (Big Creek Nos. 2A, 8, and Eastwood [Project No. 67]; and Portal Project [Project No. 2174]). Rancheria Creek supports self-sustaining populations of rainbow, brown, and brook trout and Sacramento sucker, and kokanee from Huntington Lake have been observed spawning in the Portal powerhouse tailrace and in the lower portion of Rancheria Creek. Because the Portal surge chamber and powerhouse are not part of the Big Creek ALP Projects, removal of Rancheria Creek would not have any effect on the ability of the Commission to implement any measures that are determined to be needed to protect aquatic and other resources in Rancheria Creek downstream of the Portal surge chamber and powerhouse. As a result, we recommend that Rancheria Creek should be removed from the Big Creek Nos. 1 and 2 Project license as proposed in the Settlement Agreement. Because this reach is the primary water conveyance from the back-country diversions, which are largely part of Big Creek Nos. 2A, 8, and Eastwood Project (Project No. 67), protection of this reach under this license would ensure the project's continued operation.

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[48]Section 1.1.1.0 of the Settlement Agreement does not specifically mention Adit 8 diversion.

Channel Riparian Maintenance Flows

Under Settlement Agreement measures A1.2 through A1.5, SCE would implement channel and riparian maintenance flows in the South Fork San Joaquin River and six of its tributaries: Bear, Bolsillo, Camp 62, Chinquapin, Mono, and Camp 61 creeks. Detailed plans for implementing channel and riparian maintenance flows in the South Fork San Joaquin River and in Mono and Camp 61 creeks are provided in appendices D, E, and F to the Settlement Agreement. The Forest Service filed 4(e) conditions and Interior filed 10(j) recommendations that are consistent with the channel and riparian maintenance flows proposed in the Settlement Agreement measures and listed above.

Under the Riparian Monitoring Plan (Settlement Agreement measure A1.11), as discussed below, SCE would monitor trends in riparian and meadow health in response to the channel and riparian maintenance flows in the South Fork San Joaquin River (Jackass Meadow Complex), Camp 61 Creek, and Mono Creek throughout the term of the new license.

The flow regime in the South Fork San Joaquin River and in the bypassed reaches of its tributary streams has been substantially altered by diversion of flow into Huntington Lake and the Big Creek System. Project bypassed reaches have been affected by disruption of natural geomorphic processes including sediment retention behind dams and diversion, altered floodplain connectivity, and flow regulation that alters the timing, magnitude, and duration of peak flows and base flows. These alterations affect aquatic habitat conditions including the condition of spawning gravels and the extent and condition of riparian vegetation.

The proposed channel and riparian maintenance flow releases would occur during the peak spring hydrograph to maximize the channel's ability to mobilize and transport sediment and increase riparian vegetation regeneration. Spring channel and riparian maintenance flow releases would also contribute flow to the South Fork San Joaquin River to benefit spring spawning trout.

Channel and riparian maintenance flows would increase the magnitude and duration of spring peak flows compared to current project operations and would ensure that overbank flows would occur during most wet water years (see section 3.3.1.2 for analysis). These increased peak flows would benefit riparian habitats by helping to (1) scour encroaching upland and riparian vegetation in the formerly active channel and on the channel bars; (2) deposit fresh alluvium; (3) regenerate and/or establish riparian vegetation; (4) provide higher soil moisture and water table to support riparian vegetation; and (5) discourage continued encroachment of upland species on the channel bars.

The higher peak flows would have a greater capacity to mobilize and transport accumulated sediments; increase the recruitment of LWD to the channel; contribute to the formation of physical habitat features such as riffles, pools, runs, and point bars;

support dynamic geomorphic processes over time; and decrease spawning gravel embeddedness. As spawning substrate conditions improve and LWD increases over time, we expect trout recruitment would increase, benthic macroinvertebrate productivity would increase, and young-of-the-year trout would have increased access to spaces within the substrate, which provide cover during floods.

In the Portal Project (Project No. 2174) final EA, Commission staff recommended that: (1) SCE release a channel and riparian maintenance flow to Camp 61 Creek during a 10-day period between June 1 and July 31, ramping up to 28 cfs in an above normal water year and up to 39 cfs in a wet water year; and (2) flows be released between June 1 and July 31. In the final EA, Commission staff concluded this recommended channel and riparian maintenance flow would likely mobilize and transport accumulated sediments out of the Camp 61 Creek system, leading to improved aquatic and riparian habitat conditions. Commission staff further concluded that channel and riparian maintenance flow releases after June 1 would reduce potential adverse effects on brown trout recruitment due to redd scour, as the later releases are less likely to adversely affect young brown trout because juveniles would be able to seek cover from high flows.

SCE's proposal for a channel and riparian maintenance flow in Camp 61 Creek in the Settlement Agreement differs from Commission staff's recommendation in the Portal Project final EA, and is consistent with Forest Service revised final 4(e) condition submitted for the Portal Project. Under the proposal in the Settlement Agreement, channel and riparian maintenance flows would be slightly greater in magnitude (30 cfs versus 28 cfs in above normal years; 40 cfs versus 39 cfs in wet water years), flows would be released between May 1 and June 30, as opposed to June 1 and July 30, and if the weighted mean value of the level of fine sediments measured downstream of Portal forebay is greater than 0.25 following the release of two wet water year flows, the duration of the channel and riparian maintenance flows would be increased by adding two days of flows at 30 cfs in above normal years and two days at 40 cfs in wet years.

We conclude that the slightly greater flows and the extended release periods under the Settlement Agreement proposal would have a somewhat greater capacity to mobilize and transport accumulated sediments and contribute to the formation of physical habitat features in Camp 61 Creek. These increased flows would also help support dynamic geomorphic process over time and decrease spawning gravel embedddedness; therefore, we recommend the slightly greater channel and riparian maintenance flows and extended release periods proposed in the Settlement Agreement.

Movement of gravels prior to brown trout emergence could result in physical damage to the incubating embryos and alevins still present in redds or among other substrate. Following emergence, juvenile brown trout would be able to seek cover from high flows along the channel margins and would not be subject to redd scour. Brown trout in California are fall or winter spawners (November and December) with embryos typically hatching 7 to 8 weeks thereafter, and alevins emerging from the gravel and

beginning to feed 3 to 6 weeks after hatching (Moyle, 2002). This indicates brown trout emergence from the gravel would typically occur by March or April, prior to the May 1 through June 30 channel and riparian maintenance flows proposed in the Settlement Agreement. Therefore, we recommend releasing channel and riparian maintenance flows to Camp 61 Creek between May 1 and June 30, because it would protect young brown trout and likely minimize impacts on juvenile trout recruitment, as emergence from the gravel would occur prior to May 1.

Implementing channel and riparian maintenance flows in the South Fork San Joaquin River and in these six tributaries would provide a substantive benefit to recreational fisheries for naturally produced trout, aquatic ecosystems, and riparian-dependent wildlife species. The annual costs of implementing channel and riparian maintenance flows in these reaches (estimated to be $1,775,520 for those reaches associated with the Big Creek ALP Projects) and the reduction in the average annual value of power generation are included in the total costs of the MIFs. However, given the substantial benefits identified above, we conclude that these benefits justify the costs.

We estimate that our recommended channel and riparian maintenance flows would decrease the annual benefit of the Portal Project by about $58,800, which is about $19,600 greater than the annualized cost of the channel and riparian maintenance flows that we recommended in the Portal Project final EA. As noted in our previous discussion of MIFs, any flows diverted from the Portal Project into Camp 61 Creek would enter the South Fork of the San Joaquin River upstream of the Mammoth Pool Project. Consequently, much of this flow would be available for generation purposes at the Mammoth Pool Project and the net loss in generation and associated revenue would be minimal.

Streamflow and Reservoir Elevation Monitoring

SCE plans to add or upgrade gages (see table 3-11) within the vicinity of the Big Creek ALP Projects to ensure compliance with MIFs and other flow requirements that may be specified in new licenses for these projects in accordance with the Flow Monitoring and Reservoir Water Level Measurement Plan (appendix L of the Settlement Agreement). SCE proposes to continue to monitor water levels in Mammoth Pool reservoir and Huntington, Florence, and Shaver lakes. Accurate measurement and documentation of flows is necessary to ensure compliance with MIFs, channel and riparian maintenance flows, and seasonal high flow events. In reaches used for recreational purposes (angling and boating) telemetried flow and reservoir level information that SCE plans to make available to the public via the Internet or other suitable means, would enable recreational visitors to better plan their visits to the project area. SCE plans to use existing gages to measure reservoir water levels, thus there would be no incremental cost associated with this continued monitoring. The cost to modify or replace streamflow gages, including structural modifications needed to accommodate the gages, would result in an annualized cost of $469,230 at the Big

Creek Nos. 2A, 8, and Eastwood Project; $379,930 at the Big Creek Nos. 1 and 2 Project; $850,290 at the Mammoth Pool Project; and $317,430 at the Big Creek No. 3 Project. However, because of the complexity of the interactions of flows within the Big Creek ALP Projects, sophisticated flow monitoring schemes are necessary for Big Creek System water management and to document compliance of project flows with license conditions; therefore, we conclude that the costs are warranted.

Small Diversions Decommissioning

Under Settlement Agreement measure A1.6, SCE would implement the proposed Small Diversions Decommissioning Plan included as Settlement Agreement, appendix G. SCE proposes to complete the decommissioning of the six small diversions within 5 years following issuance of the new licenses, assuming required permits are obtained. The small diversions that would be decommissioned include four backcountry hydroelectric generation diversions on North Slide, South Slide, Tombstone, and Crater creeks, and two domestic water diversions on Pitman and Snow Slide creeks. The Forest Service filed 4(e) conditions and Interior filed 10(j) recommendations that are consistent with this measure.

Under the Settlement Agreement, these six diversions would be decommissioned because they (1) are currently not in service, (2) are no longer needed for the operation and maintenance of the project, or (3) have been requested to be removed by resource agencies participating in the ALP. Decommissioning and removing these diversions would maintain or restore natural flow to the affected bypassed reaches, which would serve to provide cooler water temperatures to these streams and the South Fork San Joaquin River bypassed reach. Decommissioning these diversions would generally enhance the aquatic and riparian habitats associated with these bypassed reaches, improve fish passage, and increase the recruitment of spawning gravel to the South Fork San Joaquin River bypassed reach, which has a spawning gravel deficit due to impoundments. The combined annualized cost of decommissioning these six diversions is $116,850. We expect the energy loss associated with the decommissioning of these diversions to be minimal, given the small amount of water impounded and diverted by each of these diversions. Based on the benefits identified above, we conclude that the benefits warrant the costs.

Large Wood Debris Management at Bear Creek

The Bear Creek diversion dam blocks the transport of LWD from the upper watershed to the Bear Creek bypassed reach. Under Settlement Agreement measure A1.7, SCE would return large wood to Bear Creek by allowing LWD to pass over the Bear Creek diversion spillway during spill. SCE would also collect LWD from the impoundment in the vicinity of the intake gates and dam for placement in the bypassed reach. For purposes of this measure, LWD is defined as dead or dying wood 10-feet or longer and at least 4-inches in diameter. SCE may cut large pieces of wood that otherwise would not be feasible to collect and move the wood from the Bear Creek

forebay as long as the minimum dimensions for LWD, as defined above, are maintained. SCE would consult with the resource agencies annually to decide if the amount of LWD is sufficient or the LWD procedures are adequate to transport downstream during spill events. The Forest Service filed 4(e) conditions and Interior filed 10(j) recommendations that are consistent with this measure.

In the reference reach upstream of the Bear Creek diversion, more than half of the habitat units had 1 to 15 pieces of LWD. Most of the habitat units in the bypassed reach did not have LWD; six habitat units had 1 to 5 pieces of LWD and one unit had 5 to 10 pieces of LWD. The limiting factors analysis of the bypassed reach suggests that adult rearing and spawning habitat is heavily used by an abundant trout population, and the physical habitat may be approaching limiting values.

LWD contributes to productive aquatic ecosystems, and is an important component in the formation of complex aquatic habitat units and channel maintenance. The proposed LWD supplementation in the bypassed reach would increase the amount of available trout habitat by creating deep pools that provide thermal refugia and increasing habitat complexity. LWD creates high flow velocity breaks and provides cover from predators, including other trout. Snorkel surveys conducted by the Sierra National Forest indicate that the highest trout densities are associated with LWD. The velocity breaks created by LWD also retain and sort substrate to create gravel bars and spawning habitat for salmonids. The annualized cost of this measure is estimated to be $5,650. Given the relatively low cost of this measure and the substantial resource benefits identified above, we conclude that the benefits warrant the costs.

Temperature Monitoring and Management

Under Settlement Agreement measure A1.8, SCE would implement a Temperature Monitoring and Management Plan, included as Settlement Agreement, appendix H, to document the effects of proposed MIFs on water temperatures and allow for adaptive management where needed. SCE would monitor water temperatures during at least the first 3 to 5 years that new MIFs are released, including at least one dry or critically dry water year. Water temperature monitoring would be conducted at seven sites on the South Fork San Joaquin River and in two of its tributaries (Camp 61 and Mono creeks), at six sites in the Mammoth and Stevenson reaches of the San Joaquin River, at four sites in the middle and lower Big Creek reaches, and at two sites in North Fork Stevenson Creek. In addition, monthly temperature profiles would be measured in Mammoth Pool and in Florence Lake during the summer. Telemetry water temperature monitoring programs would be implemented in the San Joaquin River, South Fork San Joaquin River, Mammoth Pool reservoir, Florence Lake, and North Fork Stevenson Creek. The monitoring results would be presented and discussed at an annual agency consultation meeting, and would be used to develop interim and long-term water temperature control programs including measures that may be feasibly implemented by SCE to maintain water temperatures below target temperatures. Interior filed 10(a) recommendations for all four Big Creek ALP Projects that are consistent with

Settlement Agreement measure A1.8, except that it would expand the program to include monitoring of all of stream reaches and reservoirs affected by the projects.

The proposed Temperature Monitoring and Management Plan would benefit coldwater fisheries for trout by documenting how project operations affect water temperatures so that flows could be adjusted through adaptive management if needed, based on monitoring results. The plan includes measurement of water temperatures at 19 sites in 6 bypassed stream reaches where daily mean water temperatures exceeded 20°C or daily maximum water temperatures exceeded 22°C in 2000 or 2001, based on criteria supplied by the Water Board to protect coldwater beneficial uses. The estimated annualized cost of the temperature monitoring program as proposed by SCE is $87,890. The program would help to determine the effectiveness of proposed MIFs in attaining temperature objectives, and in conjunction with the proposed fish monitoring program described below, would help to determine associated fish population responses. Because this information would help to foster cost-effective adaptive management of MIFs, we conclude that the benefits of this measure warrant its costs.

Interior's 10(a) recommendation would expand the monitoring program to include 9 additional bypassed stream reaches (Stevenson, Upper Balsam, Bear, Mono, Hooper, Pitman, Bolsillo, Chinquapin, and Camp 62 creeks) none of which exceeded a daily mean temperature of 20°C or a daily maximum water temperature of 22°C in 2000 or 2001. Short-term (3 year) water temperature monitoring is proposed for Mono Creek upstream of the San Joaquin River at RM 0.1 in the Temperature Monitoring and Management Plan due to thermal heating in the reach that exceeds the Basin Plan standard (>5ºF). Based on monitoring data collected in 2000 and 2001, these reaches currently support all beneficial uses of coldwater aquatic life, would continue to do so under the MIFs proposed in the Settlement Agreement, and the proposed Mono Creek MIF is expected to decrease thermal warming to meet Basin Plan standards. Therefore, Interior's 10(a) recommendation is unnecessary.

Interior's 10(a) recommendation would also expand the monitoring program to include all 15 affected reservoirs and impoundments. However, only two project reservoirs (Shaver and Huntington) besides Mammoth Pool and Florence Lake have sufficient storage to suggest that they have the potential to be used to manage downstream water temperatures. Shaver Lake has a maximum storage of 135,568 acre-feet and likely could be used to manage water temperatures in the downstream reach of Stevenson Creek, but SCE's temperature monitoring data from 2000 and 2001 indicate that the temperature in this reach already meets the objectives to support coldwater life, and would continue to do so under the increased MIFs proposed in the Settlement Agreement. Similarly, Huntington Lake has a substantial amount of useable storage (89,166 acre-feet), but the upper Big Creek reach downstream of the reservoir already meets the objectives to support coldwater life, and would also be expected to do so under the increased flows proposed in the Settlement Agreement.

Expanding the program to include monitoring of 9 additional stream reaches and 13 additional reservoirs as recommended by Interior, would increase the annualized cost of the temperature monitoring program by about $175,780, to approximately $263,670. Based on the results of temperature monitoring conduced by SCE in 2000 and 2001, all of the additional stream reaches that would be monitored under Interior's 10(a) recommendation currently support coldwater life, and would continue to do so under the MIFs proposed in the Settlement Agreement. In addition, only four of the project reservoirs appear to have sufficient storage to provide opportunities to control downstream water temperatures, and water temperatures in reaches downstream of Huntington Lake and Shaver Lake already fully support the beneficial use of coldwater life. As a result, we conclude there would be little benefit in expanding the temperature monitoring program to include the additional reaches and reservoirs included in Interior's 10(a) recommendation and conclude that these limited benefits do not justify its costs. We note, however, that SCE's proposed annual consultation meeting would provide an opportunity for the potential need for inclusion of additional reaches to be considered, if warranted.

Fish Monitoring

Under Settlement Agreement measure A1.9, SCE would implement the Fish Monitoring Plan included in Settlement Agreement, appendix I. The Fish Monitoring Plan would evaluate the response of fish populations in selected reaches and major reservoirs to the MIFs and other enhancement measures (channel and riparian maintenance flows, LWD, sediment) included in the new licenses. Species composition, relative abundance, size and age distribution, biomass, density, and condition factor would be monitored during the months of August and September. Fish monitoring would be conducted at seven sites on the South Fork San Joaquin River, in Mono, North Fork Stevenson, and Bear creeks, and in two of its tributaries, in the Mammoth and Stevenson reaches of the San Joaquin River, in the middle and lower Big Creek reaches, and in Stevenson Creek. Fish monitoring in reservoirs would occur in Mammoth Pool reservoir, Huntington Lake, Florence Lake, and Shaver Lake. Monitoring would be implemented at years 3, 8, 18, 28 (and in year 38, if a 50-year license is granted). Monitoring would not begin until the new MIFs have been implemented in each survey reach. If monitoring is scheduled for a wet water year, it would be postponed until the next non-wet water year to prevent confounding the effect of high flows on fish recruitment and populations. The Forest Service filed 4(e) conditions and Interior filed 10(j) recommendations for all four Big Creek ALP Projects that are consistent with this measure.

Trout populations in a number of the bypassed reaches have low densities, fragmented distributions, or skewed age class distributions (see our analysis in section 3.3.1). In many cases, fish populations appear to be constrained by the effects of flow diversions and project structures on stream flows, water temperatures, fish passage, and the transport and supply of spawning gravel and LWD. The Settlement Agreement

includes measures that are expected to enhance fish populations by addressing many of these project-related effects. Monitoring fish populations in the specified bypassed reaches would provide a means of assessing the effects of the new MIFs and other enhancement measures on fish populations in these reaches and would apply adaptive management based on monitoring, as needed. Fish population monitoring in bypassed reaches would also help determine if the Forest Service, Interior, and Basin Plan objectives are being met in these reaches. Monitoring fish populations in project reservoirs would provide a means of assessing the effects of the new MIFs on fish populations in the major reservoirs, including potential effects of earlier depletion of cool water in dry years on reservoir trout. This information would help to determine if Cal Fish & Game's management objectives for these reservoirs are being met, and would assist in guiding adaptive management.

A supplemental study that includes fish, water temperature, and DO data collection would be implemented to evaluate the use and importance of the Stevenson reach for transitional zone species including hardhead, Sacramento pikeminnow, and Sacramento sucker. If the supplemental study concludes that Stevenson reach is an important native fish transition zone, and the consensus recommendation of SCE and the resource agencies is to change the beneficial use designation of the reach or the lower portion of the reach (downstream of the Stevenson Creek confluence), SCE would propose an amendment of the coldwater habitat designation in the Basin Plan.

The estimated annualized cost of fish monitoring in project bypassed reaches and reservoirs is $38,120. Because the monitoring effort would help to determine the effectiveness of proposed measures and facilitate adaptive management, we conclude that the benefits warrant the costs of this measure.

Sediment Management

Project dams impede or interrupt the flow of sediments, spawning gravels, and other materials beneficial to fish and wildlife from continuing downstream through the project affected stream reaches. Under Settlement Agreement measure A1.10, SCE would implement the sediment management measures described in Settlement Agreement, appendix J. These include measures for passing accumulated sediment through project facilities followed by flushing flows to redistribute passed sediments, removing accumulated sediment from behind dams, if needed, that may block low level outlets or intake structures, and monitoring of turbidity and pool filling. The Forest Service filed 4(e) conditions and Interior filed 10(j) recommendations for all four Big Creek ALP Projects that are consistent with this measure.

Sediment retention behind project dams has resulted in depletion of spawning gravels in the bypassed reaches. Sediment pass-through activities, as proposed in the Settlement Agreement, would restore sediment transport processes in four tributaries to the South Fork San Joaquin River (Hooper, Chinaquapin, Camp 62, and Bolsillo creeks), which would help to restore spawning gravels in the bypassed reaches of these

creeks and in the South Fork San Joaquin River. Sediment pass-through would also occur in three tributaries and three mainstem dams within Big Creek (Balsam, Pitman, and Ely creeks, and Dams 4, 5 and 6), providing similar benefits to the bypassed reaches downstream of each of these dams. Within the mainstem San Joaquin River, sediment pass-through would occur at the Rock and Ross creek dams and at Mammoth Pool dam. Likely benefits of restoring the passage of sediment into downstream reaches include: increasing the volume of spawning gravels,[49] improving benthic macroinvertebrate production, creating greater quality and diversity of aquatic habitat to benefit native fishes, and fostering point bar development to enhance riparian habitat. Sediment pass-through activities would be implemented in wet water years, prior to the implementation of channel and riparian maintenance flows in the reaches where they are proposed. Both of these provisions would assist with ensuring flows re-distribute spawning gravel, maintain pool depths via scouring, and flush fine sediment from the stream channel.

Sediment removal activities would help to prevent MIF release structures from becoming blocked by sediment, and would reduce the transport of fine sediments into downstream reaches, which could prevent potential adverse effects from fine sediment such as reducing the permeability of spawning gravels and smothering incubating trout eggs. As proposed in the Settlement Agreement, sediment removal activities would be implemented, if needed, at each of the dams where sediment pass-through activities are proposed, except for Dam 4 and Mammoth Pool dam where sediment build-up is not an issue. Removed sediments would be either placed above the mean annual flood elevation where they would not be re-entrained or removed to pre-approved, off-site locations. Therefore, mechanical sediment removal would have no adverse effects on fish habitat in downstream areas.

The sediment management measures in the Settlement Agreement include monitoring of turbidity levels downstream of seven of the larger dams to ensure that turbidity levels do not rise to levels that would be harmful to aquatic biota (see table 3-14). Monitoring of pool depths would also be performed downstream of Dams 4, 5 and 6 prior to and after implementation of sediment pass-through measures, to determine whether deposition of fine sediments has caused pools to fill with sediments and the volume of the pools reduced. Monitoring pool depth in these reaches would allow effects of sediment pass-through on pool habitat to be assessed, and would provide information that could be used to alter the implementation of sediment pass-through measures if excessive pool filling occurs, which would adversely affect habitat availability and thermal refugia for adult trout.

The Settlement Agreement does not require monitoring of pool depths for the other dams where sediment pass-through measures would be implemented, including

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[49]Except below Mammoth Pool dam, where our analysis (see section 3.3.1.2) indicates that the proposed pass-through activities are unlikely to restore movement of spawning gravels because of the large size of the reservoir.

Mammoth Pool and nine smaller headwater diversions. Because of the large size of the Mammoth Pool impoundment (approximately 8 miles in length), we expect that most of the sediment retained in this reservoir is deposited in the upstream portion of the reservoir, and that only small amounts of fine sediments would be released when pre-spill whitewater flows are released via the Howell-Bunger valve, and that these sediments would be easily transported downstream and pose little threat of pool-filling. The nine headwater diversions are on high gradient streams with very small impoundments, all of which have a surface area of less than 1 acre and a volume of less than 1 acre-foot. Given the relatively small amount of sediment that could be retained in these impoundments and the high transport capacity of these headwater streams, we conclude that there is little risk of pool-filling from sediment pass-through activities on these tributaries.

The estimated annualized cost of sediment pass-through, removal and sediment monitoring measures proposed in the Settlement Agreement is $71,430. Given the importance of keeping minimum flow structures open and the ecological benefits of restoring sediment transport processes, we conclude that these measures are warranted and justify these costs.

Expansion of the monitoring of pool-filling proposed for Dams 4, 5 and 6 to include a qualitative assessment of embeddedness of spawning gravels with fine sediment at representative potential spawning sites would allow potential adverse effects on spawning gravel and the adequacy of flushing flows to be evaluated and adjusted if warranted. A relatively simple visual assessment of the abundance of fine sediment on the surface of potential spawning areas could be conducted at a relatively low cost, especially if it were conducted in association with monitoring of pool-filling at the reaches downstream of Dams 4, 5 and 6. We estimate that this additional effort would add approximately $5,000 to the annualized cost of the sediment management measures included in the Settlement Agreement, assuming that sediment pass-through and monitoring activities would occur every 5 years. Because of its low cost and its importance in detecting and addressing any adverse effects of sediment pass-through activities on spawning gravel, we conclude that the benefits of this additional measure warrant its costs. We also conclude that limiting this monitoring effort to Dams 4, 5 and 6 is appropriate, given the more limited volume of sediments that are likely to be passed through at other project diversions.

Gravel Augmentation

To address project effects on the recruitment of spawning gravels in the Mammoth Reach, SCE proposes to implement the Gravel Augmentation Plan described in Settlement Agreement measure B.1.2. Interior filed a 10(j) recommendation consistent with this measure.

Under the proposed plan, SCE would coordinate with the Forest Service, FWS, Cal Fish & Game, Water Board, and other interested resource agencies to implement a

gravel augmentation feasibility assessment to determine if placing gravel in or near the spillway channel at Mammoth Pool dam is feasible and whether gravel placed at this location would be moved and redistributed by spill flows. The feasibility assessment would include assessing whether placing gravel at this location would cause any adverse effects on project operation or to dam safety by assessing whether it would impair the Mammoth Pool dam spillway function, cause erosion and undermine the access road, result in dam instability, or impair the operation of release structures or hinder inspection of the dam and release structures.

If the assessment concludes that the placement of gravel in or below the spillway channel would lead to any of these problems or would create other reliability or operational problems, then alternative locations for gravel placement would be evaluated. The alternative locations must have sufficient physical space and access for placement of gravels and be comparable in cost to the placement of gravels in or below the spillway. These alternative locations would include, but would not be limited to, a location below the confluence of Rock Creek.

Gravel augmentation would begin after the first fish monitoring effort has been completed following the initiation of the new flow regime. SCE would place 300 tons of gravel into the Mammoth reach immediately below the Mammoth dam spillway, or at alternative feasible location(s). SCE would monitor gravel transport and distribution and evaluate whether the next two above normal or wet water year spill events with a peak flow of at least 5,000 cfs are capable of moving the gravel from the emplacement site. The pilot project may be considered successful if after the two spill events, more than 50 percent of the gravel has moved downstream from the emplacement site.

SCE would prepare a report following the completion of gravel monitoring after the second spill event for agency review and comment. If the feasibility assessment is successful SCE and the agencies would meet and decide whether to continue or modify the gravel augmentation program. If the gravel augmentation program is not implemented, then a supplemental fish stocking program in the Mammoth Reach would be implemented by Cal Fish & Game.

If gravel augmentation is conducted, the proposed feasibility assessment would be needed to assess the potential for gravel augmentation to cause adverse effects to project facilities, including the Mammoth Pool dam, spillway, and access road.

We conclude that the proposed gravel augmentation feasibility assessment would be necessary in order to assess the potential for gravel augmentation to cause adverse effects to project facilities, including the Mammoth Pool dam, spillway, and access road. The estimated annualized cost of conducting the feasibility assessment, as proposed in Settlement Agreement measure B.1.2, is $2,200. Given that the feasibility assessment is needed to ensure dam safety, we conclude that the benefits of this measure warrant its costs and that this measure should be included as a condition of a new license. In order to ensure that gravel augmentation does not adversely affect dam safety or the integrity of project facilities, SCE should file a detailed study plan with the

Commission for approval prior to conducting the feasibility assessment. Upon completing the feasibility assessment, we also recommend that notification be provided to the Commission, in addition to the agencies noted above, detailing the results of the feasibility assessment. Further, if the pilot project is successful, and gravel augmentation is proposed by SCE to be implemented over the life of the license, SCE would be required to request an amendment to its license.

Wildlife and Plant Protection Measures

Vegetation and Integrated Pest Management Plan

Vegetation management, including trimming of vegetation by hand or equipment and the use of herbicides, occurs at several locations within the Big Creek ALP Projects. This regularly occurring management could have both beneficial and adverse effects on special-status plans and wildlife and the proliferation of noxious vegetation. SCE's proposed Vegetation and Integrated Pest Management Plan specifies measures that would be implemented to ensure vegetation management in a manner that minimizes adverse effects on the environment, protects sensitive plants and wildlife, controls the spread of noxious vegetation, ensures revegetation of disturbed sites, and provides for weed-free erosion control measures. SCE also would monitor the effectiveness of vegetation management activities that it implements. In addition, SCE would implement multifaceted training programs to ensure that employees are aware of sensitive plants and wildlife that could be affected by operation and maintenance of the Big Creek ALP Projects. SCE would also attend annual consultation meetings with the Forest Service, Interior, and Cal Fish & Game to discuss past and proposed terrestrial resource management activities. The resource and land management agencies support SCE's proposed approach to vegetation management. We consider the proposed measures to manage vegetation and control the spread of noxious vegetation to represent an effective approach to minimizing and avoiding project related effects on vegetation and the wildlife that depend on this vegetation for habitat. We estimate the annual cost of implementing the Vegetation and Integrated Pest Management Plan and associated training and agency consultation would be $52,250 at the Big Creek Nos. 2A, 8, and Eastwood Project; $52,250 at the Big Creek Nos. 1 and 2 Project; $59,500 at the Mammoth Pool Project; and $23,990 at Big Creek No. 3 Project. Given the benefits of implementing these measures, we consider these costs to be warranted.

Riparian Monitoring

Quantitative and qualitative riparian studies completed for the Big Creek ALP Projects identified potential riparian or meadow resource issues along certain bypassed streams associated with the Big Creek Nos. 2A, 8, and Eastwood Project. Under Settlement Agreement measure A1.11, SCE would implement the Riparian Monitoring Plan included as Settlement Agreement, appendix K, to determine the effectiveness of channel and riparian maintenance flows for maintaining channels and riparian and meadow ecosystems. The Riparian Monitoring Plan would be designed to monitor the

status and trends of the riparian resources along the Mono Creek, South Fork San Joaquin River, and Camp 61 Creek bypassed reaches in response to the channel and riparian maintenance flows and MIFs required under the new licenses. Specific objectives for the plan include monitoring riparian and meadow vegetation composition in selected reaches; riparian vegetation age class structure, including regeneration, in selected bypassed reaches; and trends in riparian and meadow health in selected reaches over the length of the new license. The Forest Service filed 4(e) conditions and Interior filed 10(j) recommendations that are consistent with this measure.

Under the Settlement Agreement, monitoring in Camp 61 Creek would occur the first year after license issuance, and at 10-year intervals thereafter, consistent with Commission staff recommendations in the Portal Project final EA. However, under the Settlement Agreement, monitoring would also occur 5 years following the channel and riparian maintenance flow releases made in the first wet water year for Camp 61 Creek. We support this additional monitoring event recommended in the Settlement Agreement as it would provide additional information in the short-term to determine the effectiveness of channel and riparian maintenance flows in Camp 61 Creek.

Overall, the proposed monitoring effort would provide information to determine whether or not the proposed channel and riparian maintenance flows and MIFs promote healthy riparian and meadow communities; result in successful establishment of native species' on alluvial surfaces in reaches with identified age class resource issues; support native riparian or meadow species; and discourage the establishment of mature woody vegetation and upland species on lower surfaces within the channel causing channel encroachment. Adaptive management would be implemented to ensure that the channel and riparian management goals are met in Bear, Bolsillo, Camp 62, Chinquapin, Mono, Camp 61, and South Fork San Joaquin River bypassed reaches. The estimated annualized cost of Settlement Agreement measures A1.11 is $14,160, and based on the benefits described above, we conclude that the cost of this measure is warranted.

Wildlife Protection

Numerous special-status wildlife species, including bald eagles, western red bat, Townsend's western big-eared bat, and pallid bat are known to occur in the vicinity of the Big Creek ALP Projects. SCE proposes to consult with the Forest Service, Interior, and Cal Fish & Game prior to conducting any non-routine maintenance at structures known to support sensitive bats, and would implement appropriate avoidance and protection measures as necessary to minimize disturbance of bats and their habitat. SCE also plans to implement its Bald Eagle Management Plan, which would ensure that disturbance of nesting bald eagles is minimized and foraging and roosting habitat is protected. Known nest sites would be monitored, as would wintering bald eagle populations. In addition, cases of raptor mortality at project transmission lines would be investigated and potential corrective actions developed in consultation with the Forest Service, Interior, and Cal Fish & Game. We consider these proposed measures to represent best management practices for the protection of bats and bald eagles;

however, the final plan should include the most recent APLIC guidelines to assess potential corrective actions when investigating any raptor mortality that may be associated with a project transmission line.

Mule deer migration routes cross the San Joaquin River, specifically in the Mammoth Pool Project area. In addition, project roads in the vicinity of the Big Creek Nos. 2A, 8, and Eastwood Project have the potential to disturb mule deer migrations in that area. SCE proposes to install fences at specific locations where deer crossing of the river would be unsafe and ensure that sand is present on the Mammoth Pool dam road to encourage deer to use this road as a means to safely cross the river. Monitoring of debris at the floating boom upstream of the Mammoth Pool spillway would be used to facilitate annual consultations with the Forest Service, Interior, and Cal Fish & Game. Road closures at Mammoth Pool and Big Creek Nos. 2A, 8, and Eastwood projects during the deer migration season would minimize potential disturbance of migrating deer. Implementation of these measures would address known sources of deer mortality and disturbance during annual migrations.

Human interactions with black bears in the wild can result in injury to humans, loss of wild instincts by bears that can easily obtain food in trash receptacles, and litter from bears strewing trash during their search for food. SCE proposes to minimize these effects by installing and maintaining bear-proof dumpsters at the Big Creek No. 1 administrative offices and company housing, and other project facilities where people may dispose of or store food waste. Such bear-proof receptacles are the standard means to minimize bear/human interactions.

The resource and land management agencies are in agreement with SCE's proposed measures to protect bats, bald eagles, mule deer, and black bears. We estimate that the total annual cost of implementing these measures at all four Big Creek ALP Projects would be $42,130, but the cumulative protection of wildlife that would be afforded by these measure is warranted.

Valley Elderberry Longhorn Beetle Management Plan

SCE conducted VELB habitat surveys at the Big Creek ALP Projects and found potential occurrences and habitat at all projects except Big Creek Nos. 1 and 2. To ensure the protection of VELB habitat (elderberries with stems greater than 1 inch in diameter), SCE developed the VELB Management Plan, which includes such protective measures as using flags and signage to identify mature elderberry shrubs, limitation on trimming of elderberry branches >1-inch in diameter, herbicide restrictions near elderberries, and limitations on when non-emergency road grading would occur. To compensate for project-related losses of elderberry shrubs, SCE proposes to plant elderberry seedlings at a location agreed upon by the Forest Service, Interior, and SCE, and to monitor the seedlings to ensure pre-determined success rates are achieved. Interior's 10(j) recommendations and the Forest Service's 4(e) conditions are consistent with SCE's proposed measure. Measures to protect, monitor, and mitigate project

effects on VELB are specified in FWS' 1999 Conservation Guidelines, SCE's proposed plan is consistent with provisions specified in these guidelines, and we recommend implementation of the VELB Management Plan. We estimate the total annual cost of implementing the VELB Management Plan would be $39,020, but this cost is warranted to ensure the protection of the federally listed VELB.

Recreation Management Plan

Recreation Operation, Maintenance, and Administration

SCE proposes to meet annually with the Forest Service to ensure protection and use of the recreational facilities at the Big Creek ALP Projects. Long-term planning and the implementation schedule for major facility rehabilitation and new capital improvements would be reviewed and adjustments to the Recreation Management Plan or implementation schedule considered, as needed. SCE would also complete a recreational use and facilities condition survey every 6 years, and file the results with the Commission along with the required Form 80 report. This report would summarize capacity data, including parking and campsite capacity, at formal recreational sites, days when recreational access to the projects was available to vehicular traffic, major reservoir water surface elevations during the recreational season, boat ramp accessibility, and the number of whitewater boating opportunity days provided at boatable reaches (downstream of Florence Lake and Mammoth Pool). The results of this survey would provide a basis for SCE and the Forest Service to make adjustments to the Recreation Management Plan. We recommend implementation of the survey and annual consultation with the Forest Service.

Currently, the Forest Service operates and maintains the majority of recreational facilities that provide public access to project lands and waters (see table 3-23). A sufficient number of recreational access sites are within the project boundary to ensure continued public access to project lands and waters. Those facilities outside the project boundary are on Sierra National Forest lands and are managed by the Forest Service; consequently, public access to those facilities is expected to continue in the future. SCE would continue to operate and maintain its existing facilities at the Big Creek ALP Projects. In addition, SCE proposes to maintain the section of the San Joaquin River Trail that is co-aligned with the Mammoth Pool transmission line, which would ensure that this portion of the trail would remain functional. Finally, SCE proposes to use specific snow plowing techniques at Kaiser Pass Road and Florence Lake Road to ensure that snowmobiling and cross-country skiing opportunities are retained along these roads during the winter. SCE's proposed operation and maintenance measures would ensure continued public recreational opportunities to project lands and waters and we recommend that they should be implemented.

We estimate the annualized cost to SCE for annual meetings, recreational use surveys, and operation and maintenance at the Big Creek ALP Projects would be $82,210. However, given the need to coordinate with the Forest Service on various

aspects of recreational use within the Sierra National Forest, and the appropriateness of SCE maintaining its own recreational facilities at the projects, we consider the benefits that would result from these measures to be worth the cost.

Major Recreation Facility Rehabilitation and Capital Improvements

As previously noted, the Forest Service currently maintains the majority of recreational sites that provide public access to project lands and waters. To assist the Forest Service with its maintenance of these facilities, SCE proposes numerous one-time major rehabilitation projects at each of these sites as discussed in section 3.3.2.2, *Recreational Resources* (and shown in table 3-23). We consider this a reasonable approach to share the responsibilities of continuing to provide recreational opportunities to those visitors who are attracted to the area because of its location within the Sierra National Forest and its project-related features (i.e., reservoirs). However, the licensee is ultimately responsible for the operation and maintenance of the project's recreation facilities located within the project boundary. As shown in table 3-23, many of the facilities that SCE would rehabilitate are located partially outside of the project boundary. Partial inclusion in the project boundary raises questions about the responsibility for the long-term management of these recreation facilities. Because these recreation facilities provide public access to project lands and water, and because SCE is undertaking major rehabilitation that includes components of facilities that are on lands partially outside the project boundary, following the Commission's settlement policies on project boundaries, we recommend that these facilities be included in the respective project boundary in their entirety.

In addition, SCE proposes and Forest Service conditions specify that SCE undertake major rehabilitation at five campgrounds in the Sierra National Forest that are located entirely outside of any project boundary—the Dorabelle, Upper Billy Creek, Cavatee, Kinnikinnick, and Mammoth Pool campgrounds. In our analysis, we conclude that SCE already provides adequate camping facilities at these lakes. Therefore, we do not recommend that these additional campgounds be included in the project boundary or that SCE's cost to undertake major rehabilitation at these facilities be made a condition of the license.

SCE proposes to remove the Florence Lake day-use area from the existing project boundary. We conclude in our analysis that the Florence Lake day-use area provides recreational day-use facilities associated with the project and is located adjacent to the Florence Lake boat ramp, a project facility, which also provides public access to project waters. Therefore, we do not find sufficient reason to recommend removing this facility from the existing project boundary. We recommend that the Florence Lake day-use-area remain in the existing project boundary.

SCE also proposes to construct new recreational facilities at areas where specific recreational needs were identified during its studies and consultations with stakeholders. At the Big Creek Nos. 2A, 8, and Eastwood Project, SCE would develop an accessible

fishing platform on the South Fork San Joaquin River near Jackass Meadows Campground and an accessible boat loading facility at the Florence Lake boat ramp. At the Big Creek Nos. 1 and 2 Project, SCE would develop a day-use area adjacent to Dam 3 at Huntington Lake that would include accessible access and develop an accessible fishing platform at Huntington Lake. These four proposed new recreational facilities would provide public access, especially for those with disabilities, and alleviate informal recreational use that can lead to adverse environmental effects and unsafe conditions associated with crowding. We recommend that all four proposed measures be implemented and that the new recreational facilities be included within the project boundary.

We estimate the annual cost of implementing SCE's proposed major rehabilitation of facilities currently operated and maintained by the Forest Service at the Big Creek ALP Projects (with exception of the five campgrounds located outside the project boundaries) and the construction of new recreational facilities at two of the four projects to be $1,043,090, but we consider the benefits associated with maintaining existing recreational infrastructure and expanding recreational opportunities to be worth this cost. These recreational facilities provide public access to project lands and waters and would provide more formal facilities where informal recreational use currently occurs, enhance access, particularly for those individuals with disabilities, and provide the means to help meet future recreational demand at the Big Creek ALP Projects.

Fish Stocking, Recreational Flow Releases, Reservoir Water Level Management, and Information Distribution

SCE proposes to provide resources to match stocking of Big Creek ALP Project reservoirs and stream reaches conducted by Cal Fish & Game. SCE proposes to provide this match by either acquiring fish directly or by reimbursing Cal Fish & Game for half the cost of annual stocking. Although we agree enhanced stocking would improve the recreational experience of visitors to the four Big Creek ALP Projects, funding Cal Fish & Game's stocking is contrary to the Commission's policy on the imposition of funds and cost caps. Although we encourage the cooperation between SCE and Cal Fish & Game, we note that SCE should be solely responsible for ensuring that the Big Creek ALP Project reservoirs and stream reaches are stocked. Therefore, we recommend that SCE, after consultation with Cal Fish & Game, file an annual fish stocking report with the Commission detailing the quantity, species, size, location, and frequency of stocking efforts in Big Creek ALP Project reservoirs and stream reaches.

SCE proposes to provide channel and riparian maintenance flows from Florence Lake during wet and above average water years so that the descending portion of the flow release is timed to facilitate whitewater boating opportunities. In addition, SCE proposes to provide pre-spill whitewater flow releases from Mammoth Pool to the extent practical and controllable by SCE. As previously discussed, SCE proposes to include the number of recreational boating opportunity days in its recreational use and

facility condition report that would be submitted to the Commission at 6 year intervals, which would provide a measure of effectiveness of these flow releases for whitewater boating and whether adjustments to release procedures need to be considered. We conclude the proposed releases have the potential to enhance boating opportunities and concur with SCE's proposed measure.

SCE also proposes to make a good faith effort to maintain water surface elevations of Shaver and Huntington lakes, and Mammoth Pool at a level that would support flatwater recreational opportunities during the recreational season. The estimated annualized cost for implementing water level management at these reservoirs would be about $4,110. However, for all of these reservoirs, SCE proposes no specific elevation ranges associated with the reservoir level operations. We note that the terminology in the Settlement Agreement "to make every effort" or "to make every reasonable effort" relative to water surface elevations at the reservoirs is extremely difficult for the Commission to enforce. Because of our inability to enforce compliance with these conditions and the fact that the proposed conditions for Huntington Lake and Mammoth Pool do not differ from how SCE now operates these reservoirs, we do not recommend including these measures in the Big Creek Nos. 1 and 2 (Huntington Lake) and Mammoth Pool licenses.

At Florence Lake, SCE's proposed measure would result in higher water levels during July and August about 20 percent more often than currently occurs. As such, associated flatwater boating opportunities would be enhanced by SCE's proposed measure to maintain a minimum water surface elevation of 7,276 feet during July and August and we recommend inclusion of this measure in a new license for the Big Creek Nos. 2A, 8, and Eastwood Project. At Shaver Lake, SCE's proposal would have the potential to provide more stable elevations during the recreational season. Though, again, we can't ensure compliance with this condition, we recommend this measure because SCE's efforts during the recreation season could improve the existing recreational opportunities and recreational experience at the lake.

Additionally, SCE proposes to provide streamflow and water level information to the public via the Internet, and install staff gages at representative locations to allow visitors to know the approximated flow and reservoir level when they visit specific sites. Recreation and other project-related information would be also be available to the public at interpretive display exhibits that SCE proposes to construct at locations heavily used by the public. We conclude that SCE's proposed water management plans and its proposed means to publicize flows, reservoir water levels, and other project-related recreational and cultural resources would enhance recreational opportunities at the Big Creek ALP Projects, and we recommend that they be implemented.

The cost of fish stocking, pre-spill recreational releases at Mammoth Pool, water level management at Florence and Shaver lakes, and information distribution to the public would have an annualized cost of $195,970 (the cost of releases from Florence Lake is included under our discussion of channel and riparian maintenance flows). We

consider the benefits to the public who visit these project areas that would result from these measures to be worth the cost.

Cultural Resources

SCE proposes to provide for the continued protection of cultural resources through finalization of an HPMP for the Big Creek ALP Projects. SCE's finalization of its HPMP in accordance with the provisions of the Settlement Agreement would provide for management and protection of historic properties and important cultural resources throughout the Big Creek ALP Projects APE over the license terms. It would also address Forest Service concerns (expressed in its preliminary 4(e) conditions) regarding participation in the management and protection of cultural resources in those portions of the APE lying in or adjacent to the Sierra National Forest. In addition, SCE would implement environmental programs for cultural resource awareness, and conduct annual meetings with the Big Creek Advisory Committee, which would be open to the Tribes and organizations that participated in the Cultural Resources Working Group during the Big Creek ALP. The Commission would execute a PA with the SHPO and Advisory Council, which would include SCE, the Tribes, the Forest Service, and Interior as consulting parties.

Finalization and implementation of SCE's HPMP in consultation with the SHPO, Tribes, and the Forest Service would ensure that adverse effects on historic properties arising from project operations or project-related activities over the term of the license would be avoided or satisfactorily resolved. Annual consultation would facilitate development of management and monitoring plans, review and evaluation of cultural resources data, and development and implementation of cultural resources protective measures. We recommend finalizing and implementing the HPMP. We estimate that implementation of the final HPMP, implementation of programs for cultural awareness, and annual consultation would cost about $81,040 annually at the four Big Creek ALP Projects and the benefit of protecting cultural resources would outweigh the cost of these measures.

Land Use Management and Visual Resources Protection

SCE proposes to implement its Transportation System Management Plan to ensure that responsibilities and schedule for maintaining, monitoring, and rehabilitating project-related roads is clearly defined. In addition, Proposed Article 3.1 for the Big Creek Nos. 1 and 2 and Mammoth Pool projects provides for the implementation of Visual Resources Plan to ensure to the extent possible, project features are consistent with the Forest Service VQOs for the Big Creek ALP Projects. Many project roads pass through land managed by the Forest Service, and therefore we consider it important to delineate SCE's and the Forest Service's responsibilities to ensure that these roads are well maintained and ensure appropriate access to project facilities for inspection, operation, and maintenance purposes as well as provision of appropriate public access to project lands and waters. When project facilities require painting, the consultation

with the Forest Service specified in the Visual Resources Plan would enable the current inconsistencies with the VQOs at the Big Creek Nos. 1 and 2 and Mammoth Pool projects to be addressed to the extent practical. We recommend that both plans be implemented. The annualized cost associated with implementing the Visual Resources Plan at these two projects would be $21,930, and this relatively modest cost would be worth the benefits to the aesthetic resources of the Big Creek ALP Projects. The annualize cost of implementing the Transportation System Management Plan, and associated annual consultation with the Forest Service regarding land use issues in general at all four projects would be $1,409,190. Although this would be a costly measure, considering the rough terrain and winter conditions at high altitudes, this high cost associated with maintaining project roads is not unexpected and the benefits of this plan would be worth the cost.

The Forest Service specifies three land use management measures that are not include in the Settlement Agreement but would be consistent with the Land Use Management Plan for the Sierra National Forest; a Fire Management Plan, a Spill Prevention and Countermeasure Plan, and a sign plan. SCE already has developed fire management procedures in place at each of its project facilities, and packaging them into a plan for Forest Service review would ensure coordination of efforts to prevent, control, report, and investigate fires in the vicinity of the project. Spill Prevention and Countermeasures Plan are required to be in place at all facilities that store hazardous waste in excess of threshold levels. It is therefore likely that SCE has already developed these plans for appropriate project facilities. Providing such plans for review by the Forest Service would ensure that appropriate input is provided to protect the resources associated with the Sierra National Forest. Finally, SCE proposes to install a number of interpretive signs and would also place signs at appropriate places along project roadways. Ensuring that such signage is consistent with the signage standards of the Forest Service is appropriate when SCE signage is within or visible from National Forest System lands. We recommend implementation of the three plans specified by the Forest Service. We expect that the information needed to prepare these plans already exists or would be developed under the auspices of other plans. Therefore, we expect the annual cost of implementing these three plans would be $3,940, and worth the benefits that would accrue from such coordination with the Forest Service.

5.3 UNAVOIDABLE ADVERSE EFFECTS

Project dams and diversions would continue to block upstream migration to higher quality spawning and rearing habitat upstream of the bypassed reaches, and block downstream transport of sediment and LWD from the upper watersheds to the bypassed reaches. Big Creek project operations would continue to alter natural flow regimes, adversely affecting the quality and quantity of coldwater fish habitat in some project bypassed reaches, although cool tailwater releases also improve trout habitat in some reaches. Changes in the timing, magnitude, and duration of peak and base flows, and loss of sediment and LWD recruitment from the upper watersheds would continue

to adversely affect channel morphology and aquatic and riparian habitat in the project bypassed reaches. Mortality of some fish entrained into project diversions would continue to be caused due to pressure changes or other injuries associated with turbine passage. The low densities of fish observed near the powerhouse intakes during hydroacoustic surveys and the lack of fish encountered during tailrace sampling conducted by SCE at several of the project powerhouses suggest that the magnitude of entrainment mortality at the Big Creek ALP Project powerhouses is generally low.

The proposed conservation measures would reduce some of these effects to varying degrees, particularly increased MIFs, channel and riparian maintenance flows, and LWD management. However, many of the current adverse effects (e.g., blocked upstream passage at dams and diversions and entrainment mortality) would continue as unavoidable adverse effects to native, coldwater fishes.

We have identified no other unavoidable adverse effects to resources influenced by project operations.

5.4 RECOMMENDATIONS OF FISH AND WILDLIFE AGENCIES

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by 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.

In response to the Commission's notice soliciting final terms and conditions for SCE and the REA notice for the Big Creek ALP Projects issued on December 5, 2006, for the Mammoth Pool Project and January 8, 2008, for the remaining three projects, NMFS filed letters in response to the REA notice but did not make specific recommendations pursuant to section 10(j). NMFS requested inclusion of a reopener provision in new licenses should the need arise. The Commission typically includes such a standard fish and wildlife reopener provision in new licenses that it issues. Interior filed letters of comment that included section 10(j) recommendations.[50] Interior is also a party to the Settlement Agreement.[51] In its letters, Interior recommends that

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[50]NMFS filed letters in response to the initial notice dated February 5, 2007, August 31, 2007, and September 1, 2007. Interior filed letters in response to the initial notice dated February 2, 2007 and March 5, 2008.

[51]The Settlement Agreement was filed with the Commission on February 23, 2007.

the Commission approve the Settlement Agreement and all the provisions thereof. Commission staff is also recommending the provisions of the Settlement Agreement that are within the scope of section 10(j) be included as terms of any new licenses.

We do not recommend adopting Interior's recommendation that the current diversion at Adit 8 Creek not be used. As discussed in section 5.2, *Comprehensive Development and Recommended Alternative*, we conclude that because of the lack of identified aquatic issues in this reach and the fact that the diversion is infrequently if ever used, a decision to include or remove Adit 8 Creek and the Adit 8 Creek diversion from the Big Creek Nos. 1 and 2 Project license would have little, if any, effect on aquatic resources. Although the diversion on Adit 8 Creek has not been used for several decades, the dam gives SCE the flexibility to divert water from Tunnel 5 to Tunnel 2 in the event of an outage at Powerhouse 2A, which would help to avoid adverse effects associated with a large and sudden increase in flows in Stevenson Creek. Therefore, for these reasons, we recommend that the Adit 8 Creek diversion dam remain within the project boundary.

This measure is outside the scope of section 10(j). Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document and the previous section.

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 or state comprehensive plans for improving, developing, or conserving waterways affected by the project. Under section 10(a)(2), federal, state, and local agencies filed comprehensive plans that address various resources in California. The continued operation of the Big Creek ALP Projects, as recommended in this EIS, is consistent with the 14 state and federal plans listed below that are applicable to the projects.

California Department of Parks and Recreation. 1997. Public Opinions and Attitudes on Outdoor Recreation in California. 1997. Sacramento, California. March 1998.

California Department of Parks and Recreation. 1993. California Outdoor Recreation Plan. Sacramento, California. April 1994.

California Department of Parks and Recreation. 1980. Recreation Outlook in Planning District 2. Sacramento, California. April 1980.

California Department of Water Resources. 1983. The California water plan: projected use and available water supplies to 2010. Bulletin 160-83. Sacramento, California. December 1983.

California Department of Water Resources. 1994. California water plan update. Bulletin 160-93. Sacramento, California. October 1994.

California State Water Resources Control Board. 1975. Water quality control plan report. Sacramento, California.

California- the Resources Agency. Department of Parks and Recreation. 1983. Recreation needs in California. Sacramento, California. March 1983.

Fish and Wildlife Service. California Department of Fish and Game. California Waterfowl Association. Ducks Unlimited. 1990. Central Valley habitat joint venture implementation plan: a component of the North American waterfowl management plan. U.S. Department of the Interior, Portland, Oregon. February 1990.

Forest Service. 1992. Sierra National Forest land and resource management plan. Department of Agriculture, Clovis, California. March 1992.

State Water Resources Control Board. 1999. Water Quality Control Plans and Policies Adopted as Part of the State Comprehensive Plan. April 1999.

Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior.

Fish and Wildlife Service. Undated. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, DC.

National Park Service. 1982. The nationwide rivers inventory. Department of the Interior, Washington, DC. January 1982.

Forest Service. 2001. Sierra Nevada National Forest plan amendment, including final environmental impact statement and Record of Decision. Department of Agriculture, Clovis, CA. January 2001.