FINAL
ENVIRONMENTAL ASSESSMENT
FOR HYDROPOWER LICENSE

Lee Vining

FERC Project No. 1388-001

California

Federal Energy Regulatory Commission
Office of Hydropower Licensing
Division of Project Review
825 N. Capitol Street, NE
Washington, D.C. 20426

(December 30, 1992)

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The applicant, Southern California Edison (SCE) proposes to continue operating the existing 10 megawatt Lee Vining Creek Project in California. SCE proposes to operate the project as it has in the past, storing water in reservoirs during the high-runoff spring and summer months and releasing water for power generation in the low-runoff fall and winter months. In the EA, we (the staff) looked at (1) the environmental effects of enhancement measures that we, SCE, and various agencies propose and (2) the economic effects of the measures on the project's 29,000,000 kilowatthours of annual energy generation.

In addition to SCE's proposal, we considered two alternative actions: (1) SCE's proposal with our environmental recommendations; and (2) no action.

In the comprehensive development section of the EA, we studied both environmental resources and the power and economic benefits of the project. After carefully considering these resources and benefits, we recommend that any new license issued for the Lee Vining Creek Project include the following measures: (1) a continuous release of 5 cfs or natural inflow, whichever is less, into Lee Vining Creek below Saddlebag Lake; (2) a continuous minimum flow of 3 cfs or natural inflow, whichever is less, in Glacier Creek below Tioga Lake; (3) a continuous minimum flow of 20 cfs in dry years and 25 cfs in normal and wet years in Lee Vining Creek below Poole powerhouse; (4) three flow gages to monitor instream flows; (5) flow fluctuation limits below Saddlebag Lake; (6) Ellery Lake pool elevation maintenance within two feet of spillway crest from Memorial Day weekend to September 30; (7) Tioga Lake pool elevation maintenance within six feet of spillway crest in low water years and within two feet of spillway crest in normal and high water years from Memorial Day weekend to September 30; (8) burial of a portion of the project phone line; (9) implementation of the project cultural resources management plan, including agency consultation; (10) preparation of an erosion control plan; (11) preparation of a sensitive plants protection plan; and (12) preparation of a revegetation plan.

The cost of these enhancement measures is about $16,200 annually. Overall, our recommended enhancement measures would improve fish habitat, visual quality, and recreation and provide SCE's ratepayers acceptable power benefits from the project.

We don't recommend including several enhancements proposed by various agencies, including (1) minimum instream flows in Lee Vining Creek below Poole powerhouse of either 30 or 35 cfs; (2) fish screens on the project intake in Ellery Lake; (3) energy dissipators in the powerhouse tailrace; (4) any minimum flow requirement in Lee Vining Creek below Ellery Lake; and (5) flushing flows in Lee Vining Creek below

Saddlebag Lake. We found that instream flows of 30 and 35 cfs in Lee Vining Creek below Poole powerhouse would be beneficial to fishery, visual, and recreational resources, but would not be achievable in low water (dry) years or in years on the dry side of normal. The other measures that we did not recommend would not provide any discernible environmental benefit.

Under Section 10(a)(2) of the Federal Power Act (Act), federal and state agencies have filed plans that address various resources in California. No conflicts were found between the project and the 5 relevant resource plans.

Based on our review of the proposed action and the alternatives under section 4(e) and 10(a) of the Act, we recommend the proposed project with our environmental measures. The project would enhance the existing environment, would be beneficial to operate over the term of the new license, and would be best adapted to a comprehensive plan for the Mono Basin.

On the basis of our independent environmental analysis, issuance of an order approving the proposed action with our environmental recommendations would not constitute a major federal action significantly affecting the quality of the human environment.

ENVIRONMENTAL ASSESSMENT

FEDERAL ENERGY REGULATORY COMMISSION
OFFICE OF HYDROPOWER LICENSING, DIVISION OF PROJECT REVIEW

Lee Vining Creek

FERC Project No. 1388-001—California

(December 30, 1992)

I. APPLICATION

On December 1, 1981, Southern California Edison (SCE) filed an application for a new major license for the existing Lee Vining Creek Water Power Project.

SCE would continue to operate the project on Lee Vining Creek in Mono County, near the town of Lee Vining (figure 1). Most of the project occupies lands of the United States (approximately 640 acres) managed by the Forest Service (FS) (figure 2).

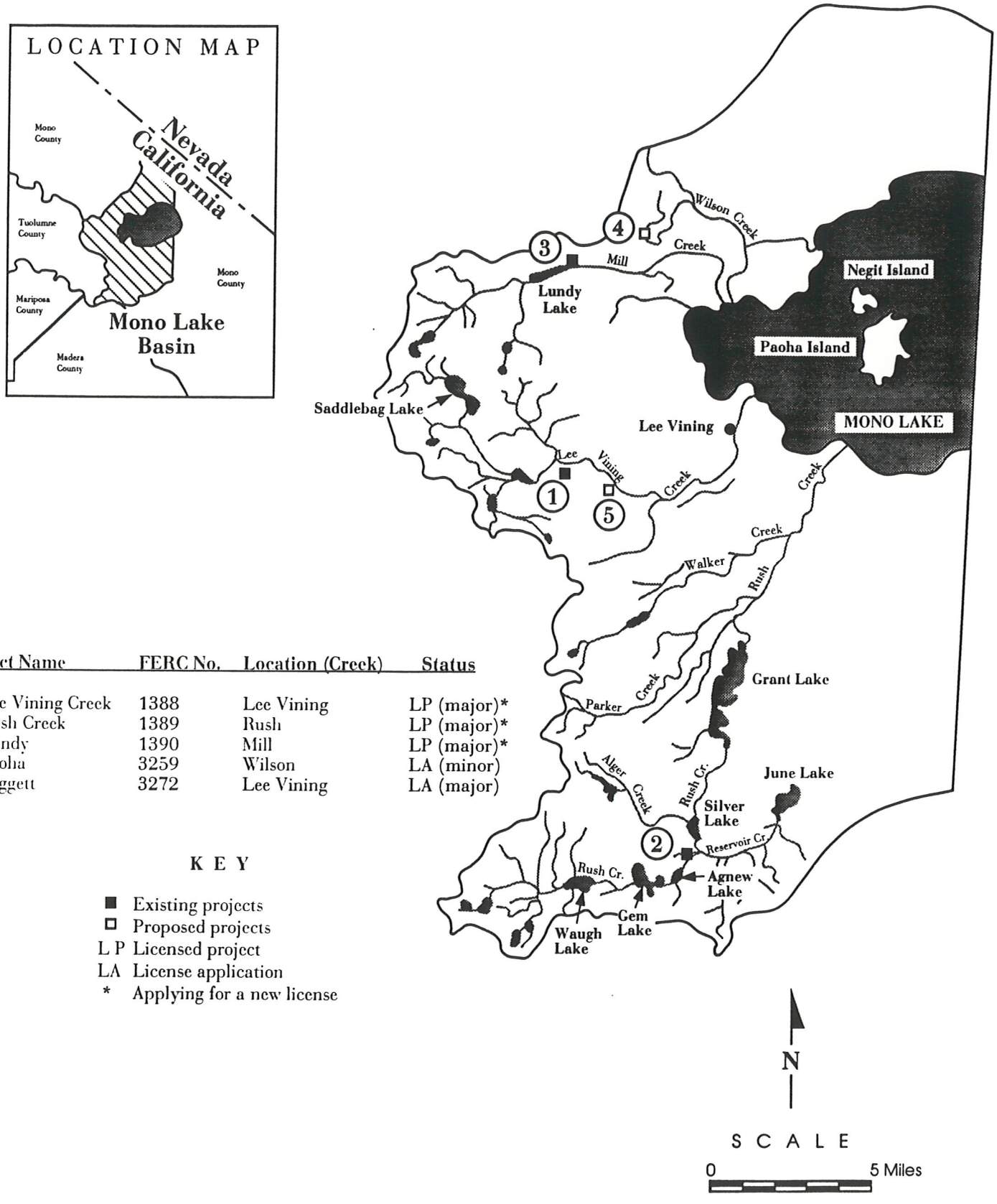
II. PURPOSE AND NEED FOR ACTION

A. Purpose of Action

The Lee Vining Creek Project is an existing, operating, licensed project with a total installed capacity of 10 megawatts (MW). Under SCE's proposal for a minimum flow of 3 cubic feet per second (cfs) below Saddlebag dam, 3 cfs below Tioga dam, and 10 cfs below the project powerhouse (called Poole powerhouse), we estimate the project would continue to produce about 29,000,000 kilowatt hours (kWh) of electrical energy annually, as it has in the past. The project would continue to fill its reservoirs in the high runoff spring and early summer months and slowly draw down the reservoirs in the low runoff autumn and winter months, an operating regime that supports year-round power generation by leveling out the seasonal flow fluctuations that would prevail under natural conditions. SCE would continue to use this renewable energy to meet its own current system load requirements and respond to the California Energy Commission's (CEC's) energy diversity recommendations.

In this Environmental Assessment (EA) we (the Commission staff) analyze the impacts associated with issuing a new license for the project, make a recommendation to the Commission on whether to issue a new license, and recommend terms and conditions to become a part of any license issued.

The Federal Power Act (Act) provides the Commission with the exclusive authority to license nonfederal water power projects on navigable waterways and federal lands. In deciding whether to issue any license, the Commission must determine that the project adopted will be best adapted to a



Project Name	FERC No.	Location (Creek)	Status
1. Lee Vining Creek	1388	Lee Vining	LP (major)*
2. Rush Creek	1389	Rush	LP (major)*
3. Lundy	1390	Mill	LP (major)*
4. Paoha	3259	Wilson	LA (minor)
5. Leggett	3272	Lee Vining	LA (major)

KEY

- ■ Existing projects
- □ Proposed projects
- L P Licensed project
- LA License application
- * Applying for a new license

Figure 1. Locations of proposed and existing hydroelectric projects in the Mono Lake Basin, California (Source: the staff).

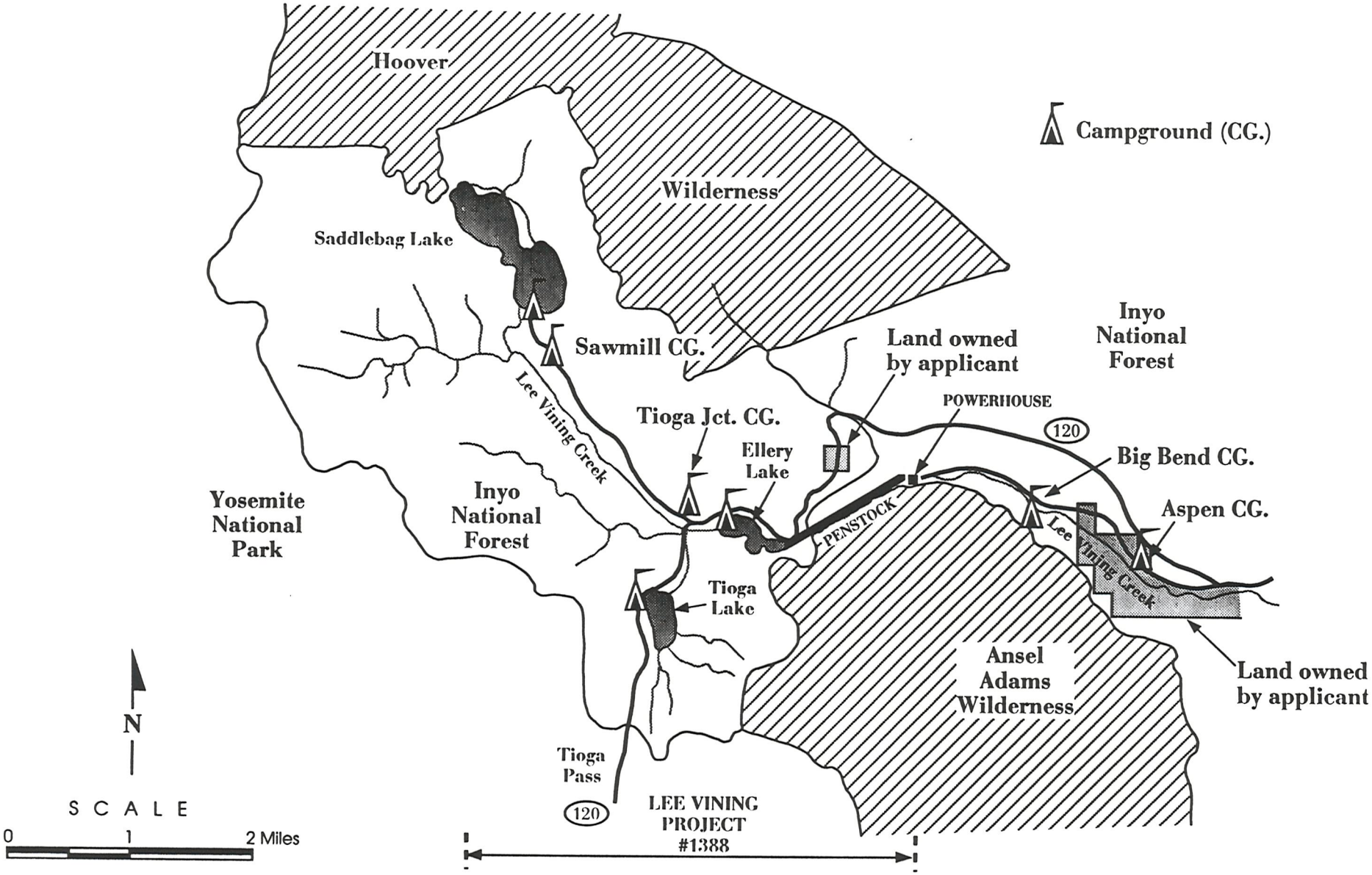


Figure 2. Lee Vining Hydroelectric Project, FERC No. 1388. All project lands except part of the transmission line area are lands of the United States managed by the Forest Service (Source: the staff).

comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued, the Commission must give equal consideration to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife (including related spawning grounds and habitat); the enhancement of recreational opportunities; and the preservation of other aspects of environmental quality.

B. Need for Power

We conclude that SCE has needed the energy and capacity from the project over the past decades, and will need the power in the future. The project's energy and capacity are already included in SCE's adopted resource plan. The 10 MW of dependable power output from the project are useful in supplying a small portion of the utility's current need for power, and provides the SCE system with energy diversity by using a nonfossil energy resource.

To consider the need for power in California, and more specifically in the SCE service territory, we reviewed the CEC's 1991 Biennial Report (California Energy Commission, 1991) and a predecessor document, the 1990 Electricity Report (California Energy Commission, 1990). The Biennial Report (California's Energy Plan) is California's principal energy planning and policy document, and it concludes:

> "The state should require the most cost-effective and efficient operation of its existing electricity generation, transmission, and distribution systems to minimize the economic and environmental impacts of existing facilities and new construction."

The CEC in its 1990 Electricity Report (ER-90) (California Energy Commission, 1990) identifies hydroelectric relicensing projects as one of seven categories of resources that should be completed. ER-90 concludes that hydro project relicensing will remain very competitive from an economic perspective because of the projects' low capital and operating costs relative to competing new projects.

The CEC is also required to assess the integrated need for new resources for each of the major utilities in California. Based upon the CEC's integrated assessment for the SCE service territory, ER-90 concludes:

- Although SCE has sufficient resources to meet expected demand through the 1990's, the utility will reduce future ratepayer costs by adding new resources in the mid to late 90's.

- Additional economic generation will be available by 1999 by repowering three existing SCE oil- and gas-fired boilers.

- Utility-owned geothermal facilities will become the most socially cost-effective resource beginning in the period 2000 through 2004.

- Additional demand side management (DSM) resources may become cost effective once societal costs (residual emissions) are considered in the DSM cost-effectiveness analysis.

Therefore, if this project license application is not approved, the project's dependable energy and capacity would probably be replaced in the short term by SCE's repowered oil/gas-fired combined cycle plants, or alternatively by power purchases from an independent power producer.

Over the long term, SCE would probably consider other replacement alternatives such as geothermal facilities and additional DSM resources.

III. PROPOSED ACTION AND ALTERNATIVES

A. Applicant's Proposal

1. Project Facilities

The Lee Vining Creek Project is located on Lee Vining Creek about 9 miles upstream from Mono Lake and the town of Lee Vining (figure 1).

First put into operation in 1924, the Lee Vining Creek Project consists of: (1) the existing 45-foot-high, 600-foot-long, redwood faced, rockfill Saddlebag dam, impounding 317-acre Saddlebag Lake; (2) the existing 27-foot-high, 270-foot-long, redwood faced, rockfill Tioga dam, impounding 73-acre Tioga Lake; (3) the existing 19-foot-high, 50-foot-long, constant radius concrete arch Tioga auxiliary dam; (4) the existing 17-foot-high, 437-foot-long rockfill Rhinedollar dam, impounding 66-acre Rhinedollar Lake (Ellery Lake); (5) the existing concrete intake structure at Rhinedollar dam; (6) the existing 2,452-foot-long, 48-inch-diameter pipeline; (7) the existing 3,680-foot-long, 42-inch to 28-inch-diameter steel penstock; (8) the existing Poole powerhouse containing one generating unit with a rated capacity of 10,000 kilowatts (kW); (9) the existing 21.7-mile-long, 115-kV transmission line from the Poole powerhouse to the Rush Creek powerhouse; and (10) appurtenant structures. No new construction is proposed by SCE.

Both Saddlebag and Tioga lakes drain into Ellery Lake (figure 2), which is the intake and regulating reservoir for Poole powerhouse. The two upper reservoirs are generally drawn down in the winter to provide storage capacity for spring runoff. Ellery Lake is basically the forebay for the powerhouse and its storage level is not varied as much as the

other two reservoirs. Water is carried from Ellery Lake to the powerhouse via the flowline/penstock.

We studied the project transmission lines to determine which lines should be considered as primary lines within the definition of section 3(11) of the Federal Power Act if a new license is issued for the Lee Vining Creek Project. Our study of the existing transmission system in the vicinity of the project indicates that only the 6.4-mile-long, 115-kV transmission line from Poole powerhouse to the Lee Vining substation should be considered as a primary line for Project No. 1388. The 15.2-mile-long, Lee Vining to Rush Creek 115-kV line, currently licensed as part of Project No. 1388, is performing SCE system functions, and as such is not subject to license within the meaning of section 3(11) of the Act.

Any new license issued for the Lee Vining Creek Project should also include the 6.6-kV line segment that extends from the project generator, through voltage transformation, to the powerhouse bus.

Historically, the project has produced approximately 29.0 million kWh of electrical energy annually with an installed capacity of 10 MW. The dependable capacity of Poole powerhouse is approximately 435 kW based on natural streamflow. The annual plant factor is about 0.315.

2. Proposed Enhancement Measures

SCE would (1) maintain a minimum instream flow below Saddlebag dam of 3 cfs or the natural flow of Lee Vining Creek above Saddlebag Lake, whichever is less; (2) maintain a minimum instream flow below Tioga dam of 3 cfs or the natural flow of Glacier Creek above Tioga Lake, whichever is less; (3) maintain a 10 cfs minimum flow below the confluence of the Poole powerhouse tailrace with Lee Vining Creek; (4) maintain Tioga Lake and Ellery Lake within 2 feet of spillway crest between the Friday before Memorial Day and September 30 in normal and wet years, and maintain Tioga Lake within 6 feet of spillway crest during the same period in dry years; and (5) modify any electric transmission line structures identified as an electrocution hazard for raptors.

3. Federal Land Management Conditions

After the final EA is completed, the FS will provide terms and conditions of occupancy for lands of the Inyo National Forest under section 4(e) of the Federal Power Act. The FS recommendations cited in this EA are preliminary 4(e) conditions provided by the FS in letters to the Commission.

B. Staff's Alternative

We agree with the applicant's proposed enhancement measures except with regard to the proposed minimum flows

below Saddlebag dam and below Poole powerhouse. We recommend that SCE maintain a minimum instream flow in Lee Vining Creek below Saddlebag dam of 5 cfs or the natural inflow, whichever is less, and that SCE maintain a minimum flow below Poole powerhouse of 20 cfs in dry years and 25 cfs in normal and wet years.

We also recommend that SCE (1) install 3 flow gages to monitor compliance with the minimum instream flow recommendations; (2) limit flow fluctuations in Lee Vining Creek below Saddlebag dam; (3) move or bury a portion of the project phone line to enhance visual quality; (4) consult with the SHPO before undertaking activities that could adversely affect cultural resources; (5) prepare an erosion control plan to protect soil resources; (6) prepare a sensitive plants protection plan; and (7) prepare a revegetation plan.

C. Alternative of No Action

No action is defined as the current environmental conditions. The project would continue to operate as required by the original project license. There would be no change to the existing environmental setting.

IV. CONSULTATION AND COMMENTS

A. Agency Consultation

The Commission's regulations require prospective applicants to consult with the appropriate resource agencies before filing an application for license. This consultation is the first step in compliance 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 documented in accordance with the Commission's regulations.

After the Commission accepts the application, formal comments may be submitted by concerned entities during the public notice period. In addition, organizations and individuals may petition to intervene and become a party to any subsequent proceedings. The comments provided by concerned entities are made part of the record and are considered during the review of the proposed project. The following entities commented on the application subsequent to the public notice, which was issued on October 14, 1982.

Commenting entities	Date of letter
Department of Housing and Urban Development	11/04/82
The Resources Agency of California	11/24/82
U.S. Department of the Interior	11/26/82
Forest Service	01/07/83

U.S. Army Corps of Engineers	01/21/83
California Sport Fishing Protection Alliance	03/28/86
California Department of Fish and Game	02/17/88
Forest Service	04/20/88

SCE did not respond to the comments, but initiated negotiations with the FS and Resources Agency of California to reach agreement on protection of resources.

B. Interventions and Protests

The following entities intervened in the licensing process or protested the granting of a new license.

Intervenors	Date of motion to intervene
California Department of Fish and Game	11/24/82
City of Vernon, California	01/07/83

Protests	Date of protest
California Department of Fish and Game	11/24/82
California Sportfishing Protection Alliance	12/20/85

The California Department of Fish and Game (CDFG) intervened in the proceedings, entered a protest, and recommended denial of a new license unless the applicant took steps to change operations that led to past damages to fish and riparian vegetation. CDFG specifically noted insufficient instream flows, excessive fluctuations in the project reservoirs, and the applicant's failure to conduct baseline hydrologic studies. SCE subsequently held joint meetings with CDFG and the FS to discuss the issues.

The City of Vernon filed a motion for conditional rejection of SCE's application and requested additional time to file a competing application. The City of Vernon subsequently agreed to negotiate with SCE for compensation pursuant to Section 10 of the Electric Consumers Protection Act, and withdrew its competing license application. A settlement agreement was signed August 2, 1988.

The California Sportfishing Protection Alliance entered a protest and requested that SCE be required to conduct fish surveys and instream flow studies, release minimum streamflows, submit hydrology records, install fish screens, maintain minimum reservoir pools, develop a sediment control plan, evaluate cumulative effects, protect raptors, mitigate wildlife losses, install flow monitoring devices, and conduct angler surveys.

C. Water Quality Certification

The applicant requested water quality certification pursuant to Section 401 of the Clean Water Act by letter dated November 4, 1981. On October 28, 1982, the California

Regional Water Quality Control Board waived Section 401 water quality certification.

V. ENVIRONMENTAL ANALYSIS

A. General Description of the Locale

1. Mono Lake Basin

The Mono Lake Basin (figure 1) is located almost entirely in Mono County, California. A small portion of the basin is in Mineral County, Nevada. The basin is approximately 340 miles north of Los Angeles, about 90 miles southeast of Lake Tahoe, about 8 miles east of Yosemite National Park, and about 10 miles southwest of the Nevada State line. The basin drains about 700 square miles. Perennial streams in the basin occur along the western side of Mono Lake; the major ones are Wilson, Mill, Lee Vining, Walker, Parker, and Rush Creeks (figure 1).

For more than 100 years, irrigation, hydroelectric developments, and water export have altered the water resource and associated riparian vegetation in the watersheds of Mono Lake. The water diversions have shrunk Mono Lake's size and depth, and the water has become too salty to support the previous large populations of migratory birds. The basin has lost: (1) riparian vegetation; (2) fish and wildlife habitat; (3) recreation opportunities; (4) scenic quality; and (5) natural character.

The natural landforms and closeness of the basin to the Los Angeles and San Diego metropolitan areas make the Mono Lake Basin an important recreation area that is visually appealing to most people visiting the area. The perennial streams are important in sustaining the highly valued recreational trout fishery and related activities.

The recreational opportunities and visual values of the basin form much of the economic base of the local communities. Mining contributes little to the economy, but is locally important in Lee Vining. The communities of June Lake and Lee Vining serve recreationists. June Lake is an important year-round resort community that includes a downhill ski area; Lee Vining's economy is closely tied to spring, summer, and autumn, when nearby Tioga Pass, the eastern entrance to Yosemite National Park, is open.

2. Cumulative Impacts

We examined the potential cumulative impacts of two proposed Mono Lake Basin hydroelectric projects, Leggett and Paoha, in combination with three existing hydroelectric projects, Lee Vining, Lundy, and Rush Creek (figure 1), on five target resources: (1) riparian vegetation; (2) riparian associated wildlife; (3) resident trout in the streams; (4)

visual quality; and (5) recreation. The Commission issued the cumulative environmental assessment (CEA) on October 11, 1990 (Federal Energy Regulatory Commission, 1990). The CEA is hereby incorporated into this document by reference.

The Commission determined that there would be no significant cumulative impacts to the target resources of riparian vegetation, riparian-associated wildlife, resident trout in the streams, visual quality, and recreation in the Mono Basin as a result of relicensing the Lee Vining Creek Project.

B. Proposed Project

1. Geology and Soils

Affected Environment: The Lee Vining Creek project area was formed by glaciers and is characterized by rounded granite outcrops, U-shaped valleys, glacial lakes within normal (glacial till) deposits, and talus slopes. The soils are thin but stable in their current environment, with low erosion potential (Southern California Edison, 1988).

The uppermost reservoir, Saddlebag Lake, lies within a glacially carved U-shaped valley. Steep, 1,200-foot ridges bound the lake on the east and west sides, and talus slopes form most of the rock shoreline. A sparse, thin soil stabilized by grasses has formed along the northern portion of the lake. Saddlebag dam is located in a narrow channel between rock outcrops.

Tioga Lake lies in a valley on glacial till, with a scattering of rounded rock outcrops. Thin soils have developed over the bedrock and till. Tioga dam, comprising a small concrete arch dam and a main dam, lies within an area of the rock outcrops.

Ellery Lake, impounded by Rhinedollar dam, has a rocky shoreline with several areas of talus slopes entering the lake from the steep terrain along the southern margin. No soils have formed in this area. Rhinedollar dam is anchored in rock at the left abutment; the right abutment is within a talus slope.

Environmental Consequences and Recommendations: The chief erosion potential associated with continued project operation is along the unsurfaced transmission line patrol roads. These roads are currently maintained in a primitive state, in accordance with the FS land management plan and SCE's special use permit (personal communication, Rick Murray, District Coordinator/Lands, Forest Service, Lee Vining, California, February 5, 1992). No Commission action is required.

SCE proposes no ground-disturbing activities that would adversely affect soil resources. We recommend enhancement measures, however, including installation of flow gages and burying a portion of the project telephone line, that would involve ground disturbance. To ensure that the associated soil disturbance does not increase erosion, we recommend that SCE prepare, file with the Commission for approval, and implement an erosion control plan. The plan should be based on actual site geological, soil, and groundwater conditions and on project design, and should include, at a minimum, the following: (a) description of the actual site conditions; (b) measures proposed to control erosion and to minimize the quantity of sediment resulting from land disturbance; (c) detailed descriptions, functional design drawings, and specific topographic locations of all control measures; and (d) a specific implementation schedule and details for monitoring and maintenance programs for the land disturbance. SCE should prepare the plan after consultation with the FS.

Unavoidable Adverse Impacts: There would be no unavoidable adverse impacts to the geology and soil resource as a result of project operations with implementation of our recommended measures.

2. Water and Fishery Resources

Affected Environment

a. Lake Operation and Hydrology

Lee Vining Creek originates in the Sierra Nevada at an elevation of 10,600 feet, and flows east into Mono Lake approximately 15 miles downstream (figure 1). The Lee Vining watershed above SCE's Poole powerhouse is approximately 17 square miles, and part of the flow in this region is controlled by releases from Saddlebag, Ellery, and Tioga lakes[1] (table 1). Natural flows in Lee Vining Creek exhibit a seasonal pattern typical of eastern Sierra streams, with high flows generally occurring in May through July, and low flows occurring in late fall and winter (table 2). Flows in reaches below the lakes do not follow the same seasonal pattern because SCE controls part of the flow. There is currently no minimum flow requirement in any of the project-affected reaches.

Saddlebag Lake (figure 3) is the primary storage reservoir, filling during the spring and early summer. Storage normally peaks in late July or August, and releases are increased thereafter to use the water for power generation

[1]Tributaries not controlled by SCE add an unmeasured amount of water to Lee Vining Creek below Saddlebag dam, to Glacier Creek below Tioga dam, and to Lee Vining Creek near Poole powerhouse.

Table 1. Lee Vining Creek Hydroelectric Project reservoir capacities. (Source: Southern California Edison, 1981).

Reservoir	Elevation (feet msl)	Surface Acres (range)	Storage Capacity (acre-feet)
Saddlebag Lake	10,090	317 (205-317)	11,077
Tioga Lake	9,650	73 (38-73)	1,254
Ellery Lake (Rhinedollar Reservoir)	9,497	66 (61-66)	749

Table 2. Historical flow data within the project area (cfs).

	Natural flow	Controlled or partially controlled flows		
	Saddlebag Lake Inflow[1]	Saddlebag Lake Outflow[2]	Glacier Creek below Tioga Lake[3,4]	Lee Vining Creek near Lee Vining[5,6]
October	2.3	9.8	11.0	38
November	2.9	10.8	7.0	32
December	1.9	13.8	1.9	30
January	1.8	13.6	1.2	33
February	2.2	10.4	0.9	30
March	1.1	13.7	0.9	34
April	3.5	11.9	1.9	42
May	27.0	6.0	10.0	123
June	47.0	4.2	23.0	182
July	32.5	5.5	13.0	119
August	13.5	11.5	8.0	59
September	5.7	13.7	7.0	44
Mean	11.8	10.4	7.2	64

[1] Computed mean daily values for 1973-1987 (Southern California Edison, 1988).

[2] Gaged mean monthly values for 1971-1985 (personal communication, Steve Gilfoy, Hydrographer, SCE, Rosemead, California, January 28, 1992).

[3] Gaged mean monthly values for 1971-1985 (letter from C.S. Brooks, Manager of Project Licensing and Planning, SCE, Long Beach, California, May 14, 1987).

[4] Includes outflow from Tioga Lake plus flow from a small tributary just below Tioga dam.

[5] Gaged mean monthly data (USGS Gage No. 10287900) for 1966-1979, about 3 miles below Poole powerhouse.

[6] Includes release through Poole powerhouse, spill that bypasses the powerhouse, and inflow near Poole powerhouse from the Warren Fork drainage.

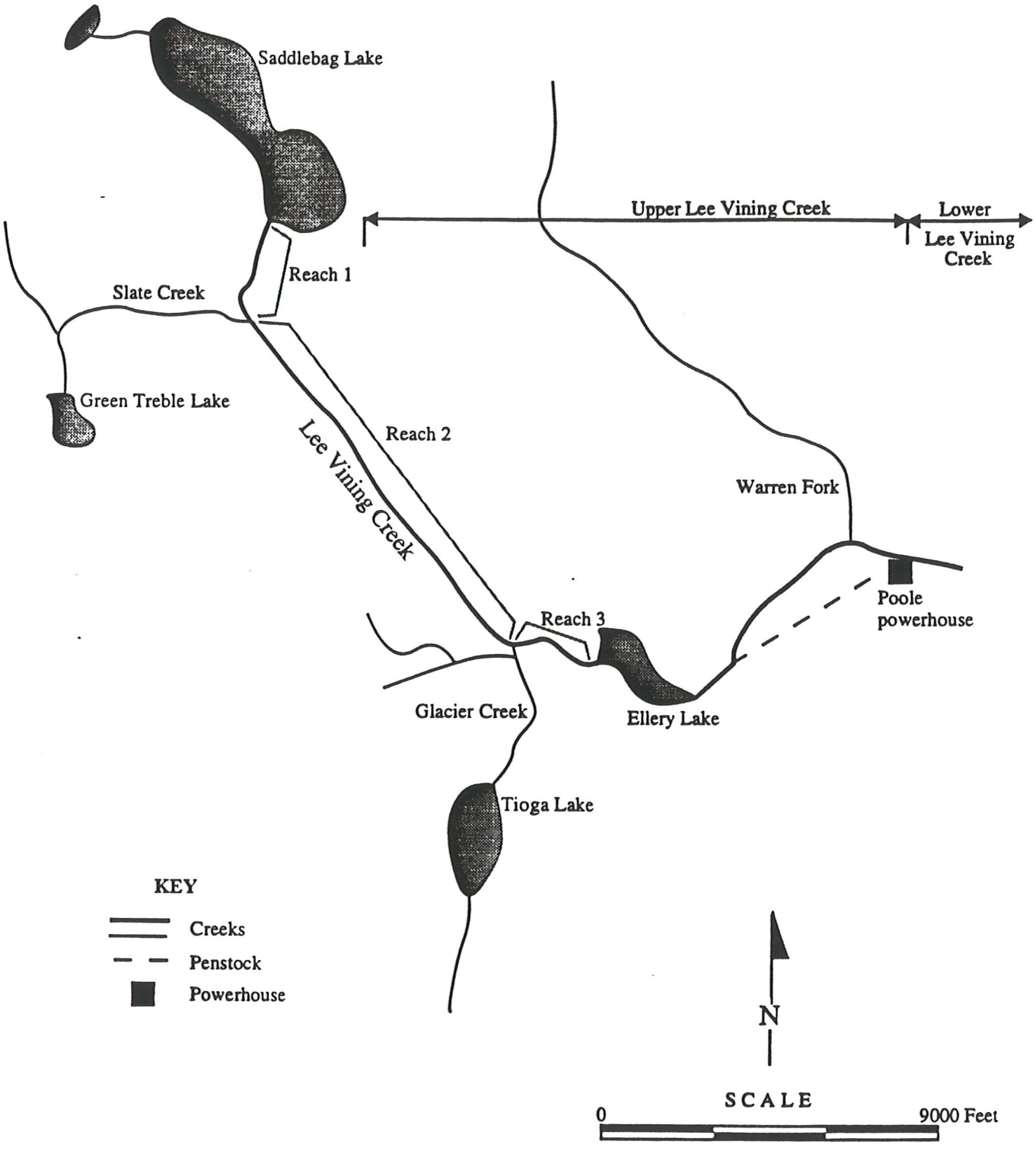


Figure 3. Locations of instream flow studies for the Lee Vining Creek Hydroelectric Project, Mono County, California (Source: the Staff).

in the fall, winter, and early spring. Outflow from Saddlebag Lake is gaged just below the dam (table 2). Lee Vining Creek below Saddlebag dam also receives inflow from Slate Creek (figure 3). Slate Creek is ungaged, but has a drainage area of comparable size to the Saddlebag Lake drainage and contributes inflow equal to or greater than the Saddlebag Lake inflow (table 2) (personal communication, Gary Aubrey, Bishop Hydroelectric Division Manager, Bishop, California, March 10, 1992).

Tioga Lake (figure 3) is also used for storage, filling between April and July and remaining full through the Labor Day holiday. During September through November, stored water in Tioga Lake is released down the stream channel to Ellery Lake. Tioga Lake remains at a minimum pool level during the winter. Outflow from the lake, plus inflow from a small tributary just below the dam, is measured by a gage just downstream of the dam (table 2).

Ellery Lake (figure 3) is used as a regulating reservoir, with the surface elevation maintained at a consistently high level to maximize head for Poole powerhouse. There are no flow releases to the bypass reach downstream of Ellery Lake unless the reservoir is spilling, although the bypass reach receives some accretion from local springs. Flows out of Ellery Lake are measured as flow through the powerhouse and/or by a spill gage below the dam.

Poole powerhouse controls most of the flow in the downstream portion of Lee Vining Creek. Releases from the powerhouse have ranged between 10 cfs and 110 cfs, with any flows above 110 cfs spilling from Ellery Lake and bypassing the powerhouse (Southern California Edison, 1981). Depending on the period of record used, the mean annual flow at the United States Geological Survey (USGS) gage (No.10287900) about 3 miles below Poole powerhouse has been variously reported as 64 or 66 cfs, with a recorded range of zero to 580 cfs. Flows measured at the gage include inflow from the Warren Fork drainage as well as flows through Poole powerhouse and the powerhouse bypass reach.

Much of the flow in the downstream section of Lee Vining Creek is typically diverted into the Los Angeles Department of Water and Power's (LADWP) aqueduct approximately 7 miles downstream of Poole powerhouse. Recent court proceedings have halted these diversions until environmental concerns regarding Mono Lake are resolved.

b. Fishery Resources

Fish resources in the project area include self-sustaining populations of brown and brook trout, and a stocked population of rainbow trout. Catchable rainbow trout are annually planted by CDFG in each of the three upstream lakes and in the creek. In 1980, approximately 35,000 catchable trout were planted in Saddlebag Lake, 20,000 in Tioga Lake, and 14,500 in Ellery Lake (Southern California Edison, 1981). Current annual plantings in Lee Vining Creek are approximately 9,000 and 53,000 catchable trout above and below the

powerhouse, respectively (personal communication, Chris Boone, Fish Hatchery Manager, California Department of Fish and Game, March 18, 1992).

The goal of CDFG for Lee Vining Creek in the project area is to optimize trout habitat, particularly for the adult life stage sought by anglers, and manage the fishery to develop its wild trout component (personal communication, Darryl Wong, Associate Fishery Biologist, California Department of Fish and Game, Bishop, California, March 12, 1992). The portion of Lee Vining Creek below Poole powerhouse is considered a candidate for inclusion in CDFG's Wild Trout Program. The Wild Trout Program establishes special angling regulations and management techniques for streams in recognition of their high productivity, good access, and aesthetic value. Streams included in this program are intended to provide high quality recreational values without the support of catchable trout stocking efforts.

Portions of Lee Vining Creek both above and below the powerhouse support a regionally important recreational fishery. Several camping areas are located in this area, and both the self-sustaining and stocked trout populations receive heavy angler use.

Aquatic habitat in upper Lee Vining Creek has been partitioned into three distinct reaches based on habitat types and channel morphology (figure 3) (EA Engineering, Science, and Technology, 1986).

Reach 1. Saddlebag Lake to confluence with Slate Creek. This reach is 1,258 feet long and is composed principally of moderate gradient riffle of various widths. Approximately 10 percent of the reach is cascade, and about 85 percent is riffle.

Reach 2. Confluence with Slate Creek to confluence with Glacier Creek. This reach consists of two low gradient meadow sections (totalling 7,880 feet) separated by a steeper gradient canyon (2,870 feet).

Reach 3. Glacier Creek confluence to Ellery Lake. This 2,406-foot reach is wide and generally shallow, with a mixture of broad riffle, run, and low-gradient cascade flowing over cobble and gravel.

Aquatic habitat in lower Lee Vining Creek (below Poole powerhouse) is characterized by alternating areas of shallow, flat pools and short sections of increased gradient with cascades and riffles. Substrates are predominately cobble, although sand is common in areas of reduced gradient.

Population studies in 1986 and 1987 in reach 1 estimated an average of 73.9 pounds per acre of brown and brook trout (EA Engineering, Science, and Technology, 1988). Estimates from 1984, 1986, and 1987 averaged 63.9 pounds per acre in reaches 2 and 3 (EA Engineering, Science, and Technology, 1988). Estimates below Poole powerhouse averaged 59.7 pounds of brown trout per acre. These estimates indicate that trout populations in Lee Vining Creek are similar to other eastern Sierra streams (EA Engineering, Science, and Technology, 1988; letter from P. Bontadelli, Director, California Department of Fish and Game, Sacramento, California, April 29, 1988).

No federally or state-listed threatened or endangered aquatic species occur in the immediate project area (letter from Steven Chambers, Office Supervisor, United States Fish and Wildlife Service, Ventura, California, January 22, 1992; California Department of Fish and Game, 1991).

c. Water Use and Quality

There is no major consumptive use of water within the project area. All water rights to in-channel water in Lee Vining Creek are held by SCE (for non-consumptive use) and LADWP (for consumptive use) (personal communication, Chuck Rich, senior engineer, California State Water Resource Control Board, Water Rights Division, November 10, 1992). Downstream of the project, flows diverted into LADWP's aqueduct are stored in Grant Lake for domestic use in southern California. SCE's storage of water for power generation purposes is conditioned by the terms of a power sales agreement between SCE and LADWP. The agreement requires SCE to draw Saddlebag and Tioga lakes down sufficiently by winter's end to maximize storage capacity for spring runoff. The FS and Lee Vining Public Utilities District have additional water rights within the basin for off-channel springs and subsurface flows.

Water quality in upper Lee Vining Creek is believed to be good, since the drainage basin is in a high altitude, sparsely populated area and upstream lakes do not have high levels of nitrates or other contaminants (Southern California Edison, 1981; Lund, 1988). The California State Water Resources Control Board 1991 Inland Surface Water Plan designates six beneficial uses for this section of Lee Vining Creek, including municipal and domestic water supply, water contact recreation, noncontact water recreation, cold freshwater habitat, wildlife habitat, and hydropower. Poor sanitation practices by recreational users may occasionally cause minor degradation of water quality.

Environmental Impacts and Recommendations

a. Minimum Instream Flows

Lee Vining Creek below Saddlebag Lake - To evaluate the effects of various project flow releases on fisheries

resources, SCE used the Instream Incremental Flow Methodology (IFIM) to model the amount of trout habitat available at flows between 3 and 50 cfs in reach 1, and between 3 and 280 cfs in reaches 2 and 3 of upper Lee Vining Creek (EA Engineering, Science, and Technology, 1986). Their analysis focused on the juvenile and adult life stages, in keeping with CDFG's goal to optimize habitat for adult trout. Their results indicate that habitat for brown and brook trout is maximized in reach 1 at flows between 15 and 25 cfs (figure 4), and declines most significantly at flows below 10 cfs. Habitat for brown and brook trout in reaches 2 and 3 is maximized at 20 to 40 cfs, and declines most rapidly below 10 cfs (figures 5 and 6). Under current operating conditions, the mean annual outflow from Saddlebag Lake is 10.4 cfs, and mean monthly flows vary from 4.2 to 13.8 cfs (table 2).

The FS has recommended, and SCE currently proposes, a year-round minimum release of 3 cfs or the natural inflow to Saddlebag Lake, whichever is less, into Lee Vining Creek below Saddlebag Lake (reaches 1, 2, and 3). The 3 cfs is less than the current mean monthly outflow from Saddlebag Lake (table 2), but would maintain a minimum flow on days when SCE might otherwise release a lower flow.

The IFIM study indicates that 3 cfs would result in approximately 50 percent of the maximum weighted usable area (WUA) for trout in reach 1 (figure 4). In reaches 2 and 3, the 3 cfs flow would maintain WUA at approximately 20 to 40 percent of maximum (figures 5 and 6), but would typically be supplemented by flow from Slate Creek (at the top of reach 2) and Glacier Creek (at the top of reach 3). The combined flow of 3 cfs from Saddlebag Lake, inflow from Slate Creek, and inflow from Glacier Creek would equal minimum flows of at least 5 to 10 cfs in reaches 2 and 3, raising WUA to approximately 40 to 70 percent of maximum on low flow days.

CDFG has recommended a minimum release of 5 cfs or the natural inflow to Saddlebag Lake, whichever is less. A flow of 5 cfs, when inflows allow, would raise the percent of maximum WUA to approximately 60 percent in reach 1 (immediately below the dam), and would enhance trout habitat by maintaining the wetted perimeter of the creek and providing adequate pool depth for cover. The combined flow of 5 cfs from Saddlebag Lake, inflow from Slate Creek, and inflow from Glacier Creek would raise WUA in reaches 2 and 3 to approximately 45 to 75 percent of maximum on low flow days.

We conclude that maintaining a minimum release into Lee Vining Creek below Saddlebag dam would enhance the fishery resource of Lee Vining Creek. Our recommendation for minimum release is presented in the Comprehensive Development and Alternatives section. To monitor natural inflows to Saddlebag Lake for determining minimum flows downstream, we recommend installation of a gage on Lee Vining Creek upstream of Saddlebag Lake.

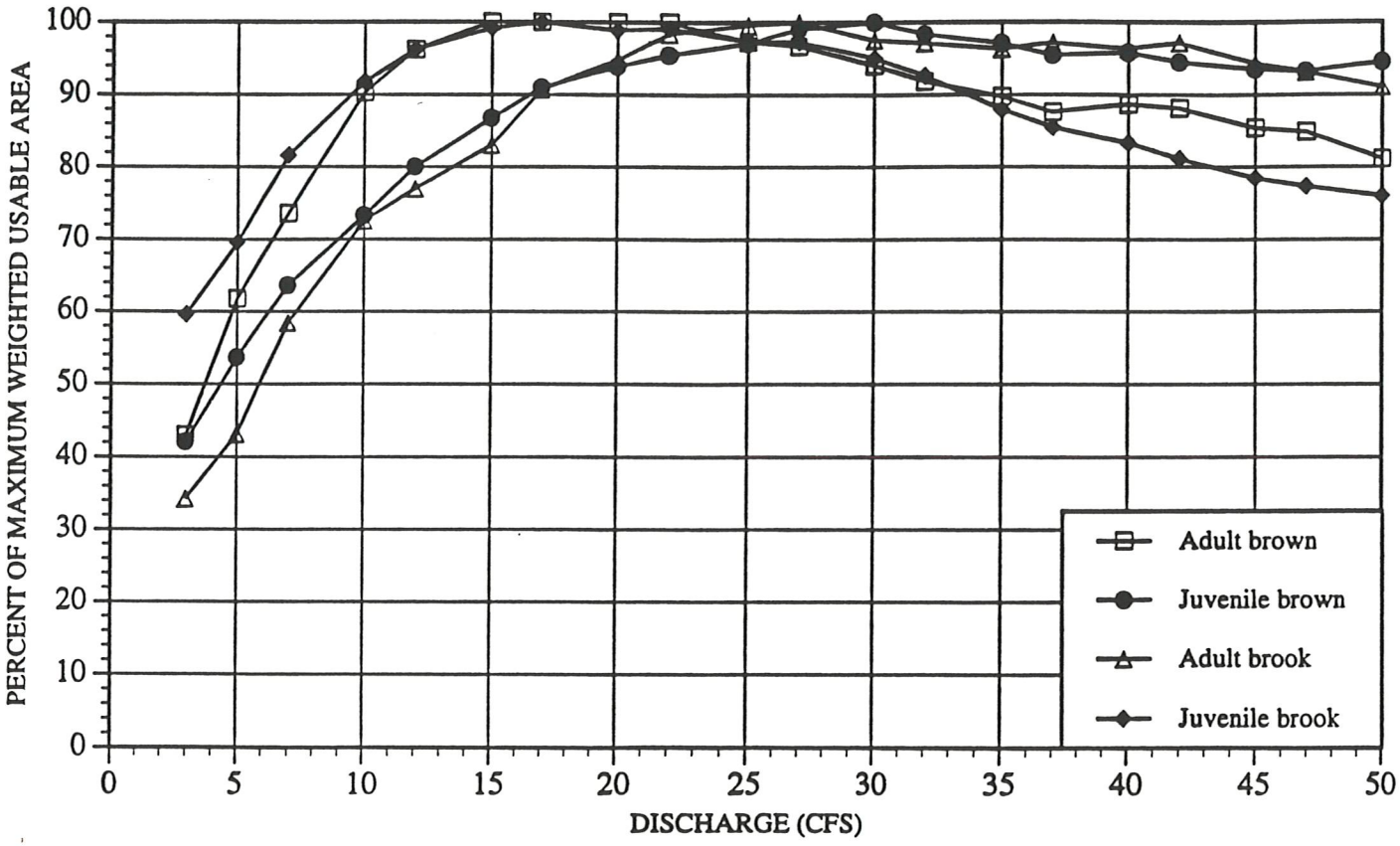


Figure 4. Percent of maximum weighted usable area versus discharge for brown trout and brook trout in Reach 1 of upper Lee Vining Creek (Source: EA Engineering, Science and Technology, 1986).

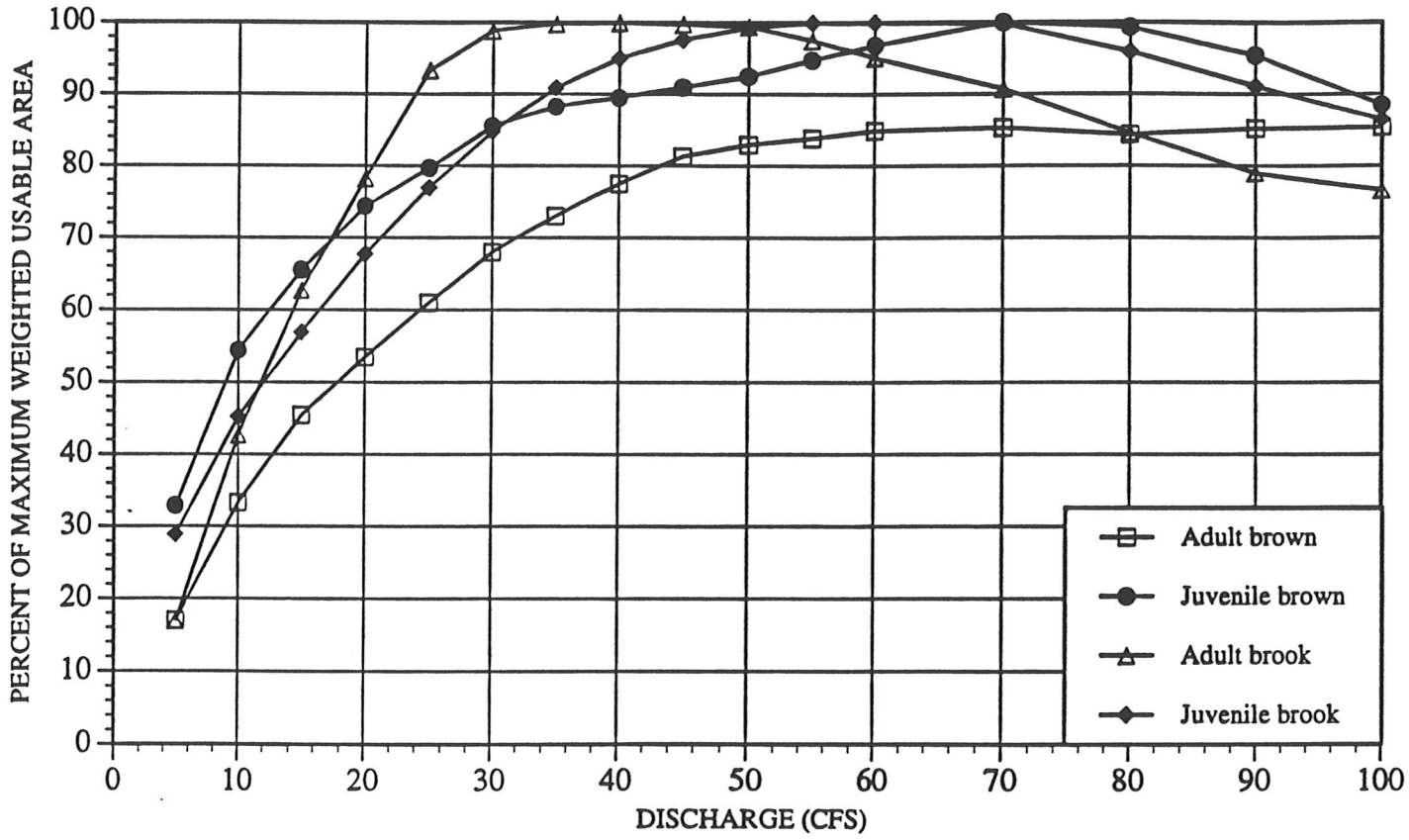


Figure 5. Percent of maximum weighted usable area versus discharge for brown trout and brook trout in Reach 2 of upper Lee Vining Creek (Source: EA Engineering, Science and Technology, 1986).

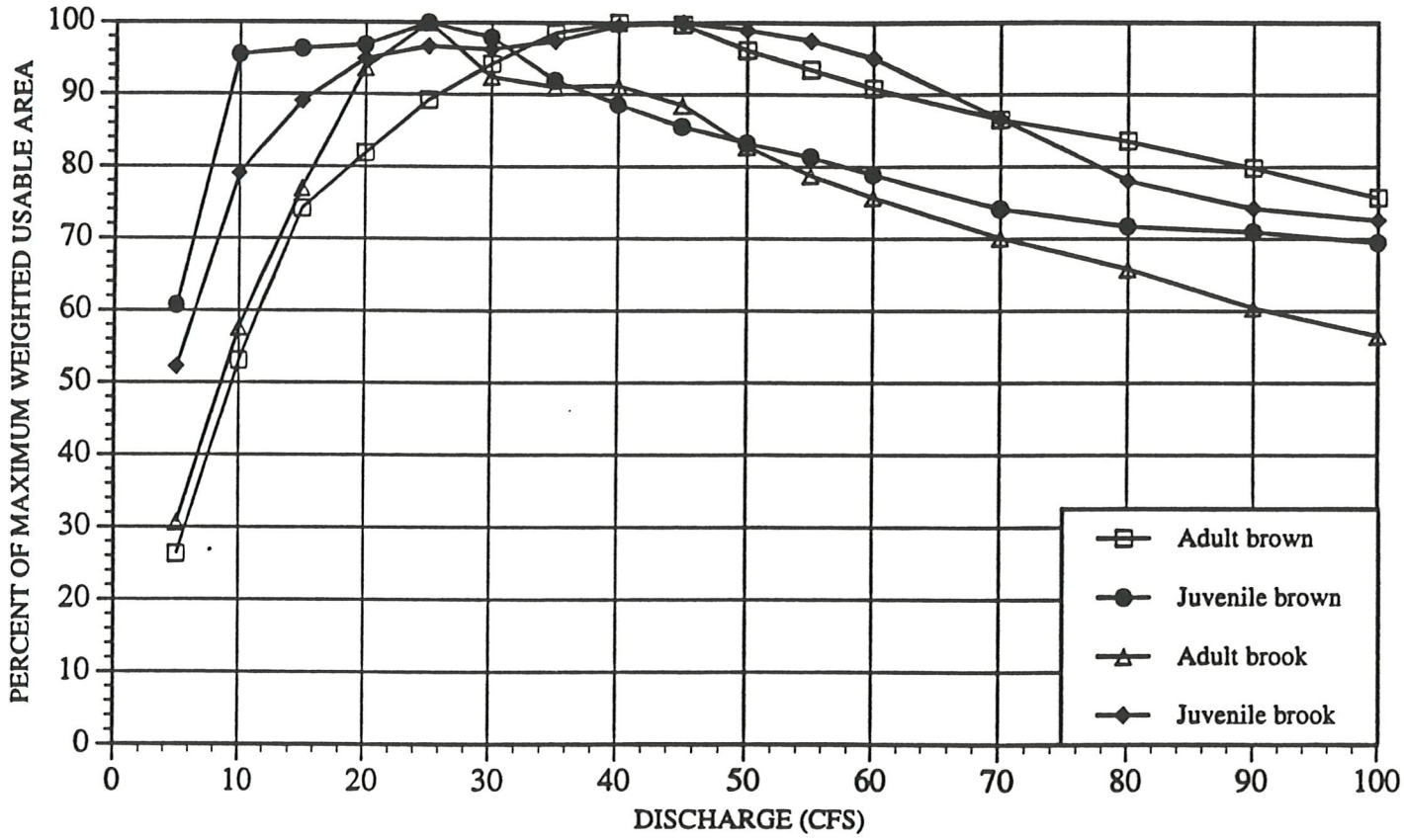


Figure 6. Percent of maximum weighted usable area versus discharge for brown trout and brook trout in Reach 3 of upper Lee Vining Creek (Source: EA Engineering, Science and Technology, 1986).

Glacier Creek below Tioga Lake - The FS and CDFG have recommended, and SCE has agreed to, a minimum flow of 3 cfs or the natural inflow to Tioga Lake, whichever is less, in Glacier Creek below Tioga Lake, as measured at the existing Glacier Creek gage. No instream flow studies have been conducted in Glacier Creek to quantify the relationship between flow and aquatic habitat, and the agencies did not state the reasons for their recommendation. Mean monthly flow data for this creek show that 3 cfs is equal to approximately 42 percent of the mean annual flow (table 2). Tennant (1976) indicates that minimum flows of at least 40 percent of the mean annual flow are a hydrologically-based estimate of conditions required for maintenance of good aquatic habitat from April through September. Tennant's method indicates that a 3 cfs flow would provide excellent aquatic habitat conditions from October through March; however, the lower natural inflow allowed by the FS and CDFG flow recommendation would probably prevail during most of that period.

We concur with the FS, CDFG, and SCE concerning the flow in Glacier Creek, and recommend a minimum flow of 3 cfs or natural inflow, whichever is less, in Glacier Creek below Tioga Lake. Providing this percentage of mean annual flow would maintain the wetted perimeter of the creek, inundate riffle areas sufficiently to maintain invertebrate productivity, and provide adequate pool depth for cover. Our analysis of the hydrological record for Glacier Creek indicates that flows below 3 cfs would be likely to result in significant narrowing of the wetted channel, resulting in loss of cover along the stream edges and reduced pool depth. Flows above 3 cfs would incrementally improve habitat, but the gain in habitat per cfs would decrease. To monitor natural inflows to Tioga Lake for determining minimum flow downstream, we recommend installation of a flow gage on Glacier Creek upstream of Tioga Lake.

Lee Vining Creek below Ellery Lake - The relationship between flow and habitat in Lee Vining Creek between Ellery Lake and Poole powerhouse has not been quantified due to the steepness and short length of the reach. This segment of the creek bypasses the powerhouse, and is joined by the Warren Fork just upstream of the Poole powerhouse tailrace. CDFG has noted that some flow in this segment would be desirable for maintenance and enhancement of the fishery (letter from F. Worthley, Regional Manager, California Department of Fish and Game, Long Beach, California, August 5, 1988). The lowest mean annual flow below Ellery Lake for the period 1968 to 1987 was 0.2 cfs, with all other years being above 0.5 cfs (Southern California Edison, 1988). Almost all of this flow results from springtime spills, although there is some accretion from nearby springs as well. We do not recommend a minimum flow in Lee Vining Creek between Ellery Lake and the Poole powerhouse because aquatic habitat is of limited potential quality due to the steep gradient, and much of any

nominal flow release would be lost to percolation, evaporation, or freezing.

Lee Vining Creek below Poole Powerhouse - CDFG has recommended a year-round continuous minimum flow of 30 cfs in Lee Vining Creek below Poole powerhouse, and the FS has recommended 35 cfs. SCE has responded with a proposal to provide a year-round minimum flow of 10 cfs. The IFIM study conducted for the proposed Leggett project (Groves Energy Company, 1984a) indicates that habitat for juvenile, adult, and spawning brown trout in this reach increases with flow up to approximately 30 to 35 cfs (figure 7). Flows for adult trout are most critical, since this life stage is considered limiting in Lee Vining Creek under current average flow conditions (letter from J. Parnell, Director, California Department of Fish and Game, Sacramento, California, June 14, 1984). Flows below 20 cfs begin to significantly reduce spawning habitat, which may cause spawning to become the limiting life stage at lower flows.

To examine opportunities for enhancing fish habitat in Lee Vining Creek below Poole powerhouse, we looked at the relationship between flow and fish habitat in several ways. First, we looked at how changes in mean monthly flows would affect habitat, and found little room for habitat improvement. Next, we considered the minimum daily flow record to determine the level of habitat enhancement that could be achieved by raising minimum daily flows. We also developed a hydrologic model to test the feasibility of alternative minimum flows. Next, we conducted a habitat duration analysis to more completely describe how habitat could be improved by raising minimum daily flows in dry years as well as in normal-to-wet years. Finally, we conducted a photographic analysis to confirm the habitat features available at various flow levels.

Looking first at mean monthly flows, we found that the existing flow regime (table 2) provides habitat for adult brown trout above 96 percent of maximum WUA (figure 7). SCE proposes to continue operating the project essentially as it has been operated in the past, so that mean monthly flow conditions, already 30 cfs or higher each month, would remain constant under all of the minimum flow alternatives except the FS alternative (35 cfs). At a 35 cfs minimum flow, mean monthly flows would increase slightly in some months.

With little habitat improvement to be gained by altering mean monthly flows, we recognized that enhancement opportunities in lower Lee Vining Creek are tied to raising the flow on the lowest flow days each year. To evaluate the effects of different minimum flow regimes, we computed average minimum monthly flows before and after implementation of each minimum daily flow regime, then calculated the corresponding WUA.

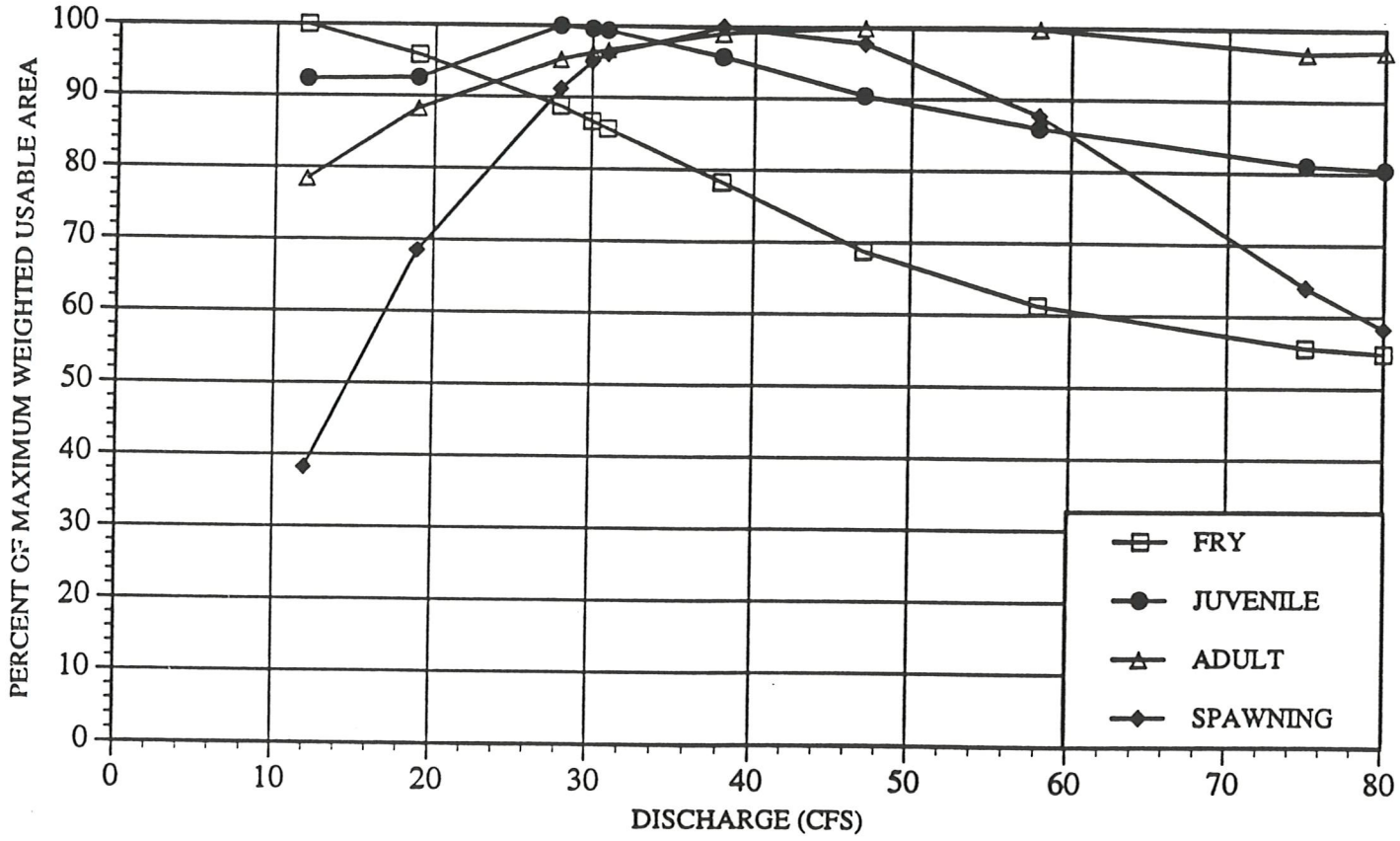


Figure 7. Percent of maximum weighted usable area versus discharge for brown trout for lower Lee Vining Creek below Poole powerhouse (Source: Groves Energy Company, 1984a).

SCE's proposal of a 10 cfs minimum flow would provide 88.3 percent of maximum WUA (table 3). This would result in no change from the existing condition, because minimum daily flows under existing powerhouse operations do not fall below this level (table 3). During the 14-year (5,113-day) period of record we examined (1968-1979), the daily flows at the Lee Vining gage were as low as 10 cfs on only 2 days, or less than one-tenth of one percent of the time.

Minimum daily flows greater than 10 cfs would add incrementally to WUA. A minimum daily flow of 15 cfs would provide 89.1 percent of maximum WUA, while 20 cfs would provide 91.4 percent of maximum WUA. The greatest gain (3.3 percentage points, from 93.0 to 96.3 percent) would occur with the change from 25 to 30 cfs (table 3). An increase in minimum flows from the CDFG-recommended 30 cfs to the FS-recommended 35 cfs would achieve little improvement in WUA (0.3 percentage points, from 96.3 to 96.6 percent).

At our next level of analysis, we developed a hydrologic model of the Lee Vining Creek watershed to evaluate the feasibility of alternative minimum flow releases below Poole powerhouse under historic dry (1976-1978) and normal-to-wet years (1974-1975). Dry years are defined as those with an expected runoff that is 75 percent or less of the average for the Mono Lake Basin, as predicted by the California Resources Agency in their April 1 issue of the "Water Conditions in California" report. Our model results indicate that minimum flows of up to 20 cfs could be maintained through two years of severe drought. Minimum flows of 25, 30, or 35 cfs would drain the reservoirs of active storage volume by April 1, January 30, or January 22, respectively, of the first drought year, and then the instream flow would be reduced to natural inflow.

Our analysis shows that flows of 25 cfs could be maintained in years on the dry end of the normal range, 30 cfs could be maintained in an average year, and flows up to 45 cfs could be maintained in a wet year.

At our next level of evaluation, we conducted a habitat duration analysis using the daily historic data from dry and normal-to-wet years, plus the results of the hydrologic model at minimum flows of 20 to 35 cfs. The habitat duration analysis calculates the percentage of days that a specific habitat level (measured as square feet of WUA per 1,000 feet of stream) is met or exceeded, thereby giving an indication of how common a particular habitat level is under a range of streamflow regimes. In the first year of a drought, a minimum flow of 20 cfs maintains WUA above 24,600 sq. ft./1,000 ft. at all times, in contrast to historic drought conditions where WUA falls below this level approximately 30 percent of the time (figure 8).

Table 3. Percent of maximum WUA for adult brown trout in lower Lee Vining Creek for the existing average minimum daily flow (1966-1979) and alternatives. (Source: the staff.)

	Existing		≥10 cfs (SCE)		≥15 cfs		≥20 cfs		≥25 cfs		≥30 cfs (CDFG)		≥35 cfs (FS)	
Month	Average Minimum Flow (cfs)	Percent of Maximum WUA	Average Minimum Flow (cfs)	Percent of Maximum WUA	Average Minimum Flow (cfs)	Percent of Maximum WUA	Average Minimum Flow (cfs)	Percent of Maximum WUA	Average Minimum Flow (cfs)	Percent of Maximum WUA	Average Minimum Flow (cfs)	Percent of Maximum WUA	Average Minimum Flow (cfs)	Percent of Maximum WUA
Oct.	24	92.2	24	92.2	24	92.2	25	93.0	28	95.3	32	97.0	36	98.4
Nov.	19	88.3	19	88.3	20	89.1	23	91.4	26	93.8	30	96.3	35	98.1
Dec.	21	89.9	21	89.9	22	90.6	23	91.4	26	93.8	30	96.3	35	98.1
Jan.	23	91.4	23	91.4	23	91.4	25	93.0	27	94.5	30	96.3	35	98.1
Feb.	21	89.9	21	89.9	21	89.9	23	91.4	27	94.5	31	96.7	35	98.1
March	21	89.9	21	89.9	22	90.6	23	91.4	25	93.0	30	96.3	35	98.1
April	29	95.8	29	95.8	29	95.8	30	96.3	31	96.7	33	97.4	36	98.4
May	47	100.0	47	100.0	47	100.0	47	100.0	48	100.0	49	100.0	50	100.0
June	99	96.5	99	96.5	99	96.5	100	96.6	100	96.6	101	96.6	101	96.6
July	77	96.8	77	96.8	77	96.8	77	96.8	78	96.9	78	96.9	79	96.9
Aug.	37	98.8	37	98.8	37	98.8	37	98.8	38	99.1	40	99.3	43	99.6
Sep.	28	95.3	28	95.3	29	95.8	29	95.8	31	96.7	34	97.7	38	99.1
Min.:	19	88.3	19	88.3	20	89.1	23	91.4	25	93.0	30	96.3	35	96.6
Change in Percent of Maximum WUA from flow to flow			0		0.8		2.3		1.6		3.3		0.3	
Cumulative change in percent of maximum WUA from flow to flow			0		0.8		3.1		4.7		8.0		8.3	

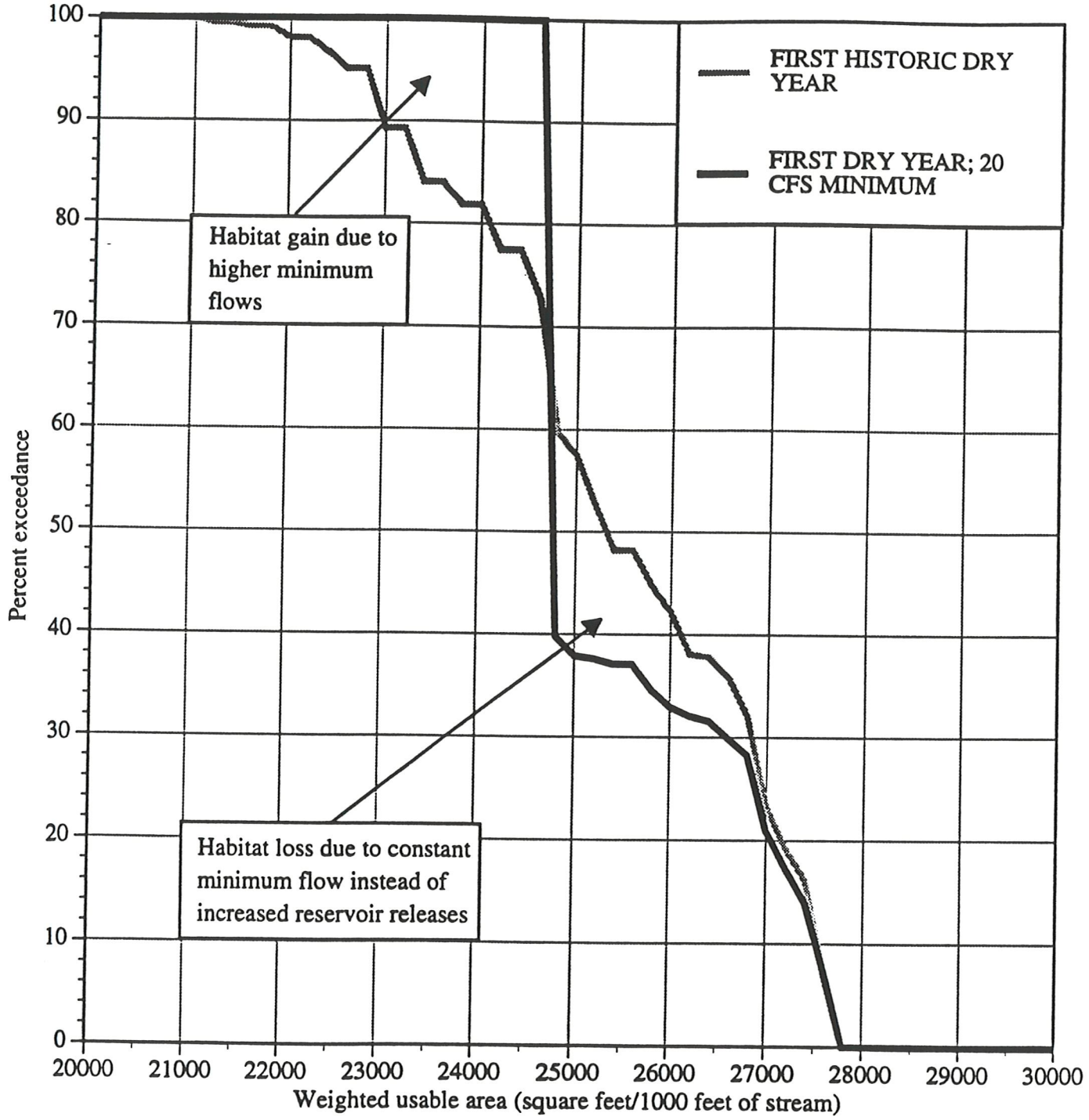


Figure 8. Habitat duration for adult brown trout in Lee Vining Creek below Poole powerhouse in the first year of a drought.

During a second year of drought, a minimum flow of 20 cfs continues to maintain WUA above 24,600 sq. ft./1,000 ft. while historic drought conditions fall below this level over 50 percent of the time (figure 9).

A minimum flow of 25 cfs in normal-to-wet years would provide a minimum WUA of 25,400 sq. ft./1,000 ft., a 15.5 percent gain compared to historic normal-to-wet year conditions. The CDFG-recommended 30 cfs minimum flow would provide a minimum WUA of 26,400 sq. ft./1,000 ft. (a 20 percent gain in minimum WUA), while the FS-recommended 35 cfs minimum flow would provide a minimum 26,600 sq. ft./1,000 ft. WUA (a 21 percent gain).

Finally, we reviewed the results of a photographic analysis of Lee Vining Creek below Poole Powerhouse (Groves Energy Company, 1984b) to assess the fish habitat quality at each of three flow ranges (9-12, 28, and 35 cfs). Flows in the 9-12 cfs range resulted in significant narrowing of the wetted channel, exposure of riffles and gravel bars, and reduction of undercut bank and overhanging vegetation microhabitats. Flows of approximately 28 cfs and above covered most gravel bars, wetted most of the stream channel, and generally provided aquatic habitat for fish and invertebrates from bank to bank.

We conclude, based on our analysis of maximum WUA, our habitat duration analysis, and the photographic analysis that initiation of minimum daily instream flows in Lee Vining Creek below Poole powerhouse would enhance the fishery resource of Lee Vining Creek. Our recommendation for minimum daily flows in this reach is presented in the Comprehensive Development and Recommended Alternatives section. To monitor flows in Lee Vining Creek below Poole powerhouse, we recommend installation of a gage downstream of the confluence of the powerhouse tailrace and Lee Vining Creek.

b. Flushing Flows

Lee Vining Creek below Saddlebag Lake has been a regulated stream since construction of Saddlebag dam in 1924. Maximum flows during the spring runoff are typically captured to provide water for power generation at other times of the year, and the highest mean monthly flows can occur in any month (table 2). CDFG has recommended that flushing flows be provided in this section of Lee Vining Creek (letter from J.W. Burns, Assistant Secretary for Resources, California Department of Fish and Game, Sacramento, California, November 24, 1982). Flushing flows remove fine sediments from the stream channel and loosen compacted spawning gravels, thus improving conditions for spawning.

We do not believe that artificial flushing flows are needed below Saddlebag Lake because 1) there is no major deposition of fine sediment in Lee Vining Creek below the lake

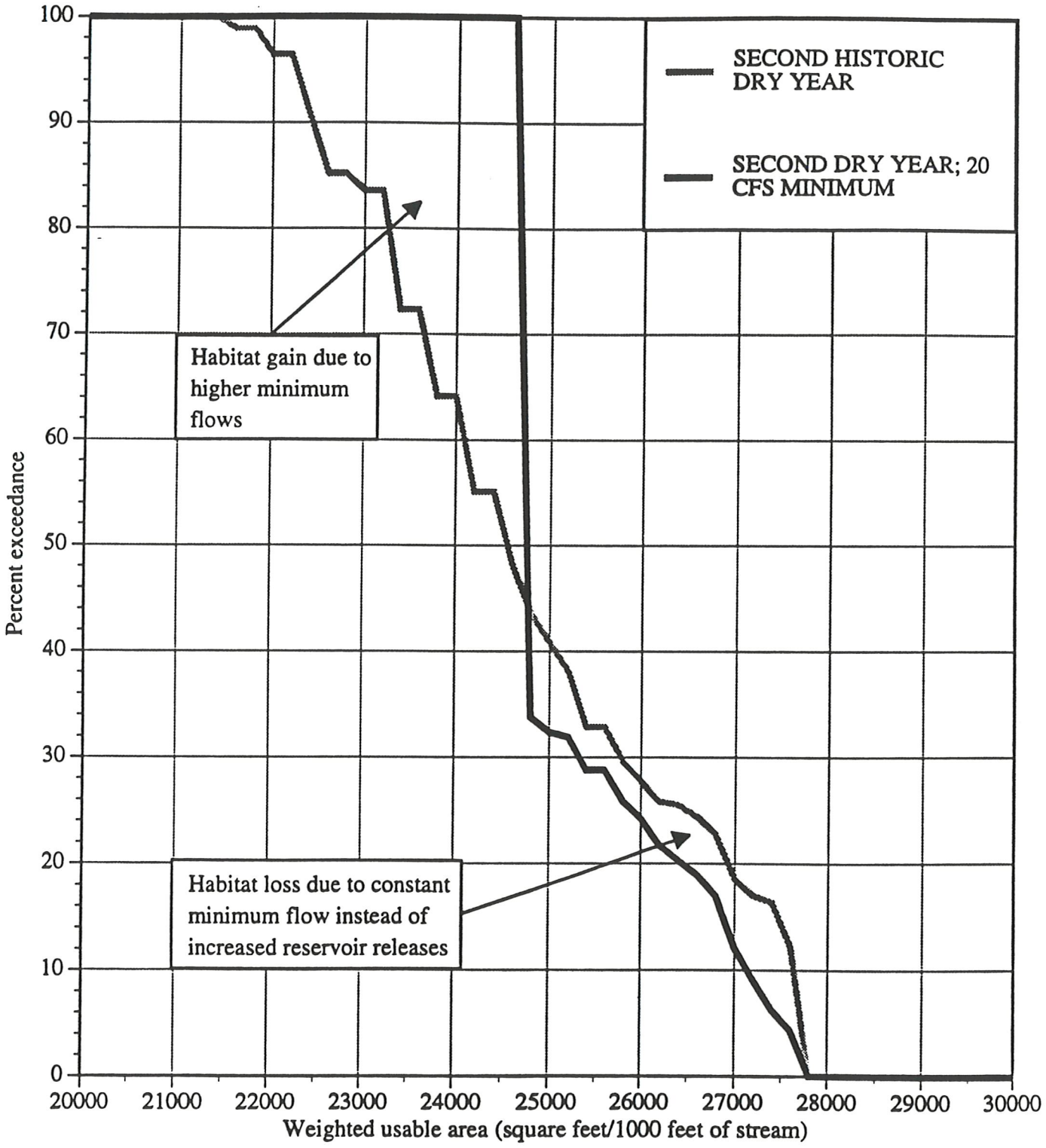


Figure 9. Habitat duration for adult brown trout in Lee Vining Creek below Poole powerhouse in the second year of a drought.

(Southern California Edison, 1988); 2) spawning gravels are not embedded; and 3) spring runoff from Slate Creek downstream of Saddlebag Lake provides a natural flushing flow for most of the reach.

c. Flow Fluctuation

Flows in Lee Vining Creek below Saddlebag Lake can be varied daily in response to power generation requirements. Although mean monthly flows during the brown trout spawning and incubation season of October through April range from 10 to 14 cfs (table 2), flows as high as 50 cfs may be released for several days (EA Engineering, Science, and Technology, 1986). Flow fluctuations during this period can be detrimental to brown and brook trout production by causing the eggs to dry out or freeze during low flows, or by scouring gravels containing redds (nests) during high flows. Loss of natural production in this stream section can result in lower recruitment of the brown and brook trout, which are an important component of the recreational fishery.

Spawning and incubation conditions in Lee Vining Creek below Saddlebag Lake can be enhanced by limiting flow fluctuations between October and April. CDFG has recommended that flows not be varied by more than ± 10 percent between October 15 and April 1 (letter from P. Bontadelli, Director, California Department of Fish and Game, Sacramento, California, June 7, 1988), which would require maintaining flows within about 1.0 to 1.4 cfs of current mean monthly flows. SCE has responded that this level of control is not operationally feasible due to natural storm events and emergency dam releases (Southern California Edison, 1988).

To help stabilize the flow regime and thereby reduce flow fluctuations that cause loss of incubating trout eggs due to scouring, drying out, or freezing, we recommend that daily flow releases from Saddlebag Lake during the brown trout and brook trout spawning and incubation season (between October 15 and April 1) not vary by more than ±10 cfs from the average daily flow in early October (between October 1 and October 14), subject to other minimum flow requirements. This level of fluctuation would be within SCE's operational control range, and would enhance brown and brook trout production by reducing changes in water depths and velocities in reach 1 that cause the loss of incubating trout eggs.

d. Entrainment

The Lee Vining Project has an unscreened intake structure on Ellery Lake. Unscreened intakes are a potential source of mortality for adult trout, since studies on eastern Sierra reservoirs indicate that most adult trout placed in the intakes were killed or severely injured by passage through the turbine (Southern California Edison, 1988). CDFG has recommended that the intake be screened (letter from P.

Bontadelli, Director, California Department of Fish and Game, Sacramento, California, June 7, 1988).

Studies of entrainment on other eastern Sierra lakes and elsewhere indicate that fish placed immediately in front of unscreened intakes are not always entrained (Southern California Edison, 1988; Page, et al., 1977; Bell, 1986), indicating that use of unscreened intakes does not necessarily lead to significant fish losses through involuntary suction into the flowline. Entrainment potential is greater at intakes with high approach velocities. The Poole powerhouse intake is located near the bottom of the reservoir, and has an approach velocity of approximately 0.5 feet per second. This velocity is significantly below the swimming speeds of both juvenile and adult trout (Bell, 1986), so involuntary entrainment into the intake is not expected to be a significant source of mortality at Ellery Lake.

Emigration of non-migratory trout from reservoirs, and the associated entrainment, generally increases when the habitat is overpopulated or environmental conditions deteriorate (EA Engineering, Science and Technology, 1987). Since Ellery Lake is not typically drawn down to a low elevation, we do not expect overcrowding or other environmental conditions (such as low dissolved oxygen or freezing) to initiate emigration of trout from the lake into the powerhouse intake. Therefore, we do not recommend installation of a fish screen on the Ellery Lake intake.

e. Energy Dissipators

CDFG has recommended installation of energy dissipators in the Poole powerhouse tailrace to eliminate the potential for bank erosion and sediment entry into Lee Vining Creek (letter from J. Burns, Assistant Secretary for Resources, California Department of Fish and Game, Sacramento, California, November 24, 1982). We do not believe such a device is necessary, since the large cobble substrates in the vicinity of the confluence of Lee Vining Creek and the tailrace are stable and preclude significant bank erosion and subsequent sediment entry into the creek.

Unavoidable Adverse Impacts: There would be no unavoidable adverse impacts to water and fishery resources as a result of project operation with implementation of our recommended measures.

3. Terrestrial Resources

Affected Environment: The plant community surrounding Saddlebag Lake consists primarily of lodgepole pine and mixed coniferous forest with isolated patches of willow, ceanothus, grasses, currant, and red mountain heather. From Saddlebag Lake, Lee Vining Creek flows southeast through a riparian

forest community consisting of aspen, willow, Jeffrey pine, and white fir (Southern California Edison, 1981).

Tioga Lake is bordered by montane meadow (Dana Meadows) and scattered lodgepole pine and mixed coniferous forest community situated on sloping granitic mountains. Glacier Creek passes through alpine meadow habitat characterized by grasses, sedges, and other herbs or shrubs before joining with Lee Vining Creek (personal communication, Rick Murray, District Coordinator/Lands, Forest Service, Lee Vining, California, January 31, 1992).

Below the confluence of Glacier Creek, Lee Vining Creek flows east through riparian forest to Ellery Lake. The plant communities surrounding Ellery Lake consist of scattered lodgepole pine and mixed coniferous forest.

Below Ellery Lake, Lee Vining Creek flows are diverted into the penstock that parallels the creek for approximately 0.25 mile before extending down a steep mountainside to Poole powerhouse. The vegetation along the penstock route consists primarily of lodgepole pine, aspen, white fir, Jeffrey pine, willow, mountain mahogany, ceanothus, and current (Southern California Edison, 1981).

Below Poole powerhouse Lee Vining Creek supports a well-developed riparian community consisting of cottonwood, aspen, and willow, interspersed with occasional Jeffrey pine. The riparian community is bordered by mixed coniferous forest.

The 6.4-mile-long transmission line between Poole powerhouse and the Lee Vining substation traverses aspen-dominated riparian woodland, yellow pine forest, montane meadow communities, and pinyon juniper woodland.

Ten sensitive plant species may occur in the project area, including the Masonic mountain jewelflower, Utah monkeyflower, Tahoe draba, Mono milkvetch, Tiehm's rock cress, Bodie Hills draba, Nodding buckwheat, Mono Lake lupine, Snow willow, and Mono buckwheat (California Department of Fish and Game, 1991; personal communication, Brian Miller, Botanist, Forest Service, Bishop, California, January 21, 1992). The species are considered sensitive because of their California Native Plant Society (CNPS) or state or federal listing status (table 4).

Environmental Impacts and Recommendations

a. Riparian Vegetation

In the section on Water and Fishery Resources, we recommend that SCE provide minimum instream flows below Saddlebag and Tioga lakes and below Poole powerhouse. The recommended minimum flows would enhance riparian vegetation during low-flow periods, because studies show strong

Table 4. Sensitive plant species that may occur within the Lee Vining Creek project area. (Source: Adapted from California Department of Fish and Game, 1991).

		Status					
		California Native Plant Society (CNPS)		California State Listing	Federal Listing		
Common Name	Scientific Name	List 1B	List 2	CR	C1	C2	C3c
Masonic Mountain jewelflower	Streptanthus oliganthus	✓				✓	
Utah monkey-flower	Mimulus glabratus spp. utahensis		✓				
Mono milkvetch	Astragalus monoensis	✓		✓	✓		
Tahoe draba	Draba asterophora var. asterophora	✓					✓
Tiehm's rock cress	Arabis tiehmii	✓				✓	
Bodie Hills draba	Draba quadricostata	✓					
Nodding buckwheat	Eriogonum nutans var. nutans	✓			✓		
Mono Lake lupine	Lupinus duranii	✓				✓	
Snow willow	Salix reticulata spp. nivalis		✓				
Mono Buckwheat	Eriogonum ampullaceum	✓				✓	

Legend:

CNPS List 1B: Rare, threatened or endangered in California and elsewhere.
CNPS List 2: Rare, threatened, or endangered in California, but more common elsewhere.
CR: State listed, rare.
C1: Enough data are on file to support the federal listing.
C2: Threat and/or distribution data are insufficient to support federal listing.
C3c: Too widespread and/or not threatened.

correlations between instream flow rates and riparian corridor width, community structure, and vigor (Taylor, 1982; Jones and Stokes, 1985; Nachlinger, et al., 1988; Stine, 1991; Vorester and Kondolf, 1988). Reduced flow rates can adversely affect community structure by decreasing regeneration potential, recruitment, and establishment of juvenile plants (Smith, et al., 1988; Johnson, et al., 1976). Establishment of our recommended minimum instream flows would initiate beneficial changes in the stand structure, species composition, and other characteristics of the riparian vegetation.

b. Revegetation

In the Water and Fishery Resources section we recommend installing flow gages to monitor minimum flows, and in the Visual Resources section we recommend moving a portion of the project telephone lines. Both actions would require some ground disturbance, and we recommend that the disturbed areas be revegetated. This would speed the restoration of vegetative cover in the area and minimize soil erosion. Before beginning any land-disturbing activities, SCE should prepare a plan for revegetating disturbed areas, including a monitoring program for evaluating the success of the revegetation and contingency plans if the revegetation effort fails.

The plan should describe the location of the areas to be revegetated and at a minimum should include: (a) a description of the plant species used and planting densities; (b) the use of locally-collected and/or native plant species; (c) a description of local native plant sources, including donor sites and propagation methods and/or native plant nurseries; (d) fertilization and irrigation requirements; (e) a monitoring program to evaluate the effectiveness of the plantings; (f) provisions for filing monitoring reports with the Commission; (g) a description of procedures to be followed if monitoring reveals that the revegetation is not successful; and (h) an implementation schedule that provides for revegetation as soon as practicable after the beginning of land-clearing and land-disturbing activities. SCE should prepare the plan after consultation with the U.S. Fish and Wildlife Service (FWS), CDFG, and FS.

c. Sensitive Plants

SCE proposes no ground-disturbing activities that would adversely affect sensitive plant species in the project area. Our recommended enhancement measures, however, including installation of flow gages and moving a portion of the project telephone lines, would involve ground disturbance. SCE should conduct reconnaissance surveys to determine if sensitive plant species grow in areas where SCE would implement these measures. If surveys indicate the presence of sensitive plant species, SCE should prepare a plan, prior to construction

activities, to avoid disturbance. The plan should include: (a) results of the botanical surveys; (b) a description of measures to protect any sensitive plants; and (c) an implementation schedule for the protection measures. SCE should prepare the plan after consultation with the FWS, CDFG, and FS.

Unavoidable Adverse Impacts: There would be no unavoidable adverse impacts to terrestrial resources as a result of continued project operation with implementation of our recommended measures.

4. Wildlife Resources

Affected Environment: The project area includes a wide variety of habitat types, primarily alpine and subalpine lodgepole forest and willow/aspen riparian forest. Characteristic bird species include Clark's nutcracker, western wood pewee, Steller's jay, mountain chickadee, pine grosbeak and green-tailed towhee. Characteristic mammals include mule deer, coyote, gray fox, mountain beaver, snowshoe hare, and long-tailed meadow vole.

Habitat types that are particularly sensitive are riparian forest and meadows. About 75 percent of local wildlife species require riparian habitat at some phase of their life cycle. Riparian-dependent species include mule deer, small mammals, warblers, flycatchers, raptors, and amphibians. Meadows are important summer forage and fawning areas for mule deer (Forest Service, 1988), and support willow thickets for species such as the willow flycatcher (letter from David Gaines, Lee Vining, California, October 15, 1984).

Mule deer are valued as a hunting and viewing resource, and depend on riparian habitat for summer range, fawning, and as a migration corridor. Each year, thousands of deer migrate through Mono Basin between the Owens Valley and Sierra Nevada crest. Three herds, Casa Diablo, Mono Basin, and East Walker, use the region. Many deer summer and fawn along Lee Vining Canyon (Federal Energy Regulatory Commission, 1990).

Sensitive animal species that occur in or near the project area include one bird species (northern goshawk) and several mammals (Pacific fisher, pine marten, wolverine, and Sierra Nevada red fox) (Forest Service, 1988).

Northern goshawks occupy mature and old-growth stands of forest such as red fir and lodgepole. Two active goshawk breeding territories are located along Lee Vining Creek, one of which is about 2 miles downstream of Poole powerhouse (Federal Energy Regulatory Commission, 1990).

Both fisher and marten are designated indicator species[2] by the Inyo National Forest. The fisher is also designated as a California Species of Special Concern by the CDFG. Both these carnivores are characteristic of mixed evergreen and red fir forests, where they eat squirrels, chipmunks, mice, rabbits, and other small mammals. Both use cavities in large snags or stumps for cover, and prefer dense forests with more than 40 percent crown closure (Zeiner et al., 1990).

We discuss the wolverine and Sierra Nevada red fox in Section 6 under Threatened and Endangered Species.

Environmental Impacts and Recommendations: In the section on Water and Fishery Resources, we recommend minimum instream flow releases to support fisheries in Lee Vining and Glacier creeks. Additional flows would support the quality of riparian habitat that is desirable for wildlife species, including those sensitive species discussed above. The riparian zone would also produce prey for species that live in the vicinity, and that require a productive riparian area nearby. The value of the Lee Vining project area as habitat for northern goshawk, Pacific fisher, and pine marten would probably stay at its present level, or may improve in areas where additional flows enhance riparian vegetation.

Unavoidable Adverse Impacts: There would be no unavoidable adverse impacts to wildlife resources as a result of continued project operation with our recommended measures.

5. Threatened and Endangered Species

Affected Environment: According to the USFWS (letter from S.E. Chambers, Office Supervisor, U.S. Fish and Wildlife Service, Ventura, California, January 22, 1992), the only federally listed species that may occur in the project area is the bald eagle. State-listed threatened species that may occur in the project vicinity include the willow flycatcher, wolverine, and Sierra Nevada red fox (California Department of Fish and Game, 1991).

Bald eagles have been noted foraging below Poole powerhouse in the project vicinity, and feed occasionally in the reservoirs and larger stretches of the creek. Bald eagles are largely present during winter months, and are not particularly disturbed by human activity during this period.

The willow flycatcher was formerly a common summer resident in California, breeding in riparian willow thickets

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[2]Management Indicator Species (MIS) designated by the FS include key harvest species, threatened and endangered species, and species that are characteristic of wildlife habitat types most likely to be affected by forest management activities.

(Grinnell and Miller, 1944). The flycatcher population has declined drastically in the last 30 to 40 years and has been eliminated from much of its former range (Federal Energy Regulatory Commission, 1990). Loss of willow riparian habitat is one of the primary reasons for decline.

The wolverine is a large carnivore, of similar habits and habitat to the fisher and marten except that wolverines generally occur at higher elevations and in more open-canopied forests (Verner and Boss, 1980). The current distribution is poorly known but there are records of wolverine occupying the head of Lee Vining Canyon. Surveys of wolverine distribution in the Inyo National Forest are underway (personal communication, Ed Rodriguez, Biologist, Forest Service, Lee Vining, California, January 6, 1992).

The Sierra Nevada red fox is listed as a sensitive species by the FS, and is listed as threatened by the State of California. There have been sightings in the June Lake area, and the habitat is similar in parts of Lee Vining Canyon (California Department of Fish and Game, 1991).

Environmental Impacts and Recommendations: Bald eagles require perches in the vicinity of water, and frequently perch on transmission line towers. Occasionally, a bald eagle may be electrocuted by simultaneously contacting both wires of a transmission tower, or contacting both a live wire and ground. Raptor-proof designs are available to reduce this source of mortality.

The CDFG has recommended that SCE incorporate raptor-proof designs in the project transmission towers (letter from Pete Bontadelli, Director, California Department of Fish and Game, Sacramento, California, June 7, 1988). SCE has proposed to use raptor-proof designs to modify transmission towers only where electrocution problems are identified (Southern California Edison, 1988).

We believe SCE's proposal is adequate to protect bald eagles because raptor electrocution generally occurs only on powerlines of 69 kV or less, where the distance between lines is less than 60 inches. Larger power lines, such as the project's 115 kV lines, are too far apart to constitute an electrocution hazard (personal communication, Richard R. Olendorff, Biologist, Bureau of Land Management, Boise, Idaho, January 30, 1992). Therefore, the project lines are already consistent with the raptor-proof design recommended by CDFG. We do not expect operation of the existing project to affect bald eagles.

Willow flycatchers would be benefitted insofar as additional instream flow supports additional willow thickets. Wolverine and Sierra Nevada red fox would not be affected by the continued operation of the project.

Unavoidable Adverse Impacts: There would be no unavoidable adverse impacts to threatened and endangered species as a result of project operation with implementation of our recommended measures.

6. Visual Resources

Affected Environment: The project is located in a visually spectacular region that is extensively glaciated and is characterized by rounded outcrops, U-shaped valleys, moraines, glacial lakes, and talus slopes (Southern California Edison, 1988). Each year over one million visitors travel Highway 120 past the project area. Many visitors are on their way to Yosemite National Park, the east entrance of which is located approximately 1 mile south of Tioga Lake (letter from Gary Cargill, Associate Deputy Chief, Forest Service, Washington, D.C. January 7, 1983). On Highway 120, viewers pass next to and are able to see Tioga and Ellery lakes, dams, and miscellaneous project facilities, but the powerhouse is not visible to the casual observer. Because of the two reservoirs' visibility to large numbers of viewers, both have been identified in FS management plans as key recreational and visual water features (letter from Gary Cargill, Associate Deputy Chief, Forest Service, Washington, D.C., January 7, 1983).

Saddlebag Lake is not visible from Highway 120, but is reached by Saddlebag Lake Road. It lies in a high valley with ridges on the east and west sides that rise 1,200 feet above the lake (Southern California Edison, 1988). Tioga Lake is in a relatively gentle valley and is several hundred feet east of Highway 120. Steep talus slopes flank Ellery Lake, which is located in a narrow rocky canyon approximately 1 mile east of Tioga Lake (Southern California Edison, 1988). Highway 120 is adjacent to and north of the lake.

Pool elevations at Saddlebag and Tioga lakes are lowered from September through the end of March (figure 10). From April through July, spring runoff refills the reservoirs. In August the reservoirs are kept essentially full (Southern California Edison, 1981). Ellery Lake does not fluctuate seasonally or as much as the other two lakes.

Environmental Impacts and Recommendations:

a. Lake Levels

Because Tioga and Ellery lakes are visible to viewers driving on Highway 120 to and from Yosemite National Park, the FS is concerned with the visual impacts created by drawing down the two lakes (letter from Gary Cargill, Associate Deputy Chief, Forest Service, Washington, D.C., January 7, 1983). The attractiveness of Tioga Lake is especially affected by drawdowns due to the bathtub ring of debris left on the

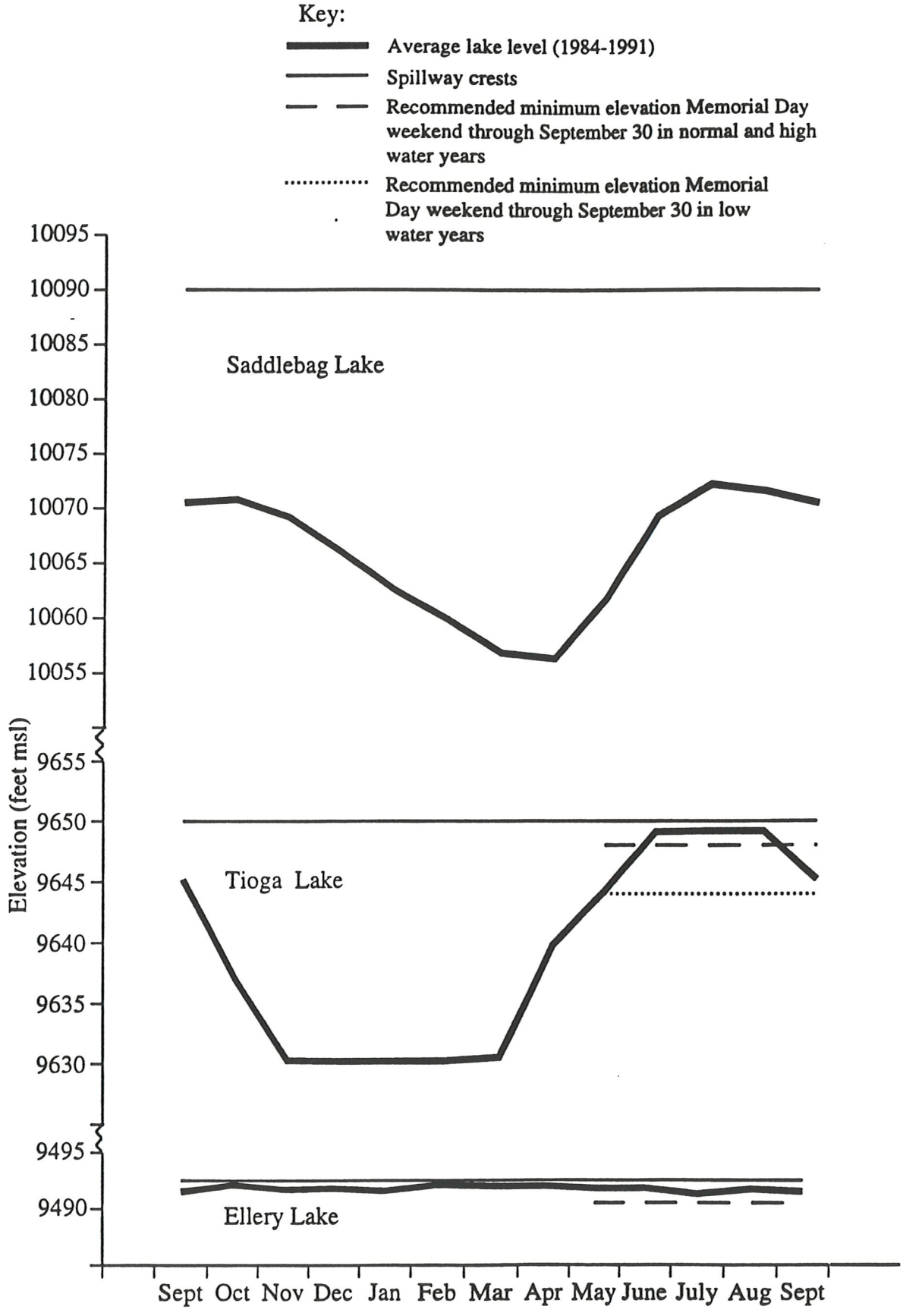

Figure 10. End of month lake levels in project reservoirs (1984-1991 average) (Source: calculated from unpublished Southern California Edison data).

shoreline (letter from Gary Cargill, Associate Deputy Chief, Forest Service, Washington, D.C., January 7, 1983).

The FS has made several recommendations that would maintain the visual integrity of the project area for the enjoyment of viewers during the recreation season (letter from Gary Cargill, Associate Deputy Chief, Forest Service, Washington, D.C., January 7, 1983; letter from Dennis Martin, Forest Supervisor, Inyo National Forest, Bishop, California, April 15, 1988). The FS recommendations include goals for normal water years as well as low water years (less than 75 percent of normal runoff) and high water years (more than 100 percent of normal runoff).

1. Maintain Ellery and Tioga lake levels within 2 feet of spillway crest between the Friday before Memorial Day and September 30 during normal and high water years (figure 10).

2. Lower Tioga Lake no more than 6 feet during low water years (figure 10).

3. During high water years, delay filling Tioga Lake for a few weeks if the capacity is needed to absorb an expected large runoff.

4. Draw Saddlebag Lake down as needed to achieve the recommended pool elevations at the more visually important Tioga Lake.

SCE has agreed to these recommendations, and we concur because they would maintain or enhance the attractiveness of the lakes, particularly during low water years, without adversely affecting project operations.

In the Water and Fishery Resource section we recommend that minimum instream flows be provided in several reaches of Lee Vining and Glacier creeks. As part of our evaluation of flows in Lee Vining Creek below Poole powerhouse, we considered whether there is enough water in the system in dry, dry-to-normal, and normal-to-wet years to simultaneously provide various alternative minimum instream flows and maintain Tioga Lake at the FS-recommended level. In all cases, Ellery and Saddlebag lakes retained their normal summer level and appearance.

In the normal-to-wet year we modeled (1974-75), we considered the effects of maintaining flows at 10, 20, 25, 30, 35, 40 and 45 cfs. We found that any of these flows could be maintained without drawing Tioga Lake down more than two feet below the spillway crest during the targeted season (Memorial Day weekend through September 30). This would satisfy FS visual resource objectives at the lake.

When we looked at dry-to-normal years, we found that a flow of 25 cfs could be maintained year-round, but 30 cfs could be maintained only by adversely affecting the lake level, and failing to meet the FS lake level goal for normal years.

In the dry years we modeled (1976-78), we considered the lake-level effects of maintaining minimum flows at 10 and 20 cfs.[3] We found that the applicant's proposed 10 cfs minimum flow could be provided while maintaining Tioga Lake within the FS-recommended dry-year level of 6 feet below the spillway crest. Indeed, the lake could usually be kept within two to three feet of the spillway crest, which would maintain the visual quality of the lake at or very near its normal summer level.

At a minimum flow of 20 cfs in Lee Vining Creek below Poole powerhouse, the FS-recommended lake level at Tioga Lake could be achieved in July through September in two consecutive dry years. During that period the water level would be three to six feet below spillway crest. A ring of exposed soil and debris would be apparent around the shoreline. Lower than normal spring inflows into the lake would leave the lake below the target level by Memorial Day; the lake would still be filling through June. In the first of two dry years, the lake would be about 7 feet below the spillway crest by Memorial Day. In a second consecutive dry year, Tioga Lake would be about 16 feet below the spillway crest by Memorial Day, and the lake's appearance would be dominated by the wide, bare shoreline.

b. Water Level in the Creeks

In the Water and Fishery Resource section we recommend that minimum instream flows be provided in several reaches of Lee Vining and Glacier creeks. These minimum flows would enhance the visual quality of the creeks and surrounding environment for viewers from Highway 120, nearby campers, and other recreationists. In particular, our analysis of photos taken at various flow levels in Lee Vining Creek below Poole powerhouse (Groves Energy Company, 1984b) indicates that visual quality is enhanced by higher flows (table 5).

The existing visual quality of the stream is at least moderate most of the time because flows in Lee Vining Creek below Poole powerhouse are generally above 30 cfs (table 2). If the minimum instream flow requirement were 10 to 20 cfs, the stream would not be as attractive on days when the flow was that low. If the minimum flow were 25 cfs to 30 cfs (the CDFG-recommended flow), the creek would retain at least a

[3]We determined that minimum flows higher than 20 cfs could not be maintained through two consecutive dry years, regardless of the lake levels.

Table 5. Visual impacts of various flow levels on Lee Vining Creek. (Source: the staff)

Flow	Notes
9-12 cfs	• narrow creek channel • significant gravel bar exposure throughout creek • low visual and aesthetic quality of falls and cascades
28 cfs	• gravel bar exposure in flat sections • would meet Retention VQO • moderate visual and aesthetic quality of falls and cascades
35 cfs	• 80 to 90 percent of gravel bars covered by 4 to 6 inches of water • impressive whitewater in cascades and falls; high visual and aesthetic quality • FS-recommended for visual and recreational purposes

moderate visual quality more days of the year, with a sufficient volume of water to fully wet the channel and create an impressive display at the cascades and falls. Meeting the FS-recommended minimum flow of 35 cfs would increase the visual quality of the creek during the winter and on days throughout the year when project operations might otherwise have produced lower flows.

c. Transmission and Telephone Lines

Two project features that detract from the visual environment in the project area are the transmission line and the telephone line from Poole powerhouse to Lee Vining. It is not economically feasible to bury or reroute the transmission line, but the FS has recommended that SCE consider rerouting or burying the phone line (letter from Gary Cargill, Associate Deputy Chief, Forest Service, Washington, D.C., January 7, 1983). We believe that such an undertaking would be particularly worthwhile in the meadow area near Aspen campground, where the phone line crosses the middle of the meadow in the foreground view of recreationists and passersby on the Poole powerhouse access road.

To enhance the visual quality of the Aspen campground area, we recommend that the project telephone line be rerouted so that it does not cross the meadow. The most feasible option appears to be burial within the road right-of-way along the access road. SCE should file with the Commission for approval a detailed plan to bury the approximately 0.8 mile section of telephone line that crosses the meadow at Aspen campground and that is visible from the Poole powerhouse access road. The plan should include, at a minimum, design

drawings and a construction schedule. SCE should prepare the plan after consultation with the FS.

Unavoidable Adverse Impacts: There would be no unavoidable adverse impacts to visual resources as a result of continued project operation with our recommended enhancement measures.

7. Cultural Resources

Affected Environment: There are three archaeological sites (CA-Mno-2414, -2416, and -2419) located along the 6.4-mile-long transmission line right-of-way that are eligible for nomination to the National Register of Historic Places (Clay and Hall, 1988, 1989; White, 1988a, 1988b, 1990; letter from Kathryn Gualtieri, State Historic Preservation Officer, California Department of Parks and Recreation, Sacramento, California, February 6, 1990).

The triplex cottage at Poole powerhouse (Building 0102) is also eligible for nomination to the National Register (White, 1990; Diamond and Hicks, 1988; Williams and Hicks, 1989; letter from Kathryn Gualtieri, State Historic Preservation Officer, California Department of Parks and Recreation, Sacramento, California, September 27, 1989).

Other elements of the Lee Vining Hydroelectric Project are not eligible for the National Register.

Environmental Impacts and Recommendations: Future project operations, including powerpole replacement or access road maintenance, could affect CA-Mno-2414, -2416, and -2419. The SHPO finds that project operation could affect these sites (letter from Kathryn Gualtieri, State Historic Preservation Officer, California Department of Parks and Recreation, Sacramento, California, February 6, 1990).

The applicant proposes marking these sites as Environmentally Sensitive Areas, avoiding them during routine maintenance operations, and monitoring the sites every four to six years to determine whether there are ongoing impacts. SCE should implement its cultural resources management plan, filed May 15, 1990 (White, 1990), which proposes avoidance and monitoring measures to protect these sites. This plan recommends that SCE consult with SHPO and FS before doing any ground disturbing activity near these sites. We agree that implementation of the cultural resources management plan would prevent adverse impacts to these sites.

Routine maintenance or future project operations could affect the characteristics of the triplex cottage at Poole powerhouse that make it eligible for National Register listing. The SHPO finds that changes made to the cottage and its surroundings during project operation could affect the cottage's integrity of association, setting and workmanship

(letter from Kathryn Gualtieri, State Historic Preservation Officer, California Department of Parks and Recreation, Sacramento, California, September 27, 1989).

SCE proposes consulting with FS and SHPO prior to making any alteration in the cottage's structure or removing the cottage. SCE should implement its cultural resources management plan, filed May 15, 1990 (White, 1990), which proposes that SCE consult with the FS and SHPO prior to making structural alterations to, or removing the cottage. We believe that SCE should consult with the FS and SHPO prior to making changes to the cottage's immediate surrounding environment, as well. Routine maintenance activities, such as painting and in-kind replacement, should not require consultation. These measures would allow for the preservation of the triplex cottage and compliance with Section 106 of the National Historic Preservation Act.

There is also the possibility that there could be undiscovered properties in the project area that could be adversely affected by project operation. Therefore, if properties are found during project operation, or if SCE undertakes ground-disturbing activities other than those approved in the new license, SCE should (a) consult with the SHPO; (b) based on consultation with the SHPO, prepare a plan describing the appropriate course of action and a schedule for carrying it out; (c) file the plan for Commission approval; and (d) take the necessary steps to protect the discovered properties from further impact until notified by the Commission that all of these requirements have been satisfied.

Unavoidable Adverse Impacts: There would be no unavoidable adverse impacts to cultural resources as a result of project operation with implementation of our recommended measures.

8. Recreation Resources

Affected Environment: The Lee Vining drainage is used by a multitude of recreationists pursuing a range of dispersed activities. Activities include camping, fishing, walking, photography, and enjoyment of the water and scenic attributes of the area (letter from Gary Cargill, Associate Deputy Chief, Forest Service, Washington, D.C., January 7, 1983). In its most recent estimate, the FS indicated that 489,000 recreation visits occurred in the project area in 1981, and this estimate did not include more than one million people who traveled Highway 120 entering or leaving Yosemite National Park or those day users who spent the night outside the drainage area (letter from Gary Cargill, Associate Deputy Chief, Forest Service, Washington, D.C., January 7, 1983). Recreational use of Lee Vining Creek is substantial and is expected to continue to increase.

Campgrounds and trails are the primary recreational facilities in the project vicinity. There are no campgrounds within the project boundary, but five campgrounds are located near or adjacent to the project reservoirs, including Saddlebag Lake (22 sites), Sawmill (7 sites), Junction (20 sites), Tioga Lake (13 sites), and Ellery (13 sites) (Forest Service, undated). All five campgrounds are located on national forest land and are managed by the FS. There are three additional campgrounds that are located adjacent to Lee Vining Creek within 4 miles downstream of Poole powerhouse. Big Bend (17 sites) is approximately 1 mile downstream from the powerhouse. It is located on national forest land and managed by the FS. Aspen (50 sites) and Lee Vining Creek campgrounds are located on SCE land and are leased to and managed by Mono County.

Use of campgrounds in the project vicinity is heavy. In its most recent estimate (1981), the FS indicated that recreation visits at 4 of the project area campgrounds equalled over 86,000 visits. This level of use equaled 51 to 101 percent of the "theoretical capacity" of the various campgrounds (letter from Gary Cargill, Associate Deputy Chief, Forest Service, Washington, D.C., January 7, 1983).

The FS and SCE are negotiating a land trade that would give the FS jurisdiction over a 150-acre parcel on the north side of Lee Vining Creek from approximately the Aspen campground (about 2 miles downstream of Poole powerhouse) to near the Lee Vining Ranger Station (about 6.4 miles downstream of the powerhouse) (personal communication, Rick Murray, District Coordinator/Lands, Forest Service, Lee Vining, California, January 30, 1992). The only project lands included in the trade are short portions of the project telephone line and transmission line. If the transaction occurs, the FS would upgrade the existing Aspen campground to conform to agency standards.

Recreational use of the Lee Vining drainage backcountry is popular and access to the backcountry is available from the project area. Several trails into the Hoover Wilderness and the Twenty Lakes Basin are accessed from Saddlebag Lake Road. In addition, a loop trail of 6 miles circles Saddlebag Lake.

Fishing is also a popular activity in the project area. CDFG plants fish in Saddlebag, Tioga, and Ellery lakes each year, as well as in Lee Vining Creek below Poole powerhouse.

Handicapped accessible facilities are available at the Big Bend campground.

Environmental Impacts and Recommendations: In the Visual Resources section, we discuss FS recommendations concerning the maintenance of high lake levels during the summer recreation season. The FS recommendations regarding summer lake levels were based in part on the FS position that reduced

summer lake levels pose a major conflict with the recreation use patterns and activities in the project vicinity (letter from Gary Cargill, Associate Deputy Chief, Forest Service, Washington, D.C., January 7, 1983). Thus, our recommendation regarding the maintenance of high summer lake levels[4] would enhance the experience of recreationists in the project area.

In the Visual Resources section we also discuss the visual quality of Lee Vining Creek below Poole powerhouse when various instream flows are maintained. Flows that are most attractive (the FS-recommended flow of 35 cfs and greater) also enhance the recreation experience because recreationists are sensitive to and appreciate more attractive surroundings. Lower flows are less attractive, but would not be likely to reduce the number of people who choose to recreate in the area.

The recommendations we made in the Water and Fishery Resources section regarding a minimum year-round flow in various reaches of Lee Vining and Glacier creeks would benefit the trout population in the project area and enhance recreational fishing.

Unavoidable Adverse Impacts: There would be no unavoidable adverse impacts to recreation resources as a result of continued project operation with implementation of our recommended measures.

C. Alternative of No Action

Under the no-action alternative, there would be no changes to the existing physical, biological, or recreational resources of the area. No enhancement of the environment would occur.

D. Consistency with Comprehensive Plans

Section 10(a) of the Federal Power Act requires the Commission to consider the extent to which a project is consistent with federal and 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 comprehensive plans that address various resources in

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[4]Our recommendation is to maintain Ellery and Tioga lakes within 2 feet of spillway crest between the Friday before Memorial Day and September 30 during normal and high water years and to draw Tioga Lake down by no more than 6 feet in low water years.

California. Of these, the staff identified and reviewed five plans relevant to this project.[5] No conflicts were found.

VI. DEVELOPMENTAL RESOURCES

As noted earlier, historically the Lee Vining Creek Hydroelectric Project has generated an annual average of about 29 GWh. If the Commission issued a new license with existing conditions, the levelized annual value of the project power would be about $2,300,000.

In this EA, we looked at various instream flows proposed for Lee Vining Creek below Saddlebag Lake, Glacier Creek below Tioga Lake, and Lee Vining Creek below Poole powerhouse. Two of the proposals would affect power generation and/or power value, while one would not.

Lee Vining Creek below Saddlebag Lake

Any minimum release into Lee Vining Creek below Saddlebag Lake of 4 cfs or less would have no effect on project generation (table 6). A minimum release of 5 cfs or the natural inflow, whichever is less, as recommended by CDFG, would increase spill below Ellery Lake in June, at a loss of approximately 0.2 percent (60,000 kWh) of project generation (table 6). Higher flow requirements would cause successively higher generation losses.

Glacier Creek below Tioga Lake

A small minimum flow requirement in Glacier Creek below Tioga Lake, such as the FS- and CDFG-recommended 3 cfs or natural inflow, whichever is less, would have no effect on project generation or power value.

Lee Vining Creek below Poole Powerhouse

Raising the instream flow requirement below Poole powerhouse would not affect power generation but would require an operational change to increase summer storage and increase winter releases. Summer peaking energy produced by the project would decrease and winter baseload energy production

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[5] (1) The California Water Plan: Projected Use and Available Water Supplies to 2010, 1983, California Department of Water Resources; (2) California Water: Looking to the Future, 1987, California Department of Water Resources; (3) Recreation Needs in California, 1983, California Department of Parks and Recreation; (4) Inyo National Forest Land and Resource Management Plan, 1988, Forest Service, Department of Agriculture; and (5) Inyo National Forest Environmental Impact Statement for the Land and Resource Management Plan, 1988, Forest Service, Department of Agriculture.

Table 6. Summary of the effects of raising instream flow in Lee Vining Creek below Saddlebag Lake on the project's generation and power value (Source: the staff)

Proposed instream flow (cfs)	Lost annual generation (kWh)	Annual levelized value of lost generation ($)
3 (FS & SCE)	0	0
4	0	0
5 (CDFG)	60,000	6,000
6	174,000	17,000
8	627,000	61,000
10	1,080,000	105,000

would increase, causing a small loss in the value of project power (table 7).

VII. COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

From our analysis of the environmental effects and the economic consequences of issuing a new license for the Lee Vining Creek Project under sections 4(e) and 10(a) of the Federal Power Act, we conclude that issuing a new license for the project with our recommended enhancement measures would offer the greatest public benefits from the waterway.

Our reasons:

1. With the instream flows we recommend, the project would continue to generate approximately 29 GWh annually from a renewable energy resource.

2. Our recommended enhancement measures would improve existing conditions in the project area. Our recommended enhancement measures include:

- Raising minimum instream flows below Saddlebag Lake, Tioga Lake, and Poole powerhouse; installing 3 flow gages to monitor compliance; and limiting flow fluctuations below Saddlebag Lake for the enhancement of fish, riparian vegetation, wildlife, visual resources, and recreation.

- Maintaining pool elevations in Ellery and Tioga lakes within 2 feet of spillway crest during the recreation season (Memorial Day weekend to September 30) in normal and high runoff years, and Tioga Lake within 6

Table 7. Summary of the effects of raising instream flow in Lee Vining Creek below Poole powerhouse on the project's power value (Source: the staff)

Proposed instream flow (cfs)	Loss in annual levelized power value ($)
10 (SCE)	0
20	7,700
25	10,200
30 (CDFG)	20,400
35 (FS)	55,300

feet of spillway crest in low runoff years, for the enhancement of visual and recreation resources.

- Moving or burying a portion of the project phone line for the enhancement of visual resources, at a cost of approximately $15,000.

- Consulting with the FS and SHPO before undertaking activities that could adversely affect cultural resources.

- Preparing an erosion control plan, a sensitive plants protection plan, and a revegetation plan to protect soil resources and vegetation from the effects of ground-disturbing activities.

3. With regard to our minimum flow recommendation below Saddlebag dam, we recommend a continuous release of 5 cfs or natural inflow, whichever is less, into Lee Vining Creek below Saddlebag Lake, because this flow level would enhance habitat relative to the existing conditions. Since mean monthly flows exceed 5 cfs in every month except June under current operations, the 5 cfs minimum release, when natural inflows allow, would reduce project generation at a cost of $6,000 annually. The 5 cfs flow represents a high percentage of the maximum potential WUA and would enhance trout habitat by maintaining the wetted perimeter of the creek and providing adequate pool depth for cover. Any further increase in minimum flow levels beyond 5 cfs would not, in our view, be sufficient to offset the decrease in power value.

4. With regard to our minimum flow recommendation below Poole powerhouse, we recommend a continuous minimum flow of 25 cfs in normal and wet years and 20 cfs during dry years to enhance fisheries, visual quality, and recreation.

Maintenance and enhancement of a high percentage of the maximum habitat value for fish in this portion of Lee Vining

Creek is merited due to the heavy angler use of the resource and the area's candidacy for inclusion in CDFG's Wild Trout Program. At 25 cfs flows in normal and wet years, the average minimum habitat for adult brown trout would increase from 88.3 percent to 93.0 percent of maximum WUA, and the negative effects of occasional extreme low-flow days would be eliminated. Spawning habitat would be maintained above 80 percent of maximum, resulting in protection and enhancement of spawning areas and incubating eggs during the low flow winter months. In addition, a photographic analysis of lower Lee Vining Creek (Groves Energy Company, 1984b) indicates that flows in the 25 to 30 cfs range maintain fish habitat by creating a fully wetted channel, deepening pools and creating turbulence needed for cover, and covering riffle areas to allow for spawning and increased invertebrate productivity.

The same photographic analysis indicates that flows in this range enhance the visual quality of the creek, especially the waterfalls and cascades, in an area visited annually by thousands of creekside campers, anglers, and other recreationists. We believe the gain in aquatic habitat value, as well as the increased visual appeal to recreationists, outweighs the approximately $10,200 annual loss in power value that would be associated with maintaining the 25 cfs flow.

The CDFG-recommended 30 cfs flow would achieve 96.3 percent of maximum WUA at a cost of $20,400 annually, while the FS-recommended flow of 35 cfs would achieve 96.6 percent of maximum WUA at a cost of $55,300 annually. Although each added cfs of instream flow above 25 cfs would provide an increase in WUA and visual quality, we found that flows this high could not be maintained in years on the dry end of the normal range. The CDFG-recommended 30 cfs flow can only be maintained when runoff is near or above the long term average, and/or carryover storage in Saddlebag Lake is relatively high. A preceding dry year or simply a "drier than average" normal year can preclude maintenance of a 30 cfs minimum flow below Poole powerhouse. A minimum flow of 25 cfs can be maintained in a "drier than average" normal year even if carryover storage is low.

During dry years, we recommend a continuous minimum flow of 20 cfs, which would also enhance aquatic habitat and would be beneficial to visual and recreation resources. At 20 cfs, adult brown trout habitat would be maintained at 91.4 percent of maximum WUA, and the visual quality of the stream would be reasonably well-maintained for the enjoyment of recreationists.

Our reason for recommending different minimum flows in normal versus dry years is based on our analysis of the hydrologic record and a recognition that SCE does not control most of the project watershed. During periods of drought, it would not be within SCE's control to maintain flows as high as 25 cfs. Of course it would also not be possible to maintain

the CDFG-recommended 30 cfs flow or the FS-recommended 35 cfs flow. Attempts to maintain flows higher than 20 cfs in dry years would drain the reservoirs and reduce the flow in Lee Vining Creek to the natural inflow. The higher flows would also conflict with the FS aesthetic goal of maintaining Tioga Lake at a high level during the summer recreation season, since there would not be enough water to keep the lake level up and simultaneously release 25, 30, or 35 cfs into the creek.

Our recommended flows would maintain adult trout habitat at 93.0 percent of maximum WUA in normal and wet years and 91.4 percent of maximum in dry years. If our recommended flow regime had been in effect during the 14-year period of record from 1966 through 1979, the net effect would have been to raise flows in 15 months, or 9 percent of the time.

Our recommended flows could be maintained in normal, wet, and dry years without drawing the reservoirs below the FS-recommended levels.

Therefore, based on our review under section 4(e) and 10(a) of the Act, the Lee Vining Creek project, if authorized with our recommended enhancement measures, would be best adapted to a comprehensive plan for developing Lee Vining Creek.

VIII. CONSISTENCY OF FISH AND WILDLIFE RECOMMENDATIONS WITH THE FEDERAL POWER ACT AND APPLICABLE LAW

Under the provisions of the Federal Power Act (Act), as amended by the Electric Consumers Protection Act 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 Act 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 have concluded that certain of the recommendations of the federal and state fish and wildlife agencies are inconsistent with the purpose and requirements of Part I of the Act or other applicable law.

We believe that CDFG's recommendation for SCE to provide a flushing flow in Lee Vining Creek below Saddlebag dam is inconsistent with section 313(b) of the Act. CDFG has not

provided substantial evidence that flushing flows are needed to improve spawning conditions. We find that 1) there is no major deposition of fine sediment in that section of Lee Vining Creek; 2) spawning gravels are not embedded; and 3) spring runoff from Slate Creek provides a natural flushing flow for most of the reach. We conclude that a flushing flow release into Lee Vining Creek below Saddlebag dam is not needed.

We believe that CDFG's recommendation for SCE to screen the unscreened intake structure on Ellery Lake is inconsistent with section 313(b) of the Act. CDFG has not provided substantial evidence there are fish entrainment and mortality problems associated with the present operation of the project intake. We conclude that there is no need to install a screen on the intake.

We also believe that CDFG's recommendation for SCE to install energy dissipators in the Poole powerhouse tailrace is inconsistent with section 313(b) of the Act. CDFG has not provided substantial evidence that energy dissipators are needed to prevent bank erosion and sediment entry into Lee Vining Creek. Since the large cobble substrates in the vicinity of the confluence of Lee Vining Creek and the tailrace are stable and preclude significant bank erosion and subsequent sediment entry into the creek, we conclude that energy dissipators are not necessary in the Poole powerhouse tailrace.

As we discussed in section V.B.2, we do not agree with CDFG's recommendation to provide for some (unspecified) flow in Lee Vining Creek below Ellery Lake because the aquatic resource potential of this reach is very low due to the steep gradient, and because any flow provided to that reach would be subject to losses through percolation, evaporation, or freezing. We have determined that this recommendation is not consistent with section 10(j) of the Act because the measure would not achieve any measurable resource protection or enhancement.

The FS recommended that SCE provide a minimum instream flow of 3 cfs or the natural inflow to Saddlebag Lake, whichever is less, in Lee Vining Creek below Saddlebag dam. As we discussed in section V.B.2, we disagree with this recommendation because a higher minimum flow would provide a greater level of fish habitat enhancement at a nominal cost.

In lieu of the FS flow recommendation, we will recommend for inclusion in any license issued for the Lee Vining Creek Project that a continuous minimum flow of 5 cfs or the natural inflow to Saddlebag Lake, whichever is less, be provided in Lee Vining Creek below Saddlebag dam.

As we discussed in section V.B.2, our studies indicate that CDFG's recommendation for SCE to provide a continuous

minimum flow of 30 cfs below Poole powerhouse, and the FS recommendation to maintain a flow of 35 cfs in the same reach, are not technically feasible in dry years or in years on the dry end of the normal range, because there would not be sufficient water. Since SCE could not comply with these recommendations, we believe they are inconsistent with the comprehensive planning standard of Section 10(a) of the Act.

In lieu of CDFG's flow recommendation, we will recommend for inclusion in any license issued for the Lee Vining Creek Project that a continuous minimum flow of 20 cfs in dry years and 25 cfs in normal and wet years be provided in Lee Vining Creek below Poole powerhouse.

We have determined that CDFG's recommendation that flow variation be limited to ± 10 percent from October 15 to April 1 in Lee Vining Creek below Saddlebag dam is inconsistent with the comprehensive planning standard of section 10(a) the Act because that level of control is not operationally feasible, given storms and occasional needs for emergency dam release.

In lieu of the CDFG recommendation, we will recommend for inclusion in any license issued for the Lee Vining Creek Project that flow variation from October 15 to April 1 be limited to ± 10 cfs from the average daily flow in early October. Our recommendation is within SCE's operational control limits and would protect incubating trout eggs.

IX. FINDING OF NO SIGNIFICANT IMPACT

On the basis of this independent environmental analysis, issuing a new license for the Lee Vining Creek project with our recommended enhancement measures would not constitute a major federal action significantly affecting the quality of the human environment.

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XI. LIST OF PREPARERS

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DRAFT LICENSING ARTICLES
LEE VINING CREEK HYDROELECTRIC PROJECT
NOVEMBER 1992

Condition A. Erosion control plan

At least 90 days before the start of any land-disturbing or land-clearing activities associated with installation of flow gages or burying the telephone line pursuant to Conditions C and J of this license, the Licensee shall file with the Commission for approval a plan to control erosion and to minimize the quantity of sediment resulting from land disturbance.

The plan shall be based on actual site geological, soil, and groundwater conditions and on project design, and shall include, at a minimum, the following:

(a) A description of the actual site conditions;

(b) Measures proposed to control erosion and to minimize the quantity of sediment resulting from land disturbance;

(c) Detailed descriptions, functional design drawings, and specific topographic locations of all control measures; and

(d) A specific implementation schedule and details for monitoring and maintenance programs for the land disturbance.

The Licensee shall prepare the plan after consultation with the Forest Service. 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 agency, and specific descriptions of how the agency's comments are accommodated by the plan. The Licensee shall allow a minimum of 30 days for the agency 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 geological, soil, and groundwater conditions at the site.

The Commission reserves the right to require changes to the plan. No land-disturbing or land-clearing activities shall 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.

Condition B. Required instream flows below Saddlebag Lake

The Licensee shall release from Saddlebag Lake into Lee Vining Creek a minimum flow of 5 cubic feet per second or the natural flow, whichever is less, as measured at the gage

located at the base of the dam, for the protection and enhancement of fish and wildlife resources, riparian vegetation, and aesthetic resources in Lee Vining Creek. Natural flows shall be determined by the gage installed upstream of Saddlebag Lake as required in Condition C.

The minimum flow may be temporarily modified if required by operating emergencies beyond the control of the Licensee, or for short periods upon agreement between the Licensee, the Forest Service, and the California Department of Fish and Game. 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.

Condition C. Plan for installation of stream flow gages above Tioga Lake, above Saddlebag Lake, and below Poole powerhouse

Within 120 days of the issuance of this license, the Licensee shall file with the Commission for approval a plan for providing flow gaging facilities on Glacier Creek above Tioga Lake, on Lee Vining Creek above Saddlebag Lake, and on Lee Vining Creek below the confluence of Lee Vining Creek and the Poole powerhouse tailrace. The gages will establish compliance with recommended minimum instream flow releases specified in Conditions B, D, and E. The plan shall include detailed design drawings of the systems to measure and record flows. A construction schedule and construction specifications shall be included in the plan.

The Licensee shall prepare the plan after consultation with the Forest Service and the California Department of Fish and Game. The Licensee shall include with the plan documentation of consultation and copies of comments and recommendations on the completed plan after it has been 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 by the agencies, the filing shall include the Licensee's reasons, based on standard engineering principles and conditions at the site.

The Commission reserves the right to require changes to the plan. No construction shall begin until the Licensee is notified that the plan is approved. Upon Commission approval the Licensee shall implement the plan, including any changes required by the Commission. As-built drawings of the system to measure and record inflow to Tioga Lake and Lee Vining Creek flows below Poole powerhouse shall be filed within 90 days after completion of construction.

Condition D. Required instream flows below Tioga Lake

The Licensee shall maintain in Glacier Creek a continuous minimum flow of 3 cubic feet per second, as measured at the existing gage located just below Tioga dam, or the natural inflow to Tioga Lake, whichever is less, for the protection and enhancement of fish and wildlife resources, riparian vegetation, and aesthetic resources in Glacier Creek. Natural flows will be determined by the gage installed upstream of Tioga Lake as required in Condition C.

The minimum flow may be temporarily modified if required by operational emergencies beyond the control of the Licensee, or for short periods upon agreement between the Licensee, the Forest Service, and the California Department of Fish and Game. 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.

Condition E. Required instream flows in Lee Vining Creek below Poole powerhouse

The Licensee shall maintain a continuous minimum flow of 25 cubic feet per second in Lee Vining Creek, as measured at the gage below Poole powerhouse required in Condition C, for the protection and enhancement of fish and wildlife resources, riparian vegetation, and aesthetic resources in Lee Vining Creek. Minimum flows may be reduced to 10 cubic feet per second during powerhouse maintenance, subject to coordination with and approval of the Forest Service and the California Department of Fish and Game.

During low water years, minimum flows may be reduced to 20 cfs beginning June 1 and extending until the following May 31. Low water years under this condition shall be defined as 75 percent or less of average predicted runoff for the Mono Lake basin, as published by The California Resources Agency in their April 1 "Water Conditions in California" report.

The minimum flow releases may be temporarily modified if required by operating emergencies beyond the control of the Licensee, or for short periods upon agreement between the Licensee, the Forest Service, and the California Department of Fish and Game. 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.

Condition F. Flow fluctuations below Saddlebag Lake

Releases to Lee Vining Creek from Saddlebag Lake between October 15 and April 1 shall be maintained within 10 cubic feet per second of the mean daily flow between October 1 and October 14 as measured at the gage located at the base of Saddlebag dam, subject to minimum flows required in Condition

B, for protection and enhancement of fish resources during the spawning and incubation periods for brown and brook trout.

The flow release may be temporarily modified if required by operating emergencies beyond the control of the Licensee, for public safety, or for short periods upon agreement between the Licensee, the Forest Service, and the California Department of Fish and Game. 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.

Condition G. Revegetation plan

At least 90 days before the start of any land-disturbing or land-clearing activities, the Licensee shall file with the Commission for approval a plan to revegetate all areas disturbed by: (a) installing flow gages; and (b) construction or soil disturbance needed to relocate the telephone line.

The plan shall describe the location of the areas to be revegetated and at a minimum shall include: (a) a description of the plant species used and planting densities; (b) the use of locally-collected and/or native plant species; (c) a description of local native plant sources, including donor sites and propagation methods and/or native plant nurseries; (d) fertilization and irrigation requirements; (e) a monitoring program to evaluate the effectiveness of the plantings; (f) provisions for the filing of monitoring reports with the Commission; (g) a description of procedures to be followed if monitoring reveals that the revegetation is not successful; and (h) an implementation schedule that provides for revegetation as soon as practicable after the beginning of land-clearing and land-disturbing activities.

The Licensee shall prepare the plan taking into account fully the erosion and sediment control plan prepared pursuant to this license (Condition A), and after consultation with the U.S. Fish and Wildlife Service, the California Department of Fish and Game, and the Forest Service. The Licensee shall include with the plan documentation of consultation and copies of the comments and recommendations of the agencies, and specific descriptions of how the plan accommodates the agencies' comments. The Licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before the Licensee files 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. No land-disturbing activities shall 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.

Condition H. Sensitive plants

At least 90 days before the start of any land-disturbing or land-clearing activities, the Licensee shall file for Commission approval a plan to protect the sensitive plant species Masonic Mountain jewelflower (Strepthanthus oliganthus), Utah monkeyflower (Mimulus glabratus spp. utahensis), Mono milkvetch (Astragalus monoensis), Tahoe draba (Draba asterophora var. asterophora), Tiehm's rock cress (Arabis tiehmii), Bodie Hills draba (Draba quadricostata), Nodding buckwheat (Eriogonum nutans var nutans), Mono Lake lupine (Lupinus duranii), Snow willow (Salix reticulata spp. nivalis) and Mono buckwheat (Eriogonum ampullaceum). The plan should also protect from land-disturbing activities any additional sensitive plant species occurring in the project area that are identified by the Forest Service, the California Department of Fish and Game, or the U.S. Fish and Wildlife Service.

The plan shall include the results of botanical surveys of all areas that would be disturbed by proposed enhancement measures. The plan shall also include (a) a description of measures to protect any sensitive plants and (b) an implementation schedule for the protection measures.

The Licensee shall prepare the plan taking into account fully the erosion and sediment control plan (Condition A) and the revegetation plan (Condition G) prepared pursuant to this license, and after consultation with the U.S. Fish and Wildlife Service, the California Department of Fish and Game, and the Forest Service. 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 plan accommodates the agencies' comments. The Licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before the Licensee files 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. No land-disturbing activities shall 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.

Condition I. Reservoir levels

The Licensee shall maintain Tioga and Ellery lakes at a full pool elevation during normal and above normal runoff years from the Friday before Memorial Day through September 30, for the enhancement of visual and recreation resources. A full pool elevation in this Condition is defined as a pool

elevation that is within 2 feet of spillway crest elevation. During low water years, drawdowns on Tioga Lake between the Friday before Memorial Day and September 30 shall be limited to 6 feet below spillway crest. Low water years under this Condition shall be defined as 75 percent or less of average predicted runoff for the Mono Lake basin, as published by The California Resources Agency in their April 1 "Water Conditions in California" report. During high water years, the filling of Tioga Lake may be delayed for a few weeks, subject to consultation with and approval of the Forest Service, if the extra capacity is needed to absorb an expected large runoff. High water years under this Condition shall be defined as 100 percent or more of average predicted runoff for the Mono Lake basin, as published by the California Resources Agency in their April 1 "Water Conditions in California" report.

The minimum pool elevation may be temporarily modified if required by operating emergencies beyond the control of the Licensee, if required for public safety or to prevent property damage, or for short periods upon agreement with the Forest Service and the California Department of Fish and Game. If the elevation is so modified, the Licensee shall notify the Commission as soon as possible, but no later than 10 days after each such incident.

Condition J. Telephone line burial

Within 120 day of the issuance of this license, the Licensee shall file with the Commission for approval a detailed plan to bury the approximately 0.8 mile section of telephone line that crosses the meadow at Aspen campground and that is visible from the Poole powerhouse access road. The plan shall include at a minimum design drawings and a construction schedule.

The Licensee shall prepare the plan after consultation with the Forest Service. 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 Forest Service, and specific descriptions of how the agency's comments are accommodated in the plan. The Licensee shall allow a minimum of 30 days for the agency to comment and make recommendations prior to filing with the Commission. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons based on standard engineering principles and conditions at the site.

The Commission reserves the right to require changes to the plan. No construction shall begin until the Licensee is notified that the plan is approved. Upon Commission approval, the Licensee shall implement the plan, including any changes required by the Commission. As-built drawings of the buried telephone line shall be filed within 90 days after completion of construction.

Condition K. Cultural resources consultation

The Licensee shall implement the cultural resources management plan filed with the Commission on May 15, 1990 (White, 1990). The cultural resources management plan provides for the avoidance of impacts to prehistoric archaeological sites CA-Mno-2414, -2416, and -2419, for preservation of the triplex cottage at Poole powerhouse, and for the treatment of cultural resources discovered during project operation.

The Licensee shall mark the location of prehistoric archaeological sites CA-Mno-2414, -2416, and -2419 on project maps and avoid them during project operations. Before beginning any ground disturbing activity near the sites, the Licensee shall file for Commission approval a cultural resources management plan for avoiding impacts to these sites, and the written comments of the State Historic Preservation Officer (SHPO) and the Forest Service (FS) on the plan. Prior to any planned demolition, alteration, or remodeling of the triplex cottage at Poole powerhouse, the Licensee shall file for Commission approval a cultural resources management plan for avoiding impacts to the site, and the written comments of the SHPO and FS on the plan.

The Licensee shall implement the plans in a manner satisfactory to the SHPO and FS, and consistent with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation. The Commission may require changes to the plans based on these filings. No land-disturbing or land-clearing activities that will affect the integrity of these sites shall begin until the licensee is notified that the plans comply with the requirements of this article.

Condition L. Cultural resources management

The Licensee, before starting any future land-clearing or land-disturbing activities associated with the project, shall consult with the California State Historic Preservation Officer (SHPO) and the Forest Service (FS) and shall conduct a cultural resources survey of the affected areas. Further, the licensee shall file the following: (1) a report containing the survey results; (2) a cultural resources management plan, approved by the Commission, to avoid or mitigate impacts to any significant archaeological or historic sites identified during the survey; and, (3) the written comments of the SHPO and FS on the report and the plan.

If the Licensee discovers any previously unidentified archaeological or historic sites during the course of constructing, developing, or operating project works or other facilities at the project, the Licensee shall stop all land-clearing or land-disturbing activities in the vicinity of the sites, shall consult with the SHPO and FS, and shall file for

Commission approval a cultural resources management plan to avoid or mitigate impacts to significant resources, together with the written comments of the SHPO and FS on the plan.

Upon Commission approval, the Licensee shall implement the plans. The survey and the plans shall be based on the recommendations of the SHPO and FS, shall be conducted and prepared by a qualified cultural resources specialist, and shall adhere to the Secretary of the Interior's Guidelines for Archaeology and Historic Preservation.

The report and plans 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 of 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 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 or land-disturbing activities until informed by the Commission that the requirements of this article have been fulfilled.