

OD-ORDER, 58 FERC ¶62,097, Southern California Edison
Company Project No. 298-000 - California, (Jan. 31, 1992)

Southern California Edison Company Project No. 298-000 -
California

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[¶62,097]

Southern California Edison Company Project No. 298-000 -
California

Order Issuing New License (Major)

(Issued January 31, 1992)

Fred E. Springer, Director, Office of Hydropower Licensing.

Southern California Edison Company (licensee/SCE) has filed an application for a new license under Part I of the Federal Power Act (Act) to continue to operate and maintain the Kaweah Project. The project is located on the East Fork, Marble Fork, and Middle Fork of the Kaweah River near the Towns of Lemoncove, Three Rivers, and Harmon, in Tulare County, California, partially on lands of the United States administered by the Bureau of Land Management (BLM).

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Notice of the application has been published. No protests or objections to issuance of the license were filed. The State of California Department of Fish and Game (DFG) filed a petition to intervene stating that it plans to negotiate with SCE concerning conditions for the operation of the project for the purpose of maintaining certain water conditions to protect fish, wildlife, and recreational resources in the Kaweah River, Middle Fork Kaweah, Marble Fork Kaweah, East Fork Kaweah, Crystal Lake, Upper Monarch Lake, Lady Franklin Lake, and Eagle Lake. These issues and the DFG s petition to intervene are discussed in the Recommendations of Federal and State Fish and Wildlife Agencies section of this license and in the attached

Environmental assessment (EA).

Project History

The project consists of the Kaweah No. 1, the Kaweah No. 2, and the Kaweah No. 3 developments with a total installed capacity of 6,850 kilowatts (kW).

The Kaweah No. 1, the Kaweah No. 2, and the Kaweah No. 3 developments commenced operation in June 1899, February 1905, and May 1913, respectively. Portions of the Kaweah No. 3 development are located within the boundaries of the Sequoia National Park (Park) and were constructed and operated under a special use permit from the Secretary of the Interior (Interior).

The former Federal Power Commission issued a minor parts license to SCE for the project on August 7, 1924, to expire on August 8, 1974. Since then the project has been operating under annual license. This original license included only those project works located outside of the then-existing boundaries of the Park (i.e., Kaweah No. 1, Kaweah No. 2, and a portion of Kaweah No. 3).

SCE filed a minor parts new license application on May 2, 1973, and a revised application for a major license on February 10, 1975.

In the National Parks and Recreation Act of 1978 (NPRA), Congress revised the boundaries of the Park to include the Mineral King Valley, an area of land that had previously been administrated by the U. S. Forest

Service as part of the Sequoia National Forest. As a result of this boundary revision, portions of the Kaweah No. 1 development were brought within the boundaries of the Park. The NPRA also made provisions for authorizing Interior to revise SCE s existing special use permit for Kaweah No. 3 to include the portion of Kaweah No. 1 now located within the boundaries of the Park.

Kaweah Project facilities within the Park include: (1) the Upper Monarch, Crystal, Eagle and Franklin dams and lakes; (2) the Marble Fork dam and flowline which consist of a concrete flume, a canal, and a steel siphon; and (3) a diversion dam on Middle Fork of Kaweah River and a flowline from the diversion dam to about 1/6 mile from the forebay of Powerhouse No. 3.

The Kaweah No. 2 and those portions of the Kaweah No. 1 and Kaweah No. 3 developments that are located outside of the Park boundaries are licensed herein. A detailed description of the portions of the project subject to this license is contained in Ordering Paragraph (B).

Section 10(a)(2)(C): Conservation Efforts

The staff reviewed SCE's efforts to encourage and help its customers to conserve electricity and find that SCE is making a good-faith effort.

SCE has made extensive efforts to conserve electric energy and reduce the peak demand for generating capacity.

The California Public Utilities Commission (CPUC), which evaluates the conservation efforts of the largest California utilities, says that SCE has been a leader in carrying out effective energy conservation programs.

Section 15(a) (2) (A): Complying with the New License

The staff reviewed SCE's plans to comply with the articles, terms, and other conditions of a new license, and concludes that if the Commission issues SCE a new license for the Kaweah Project, SCE would operate the project in compliance with all conditions of the new license.

The staff bases their conclusion on their review of SCE's compliance record for the term of the existing Kaweah license and the recommended conditions for any new license for Kaweah.

As stated above, SCE made a good-faith effort to follow all license articles, terms, and conditions.

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Section 15(a) (2) (B): Safe Operation

The staff reviewed SCE's plans to manage, operate, and maintain the project safely and finds the plans adequate. SCE proposes no change in project operation that would adversely affect project safety.

emergency
In April 1981, SCE was exempted from filing an action plan (EAP) for the project dams. As required in section 12.21(c) (1) of the Commission's regulations, SCE continues to review the conditions that allow them the exemption.

notify
Section 12.21(c) (2) also requires SCE to promptly

the Commission of any changes that might cause a project emergency endangering life, health, or property and requiring SCE to prepare and file an EAP if such a change occurs.

SCE s project safety record shows that they will cooperate with the Commission s requests and will comply fully with the terms and conditions of any new license.

Section 15(a)(2)(C): Providing Efficient and Reliable Electric Service

The staff have reviewed SCE's operating plans and its ability to provide efficient and reliable electric service and conclude that SCE is operating the project efficiently and reliably. The staff reviewed SCE's record of unscheduled outages and finds the generation lost does not represent a significant part of the annual generation for the project.

Section 15(a)(2)(D): Need for Power

The staff considered the short and long-term need for the power generated by the Kaweah Project and the cost of alternative power if SCE does not receive a new license for the project and concludes that:

SCE needs the power from the Kaweah Project, which helps meet a small part of SCE's overall needs.

The project produces about 53 million kilowatthours (kWh) of energy annually. Replacing project power would cost SCE about \$4.51 million annually or about 85 mills per kWh.

To consider the need for power in California, we reviewed the California Energy Commission's (CEC) Electricity Reports (ER's) for 1988 and 1990.

In the ER's, CEC includes existing hydroelectric projects as part of the state's Basic resource system. CEC also says the California Public Utility Commission classifies hydro relicensing improvements as nondeferrable resources.

CEC says existing hydro facilities should continue operating and should be improved economically.

CEC's forecasts:

With committed resources (those not yet operating, but expected to be successfully built), the Basic system's capacity would meet projected statewide capacity needs only until 1993.

With uncommitted resources (future generation options), the Basic system would have enough capacity until 1996 and would meet statewide energy needs until after 1999 --but

only if producers continue to use displaceable parts of existing oil-fired and gas-fired power plants to supply energy.

To consider the cost of alternative power, the staff studied the financial impact on the SCE's ratepayer,

considered collectively, that would result from the loss of the output of the project if the Commission denies a new license or issues a nonpower license. The staff assumes SCE would increase the operation of the present oil and gas-fueled, steam-electric generating units.

Section 15(a)(2)(E): Transmission Line Improvements

SCE does not see any necessity to change the transmission network affected by the project operation, whether the Commission issues a license for the project or not.

Section 15(a)(2)(F): Project Modifications

SCE proposes keeping the project's total installed capacity unchanged, but operating the project to provide minimum flows.

Comprehensive Plans

Section 4(e) of the Act states that in deciding whether to issue a license, the Commission, in addition to considering the power and development purposes of the project, shall give equal consideration to: the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of fish and wildlife, the protection of recreational opportunities, and the preservation of other aspects of environmental quality. These purposes are considered in the comprehensive development section of the EA (page 46) prepared for this project.

Section 10(a)(2) of the Act requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project.

Under section 10(a)(2), federal and state agencies filed 29 plans that address various resources in California. Of these, staff identified

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four plans relevant to this project. No conflicts were found.

Based on staff s review of agency and public comments filed in this proceeding and on staff s independent analysis, I conclude that the Kaweah Project is best adapted to a comprehensive plan for the Kaweah River.

Recommendations of Federal and State Fish and Wildlife Agencies

Section 10(j) (1)

Section 10(j) (1) of the Act, 16 U.S.C. §803(j) (1), requires the Commission to base fish and wildlife license conditions on recommendations of federal and state fish and wildlife agencies submitted pursuant to the Fish and Wildlife Coordination Act for the protection, mitigation, and enhancement of fish and wildlife. In the EA (section VIII, page 48), the staff made a preliminary determination that there were inconsistencies between some recommendations of the agencies and the purposes and requirements of the Act and other applicable laws with regard to: (1) installing fish screens and bypasses at all Kaweah Project diversions to avoid potential adverse impacts from fish entrainment; (2) increasing streamflow throughout the diverted reaches in order to enhance the existing fishery; (3) replacing wildlife crossing bridges over a project flowline within 4 years of license issuance; and (4) providing an automatic water diversion shutoff system in the event of a rupture or failure of the project's water conveyance facilities.

Section 10(j) (2) Resolution

Pursuant to section 10(j) (2) of the Act, 16 U.S.C. §803(j) (2), whenever the Commission believes that any recommendations of federal and state fish and wildlife agencies may be inconsistent with the Act or other applicable law, the Commission shall attempt to resolve such inconsistencies. Therefore, the staff requested the DFG and Fish and Wildlife Service (FWS), by letter dated August 21, 1991, to consider other options that would be agreeable to the DFG and FWS and would adequately enhance fish and wildlife consistent with other project purposes. The staff also requested the DFG and FWS to submit these options to the Commission within 45 days of the date of our letter (i.e., by October 5, 1991). Finally, in accordance with section 313(b) of the Act, the staff notified the agencies that they must provide substantial evidence supporting their options.

The DFG provided comments by letter dated October 22, 1991. The DFG does not concur with the staff's determination that DFG's recommended fish screens, instream flows, and deer crossing plan are not justified.

The DFG states that: (1) their recommended screens are necessary to protect fishery resources; (2) staff s instream flows would continue to provide marginal trout fishery; and (3) their program for enlarging and replacing deer crossing bridges is appropriate and reasonable, and

improvements over 15 years as we recommend would delay or reduce DFG's deer recovery efforts.

The FWS filed their response in a letter dated October 3, 1991. The FWS recommended: that an approved fish screen and bypass be constructed and maintained by the licensee to prevent entrainment and loss of fish resource into the Kaweah Canal. The FWS stated further that if the Commission will not require screens, then we recommend at a minimum that the licensee be required to: (1) rehabilitate the existing screens; (2) maintain the rehabilitated screens on a regular basis; (3) construct fish bypasses (i.e., escape facilities) to return trout to the stream; and (4) consult with the resources agencies regarding the above measures. As to instream flow recommendations, the FWS recommends flows that would provide 70 to 80 percent of the habitat that would be available with unimpaired natural flows, would maintain natural streamflow changes important for seasonal life stages and thus minimize the amount of time flows are maintained at a steady state. FWS also reiterated its recommendation for an automatic shutoff device.

Regarding automatic shutoff devices, the FWS recommends that if the Commission does not require an automatic water diversion shutoff system, then the Commission should include a license article requiring substantial penalties for any erosion or damage due to the uncontrolled spill of project water. Lastly, the FWS recommends the license include a requirement for a plan to prevent wildlife (especially deer) from falling into project canals. The FWS did not address the specific question of limiting the plan to the section of flowline 3 outside Sequoia National Park.

On December 3, 1991, representatives of the DFG, FWS, and the Commission met in Reno, Nevada, in a further attempt to resolve the four inconsistencies pursuant to section 10(j) of the Act. SCE representatives were also in attendance at the meeting. With regard to all

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four issues, the agencies provided no new evidence to support their original recommendation nor did they provide any options that would allow the desired fish and wildlife enhancement and be consistent with the purposes and requirements of the Act. Consequently, inconsistencies

still exist between the above four agency recommendations and the Act.

Concerning the deer bridge replacement, staff still believes, as stated in the EA (page 34, paragraph 4), that given the low level of mortality, replacement of bridges

over flowline 2 within a 4-year period as recommended by DFG is unwarranted. Also, as stated in the EA (page 35, paragraph 2), staff believes: wildlife drownings in flowline 1 are rare, wildlife can pass under flowline 1 in most places, and flowline 1 is located mostly in steep terrain which is infrequently used by wildlife such as deer. Thus, staff still believes that no measures for protection of wildlife from drowning in the flowlines are needed. However, SCE agreed at the December 3, 1991, meeting to replace the bridges in 4 years and staff believes that repairing the bridges in 4 years instead of over 15 years would not substantially add to project costs. I, therefore, am requiring SCE to rebuild the bridges in 4 years (article 408).

In accordance with section 10(j)(2) of the Act, if the Commission, after attempting to resolve inconsistencies, does not adopt a recommendation of a fish and wildlife agency, the Commission is required to publish findings (together with a statement of the basis for each of the findings) that: (A) an agency recommendation is inconsistent with the purpose and requirements of Part I of the Act (including sections 10(a)(1) and 4(e), as discussed below) or other applicable laws; and (B) conditions selected by the Commission comply with the requirements of section 10(j)(1) (i.e., that the license conditions will adequately and equitably protect, mitigate damages to, and enhance fish and wildlife).

Section 10(j)(2)(A) Finding

I find that the DFG and FWS recommendations for fish screen rehabilitation and maintenance and fish bypass construction; bypass flows; and automatic shutoff valve or substantial penalties for erosion or damage from uncontrolled spill of project water, are inconsistent with the provisions of sections 4(e), 10(a)(1), and 313(b) of the Act. A discussion of the specific inconsistencies follows.

Section 10(a)(1) of the Act requires that the Commission shall license the project that, in the judgment of the Commission, will be best adapted to a comprehensive plan for improving or developing a waterway for the improvement and utilization of water power development, for the protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including

irrigation, flood control, water supply, recreation, and other purposes referred to in section 4(e) of the Act.

Section 4(e) of the Act states that, in deciding whether to issue a license, the Commission, in addition to the power and developmental purposes of the project, shall

give equal consideration to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of fish and wildlife, the protection of recreational opportunities, and the preservation of other aspects of environmental quality. Thus, the Commission must give equal consideration to developmental and nondevelopmental values but must also resolve competing demands in the public interest, which may mean that competing values are not given equal treatment.

shall

Section 313(b) of the Act states that the Commission act based on substantial evidence. Thus, fish and wildlife agency recommendations to protect, mitigate, or enhance fish and wildlife resources must be supported by substantial evidence before the Commission can incorporate them as license conditions.

Fish screens

The FWS recommends that, in order to enhance the existing fishery, the licensee should rehabilitate and maintain the existing fish screens and provide for fish bypasses at diversions nos. 1 and 2. The DFG recommends screening facilities which meet their screening criteria. As discussed in the EA, I conclude that the existing project-induced entrainment does not significantly affect the abundance of trout populations. Therefore, I conclude a potential incremental benefit to the fishery does not justify the cost of rehabilitation and maintaining fish screens and providing for fish bypasses at diversions nos. 1 and 2. Furthermore, the DFG and FWS have not provided substantial evidence that continuing the existing entrainment would lead to the decline of the existing trout fishery in the Kaweah River, nor that eliminating entrainment would result in a substantial increase in fish population size, fish harvest, or recreational fishing.

Minimum flow

DFG and FWS recommend flows which they believe would provide 65 to 80 percent of the fish habitat that would be available with natural flows. The FWS also states that their recommended flows would maintain streamflow changes important for seasonal life stages and would minimize the amount of time flows are maintained at a steady state. DFG states that their recommendation is based on their management

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goals for the affected reaches and results of instream
flow study.

The agencies provide no rationale for the necessity or adequacy of providing 65 to 80 percent of the estimated naturally occurring habitat. Nor does the FWS provide substantial evidence that streamflow changes which are important for seasonal life stages do not take place presently under existing operating conditions and are not adequate to protect the aquatic resources. Furthermore, the FWS provides no evidence that suitable fish habitat, seasonal life stage production, or trout population dynamics are related to the minimum time flows are maintained at a steady state. In fact, the FWS proposed seven straight months of steady state flow below diversion no. 2 (i.e., 50 cubic feet per second January - July, see table 3). The FWS presents no evidence which shows that steady state flow would inhibit or regulate fish populations or habitat, or that fluctuating flows would enhance fish populations and habitat. DFG does not provide substantial evidence that their management goals are not being met, or that our recommended flows would prevent their management goals from being met. The DFG also does not provide evidence of the relationship between instream flows and their stated management goals.

I am requiring SCE to take measures to enhance the bypass flows below diversions nos. 1 and 2, which would result in a 46 to 48 percent increase in the adult rainbow trout habitat and a 76 to 89 percent increase in juvenile rainbow trout habitat.

These increases would be above the amount of habitat that now occurs below diversions nos. 1 and 2.

Automatic shutoff valve

FWS recommends that SCE provide for an automatic water diversion shutoff device to operate in the event of a rupture in the water conveyance system in order to minimize damage to fish and wildlife resources. In absence of the shutoff device, FWS recommends that the Commission require substantial penalties for erosion or damage from uncontrolled spill of project water be required by the license. As discussed in the EA, the staff believes uncontrolled spills are unlikely, and if they occur, the magnitude of erosion that would occur would be similar to the damage that would result if the project had an automatic shutoff system. Furthermore, SCE's erosion control plan includes remedial measures to repair eroded areas associated with a rupture.

In light of the above, I find, pursuant to section 10(j)(2)(A), that adoption of the recommendation of the FWS to require SCE to rehabilitate and maintain fish screens and construct fish bypasses, to increase bypass flows beyond those recommended in the EA, and to construct

an automatic shutoff valve or incur substantial penalties for erosion or damage from uncontrolled spill of project water, and the DFG's recommendations for fish screens and bypass flows, inconsistent with our conclusions under sections 4(e) and 10(a)(1) of the Act. The project as conditioned herein is best adapted to a comprehensive plan for beneficial uses of the waterway, and provides net benefits over and above the current uses of the waterway. The rehabilitated fish screens, fish bypass structures, automatic shutoff devices, and increased bypass flows, recommended by FWS and DFG are an unnecessary expense to the project.

Section 10(j)(2)(B) Finding

Pursuant to section 10(j)(2)(B), I find that the conditions included in this license comply with the requirement of section 10(j)(1) that the license adequately and equitably protect, mitigate damages to, and enhance fish and wildlife affected by the project. The Commission staff has assessed the potential impacts of the operation of the Kaweah Project on fish and wildlife resources, as discussed in the EA. Analysis of the proposed project indicates no significant adverse impacts to fish populations in the Kaweah River due to mortality of downstream migrants entering the turbines and contacting turbine blades. As the staff noted, potential beneficial impacts of the proposed project on fish include enhanced fish habitat with proposed increases in bypass flows and ramping rates to minimize fish stranding.

To enhance the existing environmental resources, the license includes requirements for a sedimentation and erosion control plan (articles 401 and 402); increased minimum bypass flows (article 405); upgrading bridges for safe terrestrial animal movement (articles 408 and 409); ramping rates to prevent fish stranding (article 404); and a management plan for wildlife habitat (article 411).

Summary of Findings

An EA was issued for this project. Background information,

analysis of impacts, support for related articles, and the basis for a finding of no significant impact on the environment are contained in the EA attached to this order. Issuance of this license is not a major federal action significantly affecting the quality of the human

environment.

The design of the project is consistent with the engineering standards governing dam safety. The project will be safe if constructed, operated, and maintained in accordance with the requirements of this order. Analysis of related issues is provided in the Safety and

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Design Assessment (S&DA), attached to this order.

Based on the above, I conclude that the Kaweah Project would not conflict with any planned or authorized development and would be best adapted to comprehensive development of the waterway for beneficial public uses.

The Director orders:

(A) This license is issued to the Southern California Edison Company, for a period of 30 years, effective the first day of the month in which this order is issued, for the continued operation and maintenance of the Kaweah Project. This license is subject to the terms and conditions of the Act, which is incorporated by reference as part of this license, and subject to the regulations the Commission issues under the provisions of the Act.

(B) The project consists of:

(1) All lands, to the extend of the licensee s interest

in

those lands, enclosed by the project boundary shown by exhibits J and K: [As discussed above, management of lands where portions of the Kaweah No. 1 development is constructed was transferred from the National Forest Service to the National Park Service after the application for major license was filed. The Commission cannot license the facilities within the Park. Exhibits J and K should be revised accordingly. Therefore article 301 requires SCE to revise exhibits F and G.]

Exhibit	FERC No. 298-	Showing
Exhibit J-1	22	Kaweah Project General Vicinity Map
Exhibit J-2	23	Kaweah Project
Exhibits K-1 through	24	

14 through 37 Kaweah Project

(2) The following project works: The Kaweah No. 1 Development consisting of: (a) a small concrete diversion dam across the East Fork of the Kaweah River; (b) a 6-foot-high, 3-foot-wide, unlined tunnel, approximately 50 feet long; (c) a 30,723-foot-long steel flume; (d) a 24-foot-

diameter steel forebay tank; (e) 3,340-foot-long steel penstock varying in diameter from 48 to 19 inches; and (f) a 22.5-foot by 26.3-foot reinforced concrete powerhouse containing a single generating unit with a rated capacity of 2,250 kW.

The Kaweah No. 2 Development consisting of: (a) a 161-footlong and 7-feet-high masonry diversion dam on the Middle Fork of the Kaweah River; (b) a flowline comprised of a 16,738-foot-long concrete ditch, a 3,822-foot-long steel flume, and a 1,047-foot-long, 50-inch-diameter steel syphon; (c) a 1,012-foot-long steel penstock varying in diameter from 60 to 40 inches; (d) a 34-foot by 62-foot wood-frame powerhouse containing a single generating unit with a rated capacity of 1,800 kW; and (6) a canal tailrace approximately

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1/3-mile long diverting water into the Kaweah River.

The Kaweah No. 3 Development consisting of: (a) a section of concrete-lined flume, approximately 2,580 feet long; (b) a forebay reservoir, with a capacity of approximately 11 acre-feet; (c) a 3,151-foot-long steel penstock varying in diameter from 42 to 36 inches; (d) a 50-foot by 50-foot reinforced concrete powerhouse containing 2 generating units with a rated capacity of 1,400 kW, each; (e) 2.4-kV generator leads and a 4.6-mile-long, 66-kV transmission line; and (f) other appurtenant facilities.

The project works generally described above are more specifically shown and described by those portions of exhibit J recommended for approval in the attached S&DA.

(3) All the structures, fixtures, equipment, and facilities used to operate or maintain the project and located within the project boundary, all portable property that may be employed in connection with the project and located within or outside the project boundary, and all riparian or other rights that are necessary or appropriate in the operation or maintenance of the project.

(C) The exhibit J and K described above and those sections of exhibit L recommended for approval in the attached S&DA are approved and made part of the license.

(D) This license is subject to the articles set forth in Form L-1 (October 1975) [reported at 54 FPC 1799], entitled Terms and Conditions of License for Constructed Major

Project Affecting Lands of the United States , except article 20, and the following additional articles.

Article 201. The licensee shall pay the United States the following annual charges as determined by the Commission, effective the first day of the month in which this license is issued for the purposes of:

a. Reimbursing the United States for the cost of administration of Part I of the Act. The authorized installed capacity for that purpose is 9,130 horsepower.

and

b. Recompensing the United States for the use, occupancy and enjoyment of 142.3 acres of

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its lands [other than for transmission line right-of-way].

Article 202. Pursuant to section 10(d) of the Act, a specified reasonable rate of return upon the net investment in the project shall be used for determining surplus earnings of the project for the establishment and maintenance of amortization reserves. The licensee shall set aside in a project amortization reserve account at the end of each fiscal year one half of the project surplus earnings, if any, in excess of the specified rate of return per annum on the net investment. To the extent that there is a deficiency of project earnings below the specified rate of return per annum for any fiscal year, the licensee shall deduct the amount of that deficiency from the amount of any surplus earnings subsequently accumulated, until absorbed. The licensee shall set aside one-half of the remaining surplus earnings, if any, cumulatively computed, in the project amortization reserve account. The licensee shall maintain the amounts established in the project amortization reserved account until further order of the Commission.

The specified reasonable rate of return used in computing amortization reserves shall be calculated annually based on current capital ratios developed from an average of 13 monthly balances of amounts properly includible in the licensee's long-term debt and proprietary capital accounts as listed in the Commission's Uniform System of Accounts. The cost rate for such ratios shall be the weighted average cost of long-term debt and preferred stock for the year, and the cost of common equity shall be the interest rate on 10-year government bonds (reported as the Treasury Department's 10-year constant maturity series) computed on the monthly average for the year in question plus four percentage points (400 basis points).

Article 203. The licensee shall clear and keep clear to an adequate width all lands along open conduits and shall dispose of all temporary structures, unused timber, brush,

refuse, or other material unnecessary for the purposes of the project which result from maintenance, operation, or alteration of the project works. In addition, all trees along the periphery of project reservoirs which may die during operations of the project shall be removed. All clearing of lands and disposal of unnecessary material shall be done with due diligence to the satisfaction of the

authorized representative of the Commission and in accordance with appropriate federal, state, and local statutes and regulations.

Article 301. Within 6 months after the date of issuance of this license, the licensee shall file for approval revised exhibits F and G.

Article 401. The erosion protection and remediation plan filed on October 1, 1990, consisting of 7 pages and 6 figures, is approved and made part of this license, and shall be implemented within 1 year from the date of issuance of this license, with the following modifications. Jute netting shall be placed below all areas below the flume where legs would be lengthened. The licensee shall be responsible for posting notices to keep foot traffic away from areas to be revegetated. The licensee shall consult with the Soil Conservation Service (SCS) and the National Park Service (NPS) to determine if seed from native plants is available for use in areas where jute netting will be placed. If such seed is available, it shall be used in these areas. Within 1 year from the issuance of this license, the licensee shall provide documentation that the above measures have been implemented including documentation of consultation with SCS and NPS. The Commission reserves the right to make changes to the plan to ensure adequate protection of the environmental, scenic, and cultural values of the project area.

Article 402. The licensee, after consultation with the Soil Conservation Service (SCS) and the National Park Service (NPS), shall develop a monitoring plan to evaluate the effectiveness of the erosion protection and remediation measures. Within 1 year from the date of issuance of this license, the licensee shall file a copy of the monitoring plan, along with the schedule for filing the results of the monitoring program. The Commission reserves the right to require modifications to the monitoring plan and the schedule. The results of the monitoring shall be submitted to the Commission according to the schedule. If the results of the monitoring indicate that further measures are necessary to prevent and/or control erosion, the licensee shall file for Commission approval a schedule for implementing the control measures. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the schedule with the Commission. The Commission reserves the right to require changes to the schedule. Upon Commission approval the

licensee shall implement the schedule, including any changes required by the Commission.

issuance Article 403. The licensee, within one year from the date of the license, shall file with the Commission, a final recreation plan for the development of recreational

facilities at the Kaweah No. 3 powerhouse. The plan shall include an implementation schedule and at least those features described in the preliminary recreation plan filed with the Commission on February 15, 1991.

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The Commission may require changes to the plan. No land-clearing, land-disturbing, or spoil-producing activities shall begin until the licensee is notified that the above plan complies with the requirements of this article.

Article 404. The licensee shall operate the project such that flows below Diversion Dams and Powerhouses Nos. 1 and 2 are not altered at a rate greater than 30 percent of the existing streamflow per hour.

Article 405. The licensee shall release from the Kaweah River Project the following continuous minimum flows measured at diversion structures No. 1 and No. 2 or inflows to the diversions, whichever are less, for the enhancement of fish resources in the bypass reach of the East Fork Kaweah River and the mainstem Kaweah River, respectively:

Kaweah No. 1
Diversion

	Normal Year	Dry Year
Month	Runoff	Runoff
Oct	5	5
Nov	5	5
Dec	5	5
Jan	5	5
Feb	5	5
Mar	10	10
Apr	10	10
Jun	10	10
Jul	10	10
Aug	5	5
Sep	5	5

Kaweah No. 2
Diversion

	Normal	Dry
	Year	Year
Month	Runoff	Runoff
Oct	11	5
Nov	11	5

Dec	11	5
Jan	20	10
Feb	20	10
Mar	30	20
Apr	30	30
May	30	30
Jun	30	30
Jul	20	10
Aug	20	10
Sep	11	5

This flow schedule may be temporarily modified if required by operating emergencies beyond the control of the licensee or for short periods on mutual agreement between the licensee, California Department of Fish and Game and U.S. Fish and Wildlife Service. If the flow is so modified, the licensee shall notify the Commission as soon as possible, but no later than 10 days after each such incident.

Article 406. The licensee, after consultation with the California Department of Fish and Game and the U.S. Fish and Wildlife Service, and within 1 year from the date of issuance of this license, shall file for Commission approval functional design drawings of the diversion dam that explain by illustration and text how the automatic release of the minimum flow required in article 402 would be achieved. The licensee shall include with the drawings documentation of consultation and copies of comments and recommendations on the drawings after they have been prepared and provided to the agencies, and specific descriptions of how the agencies comments are accommodated by the drawings. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the drawings with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes in the functional design drawings of the diversion dam. Upon Commission approval, the licensee shall construct the diversion dam including any changes required by the Commission. Within 90 days after completing construction of the diversion dam, the licensee shall file as-built drawings with the Commission.

Article 407. The licensee, after consultation with the California Department of Fish and Game, the U.S. Geological Survey, and the U.S. Fish and Wildlife Service and within 1

year from the date of issuance of this license, shall file for Commission approval a plan to install, operate, and maintain streamflow gages in the East Fork Kaweah River and the mainstem Kaweah River to monitor the minimum flow release required in article 402 and the ramping rate required in the article 404. The plan shall include the

location and design of gages, a schedule for installation, the method of collecting flow data, and a provision for providing the data to the agencies. The licensee shall include with the plan documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information. The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Article 408. The licensee, within 1 year from the date of issuance of this license, shall implement measures to minimize wildlife drownings

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in the Kaweah No. 2 flowline. The measures shall include modifying existing facilities, which are identified by numbers starting at the upstream end of the flowline. The measures are: (1) replace all the existing 3-foot-wide bridges over flowline 2 with 5-foot-wide bridges within 4 years; (2) cover all bridges (decking) with enough soil that will last for 12 continuous months without maintenance; (3) build earth ramps up to bridge level on both sides of the flowline; (4) move the deer outs at bridges 9 and 17 to the upstream sides of the bridges, and where the current slows on curves in the flowline; (5) install hazers (log and cable booms crossing the flowline at an angle) at escape ramps 2, 3, 4, 8, 10, 11, and 12, so that all escape ramps have hazers; (6) raise the hazer at escape ramp 7 off the water's surface to allow swimming deer to pass under the hazer without getting caught on the hazer cable or hitting the hazer log; (7) install flashers on the hazer cable for escape ramps 3, 5, 6, 7, and 12, so the flashers are evenly spaced and drag slightly in the current; and (8) move bridge 6 approximately 30 yards downstream to match up with the deer trail coming down the hill on the northeast side to the flowline.

Article 409. The licensee, after consultation with the U.S. Fish and Wildlife Service and the California Department

of Fish and Game, and within 1 year from the date of issuance of this license, shall file for Commission approval a plan to protect deer and other wildlife from drowning in the Kaweah No. 3 flowline. The plan shall include: (1) an identification of existing wildlife bridges and escape facilities at the section of the flowline outside Sequoia

National Park; (2) a determination of the necessity for modifying existing bridges and escape facilities and for constructing additional bridges and escape facilities; (3) a discussion of the specific construction and maintenance techniques; and (4) an implementation schedule. The licensee shall include in the filing the comments of the above-mentioned agencies on the adequacy of the plan. The licensee shall include with the plan documentation of consultation and copies of comments and recommendations on the agencies, and specific descriptions of how the agencies comments are accommodated by the plan. The licensee shall allow a minimum of 30 days prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee s reasons, based on project-specific information. The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Article 410. The licensee, after consultation with the U.S. Fish and Wildlife Service and the California Department of Fish and Game, and within 1 year from the date of issuance of this license, shall file for Commission approval a plan to monitor wildlife mortality, especially mule deer, associated with the Kaweah No. 2 and Kaweah No. 3 flowlines. The monitoring plan shall include a schedule for: (1) implementation of the program; (2) consultation with the appropriate federal and state agencies concerning the results of the monitoring; and (3) filing results, agency comments, and license s response to agency comments with the Commission.

The licensee shall include with the plan documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee s reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Project operations shall not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

If the results of the monitoring indicate that measures are necessary to protect and enhance wildlife, including the mule deer population, the licensee shall provide, for Commission approval, a schedule for implementing the measures, along with any comments from the above-mentioned

agencies on the recommended measures. At the same time, the licensee shall serve copies of the schedule upon the agencies consulted. The Commission reserves the right to require measures to protect and enhance the deer population. Upon Commission approval, licensee shall implement the schedule including any changes required by the Commission.

Article 411. The licensee, after consultation with the U.S. Fish and Wildlife Service and the California Department of Fish and Game, and within 1 year from the date of issuance of this license, shall file for Commission approval a site-specific wildlife management plan for the transmission line right-of-way. The plan shall include: (1) the location of all areas under consideration for enhancement; (2) a detailed description of site-specific enhancement measures to benefit wildlife; and (3) an implementation schedule. The licensee shall include with

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the plan documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Article 412. The licensee shall continue its monitoring of the project transmission line for injury or electrocution of raptors and other birds. Further, after consultation with the U.S. Fish and Wildlife Service, the Bureau of Land Management, and the California Department of Fish and Game, and within 1 year from the date of issuance of this license, the licensee shall file a plan and schedule to report any project-related avian deaths to the Commission and to the agencies. The licensee shall include with the plan documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific

descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific

information. The Commission reserves the right to require modifications to the plan. The Commission also reserves the right to require measures to protect raptors and other birds in the project area.

Article 413. The licensee, after consultation with the California State Historic Preservation Officer (SHPO), shall maintain and make any necessary repairs of the project facilities in the Kaweah No. 3 historic district in accordance with, respectively, the Secretary of the Interior's Standards and Guidelines for Historic Preservation Projects and the Secretary of the Interior's Standards and Guidelines for Rehabilitation. Maintenance and repair work shall be based on the recommendations of the SHPO. Within 1 year after the date of the license, the licensee shall file for Commission approval a plan with an implementation schedule for maintaining and making any repairs on the facilities in the district in accordance with the Secretary of the Interior's Standards and Guidelines, and a letter from the SHPO commenting on the plan. The licensee shall allow a minimum of 30 days for SHPO to comment prior to filing the plan with the Commission.

The licensee shall make funds available in a reasonable amount for maintenance and repair work at the project facilities of the Kaweah No. 3 historic district. If the licensee and the SHPO cannot agree on the amount of money to be spent for maintenance or repairing the plant, the Commission reserves the right to require the licensee to conduct the necessary work at the licensee's own expense. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 414. The licensee, before starting any maintenance work or other work along the right-of-way of the project transmission corridor in the vicinity of archeological sites CA-TUL-232, CA-TUL-1478, and CA-TUL-1480/H shall implement the cultural resources management plan to avoid impacts to these sites, as described in the licensee's letter dated October 1, 1990. The plan shall be implemented in accordance with the Secretary of the Interior's Standards for Archeology and Historic Preservation. Within 3 years after the date of this license, the licensee shall file with the Commission for approval a report on the implementation of the cultural resources management plan, together with a copy of a letter from the SHPO commenting on the results of implementation of the plan and on the report. The licensee shall make funds available in a reasonable amount for

implementation of the plan. If the licensee, the SHPO, and the FS cannot agree on the amount of money to be spent for implementation of the plan, the Commission reserves the right to require the licensee to conduct the necessary work at the licensee s own expense.

Article 415. The licensee, before starting any future land-clearing, land-disturbing, or spoil-producing activities associated with the project, shall consult with the California State Historic Preservation Officer (SHPO) and the Forest Service, Sequoia National Forest (FS), and shall conduct a cultural resources survey of the affected areas. Further, the licensee shall file a report containing the survey results, for Commission approval a cultural resources management plan to avoid or mitigate impacts to any significant archeological or historic sites identified during the survey, and, the written comments of the SHPO and the FS on the report and the plan. The survey and the plan shall be based on the recommendations of the SHPO and the FS, shall be conducted and prepared by a qualified cultural resources specialist,

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and shall adhere to the Secretary of the Interior's Guidelines for Archeology and Historic Preservation. Upon Commission approval, the licensee shall implement the plan.

The report with the plan shall contain the following: (1) a description of each discovered site, indicating whether it is listed or eligible to be listed on the National Register of Historic Places; (2) a description of the potential effect on each discovered site; (3) proposed measures for avoiding or mitigating the effects; (4) documentation of the nature and extent of consultation with the SHPO and the FS; and (5) a schedule for mitigating effects and conducting additional studies. The Commission may require changes to the plan.

The licensee shall not implement a cultural resources management plan or begin any land-clearing, land-disturbing, or spoil-producing activities until informed by the Commission that the requirements of this article have been fulfilled.

Article 416. (a) In accordance with the provisions of this article, the licensee shall have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the

project. For those purposes, the licensee shall also have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and

occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensee shall take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any noncomplying structures and facilities.

(b) The type of use and occupancy of project lands and

water

for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) noncommercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 watercraft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee shall require multiple use and occupancy of facilities for access to project lands or waters. The licensee shall also ensure, to the satisfaction of the Commission's authorized representative, that the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee shall: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the reservoir shoreline. To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of, project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access

roads; (5) telephone, gas, and electric utility distribution lines; (6) nonproject overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69 kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project reservoir. No later than January 31 of each year, the licensee shall file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed. If no conveyance was

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made during the prior calendar year, the licensee shall so inform the Commission and the Regional Director in writing no later than January 31 of each year.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) nonproject overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 watercraft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an approved exhibit R or approved report on recreational resources of an exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 60 days before conveying any interest in project lands under this paragraph (d), the licensee must submit a letter

to the Director, Office of Hydropower Licensing, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked exhibit G or K map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals

required for the proposed use. Unless the Director, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the licensee shall consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the licensee shall determine that the proposed use of the lands to be conveyed is not inconsistent with any approved exhibit R or approved report on recreational resources of an exhibit E; or, if the project does not have an approved exhibit R or approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee shall take all reasonable precautions to insure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project; and (iii) the grantee shall not unduly restrict public access to project waters.

(4) The Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project s scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised exhibit G or K drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage,

recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project shall be consolidated for consideration when

revised exhibit G or K drawings would be filed for approval for other purposes.

article (g) The authority granted to the licensee under this shall not apply to any part of the public lands and reservations of the United States included within the project boundary.

filing (E) The licensee shall serve copies of any Commission required by this order on any entity specified in this order to be consulted on matters related to that filing. Proof of service on these entities must accompany the filing with the Commission.

(F) This order is issued under authority delegated to the Director and constitutes final agency action. Request for rehearing by the Commission may be filed within 30 days of the date of this order, pursuant to 18 C.F.R. §385.713.

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Environmental Assessment

Federal Energy Regulatory Commission

Office of Hydropower Licensing, Division of Project Review

Kaweah Project

FERC Project No. 298-000 -- California

August 16, 1991

I. Application

On May 2, 1973, the applicant, Southern California Edison Company (SCE), filed an application for a new license for the existing Kaweah Project. The project, consisting of three developments, is located on the Middle Fork Kaweah River and its tributaries near the Towns of Three Rivers, Hammond, Oakgrove, and Tulare in Tulare County, California, on the western slope of the Sierra Mountains between Lake Kaweah and Sequoia National Park. The project is located primarily on private lands. A portion of the project is located on public lands (142.3 acres) administered by the Bureau of Land Management (BLM) (figures 1 and 2). The

project also utilizes water and flowlines located within Sequoia National Park through a special use permit.

II. Summary

SCE proposes to continue to operate an existing hydroelectric project on the Middle Fork Kaweah River and its tributaries near Tulare, Tulare County, California, and

Sequoia National Park. As proposed, the project would generate 53 gigawatthours (GWh) annually, at a levelized cost of about 15 mills/kWh. It would have a net economic benefit of about \$3.71 million annually.

consider In addition to SCE's proposal for a new license, we

two alternative actions: (1) to issue a new license with the staff's recommendations for the project, or (2) no action--to deny the license. Under the no action alternative, annual licenses would be issued until another entity takes the facility over for nonpower use. There would be no change or enhancement to the existing environment.

Based on our review of the project and the alternatives under sections 4(e) and 10(j) of the act, we conclude that relicensing the project, with the environmental measures we recommend, would best adapt the project to a comprehensive plan for the Kaweah River Basin.

Continued project operation with our recommended measures would enhance the existing environmental resources of the project area. These measures include:

- 1 Increased flows to enhance rainbow trout habitat.
- 1 A ramping rate to minimize fish stranding.
- 1 A right-of-way management plan along the transmission line to enhance wildlife habitat.
- 1 The upgrading of bridges to enhance deer movement over project canals.

With our recommended enhancement measures, the project energy would be \$3.67 million less expensive than the same amount of energy produced in a regional fossil fuel generating plant.

On the basis of staff's independent environmental analysis, issuance of a license for the project would not constitute a major federal action significantly affecting the quality of the human environment.

III. Purpose and Need for Action

A. Purpose

As we ve said, the Kaweah Project historically generates about 53 gigawatthours (GWh) of electric energy annually. As in the past, Southern California Edison Company (SCE) would use the power to meet its system load needs.

B. Need For Power

We conclude that SCE needed the power in the past and will need the power in the future. The power output from the Kaweah Project is useful in supplying a small part of SCE's need for power.

To consider the need for power in California, we reviewed the California Energy Commission's (CEC) Electricity Reports (ERs) for 1988 and 1990.

In the ERs, CEC projects the state's expected electrical needs for the next 20 years and evaluates (1) air pollutant emissions, (2) fuel use, (3) diversity and system operating cost, and (4) cost-effectiveness to reduce adverse environmental or social impacts.

In the ERs, CEC says existing hydropower projects and their improvements are nondisplaceable and nondeferrable resources in the state's Basic resource system --which includes all existing hydro facilities and proposed improvements. CEC also says the California Public Utility Commission classifies hydro relicensing improvements as nondeferrable resources.

CEC says existing hydro facilities (1) should continue operating and (2) should be improved economically.

CEC's forecasts:

1 The Basic system's capacity--committed resources--would meet projected statewide capacity needs only until 1993.

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1 Adding uncommitted resources to the Basic resources means the Basic system wouldn't need more capacity until 1996.

1 Adding uncommitted resources to the Basic system would meet statewide energy needs until after 1999--but only if producers continue to use displaceable portions of existing oil-fired and gas-fired power plants to supply energy.

SCE, like most utilities, considers load management as a demand-reducing resource and accounts for these effects in its forecasts of future capacity requirements. Similarly, SCE considers conservation measures to reduce annual energy requirements, peak demand, and average capacity

demand. SCE took into account the cost-effectiveness of these conservation measures in forecasting its Managed Area Peak Demand and includes these forecasts in its supplemental information response.

of Over the short term of 1 to 5 years, SCE says purchases existing oil- or gas-fueled units could replace the project's energy.

Over the long term, SCE would consider as alternatives to the project (1) load management, (2) energy conservation, (3) use of third-party resources, and (4) installation of a new combustion turbine unit.

IV. Proposed Project and Alternatives

A. Proposed Project

The proposed project (figure 2) has three developments consisting of the following components:

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Figure 1 Configuration of the Kaweah River Basin with
Location of Kaweah and Terminus Power Project

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Figure 2 Location of project features of Kaweah Project
California

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(A) Kaweah No. 1 development:

(1) Kaweah No. 1 Diversion Dam, a small concrete structure across the East Fork of the Kaweah River;

(2) Kaweah No. 1 Flowline, consisting of approximately 30,723 feet of steel flume, and extending from Kaweah No. 1 Diversion Dam in a generally westerly direction to the Kaweah No. 1 Forebay Tank where it connects with a 3,340-foot-long penstock leading to the Kaweah No. 1 Powerhouse;

(3) Kaweah No. 1 Powerhouse with one generating unit with an installed capacity of 2.25 MW and a tailrace which returns the diverted water to the Middle Fork of the

Kaweah River;

(B) Kaweah No. 2 development:

(1) Kaweah No. 2 Diversion Dam, a masonry structure 161 feet long and an average 7 feet high, across the Middle Fork of the Kaweah River;

(2) Kaweah No. 2 Flowline, approximately 21,607 feet in length consisting of 16,738 feet of concrete ditch, 3,822 feet of steel flume, and 1,047 feet of steel siphon, extending from the Kaweah No. 2 Diversion Dam in a southwesterly direction to the Kaweah No. 2 Forebay, where it connects with a 1,012-foot-long penstock leading to the Kaweah No. 2 Powerhouse;

(3) Kaweah No. 2 Powerhouse with one generating unit with an installed capacity of 1.8 MW and a tailrace which discharges the diverted water into Kaweah River; and

(C) Kaweah No. 3 development:

(1) the eastern section of the Kaweah No. 3 Flowline outside of Sequoia National Park, consisting of a concrete-lined flume approximately 2,580 feet in length, which connects with a 3,151-foot-long penstock leading to Kaweah No. 3 Powerhouse;

(2) Kaweah No. 3 Powerhouse with two generating units with a combined installed capacity of 2.8 MW and a tailrace which returns the diverted water to the Middle Fork of the Kaweah River;

(D) a transmission line extending approximately 4.6 miles from Kaweah No. 3 Powerhouse to Three Rivers Substation, a nonproject facility, with tap lines from Kaweah No. 1 and No. 2 Powerhouses; and

(E) telephone and control lines and access roads.

The proposed project makes use of several nonproject facilities located in Sequoia National Park. These facilities are: (1) two diversion structures on the Middle Fork and Marble Fork Kaweah River and the upper 21,000 feet of steel flume that diverts water from these structures to the Kaweah No. 3 powerhouse; and (2) four small reservoirs, named Crystal Lake, Upper Monarch Lake, Lady Franklin Lakes (two lakes), and Eagle Lake, near Mineral King, that release water during the late summer and fall months to augment low flows in the East Fork Kaweah River and generating capacity at Kaweah No. 1 powerhouse during this time of the year.

The Kaweah No. 1 reservoirs within the Park were originally constructed between 1903 and 1905 on public lands that were subsequently included in the Sierra National Forest, and were part of the original license. However, in 1978, that portion of the National Forest

lands were added to the Sequoia National Park. The enabling legislation empowered the National Park Service (NPS) to issue special use permits for the continued use of the reservoirs.

The Kaweah No. 3 diversions and flowline were constructed within the Park by permission of the NPS between 1907 and 1913 in exchange for the construction of a park road and annual payments. This portion of the project was not subject to license.

All project facilities located within the Park are currently operated under a special use permit issued to SCE by the NPS, effective September 9, 1986, pursuant to the provisions of Public Law 99-338 (letter from Bruce Blanchard, Office of Environmental Project Review, Department of the Interior, Washington, D.C., February 1, 1988).

one The project developments are operated independently of another and in a run-of-river mode. Water captured by the diversion structures is transported through connecting flowlines and penstock to the powerhouse and then returned to the river through the powerhouse tailraces.

V. Consultation and Compliance

A. Agency Consultation

The Commission's regulations require prospective applicants to consult with appropriate resource agencies before filing an application for license. This is the first step in complying with the Fish and Wildlife Coordination Act, the Endangered Species Act, the National Historic Preservation Act, and other federal statutes. Prefiling consultation must be complete and must be documented in accordance with the Commission's regulations.

After the Commission accepts an application, concerned entities may submit formal comments during a public comment period. In addition, organizations and individuals may petition to intervene and to become a party in any subsequent proceedings. The Commission

makes the comments provided by concerned entities part of the record, and the staff considers the comments during the review of the proposed project. After the Commission issued a public notice of the initial application for the Tule River Project on July 13, 1977, the following entities commented on the application or filed petitions to intervene.

Commenting entities -- Date of letter

California Office of Historic Preservation -- September 16, 1977

California State Lands Division -- September 22, 1977

Department of the Army, Sacramento District Corps of Engineers -- October 14, 1977

California Resources Agency -- October 17, 1977

Forest Service -- November 28, 1977

Department of the Interior -- December 1, 1977

Motion to intervene -- Date of intervention

California Department of Fish and Game -- September 14, 1977

SCE responded to the comment letters and the motion to intervene on July 26, 1978.

B. Water Quality Certification

SCE filed a request for a water certificate on July 25, 1973. The California State Water Quality Resources Control Board (WRC) did not act on the request. On January 14, 1987, SCE requested the WRC to act on the request. The WRC replied on February 4, 1987, that a water quality certificate would not be issued until SCE agreed to flow recommendations of the California Department of Fish and Game (DFG).

Pursuant to Order No. 464 [FERC Statutes and Regulations, Regulations Preambles 1986-1990 ¶30,730], the Commission deems the water quality certificate to be waived. By letter dated April 2, 1987, the WRC was advised that the water quality certificate for the Kaweah Project is deemed waived and was invited to file with the Commission comments and recommendations regarding water quality. No response was filed by the WRC. Under the provisions of Order 533 [FERC Statutes and Regulations ¶30,921] the water quality certificate is waived.

VI. Environmental Analysis

A. General Description of the Locale

1. Kaweah River Geographic Region

The project is situated in the foothills of the western slope of Sierra Nevada mountains. Elevation in the project area varies from 500 feet to 2,600 feet above mean sea level (m.s.l.). The area east of the project is mountainous and located in Sequoia National Park. Here elevations increase to over 12,000 feet m.s.l. Foothills and valleys are the characteristic landforms west of the project.

Flows diverted for the project originate in two large basins in the higher elevations of Sequoia National Park. The basins provide water for the Middle Fork and Marble Fork of the Kaweah River and the East Fork of the Kaweah River.

Downstream of the project, at the junction of the tributaries, the Corps of Engineers has impounded the Kaweah River at Terminus Dam to form Lake Kaweah. Lake Kaweah is about 1 mile west of the community of Three Rivers. Lake Kaweah marks the point where mountainous terrain of the higher elevations changes into a gentle foothills and valley environment of the lower elevations.

The Kaweah River basin has a drainage area of 561 square miles upstream of Lake Kaweah. Lake Kaweah provides flood control and irrigation water for the valley floor lands. From Lake Kaweah the Kaweah River flows southwesterly to join the Tule River approximately 15 miles east of Tulare Lake in the San Joaquin Valley. Kaweah River flows from the Lake Kaweah are normally depleted for irrigation purposes before reaching Tulare Lake, except during periods of flooding (Federal Power Commission, 1966).

Mean annual precipitation in the higher elevations is approximately 40 inches. Most of the precipitation occurs as snowfall during the winter months and is held in snowpack until the spring thaw. Runoff usually starts in March, peaks sometime in May or early June, and ends by July. Runoff peaks earlier in years of below average precipitation. Except during heavy storms, virtually all water in the Middle Fork, East Fork, and Marble Fork of the Kaweah River comes from groundwater. In midsummer through fall groundwater disappears or is negligible in the lower elevations, and virtually all water comes from higher elevations.

Foothill vegetation consists primarily of oak and grass communities. On drier slopes chamise shrub predominates.

Canyons and low-lying areas among the foothills contain streams or rivers with riparian communities that include trees such as willows, alders, and sycamore. Granite rock outcroppings are common in most areas and vary from small boulders to steep cliffs.

Sequoia National Park and Lake Kaweah are the major attractions for visitors. State Highway 198 parallels project facilities and is a major route for accessing the lake and the park. Mineral King highway parallels the Kaweah

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No. 1 facilities and provides access to the Mineral King part of the park. Recreational use of the project area is not great. The area serves mainly as a transportation corridor to Sequoia National Park.

Local residents within the project area live in the community of Hammond, along State Highway 198, near Kaweah No. 1 powerhouse; at Oakgrove, along Mineral King Road, near the Kaweah No. 1 diversion dam and intake; in dispersed locations in the Kaweah River valley particularly in the vicinity of Washburn Cove, near the Kaweah No. 2 powerhouse; and in the community of Three Rivers, about 1 mile west of the Three Rivers substation, the terminus of the Kaweah transmission line and the western end of the project. Population density is low (Southern California Edison Company, 1975; Keller Environmental Associates, 1989a, 1989b).

2. Proposed Projects and Existing Hydroelectric Development

There are no other projects proposed for licensing in the Kaweah River Basin. There is only one other hydropower project within the basin--the Terminus Power Project (FERC Project No. 3947) (figure 1), located about 4 miles downstream of the Kaweah Project at Terminus Dam. The Terminus Power Project has an installed capacity of 17 MW and was licensed by the Commission in 1986. Project operation began in 1990.

3. Target resources

A target resource is an important resource that may be cumulatively affected by multiple hydropower development within the basin. We have identified recreation as a target resource for the Kaweah River Basin. Because of the extremely hot summers, especially at lower elevations, there is a demand for water-based recreation. Lake Kaweah and Sequoia National Park are used extensively for recreation; other recreational attractions in the basin

also contribute to the local economy. The principal recreational activities in the project area are fishing and white-water boating.

4. Cumulative impacts

The Council on Environmental Quality defines cumulative impacts as impacts on the environment that result from adding the impact of an action to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions. The Council says cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 C.F.R. part 1508.7). The geographical area included in this cumulative impact analysis is limited to the Kaweah River Basin.

The Kaweah Project would not cause cumulative adverse impacts to the target resource, but, as discussed in section VI.B.3 and section VI.B.7, would enhance the existing situation. SCE (1991a) proposes to construct a formal whitewater boating site with parking, sanitation, and improved trail facilities at the Kaweah No. 3 powerhouse to enhance recreational use of the project area. Recreational fishing opportunities would be improved by our recommended increases in flows within the Kaweah River project reach and the improved access at the Kaweah No. 3 powerhouse.

B. Proposed Project

1. Geology and Soils

Affected Environment: The project area lies in the high foothills along the western edge of the Sierra Nevada Mountains. Bedrock is primarily granitic rock which is relatively massive, with areas of metasedimentary rock. All of the project facilities are in granitic rock except for a short segment of the Marble Fork flowline, which is underlain by hard, relatively massive schist. Bedrock outcrops in scattered locations; in a few areas, outcrops comprise up to 50 percent or more of the ground surface. Weathering of the granitic rock is quite variable: in some areas the bedrock is completely decomposed to depths of 20 feet or more. The project is in an area of low historic seismicity.

Soils are generally residual, forming from the underlying bedrock. These soils are typically shallow to moderately deep, well to excessively drained coarse sandy loams. The excessively well-drained nature of the soils can make revegetation difficult, especially on steeper slopes. Soil cover over most of the area ranges between 1 of 5 feet

deep. Minor deposits of alluvium (stream deposits) and colluvium (material moved by gravity) occur at scattered locations throughout the area. Most of the soils in the area are moderately susceptible to erosion when vegetation is removed. Very little erosion is present on natural slopes. Moderate erosion occurs where concentrated runoff

from roads or other graded areas has been directed down natural slopes.

Environmental Impacts and Recommendations: The project area is generally stable and well-maintained. However, there are some minor localized areas of active erosion. Project access roads are essentially unpaved and are regraded yearly to maintain ditches, water bars, and berms to keep runoff controlled and directed into culverts and downdrains. Ground and helicopter inspection of the transmission line and substation did not reveal any significant erosion. The flowlines are narrow and essentially contour the hillsides, so there are limited areas of cut and fill that could be

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subject to erosion or slope instability. Slope runoff above the flowlines is channeled through culverts and overflow chutes.

There are a few sections of active erosion along Flowline 1 where the flume follows along the top of steep cut slopes for the Mineral King road. Gullies up to 2 feet deep on the face of the road cuts are progressing upslope toward flume piers by headward erosion. While there is not immediate threat to the flume, there is a potential for some of the piers to be undercut.

There are other areas along the flowlines where gullies are present from old (10 years or more) flume breaks or overflows from the flume due to past ice jams. These small gullies, however, do not appear to be undergoing active erosion, and most have been revegetated by native grasses and scattered brush. Shallow gullies less than 1-foot-deep have developed at several places along the Marble Fork segment of Flowline 3 where heavy foot traffic from Potwisha Campground leads up to the canal sections.

The FWS recommends that SCE develop and implement a comprehensive erosion control plan for the project, including existing facilities and continued operation, and recommends that the erosion control plan be submitted to the Commission along with resource agency comments prior to any new project construction. FWS also recommends that the licensee provide an automatic water diversion shutoff system to operate in the event of a rupture in the water conveyance system.

On October 1, 1990, SCE filed an erosion protection and remediation plan. This plan identifies measures to protect support legs for the flume in Flowline 1 from being undercut by erosion, including extending the support legs, placing sacrete berms to deflect and diffuse runoff and

reinforced gunite aprons downslope. Measures to control erosion along the Marble Fork Canal (Flowline 3) include constructing wood retaining walls on the outside of the canal to maintain a walkway along the canal, and covering eroded areas downslope with jute mats to reduce further erosion until natural revegetation can occur. SCE states that (1) the cooperation of NPS will be needed so that these areas can be posted to keep foot traffic away and (2) that NPS personnel have indicated that bringing in soil and plants from other places to revegetate eroded areas probably would not be acceptable because this may introduce foreign plant species into the area.

SCE would continue maintaining the access roads and associated ditches and waterbars, conducting weekly inspections of the flowlines, and monitoring flow in the system. This enables potential problems such as leakage from the canals or flumes to be discovered and repaired before a major problem develops. Continued maintenance of drainage control systems also limits the erosion potential along the facilities. If a break occurred in a flowline or canal section, flow would be shut off within about 2 hours, and repairs would begin within one working day. Proposed remedial measures include retaining walls, berms to divert surface flow, fabric mats, and hydromulch to promote revegetation.

appropriate

We agree that the measures proposed by SCE are and should be implemented. We also recommend that: (1) the licensee consult with the Soil Conservation Service and NPS to determine if seed of vegetation native to the area can be obtained for use in areas where jute netting would be used; (2) that jute netting be used on all areas below the flume where legs would be lengthened; and (3) that SCE be responsible for posting notices to keep people away from areas to be revegetated.

The erosion control plan addresses the concerns of FWS. The applicant does not propose any new construction at the project. If new construction is proposed in the future, the Commission would require that the erosion control plan be expanded to cover such areas.

SCE disagrees with FWS's recommendation to provide for an automatic water diversion shutoff device because (1) SCE has an active monitoring procedure for rupture or failure of the water conveyance facilities, and (2) in the event

of a rupture SCE immediately dispatches personnel to the project intake to control water movement. SCE concludes that their procedure works very well and that automation is unnecessary and would likely be very costly.

preventative We agree with SCE. Because of SCE s system of maintenance, the risk of a rupture is very low. Due to the

length of the conveyance system, the amount of water entering the system from the intakes is very small compared to the volume of water within the conveyance system itself. As a result, most of the erosion associated with a rupture would come from the water already within the conveyance system. The magnitude of erosion that would occur by immediately dispatching personal to the intake structure compared to having an automatic shut-off device would be similar. Further, SCE s erosion control plan includes remedial measures to repair eroded areas associated with a rupture. We conclude, therefore, that automation is unnecessary.

Unavoidable Adverse Impacts: With implementation of the proposed erosion and remediation plan and our recommendations, there would be no adverse impacts to soils and geologic resources from continued operation of the project.

2. Water Resources

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Affected Environment:

a. Streamflow: Kaweah River has had the present regulated flow regime for about 80 years. Since 1898, the Kaweah Project has diverted up to 28 cubic feet per second (cfs) of water from East Fork at Intake No. 1; since 1913, up to 85 cfs has been diverted from the Middle Fork Kaweah River at Intake No. 2 (figure 2).

Flow in Kaweah River and its tributaries vary on a monthly basis, depending on the amount of runoff and on SCE s release schedule, that is dictated by snow pack, snowmelt, spring rains, drought and power demand. The peak runoff is normally April through June; and low flows generally occur August through December. Calculated monthly median flows in the Middle Fork Kaweah River above Diversion No. 2 range from 36 cfs in September to 927 cfs in May, and flows in the East Fork Kaweah River below Diversion No. 1 range from 17 cfs in September - October to 348 cfs in June (table 1).

SCE operates the project so that nearly all the water at Intakes Nos. 1 and 2 is regularly diverted, except during high runoff periods (which usually occur April through

June, depending on irrigation and other authorized water diversions, and runoff). The flow remaining in the bypass reaches downstream of Diversions Nos. 1 and 2 during low-flow periods (i.e., August through December) are the result of SCE's historical release of 1 cfs at these diversions and from accretion from hill-side runoff, tributary flow, and tailrace return flow.

b. Water Quality: During the spring and summer of 1989 water quality studies were conducted in the project areas of Kaweah No. 1 and No. 2 (Entrix, 1989). The studies included analyses of water samples taken from four locations on the Middle Fork Kaweah River and two locations on the East Fork Kaweah River and from Crystal, Monarch, Eagle, and Lady Franklin Lakes, located within the East Fork watershed (figure 3). The water quality samples were collected during the spring high runoff period and again during the summer low runoff period, under the assumption that the best-case and worst-case water quality conditions would thus be represented. The quality of the waters was expected to be better during spring runoff, when the flows are high and air temperatures cool; as opposed to the quality of the waters in the late summer, when flows are low and air temperatures are high (Entrix, Inc., 1989). Spring high flow water quality samples were collected on April 24 and 25 in the river and on June 26, 28, and 29 in the lakes. Summer low flow water quality samples were collected in the river on September 9 and 11 and in the lakes on September 10, 11, and 16. Measurements of temperature in degrees centigrade (°C) and dissolved oxygen (DO) in milligrams per liter (mg/l) of the water quality samples from the 10 stations are presented in table 2.

Table 1. Computed median monthly flows above and below Diversions No. 1 and No. 2 (Source: Southern California Edison, May 1, 1989, letter from Ron Schroeder to Dale Mitchell, California Department of Fish and Game).

		Flows (cfs)		
		Below Diversion No. 1		
Diversion No. 2	Month	above	below	above
	below			

January	29	13	124
18			

February 77	46	25	153

March 138	68	49	258

April 204	132	119	425

May 512	341	292	927

June 482	348	268	603

July 79	77	41	199

August 6	27	4	65

September 3	17	1	36

October 2	17	1	41

November 4	22	2	59

December 7	28	6	86

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Figure 3 Location of project-related reservoirs and Kaweah Project

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Table 2. Kaweah project water quality data collected spring and summer 1989
(Source: Entrix, Inc., 1989, as modified by staff).

Station Dissolved Location	Date sampled	Time sampled	Temperature °C
oxygen mg/l			

Above

Diversion	4/24/89	1600	8.0
9.4			
No. 2	9/08/89	1245	20.0
8.0			

HR249,R2,R6;-

Below			
Diversion	4/24/89	1730	7.8
9.3			
No. 2	9/08/89	1340	21.0
6.6			

HR249,R2,R6;-

Above			
Diversion	4/25/89	1200	4.4
12.0			
No. 1	9/11/89	0700	14.7
7.4			

HR249,R2,R6;-

Below			
Diversion	4/25/89	0930	5.4
13.4			
No. 1	9/08/89	1515	22.0
4.5			

HR249,R2,R6;-

Below			
Powerhouse	4/25/89	1100	7.7
12.3			
No. 1	9/08/89	1750	22.0
5.7			

HR249,R2,R6;-

Below			
Powerhouse	4/25/89	1330	8.9
11.2			
No. 2	9/08/89	1700	23.0

6.5
HR249,R2,R6;-

Lady

Franklin	6/26/89	1415	11.0
7.8			
Lakes	9/16/89	1615	14.6
9.9			
HR249,R2,R6;-			

Crystal	6/28/89	1330	7.5
8.3			
Lake	9/10/89	1220	12.3
7.5			
HR249,R2,R6;-			

Monarch	6/28/89	1630	8.5
8.1			
Lake	9/10/89	1600	13.9
7.2			
HR249,R2,R6;-			

Eagle	6/29/89	1030	13.1
7.6			
Lake	9/11/89	1345	15.0
7.3			
HR249,R2,R6;-			

The water temperature and DO data from the river and lake samples show that water temperatures were higher and DO lower during low-flow periods in late summer than in high-flow periods in spring. For example, at Station 4 below Diversion No. 1, water temperature was 22.0°C and DO was 4.5 mg/l in September; whereas in April, water temperature was 5.4°C and DO was 13.4 mg/l. Similarly, in Crystal Lake (Station 8) DO measured 8.3 mg/l at 7.5°C in June, and in September DO measured 7.5 mg/l at 12.3°C (table 2).

Not only did water temperature increase and DO decrease as flows decreased and air temperature increased from spring to summer, but also water temperatures and DO measurements were notably different above and below Diversion No. 1 on the East Fork Kaweah River and Diversion No. 2 on the Middle

Fork Kaweah River. For example, water temperature was lower above Diversion No. 1 (Station 3) in both April and September (i.e. 4.4°C and 14.7°C, respectively) than below Diversion No. 1 (Station 4) (i.e. 5.4°C and 22.0°C, respectively). Likewise, DO was higher above the diversions than below the diversions. DO measured 7.4 mg/l in September

above Diversion No. 1 (Station 3) and 4.5 mg/l below Diversion No. 1 (Station 4). Above Diversion No. 2 (Station 1) temperature in September measured 20.0°C and DO measured 8.0 mg/l; whereas below Diversion No. 2 (Station 2) temperature in September measured 21.0°C and DO measured 6.6 mg/l.

The water quality data (table 2) shows that the reaches below the diversions typically have higher temperature and lower DO than reaches above the diversions, and that the highest temperature and lowest DO occur in late summer low-flow periods rather than during spring high-flow periods.

Environmental Impacts and Recommendations: Continued operation of the project with

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enhanced minimum flows as proposed by SCE or recommended by the DFG and the FWS (table 4) should enhance the existing water quality and fish habitat of the streams within the project reach (section 3). Increased flows of water from above the diversions would directly benefit the downstream water quality. Releases of cooler and more oxygenated water from above diversions (table 2) would decrease downstream water temperature while increasing dissolved oxygen levels. Additionally, increased streamflow to diverted reaches would reduce retention time and resultant radiant heating of pooled water within the diverted reaches. Turbulent mixing and greater aeration of water should result from increased streamflow below diversions No. 1 and No. 2 (figure 2).

Additional flow in the diverted reaches would potentially provide greater volume (cubic feet) and wetted perimeter and consequently more space for fish to occupy. Potentially, more space would provide for additional fish habitat and fish. We discuss in greater detail the proposed and recommended increase in streamflows and the resultant enhancement to water quality (i.e. temperature and DO) and fish habitat in section VI.B.3b.

Unavoidable Adverse Impacts: None.

3. Fisheries Resources

and Affected Environment: Kaweah River supports a mixed warm coldwater fishery composed primarily of rainbow trout,

Sacramento sucker, roach, squawfish, sculpin, and smallmouth bass. Brook trout are found in Monarch Lake, Crystal Lake, Eagle Lake, and Lady Franklin Lakes. In Monarch and Crystal Lakes, supplemental stocking of brook trout occurs periodically.

Two fish population surveys, which include six collection sites completed by EA Engineering, Science, and Technology, Inc. (1986 and 1987) indicate that a self-sustaining wild rainbow trout fishery exists throughout the project's bypass reaches. The surveys further indicate that rainbow trout is most abundant in East Fork and in Kaweah River above its confluence with the East Fork. However, population estimates from the data show that rough fish, such as suckers and sculpins occur in greater numbers than do game species throughout the Kaweah River (table 3).

Based on Moyle (1976) this assemblage of species would be classified as typical in the foothills of the western Sierras which is characterized by low summer and fall streamflows and high summer water temperatures which are only marginally suitable for trout, i.e. exceed 20°C.

DFG stocks Kaweah River each spring and summer with about 4,000 catchable rainbow trout for a put and take fishery. Throughout the fishing season, DFG stocks catchable rainbow trout from below the Diversion No. 2 to above Powerhouse No. 2 on the mainstem Kaweah River to supplement the existing wild trout population (telephone conversation, May 6, 1991, with Stan Stevens, Regional Fishery Biologist, California Department of Fish and Game). In a letter dated May 18, 1990, George Nokes, Regional Manager, California Department of Fish and Game, Region 4, states DFG's management goals for Kaweah River are: (1) to manage for a viable smallmouth bass fishery in the mainstem Kaweah River between Powerhouse Nos. 1 and No. 2; (2) to manage for a self-sustaining wild rainbow trout fishery, augmented by stocking catchable trout in the mainstem Kaweah River from Diversion No. 2 to Powerhouse No. 1; and (3) to manage for self-sustaining rainbow trout fishery in East Fork from Diversion No. 1 to the confluence with the mainstem Kaweah River.

Table 3. Fish population estimates for six sites surveyed in Kaweah River (estimates in fish/mile) (Source: EA Engineering, Science, and Technology, Inc., 1986; and Southern California Edison Company, 1991b; exhibit 2; as modified by staff).

Site Location	Rainbow trout Percent
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	(RBT)	Roughfish	RBT
Middle Fork Kaweah R. below Diversion No. 2	1,225	1,626	43.0

Middle Fork Kaweah R. below confluence with East Fork Kaweah R.	437	18,258	2.0
Middle Fork Kaweah R. below Powerhouse No. 1	83	14,520	0.5
Middle Fork Kaweah R. above Powerhouse No. 2	0	5,452	0.0
Middle Fork Kaweah R. below Diversion No. 1	961	814	55.0
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East Fork Kaweah R. above Diversion No. 1	2,031	53	84.0

Environmental Impacts and Recommendations:

a. Entrainment: During project operations, there could be some entrainment of fish at Intakes No. 1 and No. 2. Early life stages (fry and juveniles) and a few adults could become entrained and could suffer injury or death from project operations.

impacts FWS and DFG express concerns about potential adverse from fish entrainment. FWS recommends that the licensee construct and operate, within 2 years of relicensing, a fish screening system (including a fish bypass to allow fish entrapped in the open canal flume to return to the stream) that would prevent fish from becoming entrained or entrapped in the Kaweah Hydroelectric Project diversions and water

conveyance facilities (letter dated February 28, 1991, from Wayne S. White, Field Supervisor, U.S. Fish and Wildlife Service, Sacramento Field Office, Sacramento, California). FWS further states that in their opinion the four screens installed in 1917 at the four diversions, do not effectively prevent entrainment of fry and juvenile trout, as evidenced by trout in the canal. Furthermore, FWS believes new screen

systems should be constructed because it is their opinion that: (1) the mesh size on the existing screens are inappropriate for screening fry and juveniles; (2) maintenance needs to be performed on a regular basis; and (3) fish bypasses are needed to allow trout to return downstream.

DFG does not believe screens at Diversions No. 1 and No. 2 are effective in preventing entrainment of fry and juvenile trout at either diversion (letter dated October 5, 1988, from Dale F. Mitchell, Environmental Service Supervisor, DFG, Region 4, Fresno, California). DFG also says significant entrainment at Diversion No. 1 is evidenced by: (1) the numbers of fish present in the diversion canal when drained for maintenance each year and (2) the fact that the public fishes for trout in the canal and forebay above Powerhouse No. 1 with reasonable success. DFG did not provide any creel census data, nor any canal fishery survey data.

In a letter dated May 18, 1990, DFG recommends replacement or modification of existing screens at Diversions No. 1 and No. 2. DFG states screen configuration at Kaweah No. 1 is worse than having no screen at all and recommends the existing drum screen be removed and replaced with new screens meeting DFG criteria. In addition, DFG states No. 2 diversion screen is the same as No. 1 and poses the same lethal threat to fish that are exposed to it. DFG recommends removal and replacement with new screens meeting DFG standards and with a fish bypass system to return fish to the river (letter dated May 18, 1990, from George D. Nokes, Regional Manager, California Department of Fish and Game, Region 4, Fresno, California). DFG states that uninterrupted recruitment to downstream areas at Diversion No. 2 is critical to the viability of the trout population in downstream reaches due to the lack of suitable spawning areas there.

SCE states that the engineering feasibility for installation

of new screens, which meet DFG criteria, is limited at Diversions No. 1 and No. 2 due to the remoteness of the sites and the steep, rugged, and inaccessible terrain. Furthermore, SCE reports that preliminary cost estimates for new screens, which meet DFG standards, at these two sites, equal approximately \$175,000 at Diversion No. 1 and \$200,000 to \$500,000 at Diversion No. 2. Although no figures are given, SCE says cost of maintenance of the recommended new

screens would be substantial, and increase in vandalism and its resultant cost would be significant.

Because water is drawn into an open flume that routes water past the existing rotary drum screens into an open canal leading to hydropower turbines, operation of the project may adversely affect fish. The diversion of flow into an open

50-foot-long flume before being screened, may entrap fish in the flume, especially fry and juveniles. The screen's mesh size (up to 3/4 inch diameter openings) may allow small fish to pass into the open canal and eventually through the powerhouse which could result in fish passing through the turbines and being injured or killed. Greatest turbine mortality would probably occur at Powerhouse No. 1 with its impulse turbine; whereas, Powerhouse No. 2 which contains a Pelton Horizontal Reaction Francis turbine, could have as little as 13 percent mortality or as high as 31 percent (Eicher and Associates, 1987). Lastly, the worn-out bottom seal, high rotational speed (DFG's estimate is 50 rpm), and high approach velocity of the existing drum screens may result in some fish being impinged and being injured or killed, or being trapped between the screen and canal bottom and injured or killed.

No empirical data exists regarding current entrainment and turbine mortality. Nor is there any data on recruitment, spawning success, survival or carrying capacity below the diversions. However, some evidence exists that some trout are entrained by project operations, but Kaweah River has a productive self-sustaining wild rainbow trout population. EA Engineering, Science, and Technology, Inc. (1986) estimates the population of rainbow

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trout below Diversion No. 2 on the mainstem Kaweah River at about 1,200/mile and below Diversion No. 1 on East Fork at about 960/mile. These population estimates are comparable to other streams in California (Deinstadt et al., 1985; Gerstung, 1973). Population estimates below these diversions suggest too that recruitment of young fish downstream and spawning downstream by adults occurs and is successful enough to maintain these populations. Furthermore, DFG's goals of maintaining a self-sustaining rainbow trout fishery in the bypass reaches below Diversion Nos. 1 and 2 are being met.

Lack of data regarding trout populations, stream capacity, and limiting factors on trout populations in Kaweah River make prediction of potential population change difficult. However, in light of the information regarding water quality and fish community structure, discussed below, it would be reasonable to assume entrainment plays a minor role in dictating trout population size or harvest.

For example, water temperature in the bypass reaches often exceeds 20C, DO can be as low as 4.4 mg/l; and flows are reduced below 1 cfs for many days each year. Furthermore, significant numbers of non-game fish (as high as 18,000/mile) that might compete with and prey on rainbow trout most likely play a substantial role in controlling the

size of the rainbow trout population and its potential to increase.

Intake screens at Diversion Nos. 1 and 2 are not justified at this time. However, if in the future new information becomes available to the Commission regarding fish entrainment and project-related mortality to fish, Commission staff can analyze the new data and the project license could be amended as needed after notice and opportunity for hearing.

flow b. Fishery Enhancement: Presently, 1 cfs is the minimum

released if available below Diversions No. 1 and No. 2. To enhance the fishery habitat, SCE proposes to bypass minimum flows shown in table 4 at Diversions No. 1 and No. 2. SCE's proposed minimum instream flow releases range from 5 cfs to 10 cfs on East Fork and from 11 cfs to 30 cfs on the Middle Fork Kaweah River. DFG and FWS recommend that SCE increase stream flows in the project's bypass reaches below Diversions No. 1 and No. 2 to enhance fishery habitat (table 4).

The agencies recommended minimum bypass flows range from 3 cfs to 40 cfs greater than SCE's proposed bypass flows. DFG recommends bypass flows ranging from 8 cfs to 24 cfs on the East Fork and from 15 cfs to 30 cfs on the Middle Fork Kaweah River. FWS recommends flows ranging from 12 cfs to 32 cfs on the East Fork and from 25 cfs to 50 cfs on the Middle Fork Kaweah River. During dry years (i.e., less than 80 percent exceedance flows) minimum flows would be decreasing accordingly.

The agencies and SCE base their flow recommendations on the results from the Instream Flow Incremental Methodology (IFIM). IFIM is a hydraulic model developed to predict the amount of habitat available to fish at different stream flows (Bovee, 1982). Weighted Useable Area (WUA) is the output of this model simulation. WUA is assumed to vary by how well sample habitat characteristics measured during an IFIM study, fit habitat characteristics believed to be suitable for or preferred by fish of a particular species and lifestage in the stream. Thus, the amount of WUA, measured in square feet per 1,000 feet of stream (sq.ft./1,000 ft.), varies with the amount of stream discharge (cfs). Moreover, it is assumed that fish populations fluctuate with changes in WUA such that the predicted increase in WUA is an indication of potential

enhancement of fish populations.

Results of the IFIM study (Southern California Edison Company, 1991b, exhibit 1) are presented in Table 5. In the Middle Fork Kaweah River below Diversion No. 2 the existing minimum flow of 1 cfs produces approximately 2800 sq.ft./1,000 ft. for adults; 890 sq.ft./1,000 ft. for

juveniles; and 300 sq.ft./1,000 ft. for fry. The maximum predicted WUA equals about 5359 sq.ft./1,000 ft. for adults at 100 cfs; 1676 sq.ft./1,000 ft. for juveniles at 25 cfs; and 1503 sq.ft./1,000 ft. for fry at 15 cfs.

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Table 4. SCE s proposed and agency recommended minimum flow releases for the Kaweah Hydroelectric Project (Source: Southern California Edison Company, 1991b, exhibit 1).

		Proposed and		
Recommend Minimum Flow Releases				
		Below Diversion No. 1		
		Below Diversion No. 2		
Month	SCE	SCE	DFG	DFG
FWS	SCE		DFG	
FWS				
Oct.		5		8
12	11		20	
25				
Nov.		5		10
14	11		25	
35				

Dec.		5		14
18	11		30	
45				

50	Jan. 28	20	5	30	14
50	Feb. 32	20	5	30	22
50	March 32	30	10	30	24
50	April 32	30	10	30	24
50	May 32	30	10	30	24
50	June 32	30	10	30	24
50	July 32	20	10	30	24
40	August 18	20	5	25	14

Sept. 5 8
12 11 15
25

In the East Fork Kaweah River below Diversion No. 1 the existing minimum flow of 1 cfs produces approximately 3940 sq. ft./1,000 ft. for adults; 1500 sq. ft./1,000 ft. for juveniles; and 1500 sq. ft./1,000 ft. for fry. The maximum predicted WUA equals about 11,309 sq. ft./1,000 ft. for adults at 36 cfs; 3069 sq. ft./1,000 ft. for juveniles at 10 cfs; and 1500 sq. ft./1,000 ft. for fry at cfs.

Generally, as flows increase, more WUA is predicted for adult fish; lower flows provide more juvenile and fry habitat. This is generally true because adults can take advantage of the deeper water and higher velocities associated with increased flows; whereas juveniles and fry are more vulnerable to higher velocities. (Bovee, 1988; Nehring and Miller, 1987).

Table 5. Weighted Useable Area in relation to stream discharge (cfs) for rainbow trout in the East Fork and Middle Fork Kaweah River (Source: Southern California Edison Company, 1991b, exhibit 1)

Weighted Usable Area (sq. ft./1,000 ft.)

Middle Fork Kaweah River below Diversion No. 2				East Fork Kaweah River below Diversion No. 1			
Flow (cfs)	Adult	Juvenile	Fry	Flow (cfs)	Adult	Juvenile	Fry
1	2800	890	300	1	3940	1500	1500
5	3169	1119	668	2	4242	1832	1160

10	3500	1354	1119	4	4943	2504	797
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11	3530	1390	1185	5	5273	2650	650
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15	3806	1551	1503	6	5516	2818	518
20	4122	1672	1164	8	6065	3003	412
25	4386	1676	961	10	6588	3069	381
30	4635	1642	899	12	7120	3040	354
35	4825	1593	898	14	7644	2965	330
40	4958	1540	778	16	8154	2871	301
45	5024	1503	704	18	8669	2778	277
50	5055	1469	661	20	9192	2680	259
55	5089	1440	621	22	9679	2601	252
60	5107	1416	564	24	10120	2520	277
65	5117	1398	527	28	10793	2358	324
70	5106	1387	511	32	11181	2239	375
75	5114	1275	526	36	11309	2126	377
80	5162	1361	537	40	11220	2004	373
[63,261]							
85	5202	1347	511	44	11124	1926	362

90	5266	1341	542	50	10947	1824	262
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95	5313	1342	542
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100 5359 1346 544

The percent change in WUA provided by the alternative minimum flows proposed by SCE, DFG, and FWS for each lifestage for the East Fork and Middle Fork Kaweah River is shown in Table 6. SCE's proposed flows generally provide greater enhancement for fry and juvenile trout than for adult trout; whereas DFG and the FWS flows generate greater percentage of increase in the WUA for adult trout than for juvenile and fry trout. However, in the East Fork Kaweah River, all flows proposed would result in decreases in fry WUA since the maximum WUA for fry occurs now at 1 cfs.

In the East Fork Kaweah River (below Diversion No. 1), the minimum flows proposed by SCE, DFG, and FWS would increase average monthly WUA for adults by 48% (range of 34 to 67%), 116% (range of 54 to 157%), and 148% (range of 81 to 184%), respectively; and for juveniles by 89% (range of 77 to 105%), 84% (range of 68 to 105%), and 68% (range of 49 to 100%), respectively (Table 6). The alternative flows of SCE, DFG, and FWS would decrease average monthly fry WUA by 65% (range of 57 to 75%), 78% (range of 73 to 83%), and 76% (range of 75 to 81%), respectively.

All alternative flow proposals provide a relatively similar increase in average monthly juvenile WUA in the Middle Fork Kaweah River below Diversion No. 2--76% increase under SCE's proposal (range of 56 to 88%), 84% under DFG's recommendation (range of 74 to 88%), and 71% under FWS's recommendation (range of 65 to 88%) (Table 6). FWS's proposal would increase average monthly adult habitat the most (average of 76%, range of 57 to 81%) as compared to SCE's (average of 46%, range of 26 to 66%) and DFG's proposed flows (average of 60%, range of 36 to 66%). Average monthly fry WUA would be increased by SCE's, DFG's, FWS's proposed flows by 261% (range of 200 to 295%), 227% (range of 200 to 400%), and 147% (range of 120 to 220%), respectively. Fry would therefore realize the greatest percentage increase in WUA in the Middle Fork Kaweah River of all three lifestages under all alternative proposals.

Electrofishing surveys (EA, Engineering, 1986 and 1987)

show

that a well established self-sustaining wild rainbow trout fishery exists below Diversions No. 1 and No. 2 in East Fork

and Middle Fork Kaweah River, respectively. The surveys also show that DFG's fishery management goals are being met; these include: (1) maintaining a self sustaining wild rainbow trout fishery between Diversion No. 2 and Powerhouse No. 1 and between Diversion No. 1 and the confluence of East Fork with Kaweah River; and (2) maintaining a self-

sustaining smallmouth bass fishery between Powerhouse Nos. 1 and 2.

Table 6. Percent change of existing Weighted Usable Area for three lifestages of rainbow trout with alternative minimum flows below Diversions No. 1 and No. 2. (Source: Southern California Edison Company, 1991b, exhibit 1, as modified by staff).

Diversions No. 1		% Change WUA Below	
		Adult	Juvenile
Proponent	Flow (cfs)		
Fry			
SCE	5	34	77
-57			
	10	67	105
-75			
DPG	8	54	100
-73			
	10	67	105
-75			
	14	94	98
-75			
	22	146	73
-83			
	24	157	68
-82			
FWS	12	81	100
-76			
	14	94	98
-75			
	18	120	85
-81			

-78	28	174	57
-75	32	184	49

Diversion No. 2		% Change WUA Below	
Proponent Fry	Flow (cfs)	Adult	Juvenile
SCE 295	11	26	56
[63,262]			
288	20	47	88
200	30	66	84
DFG 400	15	36	74
288	20	47	81
220	25	57	88
200	30	66	84
FWS 220	25	57	88
199	35	72	79
159	40	77	73
135	45	79	69
120	50	81	65

The development of a flow recommendation for the project is based on the benefits to the fishery, expected recreational use of the project area, and economics of the project. Our recommendation for the project is discussed in the Comprehensive Development Section (section VI).

In addition to releasing the minimum flow discussed in section VI, SCE should do the following: (1) maintain recommended flows by building and operating an automatic bypass streamflow release device such as a gated outlet pipe; and (2) install streamflow gages below Diversions No. 1 and No. 2 in the bypass reaches to measure release of bypass flows.

c. Fish stranding/ramping rate: Project start-up could suddenly decrease the amount of water in the bypass reaches and might strand some fish in small shallow pools. These pools could dry up, thereby resulting in mortality of fish in Kaweah River. FWS recommends that the licensee not alter instream flow at a rate greater than 30 percent of the existing streamflow per hour. FWS does not state why they recommend 30 percent per hour ramping rate. SCE agrees to implement the recommended ramping rate.

Whether mortality to fish due to stranding as a result of project operations occurs, what the magnitude of the alleged stranding mortality is and what its significance is to Kaweah River's fishery is unknown. No evidence exists regarding the likelihood of stranding, fish mortality from stranding, or significance of stranding mortality. Due to the geomorphology of the Kaweah River and its tributaries (i.e. steep walls, high gradient), and the infrequency of project shutdown, stranding is unlikely. Drying up of pools is also unlikely because of short-term nature of the shutdowns that do occur. Stranding mortality (if it occurs) probably: (1) represents a small fraction of the juvenile and fry mortality which would be present in Kaweah River; (2) is infrequent (less than once every year or two); and (3) substitutes for other means of fish mortality within the river's population, such as predation, disease, etc.

Although we do not believe that stranding would be a problem, implementation of a ramping rate would be a simple and inexpensive means to ensure that unforeseen problems do not occur. The ramping rate recommended by FWS has been effective at similar projects in California. Therefore, SCE should ensure that flows are not altered at a rate greater than 30 percent of the existing streamflow per hour.

Unavoidable Adverse Impacts: None.

4. Vegetation

Affected Environment: The entire route of the two

flowlines associated with the Kaweah No. 3 powerhouse and virtually all the route for the Kaweah No. 1 flowline are located in live oak woodland. Typical species in the live oak woodland are canyon live oak, interior live oak, buckeye, chamise, bay tree, ceanothus, yerba santa, and red bud (Beak Consultants, 1989a).

Blue oak woodland dominates most of the 3-mile-long Kaweah No. 2 flowline and the 5-mile-long transmission line corridor. Common species of the blue oak woodland are buckeye, whiteleaf manzanita, interior live oak, poison oak, and bush lupine. Typical understory herbaceous species are foxtail brome, filaree, and tarweed (Beak Consultants, 1989a).

Mixed riparian habitat occurs at the diversion sites on the East, Middle, and Marble Forks of the Kaweah River, at the Marble Fork flowline river crossing, near the project powerhouses, and at the four locations where the transmission line crosses the Middle Fork Kaweah River. Common riparian species are white alder, arroyo willow, elder, Himalaya blackberry, sycamore, and Fremont cottonwood (Beak Consultants, 1989a).

The facilities within Sequoia National Park are located in subalpine conifer forest, dominated by foxtail and lodgepole pines, and in alpine dwarf shrub habitat. These habitat types are described in Beak Consultants, Inc., 1989a and 1989b.

the SCE has conducted surveys for sensitive plant species in project area (Beak Consultants, Inc., 1989a). (Sensitive species are plant

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or animal species that NPS or Forest Service (FS) recognize as needing special management to prevent their classification by federal and state agencies as threatened or endangered.) SCE s surveys located two plants that NPS considers sensitive: mountain phacelia and Mineral King draba. Mountain phacelia grows along the trail to Eagle Lake, about 0.4 mile below the lake. Mineral King draba grows along the Eagle Lake Trail in a red fir forest clearing, about 1 mile east of Eagle Lake.

SCE s surveys also identified three plants on FS s watch list as potential sensitive species. These three plants are Culbertson s Indian paintbrush, Munz iris, and cut-leaved monkeyflower. Culbertson s Indian paintbrush grows in two places near the reservoirs in Mineral King: 30 plants grow about 900 feet below the dam at Franklin Lake, and 50 plants grow in a meadow 0.5 mile west and below the Crystal Lake

dam. Munz iris grows in two places in the project area. Two closely spaced iris populations grow next to the Kaweah No. 1 flowline, about 3 miles west of the diversion site. An iris population of about 300 plants grows in Sequoia National Park next to the Kaweah No. 3 flowline, about 1 mile east of the NPS Ash Mountain headquarters. A small

population of cut-leaved monkeyflower grows near the Kaweah No. 1 flowline, east of Hammond.

operation
Environmental Impacts and Recommendations: Project

and maintenance and any new construction may adversely affect sensitive plants growing in the project area. Interior recommends that SCE survey the project area for sensitive plants and take appropriate measures to protect and maintain the habitat of any such plants. Five sensitive plant species occur in the project area. Of these five, only Munz iris is close enough to Kaweah facilities to be affected by routine operation and maintenance activities. Munz iris grows adjacent to Flowlines 1 and 3, within the zone from which SCE periodically clears woody vegetation. Since the iris populations are vigorous and reproducing, we believe that routine right-of-way maintenance is not adversely affecting Munz iris.

FWS, NPS, BLM, and DFG have reviewed SCE's report on the plant survey. The agencies concur that continued operation and maintenance of the project would not adversely affect sensitive plants in the project area.

SCE proposes two ground-disturbing activities: (1) controlling erosion along Flowlines 1 and 3; and (2) developing a whitewater boating access facility. Two populations of Munz iris grow next to the Kaweah No. 1 flowline. The iris populations are about 1 mile from the areas along the flowline where erosion control is necessary. (See the section on geology and soils). The cut-leaf monkeyflower population near the Kaweah No. 1 flowline is more than 2 miles from the areas proposed for erosion control. Erosion control measures thus would not affect Munz iris or cut-leaf monkeyflower.

None of the sensitive plants grow near the Kaweah No. 3 powerhouse, so developing a whitewater boating access facility there, as discussed in the section on recreational resources, would not affect sensitive plants.

Unavoidable Adverse Impacts: None.

5. Wildlife

Affected Environment: The major big game species in the project area is mule deer. The Kaweah deer herd is estimated to consist of between 1,400 and 2,800 animals. The current

population size represents a substantial decline from an estimated 12,000 animals in 1949. The Kaweah River drainage is home to the Mineral King segment of the Kaweah deer herd. DFG states that the Mineral King segment receives very little hunting pressure and appears to be maintaining deer numbers at higher levels than the rest of the population.

Other big game species in the project area are black bear and mountain lion. Smaller mammals are gray fox, coyote, raccoon, bobcat, ringtail, Virginia opossum, striped skunk, brush rabbit, and desert cottontail (Southern California Edison Company, 1975, application, exhibit W).

Game birds include California quail, mountain quail, band-tailed pigeon, and mourning dove. A population of Merriam's turkey has been established in the project area; turkey tracks have been seen on the Kaweah No. 2 flowline (SCE, 1975, application, exhibit W). Raptors in the project area are osprey, Cooper's hawk, sharp-shinned hawk, northern goshawk, red-tailed hawk, golden eagle, and great horned owl (Southern California Edison Company, 1975, application, exhibit W).

SCE has conducted surveys for sensitive wildlife in the project area (Beak Consultants, 1989b). Golden eagles, which DFG considers a species of special concern, are the only sensitive wildlife whose presence has been verified in the project area. Golden eagles are known to occur in the Mineral King area, within Sequoia National Park, and may occasionally utilize habitat surrounding project facilities in the foothills.

SCE's surveys identified suitable habitat for seven other sensitive species in the project area, although the presence of those species was not confirmed. Three species that are candidates for federal listing as threatened or endangered could occur in the Mineral King area. The candidate species are wolverine, Sierra Nevada red fox, and Mount Lyell salamander.

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SCE found an animal track on the south shore of Monarch Lake that appeared to be a wolverine track, but the quality of the track was too poor for conclusive identification. SCE found a canid scat at Crystal Lake that was the right size for either a red fox or a coyote. SCE found no evidence of the Mount Lyell salamander.

Two species that FS designates as sensitive species, fisher and northern goshawk, could occur at low population levels at the high-elevation lakes in the Mineral King area. SCE found no evidence of either fisher or goshawk. Northern goshawk also may use hardwood inclusions in the oak woodlands along the Kaweah No. 1 and Kaweah No. 3 flowlines

and riparian habitat for foraging and cover during the winter.

Two beetle species that are candidates for federal listing as threatened or endangered, moestan blister beetle and Morrison s blister beetle, may occur in blue oak woodland

habitat around the Kaweah No. 2 facilities and within the transmission line right-of-way. SCE found no evidence of the blister beetles presence.

SCE did not survey the project area, however, for the California spotted owl, a bird that is a candidate for federal listing as a threatened or endangered species and a species of special concern to DFG. DFG says that the spotted owl nests in low foothill oak woodland areas of Fresno and Tulare counties and the bird may also occur in the project area.

Environmental Impacts and Recommendations:

a. Wildlife drownings

Drowning in the two open-ditch flowlines, Kaweah No. 2 and Kaweah No. 3, has been a cause of wildlife mortality in the project area. A total of 142 deer were reported drowned in the flowlines since 1964, with 103 and 39 drowning in Flowlines 2 and 3, respectively (Southern California Edison Company, 1989, exhibit 5, table 1). As many as 31 deer, mainly does and fawns, drowned in Flowline 2 in one year, 1964. Wildlife other than deer drown in the flowlines. For example, in the spring of 1989, two mountain lion kittens were drowned in the Kaweah No. 3 flowline and a bear cub was drowned in the Kaweah No. 1 flowline.

To reduce wildlife mortality in the flowlines, SCE began installing 3-foot-wide, 16-foot-long flowline bridges and escape ramps in 1962-1963, and installed more of these structures in the mid-1970 s. The 4.5-mile-long Kaweah No. 2 flowline now has 28 wildlife bridges, 12 concrete escape ramps, 18 deer outs (chain link fencing attached to the side of the flowline), and 10 hazers (log and cable booms crossing the flowline at an angle, to direct a swimming deer to an escape ramp) (SCE, 1989, exhibit 5, figure 2). The Kaweah No. 3 flowline has 25 wildlife crossings and a number of escape structures along its 5-mile length.

To determine if SCE s measures were adequate, DFG conducted a field survey of the Kaweah No. 2 flowline, the water conveyance structure with the highest wildlife mortality. Based on its survey, DFG believes that the existing bridges and escape facilities are present in sufficient numbers, but are inadequately designed and need to be upgraded to the following minimum standards.

(1) Bridges should be 5 feet wide and covered with enough soil to be retained for 12 continuous months without maintenance. Bridges should be sturdy and solid, with no bounce or gaps in the planking. SCE should build up earth ramps to bridge level on both sides of the canal.

(2) Deer outs should be placed on the upstream side of a bridge and placed where the current slows on curves in the canal.

(3) Hazers should be sufficiently high that a deer will not get caught on the cable or hit the log. Each hazer should have flashers attached to the cable that are evenly spaced, at about 6-inch intervals, and that drag slightly in the current to create the flashing effect. Each escape ramp should have a hazer.

DFG recommends the following specific enhancement measures for the Kaweah No. 2 flowline:

(1) upgrading all existing bridges to minimum standards;

(2) completing bridge upgrading over a 4-year period, beginning on July 1, with a minimum of five bridges upgraded each year; and

(3) maintaining soil on the existing bridges during the deer activity periods.

high

For the Kaweah No. 3 flowline, DFG recommends surveying to determine the adequacy of its wildlife crossings and escape ramps and, if necessary, developing a plan to bring Flowline 3 into conformance with the standard of Flowline 2. For both flowlines, DFG recommends monitoring all wildlife drownings associated with the flowlines, to include: (a) an independent consultant interviewing SCE field personnel each year, (b) monitoring the flowlines on an annual basis, and (c) preparing an independent report for submittal to the Commission and to DFG.

FWS recommends that SCE implement a plan that includes the following items: (1) an identification of the types of deer bridges; (2) a determination of the locations for upgrading existing crossings and for constructing additional crossings; (3) a discussion of the specific

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construction and maintenance techniques; (4) an implementation schedule; and (5) a monitoring and evaluation program to determine the effectiveness of the plan and the mitigative measures.

SCE notes that the loss of deer in the Kaweah No. 2 flowline has declined from a high of 30 drownings in 1964 to zero in 1984 and only one since 1984. SCE says that, in part, this decline reflects the overall decline in the size of the Kaweah herd from between 3,000 and 5,000 deer in 1960 to its present level of between 1,400 and 2,800 deer. SCE believes, however, that the primary reason for the decline

in deer losses in the flowlines is installation of bridges and other deer protection facilities in the 1960 s and 1970 s.

SCE disagrees with DFG s recommendation to increase the width of the existing bridges to 5 feet over a 4-year period. SCE would, however, install 5-foot-wide bridges as the existing 3-foot-wide bridges wear out and need to be replaced. SCE recently replaced two existing bridges over the Kaweah No. 2 flowline with 5-foot-wide structures and expects that two or three bridges would need to be replaced a year. Therefore, all the bridges over the Kaweah No. 2 flowline would meet DFG s standards within 15 years.

SCE concurs with DFG s other recommendations, including installing additional hazers and flashers, relocating one bridge and several deer outs , and placing soil on all bridges.

The existing crossing and escape facilities of Flowlines 2 and 3 appear to be adequate for the current deer population size and use of the project area. From 1964 (when SCE began recording deer drownings) to 1969, 73 deer drowned in the two flowlines. From 1970 to 1979, deer mortality declined to 57 animals. From 1980 to 1989, only 12 deer drowned in Flowlines 2 and 3. The decline in deer mortality demonstrates that the bridges and escape facilities have reduced drowning to a low level.

Minor changes in the existing facilities, however, would encourage deer to use the bridges and further reduce drownings. Replacing the existing 3-foot-wide bridges with 5-foot-wide structures would facilitate wildlife passage over the flowlines. BioSystems Analysis (1985) found that deer cross bridges at least 4 feet wide more often than bridges less than 4 feet wide. Based on this observation, BioSystems Analysis suggested that any new wildlife bridge be at least 5 feet wide. Therefore, replacing the existing bridges over the Kaweah flowlines would enhance the protection of deer.

SCE s proposal to replace the existing 3-foot-wide bridges with 5-foot-wide bridges as the existing bridges wear out is a reasonable enhancement measure. Deer drownings in the flowlines have decreased substantially since SCE has installed bridges and escape ramps. Only one deer has drowned in the Kaweah No. 2 flowline since 1984. Given the current low level of mortality, we do not believe that

replacing all 28 bridges over Flowline 2 within a 4-year period, as DFG recommends, is warranted.

should To increase the protection of wildlife resources, SCE upgrade the bridges and other facilities at Flowline 2 to the standards DFG specifies as they propose. SCE should

replace the existing 3-foot-wide bridges with 5-foot-wide bridges as the existing structures wear out. SCE s expects to have all bridges replaced within 15 years. SCE should maintain soil on all bridges over the flowlines and should maintain earth ramps on both sides of the flowlines. Further, SCE should upgrade as necessary all deer hazers and deer outs to DFG s standards within 1 year, as they propose.

All but 3,000 feet of the 5-mile-long Kaweah No. 3 flowline is located within Sequoia National Park. The special use permit under which SCE operates the facilities in the park provides for the construction of additional wildlife protective devices if necessary. The adequacy and condition of the deer protective measures along the 3,000-foot-long section have not been evaluated. Although deer mortality is currently negligible (no deer mortality from 1984 to 1989), increases in deer numbers in the future could increase deer mortality. Therefore, SCE should review these protective measures, after consultation with the agencies, to determine if the measures are in need of repair or modifications to meet CDFG criteria. To determine if the existing bridges and escape facilities at the 3,000 feet of the Kaweah No. 3 flowline included in the project are present in sufficient numbers and are properly located for wildlife use, SCE should conduct a field survey and develop a plan to protect and enhance wildlife resources in the vicinity of the flowline.

Wildlife drownings in the Kaweah No. 1 flowline are rare. Flowline 1 consists of a steel flume elevated on wooden supports (Southern California Edison Company, 1975, application, exhibit L, sheet 3). Wildlife can pass under the flume in most places. Further, the flowline crosses steep terrain that receives little wildlife use. For these reasons, we believe that no measures to protect wildlife on Flowline 1 are necessary.

SCE should monitor wildlife drownings in the project flowlines to determine if any changes in deer numbers or use of the project area require further modifications to the bridges and escape facilities. SCE agrees to monitor wildlife drownings, but disagrees with DFG s recommendation that, to encourage accurate reporting,

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an independent consultant oversee the monitoring. We believe that an SCE biologist would interview field personnel and

prepare annual reports effectively and that an independent consultant is not necessary. A DFG biologist could participate in the interview sessions.

b. Wildlife habitat management

Transmission line corridors can be managed to enhance wildlife habitat. FWS recommends that SCE implement a right-of-way management plan to provide food and cover for wildlife within the 4.6-mile-long transmission line right-of-way.

SCE (1991a) has prepared transmission line right-of-way management guidelines that among other things: enhance plant diversity and edge structure; leave riparian habitat undisturbed, or develop openings to provide access to water; provide more snag habitat for wildlife; and provide additional nesting sites and escape cover. To reduce disturbance to wildlife, SCE would avoid maintenance operations, except in an emergency, during critical wildlife use periods; gate, reclaim, and waterbar any roads not needed for permanent access; and conduct burning only during low fire hazard months.

SCE would use these guidelines to develop site-specific prescriptions for vegetation management to benefit wildlife. SCE proposes to implement these guidelines, however, only on the 0.25-mile-long stretch of right-of-way that crosses BLM lands. SCE says that it does not have sufficient access and rights of easement to manage for wildlife on the private lands that make up approximately 95 percent of the transmission line right-of-way. Further, SCE says that approximately half the right-of-way is on grazing lands, and that other portions are along streets, through housing developments, and along the edge of a high, steep terrace of the Kaweah River. The right-of-way crosses 34 different private landholdings.

Implementing SCE's proposed management guidelines would enhance the habitat value of the transmission line right-of-way for wildlife. We do not agree with SCE that the sections of the right-of-way crossing private lands should not be managed to improve their wildlife habitat value.

SCE has access and rights of easement to maintain the right-of-way to ensure the safe and reliable operation of the transmission line. The major right-of-way maintenance activity is the removal of trees and other tall vegetation to reduce fire and safety hazards. SCE's proposals to enhance plant species diversity and edge structures by selectively removing unwanted species, trimming tall vegetation valuable to wildlife, and feathering the edges of clearings are similar to SCE's current maintenance practices. Therefore, the proposed guidelines would likely

be compatible with existing land uses and the landowners wishes.

We believe that SCE s right-of-way management guidelines
can

be applied to a substantial portion of the 4.6-mile-long right-of-way. Some of the management activities might not be

compatible with existing land uses in some segments of the right-of-way. For instance, burning would not be an acceptable vegetative management technique in the parts of the right-of-way that cross housing developments. Many of the guidelines, such as snag creation or retention, would have no effect on grazing lands, which make up about half the right-of-way. Therefore, SCE should develop site-specific prescriptions to implement as many of the guidelines over as much of the right-of-way as possible.

c. Raptor electrocution

The Kaweah Project has a 5-mile-long, 66-kV transmission line. Transmission lines less than 69 kV can be an electrocution hazard for eagles, hawks, and other birds large enough to simultaneously touch two energized wires or other hardware (Raptor Research Foundation, Inc., 1981).

SCE's records of circuit outages for the period of 1962 to 1988 show one unidentified bird was electrocuted (Southern California Edison Company, 1989, exhibit 7). The use of circuit outage data, however, is not a conclusive means of determining the safety of the existing lines. Only a small percentage of raptor electrocutions actually result in circuit outages--most electrocutions result in only momentary interruptions of service.

SCE filed design drawings for the existing project transmission line (Southern California Edison Company, 1989, exhibit 7). The drawings show that the transmission line poles, crossarms, and conductor placements separate energized hardware 60 inches or more. This design meets the criteria for raptor protection developed by the Raptor Research Foundation (1981).

data FWS, NPS, BLM, and DFG have reviewed the circuit outage

and the existing transmission line design, and say that the transmission line design provides adequate protection for raptors in the project area. We concur with the agencies that the circuit outage data and the transmission line design show that the existing lines do not need to be modified to protect raptors.

FWS recommends that SCE continue to monitor the existing lines, and if it is determined that the lines are a hazard to raptors, SCE should modify the lines. BLM recommends that SCE include in its standard operating procedure

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a system of reporting any raptor deaths, to determine quickly any changes in frequency of raptor mortality.

The design of the project transmission line provides adequate protection for raptors in the project area. SCE should report all raptor deaths associated with the transmission line to the agencies.

to FWS recommends that SCE design any new transmission lines prevent avian injury or electrocution. SCE does not propose constructing new project transmission lines. If SCE proposes such construction in the future, the need for raptor-proofing would be addressed then.

d. Sensitive species

Project operation and maintenance could potentially affect sensitive animals occurring in the project area. Interior recommends that SCE survey the project area for sensitive animals and take appropriate measures to protect and maintain the habitat of any such animals.

presence Golden eagles are the only sensitive wildlife whose has been verified in the project area. SCE s surveys identified suitable habitat for seven other sensitive species: wolverine, fisher, Sierra Nevada red fox, northern goshawk, Mount Lyell salamander, moestan blister beetle, and Morrison s blister beetle. SCE did not survey for the California spotted owl, a sensitive species that may use oak woodland habitat in the foothill areas of the project.

Four of these sensitive animals--wolverine, fisher, Sierra Nevada red fox, and Mount Lyell salamander--may occur at high elevations in the Sequoia National Park. The special use permit under which SCE operates the facilities in the park provides for the protection of any sensitive species that may be identified in the future.

The remaining sensitive animals--golden eagle, northern goshawk, California spotted owl, moestan blister beetle, and Morrison s blister beetle--may occur in the foothill areas of the project. If any of these sensitive species occur in the area, continued operation and maintenance of the project would not adversely affect them. The project transmission line design meets the criteria for raptor protection developed by the Raptor Research Foundation (1981). Electrocution of golden eagles, goshawks, or spotted owls is thus unlikely.

Little is known about the life histories of the moestan and Morrison s blister beetles. The beetles may occur in oak woodland habitat around the Kaweah No. 2 facilities and within the transmission line right-of-way. Population levels of these beetles are usually very low. Adult blister beetles feed on flowers and foliage. Blister beetle larvae either feed on grasshopper eggs or parasitize the eggs and larvae of bees and wasps. Vegetation management to enhance species

diversity within the transmission line right-of-way would be unlikely to adversely affect blister beetles.

We conclude that continued operation and maintenance of the project would not affect sensitive wildlife.

FWS, NPS, BLM, and DFG have reviewed SCE's report on sensitive wildlife in the project area. The federal agencies concur with SCE's conclusion that continued operation and maintenance of the project would not adversely affect sensitive wildlife species.

Unavoidable Adverse Impacts: Improvement of the existing wildlife bridges and escape facilities at the flowlines would reduce wildlife mortality to a very low level. On rare occasions, however, deer and other wildlife would fall into the flowlines, be unable to get out, and drown.

6. Threatened and Endangered Species

and

Existing Environment: SCE's surveys for sensitive plants and animals also considered species federally listed or proposed for listing as threatened or endangered (Beak Consultants, 1989a, 1989b). SCE identified three threatened or endangered species that may occur in the project area: San Joaquin kit fox; valley elderberry longhorn beetle; and Little Kern golden trout.

The San Joaquin kit fox, which is federally listed as endangered, is found throughout the San Joaquin Valley and many of the surrounding foothills. Kit fox have been reported as far east as Exeter, about 20 miles southwest of the project area, in the Kaweah River floodplain. SCE's surveys noted abundant fox scats in all foothill habitat associated with the project. Most scats consisted primarily of berries, which are a major food item of grey fox, but not used extensively by the kit fox. SCE's survey identified fox tracks next to the Kaweah No. 2 flowline; the species of fox could not be determined. Habitat types in the project area are of high importance for the grey fox, but of low importance for the kit fox. Therefore, the fox signs found at the project were probably made by grey foxes, rather than kit foxes.

SCE surveyed riparian habitat in the project area for the valley elderberry longhorn beetle, which is federally listed as threatened. SCE examined elderberry trees along project

facilities for beetle emergence holes. No emergence holes were found. Therefore, the valley elderberry longhorn beetle is not likely to occur in areas affected by the project.

Little Kern golden trout, which is federally listed as threatened, was introduced from the adjacent Little Kern

River drainage into the East Fork Kaweah River and into Lady Franklin, Upper Monarch, Crystal, and Eagle lakes

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around 1880. Subsequently, rainbow trout, which interbreed with golden trout, and brook trout, which compete with golden trout, were introduced into the high-elevation lakes and streams of the East Fork Kaweah watershed. Trout occur in all four of the high-elevation reservoirs, but SCE believes it is unlikely that any pure strains of golden trout remain in the East Fork Kaweah drainage.

We find no evidence that the kit fox, longhorn beetle, or golden trout occur in the project area. FWS, NPS, BLM, and DFG have reviewed the sensitive plant and animal reports. The agencies concur that no further surveys for threatened or endangered species are necessary.

Environmental Impacts and Recommendations: None.

Unavoidable Adverse Impacts: None.

7. Recreation and Land Use

the Affected Environment: The project is located adjacent to Sequoia National Park along a major travel route to the Park. There are no developed recreational facilities within the project area. Opportunities for developed recreational sites are limited by the steep topographic relief of the foothills that predominate in the area, as well as by the lack of access. Most of the BLM lands in the project area are used for dispersed semiprimitive recreational activities such as hunting and hiking.

The majority of private lands are located along the Kaweah River and State Highway 198, as well as along the Mineral King Road. Private lands are utilized primarily for residential homes and motels, restaurants, and lodges. Because of the private ownerships, public access to the Kaweah River from State Highway 198 is restricted through most of the project area.

area. There is a limited recreational fishery in the project

As noted in section V.B.3, the DFG stocks the Kaweah River each spring and summer with about 4,000 catchable rainbow

trout. The DFG also manages the Kaweah River for self-sustaining small-mouth bass and wild rainbow trout fisheries. The fishery is limited by lack of good access to fishing sites and the rugged terrain of the river canyons rather than by the number of fish available.

There is an existing whitewater boating run that starts below Kaweah No. 3 powerhouse. Access currently is via a

primitive, steep dirt path from the highway edge. Recreationists now park along the highway shoulder, an unsafe practice.

Environmental Impacts and Recommendations: Existing recreational fishing and whitewater boating would not be affected by continued operation of the project. In a preliminary recreation plan, SCE (1991a) proposes to enhance the whitewater boating access site with parking, sanitation, and improved trail facilities at the Kaweah No. 3 powerhouse to enhance recreational use of the area and to improve user safety. Providing this site would enhance the recreational opportunities in the project area. SCE should construct and operate the access facility at the Kaweah No. 3 powerhouse as described in their preliminary recreation plan.

Unavoidable Adverse Impacts: None.

8. Visual Resources

Affected Environment: Within the project vicinity, the landscapes are characteristically rolling foothills and mountains that range in elevation from 1,500 feet at the lower end of the project to over 3,000 feet in Sequoia National Park at the upper end of the project. Vegetation in the foothills consists primarily of oak and grass communities. Oak specimens vary from evergreen to deciduous, and on the drier slopes, the chamise evergreen shrub dominates. Interspersed with the vegetation on the southwestern slopes are granite rock outcroppings which vary in size from small boulders to dramatic vertical cliffs.

The visual character of the project site varies between the wet and dry seasons. During the winter wet season, the area is green, but by early April, open grassy slopes are covered by wildflowers. The predominant visual character emerges during the dry season, however. By the end of May, the grass hillsides and flowers have died off and created a golden wheat color and texture. The stunted oak species and evergreen chamise are characteristically an olive-green that contrasts sharply with the hillside grasses. During this season, the intense green vegetation following the waterways also contrasts with the surrounding landscape.

The scenic quality of the project area is enhanced with flowing water and wetlands vegetation, and in areas where views to the high snow-capped Sierras and canyons are afforded.

of The project area is seen from several state highways, all
which are major access routes to Sequoia National Park.

Environmental Impacts and Recommendations: All of the
project facilities have been in place for almost 100 years.

As such, they have become part of the landscape and are rarely visible to highway users. Vegetation shields most of the flumes and channels from view, and the powerhouses also blend well with the landscape (Keller Environmental Associates, Inc., 1989b).

Two areas of moderate visual impact were identified.

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a. About 1 mile of Kaweah No. 2 flume connecting to the forebay is visible for more than 1 mile along State Highway 198. A moderate to strong contrast between the reflective steel flume and the surrounding hillside occurs. We do not believe that the contrast is sufficient to warrant any relocation or camouflaging of the flume.

b. Sequoia National Park, in a letter to SCE's consultant Keller Environmental Associates, Inc. dated November 1, 1989, suggested that the visual resource study missed the significant visual impact of the 66-kV transmission line which passes directly over the park entrance station plaza. SCE subsequently analyzed this potential impact and concluded that the presence of the 66-kV transmission line in this location is not inconsistent with the surrounding landscape.

The visual landscape in the immediate area of the park entrance station is a mix of private, governmental and commercial structures, other overhead wires, and some masking vegetation. While the removal of the transmission line from the entrance station area would undoubtedly enhance the view approaching the park, we do not believe that the low to moderate visual impact of the transmission line warrants its relocation.

Unavoidable Adverse Impacts: None.

9. Cultural Resources

Affected Environment: SCE conducted a cultural resources survey of the project area. The survey inventoried three archeological sites along the project transmission corridor that are eligible for inclusion in the National Register of Historic Places. The survey also indicated that the Kaweah No. 3 powerhouse, diversions, conduits, forebay, and penstock are also eligible for inclusion in the National Register as a historic district, and that Kaweah No. 1 and 2

powerhouses and associated facilities are not eligible (Lehman et al., 1990; Wickstrom et al., 1990).

The California State Historic Preservation Officer (SHPO) has reviewed the reports on the survey investigations and concurs with these findings (letter from Kathryn Gualtieri,

State Historic Preservation Officer, California Department of Parks and Recreation, Sacramento, California, August 27, 1990). We have reviewed the reports and also concur.

The eligible archeological sites are examples of late prehistoric Indian occupations of the project vicinity. One site is a permanent habitation area and contains housepits and a dense concentration of artifacts, including stone tools and lithic debris from tool manufacture, ceramic and steatite container fragments, shell and steatite beads, and animal bone and shell food remains. The remaining sites contain bedrock mortars, other bedrock grinding surfaces, grinding tools, and similar stone tools for processing and procuring acorns and other seeds for food. One of these sites also contains a historic component consisting of the remnants of a stone wall, metal cans, square and round nails, glass and ceramic fragments, saw-cut bone, and other historic materials dating to the 1890 s and early 1900 s. This component appears to be the residence of an individual or family occupying the vicinity of the town of Hammond at the time of or shortly after the construction of the Kaweah Project. These sites are eligible for listing in the National Register because they have the potential to yield significant information on the late prehistory and early history of the project area (Wickstrom et al., 1990).

Mount Whitney Power Company began construction of the project in 1898, and continued to operate the project until 1916 when Pacific Power and Light purchased the company and the project. Pacific Power and Light in turn sold its electric power business, including the Kaweah Project, to SCE in 1917. The project developments were constructed during the following periods: Kaweah No. 1 development between 1898 and 1899; Kaweah No. 2 development between 1900 and 1905; and Kaweah No. 3 development between 1912 and 1913. The project was constructed to provide an economical source of power to operate wells for irrigation purposes. The project opened vast areas in the project vicinity for irrigation and agricultural development where such development was not previously feasible. The project contributed significantly in this capacity to the economic development of the area (Lehman et al., 1990).

The entire Kaweah Project would be eligible for inclusion
in

the National Register as a historic district for its contribution to the economic development of the project vicinity if all the project facilities retained their

historical integrity. However, only the Kaweah No. 3 historic district retains such integrity. The district is eligible because (1) the district facilities are operating essentially unchanged from the original design and construction of the project, and therefore retain their historical integrity; (2) the district is a self-contained development which shows how the project originally operated

and contributed to the economic development of the area; and (3) several components in the district are considered to have had special technical merit at the time of project was constructed, specifically the on-site fabricated concrete slabs used for the conduit and the design and construction of the siphon system, making the engineering and technical journals

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of the day. The Kaweah No. 1 and 2 developments do not retain historical integrity and therefore are not eligible because they have been altered at various times over the history of the project. Examples are the replacement of the Kaweah No. 1 powerhouse in 1928, and significant modifications to the generation equipment in Kaweah No. 2 powerhouse (Lehman et al., 1990).

Environmental Impacts and Recommendations: The applicant states that the project would not affect the Kaweah No. 3 historic district or the three eligible archeological sites along the proposed transmission line corridor. We agree if measures are implemented to ensure that impacts would not occur.

The applicant states that there are no plans to alter the project facilities within the Kaweah No. 3 historic district, and that routine maintenance would focus on maintaining the plant, intakes, conduits, penstock, and other facilities as presently constructed. The applicant proposes a cultural resources management plan to avoid impacts to the eligible archeological sites along the transmission corridor. The plan consists of informing SCE line maintenance and emergency outage crews of the location of the sites and avoiding any disturbance of the sites with mechanized equipment. In the event that nearby transmission line towers require replacement, new towers would be located out of site areas and the old towers would be cut off at the surface and footings left in place (letter from Thomas T. Taylor, Senior Archeologist, Southern California Edison Company, Rosemead, California, October 1, 1990).

The SHPO concurs with the applicant that the project would not affect the integrity of the Kaweah No. 3 historic district or the three eligible archeological sites (letter from Kathryn Gualtieri, State Historic Preservation Officer, California Department of Parks and Recreation, Sacramento, California, August 27, 1990). We agree that continued

operation would not impact the three eligible archeological sites if the SCE cultural management plan is implemented. However, we conclude that impacts to the historic district could occur unless maintenance and any necessary repair work are undertaken in accordance with the Secretary of the Interior's Standards and Guidelines for Rehabilitation and

the Secretary of the Interior's Standards and Guidelines for Historic Preservation Projects.

Therefore, the SCE cultural resources management plan to avoid impacts to the three eligible archeological sites along the proposed transmission corridor should be implemented as a condition of the license. Further, a condition should also be included requiring the licensee to conduct any maintenance or repair work associated with continued project operation of the Kaweah No. 3 historic district in accordance with the Secretary of the Interior's Standards and Guidelines for Historic Preservation Projects and the Secretary of the Interior's Standards and Guidelines for Rehabilitation.

access SCE's proposed plan to enhance the whitewater boating site near Kaweah No. 3 powerhouse would not affect the integrity of the Kaweah No. 3 historic district or any archeological or other historic sites eligible for inclusion in the National Register of Historic Places.

the The SHPO's comments on the proposed project are based on premise that the project would require no new construction and would be operated as described in the application without significant changes. Changes to the project are occasionally found to be necessary after a license has been issued. Under these circumstances, whether or not an application for amendment of license is required, the SHPO's comments would no longer reliably depict the cultural resources impacts that would result from operating the project.

Therefore, before starting any future land-clearing, land-disturbing, or spoil-producing activities associated with the project, other than activities authorized by the project license, SCE should consult with the SHPO about the need to conduct a cultural resources survey and to implement avoidance or mitigative measures, and conduct any necessary survey. SCE should file for Commission approval a report containing the results of any survey work and a cultural resources management plan for avoiding or mitigating impacts to inventoried cultural resources, along with copies of the SHPO's written comments on the report. The survey and the report should be based on the recommendations of the SHPO and adhere to the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. SCE

should not implement any cultural resources management plan or begin any land-clearing, land-disturbing, or spoil-producing activities until informed by the Commission that the requirements discussed above have been fulfilled.

Unavoidable Adverse Impacts: None.

C. Alternative of No Action

Carrying out the no-action alternative would not change the existing physical, biological, and cultural components of the area that have developed with the project. Under the no-action alternative, annual licenses would be issued until another entity takes the facility over for nonpower use.

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Denying the license would force SCE to do the following:

- (1) stop operating the project for power generation.

SCE would have to replace the project's output of 53-GWh electrical energy by consuming fossil fuels in their existing power plants. Burning fossil fuels emits air pollutants that may contribute (a) acid rain, (b) global warming (the greenhouse effect), and (c) depletion of the ozone layer. Using fossil-fueled alternatives to generate energy equal to the project's generation would consume about 90,000 barrels of oil or 22,000 tons of coal annually.

- (2) find other sources of capacity and energy they could develop to meet their existing and forecasted load growth.

Other possible resource options include:

1 Building cogeneration facilities that use biomass fuels, if the fuels are available

1 Taking part in projects that use geothermal, wind, and solar power

1 Using combustion turbines for peaking, though the turbines consume nonrenewable fossil-fuels and pollute the air

D. Recommended Alternative

We recommend the project as modified by staff because it would result in relatively minor environmental impacts. The project as modified by staff is preferred to the no-action alternative, because electricity produced at the project would be generated from a renewable resource, lessening the use of fossil-fuels, and because the enhancement measures would reduce environmental impacts in comparison to those caused by continued operation of the project on annual

licenses.

E. Comprehensive Development

Section 4(e) of the Federal Power Act (Act) states that in deciding whether to issue a license, the Commission, in

addition to considering the power and development purposes of the project, shall give equal consideration to (1) the purposes of energy conservation, (2) the protection of, mitigation of damage to, and enhancement of fish and wildlife, (3) the protection of recreational opportunities, and (4) the preservation of other aspects of environmental quality.

Further, in section 10(a), the Act further states that the project adopted shall be one that in the judgement of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway for (1) the use or benefit of interstate or foreign commerce, (2) the improvement and utilization of water power development, (3) the adequate protection, utilization, and enhancement of fish and wildlife (including related spawning grounds and habitat), and (4) other beneficial public uses, including irrigation, flood control, water supply, and recreational and other purposes discussed in section 4(e).

In this environmental assessment, we evaluate the effects of project operation on the environmental resources of the project area and discuss the measures that SCE should take to enhance environmental resources. These enhancement measures include: (1) providing minimum instream flows; (2) improving deer crossings; (3) enhancing recreational access; (4) implementation of an erosion protection and remediation plan; and (5) implementation of a cultural resources management plan.

and We evaluate installing fish screens at Diversion Nos. 1

2. Using SCE estimates of between \$375,000 to \$675,000, we find installing screens would reduce the project's benefits by \$58,000 to \$95,000 annually. We conclude in the fishery resources section that any existing entrainment and mortality likely does not significantly affect the abundance of the existing fish populations. We also conclude in the recreational resources section that recreational use of the resource is expected to be small. Therefore, we do not believe that any incremental benefits to the fishery would justify the cost of installing the screens.

We also evaluated the effect of different flow regimes on fish populations. We found that SCE's proposed minimum flow releases would generally increase rainbow trout fry and juvenile habitat in the bypass reaches as much as

alternative higher minimum flows (table 7). Adult habitat, however, would not be increased as much as with the agencies proposals.

Table 7. Percent change in average monthly weighted usable area compared to

existing flows for various life stages of rainbow trout under different alternative flow regimes (Source: Southern California Edison Company, 1991b, as modified by staff).

Flow regime	Middle Fork Kaweah River		East Fork Kaweah River	
	Below Diversion No. 1		Below Diversion No. 2	
Fry	Adult	Adult	Juvenile	Juvenile
SCE -65 261	46	48	76	89
DFG -78 227	60	116	84	84
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FWS -76 147	76	148	71	68

The proposed flow releases would provide reasonable enhancement of the existing fishery--46 to 48 percent increase in existing adult rainbow trout habitat and 76 to 89 percent increase in juvenile habitat. Given the good existing fish population levels (see section VI.B.3) and marginal fishery potential because of poor access, we do not

believe that any incremental benefits of higher minimum flow releases would justify the cost and reduction in power generation (table 8).

Table 8. Economic evaluation of various alternative flow regimes (Source: the staff).

Levelized value of reduced generation Flow regime (dollars)	Generation (gigawatthours)
existing	53.1
SCE 43,000	52.6
DFG 262,000	50.0
FWS 463,000	47.6

Based on our review under section 4(e) and 10(a) of the Act, the project, if licensed with the recommended enhancement measures, would be best adapted to a comprehensive plan for developing the Kaweah River basin.

VII. Finding of No Significant Impact

Continued project operation with staff recommended measures would enhance the existing environmental resources of the project area. These measures include:

1 Increased flows to enhance rainbow trout habitat.

1 A ramping rate to minimize fish stranding.

1 A right-of-way management plan along the transmission line to enhance wildlife habitat.

1 The upgrading of bridges to enhance deer movement over project canals.

Continued operation with staff modifications would not affect federally listed or proposed endangered and threatened species or other sensitive species within the project area.

Continued operation with staff modifications would not affect archeological or historic sites listed on or eligible for inclusion in the National Register of Historic Places.

In accordance with the National Environmental Policy Act of 1969, we prepared this environmental assessment for the Kaweah Project. On the basis of the record and this environmental analysis, issuance of a license for the proposed project, with the mitigative measures we recommend, would not constitute a major federal action significantly affecting the quality of the human environment.

VIII. Preliminary Determination of Consistency of Fish and Wildlife Recommendations with the Federal Power Act and Applicable Law

Under the provisions of the Federal Power Act (FPA), as amended by the Electric Consumers Protection Act (ECPA) of 1986, 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 such 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 Act or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, given due weight to the recommendations, expertise, and statutory responsibilities of such agency.

Pursuant to section 10(j) of the Act, we are making a preliminary determination that certain of the recommendations of the federal and state fish and wildlife agencies are inconsistent with the purpose and

requirements of Part 1 of the Act or other applicable law.

As discussed in section VI.B.1 of the EA, staff does not agree with FWS's recommendation to provide an automatic water diversion shutoff system in the event of a rupture or failure of the water conveyance facilities. Staff

believes, that SCE's existing pipeline monitoring program is satisfactory and that an automatic shutoff system would not substantially reduce the magnitude of erosion as compared to SCE's program. FWS has not provided any information to the contrary. Therefore, we believe that FWS's recommendation is inconsistent with the substantial evidence requirements of section 313(b) of the Act.

Staff believes that DFG's and FWS's recommendations to install fish screens at all intakes leading to Powerhouses Nos. 1 and 2 in order to avoid potential adverse impacts from fish entrainment and to increase stream flows throughout the diverted reaches in order to enhance the existing fishery are inconsistent with the public interest standard of section 4(e), the comprehensive planning standard of section 10(a), and the substantial evidence standard of section 313(b) of the Act.

As discussed in section VI.B.3 of the EA, staff believes that: (1) the existing project entrainment does not significantly affect the

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abundance of the existing fish populations, and therefore, a potential incremental benefit to the fishery does not justify the cost of installing the screens; and (2) presently a good fish population thrives in Kaweah River with the existing flow regime, and SCE's proposed flows would maintain or enhance Kaweah River's fishery at less cost and allow for greater power production.

Furthermore, the agencies have not provided substantial evidence that continuing the existing entrainment rate would lead to the decline of the existing trout fishery in Kaweah River; nor that eliminating entrainment would result in a substantial increase in fish population size or fish harvest. Likewise, the agencies have not provided substantial evidence to support the need for greater minimum flows to protect or enhance Kaweah River's fishery.

In summary, staff recommends that SCE not incorporate the agencies recommended new screens and enhanced flows into the project's design and operation because these recommendations are inconsistent with public interest and comprehensive development standards of the FPA and are not supported by substantial evidence.

Lastly, we believe that DFG's recommendation to replace all 28 existing wildlife crossings over the Kaweah No. 2 flowline with wider crossings within 4 years is inconsistent with sections 10(a) and 313(b) of the Act for the reasons previously discussed in section VI.B.4. We

recommend that SCE install wider crossings as the existing structures wear out or within 15 years, whichever comes first. Only one deer has drowned in the Kaweah No. 2 flowline since 1984. Given the low level of wildlife mortality, we do not believe that replacing all 28 bridges within 4 years, as DFG recommends, is warranted. DFG has not provided substantial evidence that replacing all the bridges within 4 years would benefit wildlife in the project area.

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Safety and Design Assessment

Kaweah Project No. 298-000

California

October 30, 1991

Project Design and Operation

Southern California Edison Company (SCE) applied for a major license for the continued operation and maintenance of the constructed Kaweah Project No. 298.

Tulare

The project, on the Kaweah River and tributaries in County, has three developments: Kaweah No. 1, Kaweah No. 2, and Kaweah No. 3. The Commission may not license any part of the project within the Sequoia National Park (parts of Kaweah No. 1 and Kaweah No. 3), but may license those parts of the Project outside the boundaries of the Sequoia National Park (Kaweah No. 2 and parts of Kaweah No. 1 and Kaweah No. 3).

Kaweah No. 1 Development has (1) a small concrete diversion dam across the East Fork of the Kaweah River, diverting flows into (2) a 6-foot high, 3-foot-wide, unlined tunnel, extending approximately 50 feet, to (3) a 30,723-foot long steel flume, leading to (4) a 24-foot diameter steel forebay tank, connected to (5) a steel penstock, 3,340 feet long and varying in diameter from 48 to 19 inches, leading to (6) a 22.5-foot by 26.3-foot reinforced concrete powerhouse, housing (7) a single generating unit with a rated capacity of 2,250 kilowatts

(kW) .

Kaweah No. 2 Development consists of (1) a masonry diversion dam, 161 feet long and 7 feet high, on the Middle Fork of the Kaweah River, diverting flows into (2) a flowline comprised of 16,738 feet of concrete ditch, 3,822 feet of steel flume, and 1,047 feet of 50-inch steel

syphon, leading to (3) a steel penstock 1,012 feet long and varying in diameter from 60 to 40 inches, leading to (4) a 34-foot by 62-foot, wood-frame powerhouse, housing (5) a single generating unit with a rated capacity of 1,800 kW, and (6) a tailrace canal extending approximately 1/3 of a mile to the Kaweah River.

Kaweah No. 3 Development consists of (1) a section of concrete-lined flume, approximately 2,580 feet in length conveying flows to (2) a forebay reservoir, with a capacity of approximately 11 acre-feet, and thence into (3) a steel penstock, 3,151 feet long and varying in diameter from 42 to 36 inches, leading to (4) a 50-foot by 50-foot reinforced concrete powerhouse, housing (5) two generating units with a rated capacity of 1,400 kW each.

The Kaweah Project has three individual powerplants, each operates independently as a run-of-river plant:

1 Powerplant No. 1 uses water diverted from the East Fork of the Kaweah River by diversion dam No. 1 and water stored in four small reservoirs in the Mineral King area (Eagle Lake, Monarch Lake, Lady Franklin Lake, and Crystal/Silver Lake) to supplement streamflow in the East Fork during periods of low flow.

1 Powerplant No. 2 uses water diverted from the Middle Fork of the Kaweah River by diversion dam No. 2, just below Kaweah powerplant No. 3.

1 Powerplant No. 3 uses water diverted from both diversion No. 3 on the Middle Fork, and diversion dam No. 4 on the Marble Fork of the Kaweah River.

The total installed capacity at the three powerplants is 6,850 kW. In the license application, SCE says the project generates 51.1 gigawatthours (GWh) of electrical energy annually and has a dependable capacity of 444 kW. But, for the years 1971 to 1985, the project generates about 53 GWh annually. SCE proposes no addition to the facilities already built for Project No. 298.

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Determination of Licensable Transmission Facilities

A new license for the Kaweah Project should include the 2.4-kilovolt (kV) primary line segments and related

facilities extending from the generators at each powerhouse, through voltage transformation, to a connection with the project transmission line. The transmission line is a 66-kV line about 4.6 miles long, and extends from powerhouse No.3 directly into SCE s

interconnected transmission system at the Three Rivers Substation.

Dam Safety

We evaluated the dam safety of the Kaweah Project and find the project safe and adequate for continued use and operation.

The project has two diversion dams with low downstream hazard potential. Failure of any of the low-hazard dams during extreme loading conditions would not affect downstream life or property.

on The San Francisco Regional Office inspected the project August 21 and 22, 1990, and found (1) SCE is properly maintaining the project and (2) the project structures are in satisfactory condition.

Water Resources Planning and Comprehensive Development

As we said, the Kaweah Project includes (1) four small reservoirs at high elevations in the Mineral King area of Sequoia National Park, (2) four small diversion dams, two of them (diversion No. 3 and No. 4) in Sequoia National Park, (3) three main conduits, and (4) three powerhouses housing four units, with a total installed capacity of 6,850 kW.

The Kaweah conduit No. 1 can convey about 26 cubic feet per second (cfs), the Kaweah conduit No. 2 about 87 cfs, and the Kaweah conduit No. 3, partly within Sequoia National Park, can convey about 97 cfs.

generating Because the hydraulic capacity of the project's units is matched to the maximum flow capacities of the water conveyance systems, installing additional capacity would mean enlarging all project facilities. We consider SCE's proposal to maintain the present installed capacity reasonable.

SCE operates the three Kaweah powerhouses as run-of-river generating plants, using flows from the Marble, the Middle, and the East Forks of the Kaweah River. Other than providing minimum instream flows, SCE proposes no change in operations.

The Secretary of the Interior granted SCE a 10-year special use permit for the continued operation and maintenance of the four small reservoirs in the Mineral King area and the parts of Kaweah No. 3 inside the Sequoia National Park. This permit covers the period from September 9, 1986, through September 8, 1996, and sets flow releases for the Middle Fork at diversion No. 3 and

the Marble Fork at diversion No. 4. SCE agrees with all the requirements imposed by the Sequoia National Park.

recommended

SCE disagrees, however, with the minimum flows by the U.S. Fish and Wildlife Service (FWS) and the California Department of Fish and Game (CDFG), for the East Fork at diversion No. 1 and the Middle Fork at diversion No. 2: SCE proposes lower flows at both diversions. In our environmental assessment (EA) for the Kaweah Project, we look at requiring minimum instream flows for Kaweah No. 1 and No. 2.

Because the original license has no minimum flow requirements, any minimum flows the Commission requires in a new license would reduce the power benefits of the project. We've evaluated how several instream flow proposals would affect project generation. For each proposal, Table 1 shows the releases SCE must make and the total energy the existing project would generate.

Table 1. Effects of four proposals for instream flow in cubic feet per second on project generation in gigawatthours (Source: the staff).

Instream flow proposals

Month	Normal year runoff		
	SCE	CDFG	PWS

Kaweah No. 1 Diversion

January	5	14	
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28

February
32

5 22

March 32	10	24
April 32	10	24
May 32	10	24
[63,276]		
June 32	10	24
July 28	10	24
August 18	5	14
September 12	5	8
October 12	5	8
November 14	5	10

December
18

5 14

Kaweah No. 2 Diversion

January 50	20	30
February 50	20	30
March 50	30	30
April 50	30	30
May 50	30	30
June 50	30	30
July 50	20	30
August 40	20	25
September 25	11	15

October
25

11 20

November 35	11	25
December 45	11	30
Project generation GWh 47.6	52.6	50.0

As we said, NPS's special use permit imposed on SCE the minimum releases at diversion No. 3 on Marble Fork and diversion No. 4 on Middle Fork. SCE has complied and operated Kaweah No. 3 Powerplant with these minimum releases. For the years 1971 to 1985, our records show, and SCE confirms, the total average annual generation of the Kaweah Project, including Kaweah No. 1, No. 2, and No. 3 powerplants, was about 53 GWh.

Section 10(a)(2) of the Federal Power Act requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project.

Federal and state agencies filed comprehensive plans that discuss various resources, 33 plans in California. The project doesn't conflict with any of these plans or with any existing or planned water resource development in the Kaweah River basin.

We've reviewed our hydroelectric site data base and federal and state agency comments: we find no conflicts with any proposed or existing projects.

Project Economics

We studied the economics of the instream flow enhancements SCE, CDFG, and FWS propose. We find:

1 SCE's enhancements would reduce the project's benefits by \$43,000 a year.

1 CDFG s enhancements would reduce the project s benefits
by \$262,000 a year.

1 FWS s enhancements would reduce the project s benefits
by \$463,000 a year.

As we've said, from 1971 to 1985 the project generates an average of about 53 GWh of energy annually. We assume the project now has no dependable capacity, however, as a result of recreational and instream flow enhancement in effect. To estimate the cost of the various enhancement proposals, we've determined how they reduce the project's power benefits.

We base the value of the project's existing energy generation on the cost of existing gas-fired, steam-electric plants in the region.

If the Commission issues a new license for the project, with the original license conditions, we calculate the present value of the project's power would be \$40.80 million over the license term. If we levelize the present value, the annual value of the project's power is about \$4.51 million.

Semiannually, SCE pays the federal government 0.3 mills/kWh generated at Kaweah No. 3. Using this cost and the operation and maintenance costs we estimated, we calculate the present value benefit of the project is \$33.53 million. The levelized annual benefit of the Kaweah Project--without project enhancements--is \$3.71 million.

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Instream Flow Enhancements

In our Water Resource Planning and Comprehensive Development section, we show how SCE's, CDFG's, and FWS's proposals to enhance flows reduce the project's generation.

As we've said, any instream flows the Commission requires in a new license would reduce the benefits of the project. In Table 2, we show how each instream flow proposal would affect SCE's benefits.

Table 2. A comparison of the effects of no instream flow and of three instream

flow proposals on the economic benefits of the Kaweah Project (Source: the

staff).

Benefits			No instream
flow	SCE	CDFG	FWS

Present value of benefits in millions of

dollars			33.5
	33.1	31.2	29.3
Levelized annual benefits in millions of dollars			3.708
	3.666	3.446	3.245

When compared to the existing project without flow enhancement, SCE's flow proposal would lower project benefits the least; FWS's proposal would lower them the most.

The reduced benefits under each proposal:

1 SCE would reduce the project's benefits by \$43,000 annually or 1.1 percent.

1 CDFG would reduce the project's benefits by \$262,000 annually or 7.0 percent.

1 FWS would reduce the project's benefits by \$463,000 annually or 12.7 percent.

Fish Entrainment Studies and Fish Screens

If the Commission issues a new license for the Kaweah Project, CDFG and FWS recommend SCE install fish screens and fish bypasses at all diversions to avoid potential adverse effects from fish entrainment. SCE estimates the minimum cost to build screens at intakes No. 1 and No. 2 would be about \$375,000 to \$675,000. Using these cost estimates, we find installing screens would reduce the project's benefits by \$58,000 to \$95,000 annually.

Exhibits

The status of parts of the project land has changed from National Forest Land to National Park Land. The Commission has no jurisdiction over National Park Land: exhibits J and K should be revised accordingly. Article 301 of the license requires SCE to revise these exhibits to be labeled now exhibits F and G.

We approve the following drawings of exhibits J, K, and L,
which conform to the Commission's Rules and Regulations, and we make them a part of the license only to the extent

they show the general location, description, and nature of
project works:

Application No.
Showing

FERC No.

Exhibit J-1	298-22	Kaweah Project
General Vicinity		Map
Exhibit J-2	298-23	Kaweah Project
Exhibits K-1 through 14	298-24	
	through 37	Kaweah Project
Exhibit L-1	298-38	Kaweah No. 1 -
Mineral King area		dams
Exhibit L-2	298-39	Kaweah No. 1 -
Intake structures		
Exhibit L-3	298-40	Kaweah No. 1 -
Typical Flume and		sections
Exhibit L-4	298-41	Kaweah No. 1 -
Penstock and		forebay
Exhibit L-5	298-42	Kaweah No. 1 -
Powerhouse		
Exhibit L-6	298-43	Kaweah No. 1 -
Switchyard		
Exhibit L-7	298-44	Kaweah No. 2 -
Diversion dam and		intake
structures		
Exhibit L-8	298-45	Kaweah No. 2 -
Typical flume and		sections
Exhibit L-9	298-46	Kaweah No. 2 -
Typical conduit		and sections
Exhibit L-10	298-47	Kaweah No. 2 -
Inverted siphon		
Exhibit L-11	298-48	Kaweah No. 2 -
Forebay and		penstock
Exhibit L-12	298-49	Kaweah No. 2 -
Powerhouse		
Exhibit L-13	298-50	Kaweah No. 2 -
Switchyard		
[63,278]		
Exhibit L-14	298-51	Kaweah No. 3 -
Typical flume		sections
Exhibit L-15	298-52	Kaweah No. 3 -
Forebay		

Exhibit L-16	298-53	Kaweah No. 3 -
Forebay dam		
Exhibit L-17	298-54	Kaweah No. 3 -
Penstock		
Exhibit L-18	298-55	Kaweah No. 3 -
Powerhouse		

Exhibit L-19 298-56 Kaweah No. 3 -
Switchyard

-- Footnotes --

[63,234]

1

By Act of February 15, 1901, Congress authorized Interior to permit the use of rights-of-way within public lands, including the Sequoia National Park, for facilities associated with, among other things, hydroelectric power generation and distribution (31 Stat. 790, 16 U.S.C. §79).

2

See Fifth Annual Report of the Federal Power Commission, Fiscal Year Ended June 30, 1925, p. 182.

3

Pub. L. No. 95-625, 92 Stat. 3482.

4

See §314(d)(3) of the NPRA, codified in a note to 16 U.S.C. §45a-1.

[63,236]

5

The California Water Plan: projected use and available water supplies to 2010, 1983, California Department of Water Resources; California water: looking to the future, 1987, California Department of Water Resources; Water Quality Control Plan Report, 1975, California State Water Resources Control Board; Recreation needs in California, 1983, California Department of Parks and Recreation.

[63,239]

6

SCE has used the flowline for Kaweah Powerhouse No. 2 for domestic use and fire fighting. SCE estimates these domestic water user needs, including provisions for leakage, evaporation, and head losses, to be at least 4 cfs (letter from E. Martinez, Manager of Hydro Operations, Southern California Edison Company, Rosemead, California, October 21, 1991).

Document Content(s)

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