**UNITED STATES OF AMERICA**
**FEDERAL ENERGY REGULATORY COMMISSION**

Southern California Edison Project No. 2174-012—California

**NOTICE OF AVAILABILITY OF FINAL ENVIRONMENTAL ASSESSMENT**

(April 27, 2006)

In accordance with the National Environmental Policy Act of 1969, as amended, and the Federal Energy Regulatory Commission's (Commission or FERC) regulations (18 CFR Part 380), Commission staff has reviewed the application for license for the Portal Hydroelectric Project (FERC No. 2174-012) and has prepared a final environmental assessment (EA). The project is located on Camp 61 Creek and Rancheria Creek in Fresno County, California.

The final EA contains the staff's analysis of the potential environmental effects of the project and concludes that licensing the project, with appropriate environmental protective measures, would not constitute a major federal action that would significantly affect the quality of the human environment.

Before the Commission makes a licensing decision, it will take into account all concerns relevant to the public interest. The final EA will be part of the record from which the Commission will make its decision. Copies of the final EA are available for review in Public Reference Room 2-A of the Commission's offices at 888 First Street, NE, Washington, DC. The final EA also may be viewed on the Commission's Internet website (www.ferc.gov) using the "eLibrary" link. Additional information about the project is available from the Commission's Office of External Affairs, at (202) 502-6088, or on the Commission's website using the eLibrary link.

Magalie R. Salas
Secretary

# PUBLIC

## Final Environmental Assessment

Southern California Edison & Company
Portal Hydroelectric Project
FERC No. 2174-012

# FINAL ENVIRONMENTAL ASSESSMENT

PORTAL HYDROELECTRIC PROJECT
CALIFORNIA

(Project No. 2174-012)

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
888 First Street, N.E.
Washington, DC 20426

APRIL 2006

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## ACRONYMS

| | |
|---|---|
| °C | degrees Celsius |
| °F | degrees Fahrenheit |
| ACHP | Advisory Council on Historic Preservation |
| AIR | additional information request |
| ALP | Alternative Licensing Process |
| ADA | Americans with Disabilities Act |
| ANOVA | analysis of variance |
| APE | Area of Potential Effect |
| BCHS | Big Creek Hydroelectric System |
| BE | Biological Evaluation |
| CalEPPC | California Exotic Pest Plant Council |
| Cal-IPC | California Invasive Plant Council |
| CDFA | California Department of Food and Agriculture |
| CDFG | California Department of Fish and Game |
| cfs | cubic feet per second |
| CNPS | California Native Plant Society |
| CMP | California-Mexico Power |
| CPUC | California Public Utilities Commission |
| Commission | Federal Energy Regulatory Commission |
| Corps | U.S. Army Corps of Engineers |
| CSBP | California Stream Bioassessment Protocol |
| CSC | California species of concern |
| CTR | California Toxics Rule |
| Central Valley Board | Central Valley Regional Water Quality Control Board |
| DEA | draft environmental assessment |
| DO | dissolved oxygen |
| EA | environmental assessment |
| EPA | U.S. Environmental Protection Agency |
| EPT | Ephemeroptera, Plecoptera, and Tricoptera |
| ESA | Endangered Species Act |
| FERC | Federal Energy Regulatory Commission |
| FC | federal candidate |
| FE | federally endangered |
| FP | federally proposed |
| FPA | Federal Power Act |
| FS | U.S. Forest Service |
| FSC | FWS species of concern |
| FSS | Forest Service sensitive |
| FT | Federally threatened |
| FWS | U.S. Fish and Wildlife Service |
| HLHD | Huntington Lake Historic District |

| | |
|---|---|
| HPMP | historic properties management plan |
| H-B | Howell Bunger valve |
| IFMP | instream flow measurement (or monitoring) plan |
| Interior | U.S. Department of the Interior |
| LOP | limited operating period |
| Interior | Department of the Interior |
| KOP | key observation points |
| kWh | kilowatt-hour |
| LWD | large woody debris |
| MCL | maximum contaminant level |
| mg/l | milligrams per liter |
| mg$CaCO_3$/l | milligrams as calcium carbonate per liter |
| MIS | management indicator species |
| MPN | Most probable number |
| msl | mean sea level |
| MTBE | methyl-*tert*-butyl ether |
| MW | megawatt |
| MWh | megawatt hour |
| National Register | National Register of Historic Places |
| ND | non-detectable |
| NEPA | National Environmental Policy Act |
| NFS | National Forest System |
| NGVD | National Geodetic Vertical Datum |
| NHPA | National Historic Preservation Act of 1966 |
| NPDES | National Pollution Discharge Elimination System |
| NTU | nephelometric turbidity unit |
| PFC | properly functioning condition |
| PAC | protected activity center |
| RM | river mile |
| ROS | Recreation Opportunity Spectrum |
| RWQCB | Regional Water Quality Control Board |
| SD1 | scoping document 1 |
| SCE | Southern California Edison Company |
| SE | State endangered |
| SFSJR | South Fork of the San Joaquin River |
| SHPO | State Historic Preservation Officer |
| SNF | Sierra National Forest |
| ST | State threatened |
| SWRCB | State Water Resources Control Board |
| TPH | total petroleum hydrocarbons |
| $\mu$g/l | microgram/liter |
| $\mu$S/cm | micro-Siemens/centimeter |
| USGS | U.S. Geological Survey |

| | |
|---|---|
| VQO | Visual Quality Objective |
| WECC | Western Electricity Coordinating Council |
| WQC | Water Quality Certification |

# EXECUTIVE SUMMARY

On March 27, 2003, Southern California Edison Company (SCE) filed an application with the Federal Energy Regulatory Commission (Commission or FERC) to relicense the existing 10.8-megawatt (MW) Portal Hydroelectric Project, FERC No. 2174-012, located in the upper San Joaquin River Basin in Fresno County, California. The Portal Project is located on Camp 61 Creek and Rancheria Creek, tributaries to the South Fork San Joaquin River (SFSJR). The project includes 77.7 acres of lands of the United States, which are administered by the Forest Supervisor of the Sierra National Forest (SNF).

This final environmental assessment (EA) evaluates the site-specific and cumulative effects of the continued operation of the Portal Project and recommends conditions for a new license for the project. In the final EA, we consider three alternatives: (1) the SCE Proposal; (2) the Staff Alternative, which is the SCE Proposal with additional staff-recommended enhancement measures; and (3) the No-action Alternative, or continued operation of the project as currently licensed. However, since the project occupies lands of the SNF, the U.S. Forest Service (FS) has authority to impose mandatory license conditions under Section 4(e) of the Federal Power Act (FPA). The FS has provided such conditions. Subsequently, pursuant to section 241 of the Energy Policy Act of 2005, SCE has filed a request for FS consideration of certain alternative conditions. This final EA considers various alternative environmental measures proposed by agencies and others in conjunction with the analysis of the three alternative actions.

Presented by resource area, SCE proposes to:

**Water Resources and Aquatic Resources**

- Provide a minimum instream flow into Camp 61 Creek downstream of the Portal forebay. The proposed flows are based on anticipated benefits to aquatic habitat and would mitigate temperature and dissolved oxygen effects in Camp 61 Creek.

| Date | Flow (cfs) |
|---|---|
| March 1–July 31 | 7 day average of 1.0 cfs, instantaneous floor of 0.7 cfs |
| August 1–February 28/29 | 7 day average of 0.5 cfs, instantaneous floor of 0.3 cfs |

- Provide channel and riparian maintenance flows into Camp 61 Creek between April 1 and July 31 during above normal and wet water year types. Flows would be released over a 10-day period, ramping up to 28 cfs in an above normal water year and up to 39 cfs in a wet water year.

- Construct a new channel to re-route runoff from Adit 2 Creek (which flows into Camp 61 Creek approximately 2.0 miles south of SFSJR) to Camp 61 Creek (*see* figure 3, below). This measure is intended to reduce the flow of water down Adit 2 Creek and prevent further erosion of the channel.

- Install porous check dams in Adit 2 Creek to stabilize channel downcutting and establish vegetation to prevent ongoing erosion. This measure would be implemented after the completion of a new channel to route flow away from Adit 2 Creek.

- Modify the existing catchment basin downstream of Portal dam to increase the rate of aeration downstream of the catchment basin and better contain elevated iron concentrations.

- Investigate the feasibility of conducting periodic iron residue removal from the catchment basin, using a vacuum truck. Removal of the iron residue would mitigate the visual impact of the iron staining and reduce the potential for iron residue to be transported downstream into Camp 61 Creek.

- Perform limited water quality sampling and analyses, as needed and appropriate, and obtain a National Pollution Discharge Elimination System permit if required by the Regional Water Quality Control Board (RWQCB).

- Develop and implement a plan to monitor fish populations in Camp 61 Creek in years 5, 10, and 20 during the term of any new license issued.

- Develop and implement a plan to monitor project-related sediment accumulation and spawning gravel in Camp 61 Creek upstream and downstream of the confluence with the Adit 2 channel. Sediment monitoring would include a baseline survey plus three additional surveys in conjunction with the fish population monitoring.

**Terrestrial Resources**

- Monitor bank stability and riparian vegetation in Camp 61 Creek in conjunction with baseline sediment survey, then again in years 10, 20, and 30.

- Develop a vegetation management plan that addresses special-status plant species, wetlands, and other sensitive habitats, including riparian communities. This plan would include a noxious weed and invasive non-native plant management program that would address the use of herbicides.

**Recreational Resources**

- Conduct recreation surveys and file a report on project-induced recreation every sixth year.

- Develop and implement, in consultation with FS, a recreation plan addressing the development and management of project-related recreation use and opportunities, including scheduling the implementation of several improvements at the Portal Forebay Campground.

**Land Management**

SCE proposes five modifications to the existing project boundary, including areas proposed for removal and areas for inclusion. SCE also proposes to develop management plans to address the occupancy and use of FS lands.

- Areas proposed for removal from the current project boundary include:

  1. Camp 61 Creek from Portal forebay dam outlet works downstream to the confluence with the South Fork San Joaquin River—This reach, bypassed by the current diversion at Portal forebay, is a natural stream channel, not part of the project works, and SCE does not require any special access to the stream banks beyond its outlet works. SCE believes it is not necessary for this reach to be included within the project boundary for the safe and efficient operation and maintenance of the project, nor for other specified project purposes, such as public recreation or protection of environmental resources.

  2. Eastwood Overflow Campground (*see* figure 2, below)—The campground is already within the project boundary of two other FERC-licensed projects owned and operated by SCE; Big Creek Nos. 1 & 2 (FERC Project No. 2175) and Big Creek Nos. 2A, 8, and Eastwood (FERC Project No. 67). *See* figure 1, below. The inclusion of the same land within three project boundaries is confusing and unnecessary. SCE believes this area would be more properly included within FERC Project No. 2175, because it serves recreation visitors to Huntington Lake.

  3. Rancheria Creek downstream of Portal powerhouse (Portal tailrace) (*see* figure 2, below)—SCE believes Rancheria Creek should be deleted from the project boundary because it is a natural streambed and SCE does not require any special access to the stream banks beyond its outlet works. SCE believes it is not necessary for this reach to be within the project boundary for the safe and efficient operation and maintenance of the project, nor for other specified project purposes, such as public recreation or protection of environmental resources.

- Areas proposed for incorporation into the project boundary include:

  1. Gaging stations on the East and West Forks of Camp 61 Creek—The gages are currently included in the project boundary of FERC Project No. 67 (Big Creek Nos. 2A, 8, and Eastwood), but their purpose is to allow SCE to measure the contribution of flow from the East Fork and West Fork Camp 61 Creek into the Portal forebay. Therefore, SCE believes these gages should be removed from the project boundaries of FERC Project No. 67 and included in the Portal Project boundary.

  2. Adit 2 leakage weir (*see* figure 3, below)—SCE believes the weir should be included within the Portal Project boundary, because it is one of the principal project works, and it is necessary for SCE to maintain and monitor it for the safe and efficient operation of the project.

- Development of plans to address transportation and road management, fire management, signage, hazardous substances, and visual management.

**Cultural Resources**

- As part of the Big Creek Alternative Licensing Process (ALP), SCE is developing a comprehensive historic properties management plan (HPMP) that is intended to cover operation and maintenance activities for all of the Big Creek Hydroelectric System (BCHS) projects. The comprehensive HPMP would also address historical properties associated with the Portal Project.

After evaluating the SCE proposal and the recommendations from resource agencies and interested parties, we considered what environmental measures would be necessary or appropriate for continued operation of the project. Based on this analysis, we recommend all of SCE's measures, with the exception of the minimum instream flow regime, the construction of a new channel between Adit 2 Creek and Camp 61 Creek, the installation of porous check dams and vegetation in Adit 2 Creek, and the timing of channel and riparian maintenance flows. We also recommend SCE implement the additional measures listed below:

**Water Resources and Aquatic Resources**

- Provide a flow release to Camp 61 Creek as follows, for all water year types:

| **Date** | **Flow (cfs)** |
|---|---|
| March 1–July 31 | 7 day average of 1.0 cfs, instantaneous floor of 0.7 cfs |
| August 1–September 30 | 7 day average of 0.5 cfs, instantaneous floor of 0.3 cfs |

| Date | Flow (cfs) |
|---|---|
| | instantaneous floor of 0.3 cfs |
| October 1–December 15 | 7 day average of 1.0 cfs, instantaneous floor of 0.7 cfs |
| December 16–February 28/29 | 7 day average of 0.5 cfs, instantaneous floor of 0.3 cfs |

- Provide channel and riparian maintenance flows into Camp 61 Creek between June 1 and July 31 during above normal and wet water year types. Flows would be released over a 10-day period, ramping up to 28 cfs in an above normal water year and up to 39 cfs in a wet water year.

- Develop and implement an instream flow management plan that would describe existing or proposed provisions for the purposes of measuring and documenting compliance with the required minimum instream flows in the Camp 61 Creek bypass reach.

- Implement a restriction on downramping rates to less than 6 inches per hour with channel and riparian maintenance flows.

- Develop, in consultation with California State Water Resources Control Board (SWRCB), and implement a water temperature and dissolved oxygen (DO) monitoring plan to document the effectiveness of increasing DO through modification of the catchment basin.

- Develop and implement a plan in coordination with the FS and the SWRCB to reduce the active channel and stream bank erosion that is occurring in Adit 2 Creek between river miles (RM) 0.3 and RM 0.5.

- Continue stocking rainbow trout from SCE's own trout-rearing facility in consultation with the California Department of Fish and Game (CDFG) to support recreational fishing in the Portal forebay, and provide 50 percent of the costs of fish production.

**Terrestrial Resources**

- Prepare a biological evaluation for FS approval before constructing any new project features on National Forest System lands to evaluate potential effects on FS sensitive species or management indicator species and monitor effectiveness of mitigation measures, if any are needed.

- Monitor riparian vegetation along Camp 61 Creek as part of fish population and sediment monitoring.

- Consult with FS to identify and implement measures to protect existing populations of subalpine fireweed growing near the distribution/communication line corridor (*see* figure 3, below).

- Develop and implement a fish and wildlife management plan to address stocking fish in Portal forebay, limited operating periods to protect special status birds, and monitoring for special status amphibians and bats.

- Monitor ground-disturbing activities annually for three years following implementation to detect and map new weed populations.

- Conduct systematic surveys for noxious weeds and non-native invasive plant occurrences at project facilities, roads, trailheads, and recreation features every five years through the term of any new license.

**Threatened and Endangered Species**

- Develop and implement a plan to monitor bald eagles, as part of the fish and wildlife management plan.

**Recreational Resources**

- Develop and implement a recreation report and recreation plan in consultation with the FS. The recreation plan should include scheduling the implementation of several improvements at the Portal Forebay Campground. The recreation report should include results from the recreation use survey and be filed every sixth year following the schedule of Form 80 filing. Recreation surveys should include specific questions about angler interactions with the power line crossing Portal forebay.

**Land Management**

- Develop and implement a single comprehensive land management plan in consultation with the FS. This plan should included components to address transportation and access roads, fire prevention and response, signage requirements, and the management of hazardous substances.

**Cultural Resources**

- Develop SCE maintenance procedures to ensure that adverse effects on archaeological sites PL-KAI-001 and CA-FRE-369 are avoided.

Under the No-action Alternative, the Portal Project would generate an average of 50,096,000 kWh of electricity annually, have an annual power value of

$2,504,800 (50.00 mills/kWh), and a total annual cost of $1,481,600 (29.58 mills/kWh), resulting in a net annual benefit of $1,023,200 (20.42 mills/kWh).

As proposed by SCE, the Portal Project would generate an average of 47,663,000 kWh of electricity annually, have an annual power value of $2,390,800 (50.16 mills/kWh), and a total annual cost of $1,747,100 (36.66 mills/kWh), resulting in a net annual benefit of $643,700 (13.50 mills/kWh).

Under the Staff Alternative, the Portal Project would generate an average of 47,404,000 kilowatt-hours (kWh) of electricity annually, have an annual power value of $2,378,600 (50.18 mills/kWh[1]), and a total annual cost of $1,789,000 (37.74 mills/kWh), resulting in a net annual benefit of $589,600 (12.44 mills/kWh).

The project economics are summarized in section VI, *Developmental Analysis, below*. Our analysis shows that the best alternative for the Portal Project is to issue a new license consistent with most of SCE's proposed environmental measures and with the staff recommended measures described above. With these measures in place, we conclude that issuing a new license for the Portal Project would not be a major federal action significantly affecting the quality of the human environment.

[1] Value is slightly greater than 50 because the new flow regime is implemented in year 2 of any new license.

# FINAL ENVIRONMENTAL ASSESSMENT

**Federal Energy Regulatory Commission**
**Office of Energy Projects**
**Division of Hydropower Licensing**

**Portal Hydroelectric Project**
**FERC Project No. 2174-012**
**California**

## I. APPLICATION

On March 27, 2003, Southern California Edison Company (SCE) filed an application with the Federal Energy Regulatory Commission (Commission or FERC) to relicense the existing 10.8-megawatt (MW) Portal Hydroelectric Project, FERC No. 2174-012, located in the upper San Joaquin River Basin in Fresno County, California. The Portal Project is located on Camp 61 Creek and Rancheria Creek, tributaries to the South Fork San Joaquin River (SFSJR) (figures 1, 2, and 3). The project includes 77.7 acres of land of the United States, which are administered by the Forest Supervisor of the Sierra National Forest (SNF). The Portal Project has generated an average of 38,009 megawatt hours (MWh) of electric energy per year under recent historical operating conditions.

## II. PURPOSE AND NEED FOR ACTION

### A. PURPOSE OF ACTION

The Commission issued a license for the Portal Hydroelectric Project (No. 2174-012) to SCE on April 19, 1955. The original license expired on March 31, 2005. The Commission issued an annual license on April 11, 2005 to cover the period between April 1, 2005 and March 31, 2006, or until issuance of a new license or other disposition under the FPA, whichever comes first. The Commission must decide whether to issue a new license to SCE and what conditions to place on any license issued. In deciding whether to authorize continued operation of the project in compliance with the FPA and other applicable laws, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing the waterway. In addition to the power and developmental purposes for which licenses are issued (*e.g.*, flood control, irrigation, and water supply), 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 protection of recreational opportunities; and the preservation of other aspects of environmental quality.

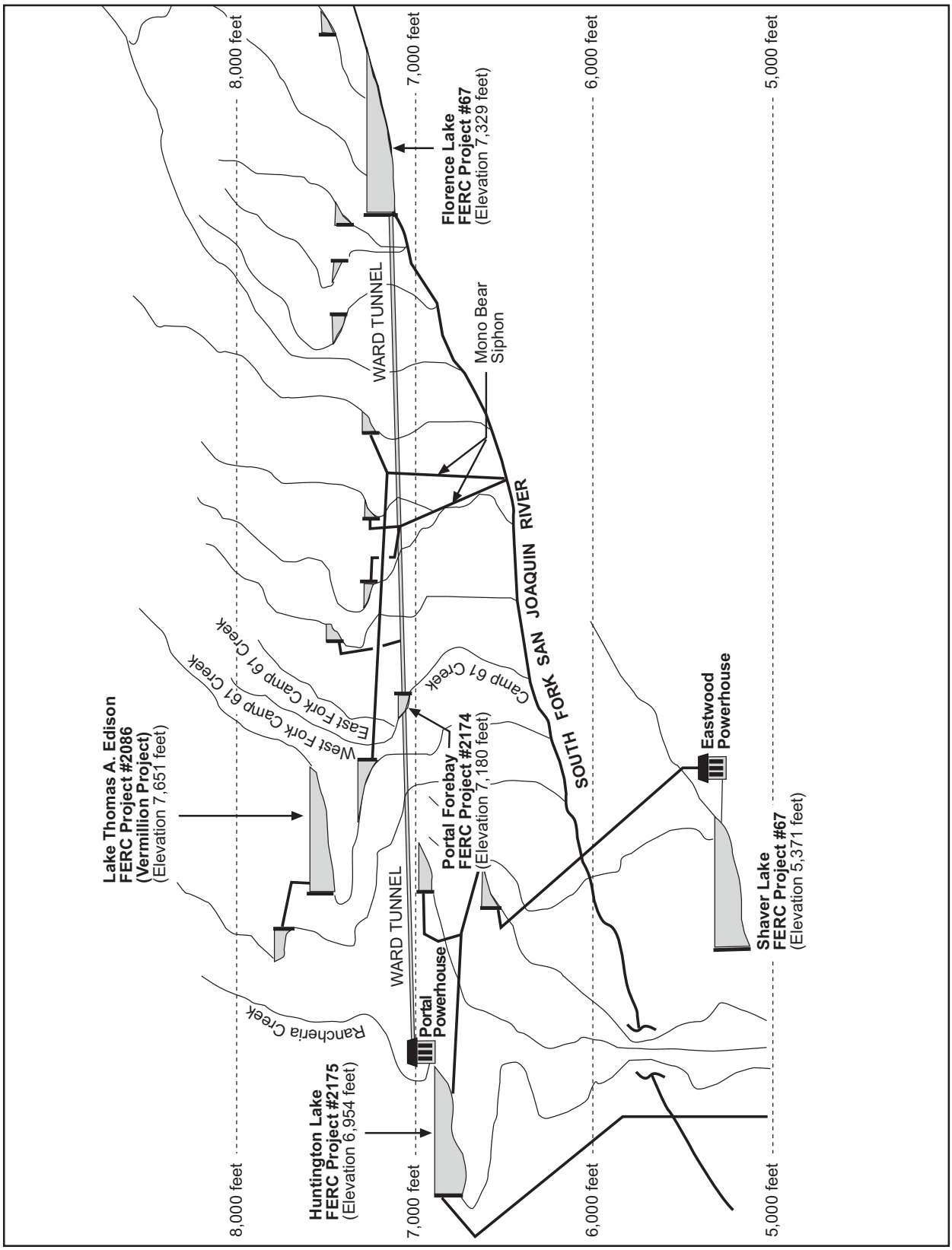


Figure 1. Upper Big Creek hydroelectric system. (Source: SCE, 2003, as modified by staff)

Figure 2
Page 3

Public access for the above information is available only through the Public Reference Room, or by e-mail at public.referenceroom@ferc.gov.

Figure 3
Page 4

Public access for the above information is available only through the Public Reference Room, or by e-mail at public.referenceroom@ferc.gov.

In this final environmental assessment (final EA), we assess the environmental and economic effects of (1) operating the project as proposed by SCE and (2) operating the project with most of SCE's proposed measures and with additional measures recommended by staff and agencies. We also consider the No-action Alternative.

The major issues we considered include: (1) minimum instream flows for Camp 61 Creek; (2) erosion and sediment control in Camp 61 Creek and Adit 2 Creek; (3) riparian vegetation adjacent to Camp 61 Creek; (4) modification of the project boundary to include and exclude certain lands; (5) project-related recreation use; and (6) existing cultural resource sites.

## B. NEED FOR POWER

Under recent historical operating conditions, the Portal Project generates an average of 38,009 MWh[2] of electric energy per year. The energy generated by the project is transmitted to the SCE transmission and distribution system and is used to meet the power needs of SCE's customers. The project, which has a nameplate capacity of 10.8 MW, has a dependable capacity of 10.5 MW.

The Portal Project accounts for less than 1 percent of SCE's total hydroelectric capacity. Hydroelectric generation accounts for 1,150 MW (written testimony of W.D. Pagel, Manager, Eastern Region, Hydro Generation, SCE, before the National Parks, Recreation, and Public Lands Subcommittee of the U.S. House Committee on Resources, on April 29, 2004) of SCE's total generation supply of 5,000 MW (Hoover's, 2004). SCE is a publicly regulated utility supplying electricity to 4.6 million business and residential customers over a 50,000 square mile service area in coastal, central, and southern California. SCE system generation serves all customers through a diverse transmission system and with a generation mix based on many different resources, such as gas, coal, nuclear, hydroelectric, and purchases from other utilities or non-utility power producers.

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[2] SCE provided historical energy generation data for 1987 through 2003 (the last 2 years were provided in its response to our July 2, 2004, additional information request (AIR)). We analyzed the types of water year using the Four Rivers Index (CDWR, 2000) and determined that only four of the years were in the middle range (above normal, below normal, and dry) which is only 24 percent of the time. Under a longer 40-year period of record from 1958 through 1997, we estimate that 35 percent of the years would be dry, below normal, or above normal. This means that 65 percent of the years are either very wet or extremely dry (critical). We estimate that average annual energy over this longer period of record (1958–1997) may be as much as 50,096 MWh, and have adopted this figure as our baseline so as not to underestimate energy losses associated with instream and channel maintenance flows driven by the Four Rivers Index. The basis for the Four Rivers Index is explained on CDWR's website at http://watersupplyconditions.water.ca.gov/hydrologic.cfm and is a function of the previous year's water condition, current water year runoff through March, and forecast runoff for April through July.

SCE currently is unable to supply energy to all its customer loads from the SCE generation resources for all hours. SCE currently does not have the necessary resources, but does plan to develop or acquire additional generation plants, as evidenced by the Draft Documents For a Request for Electronic Energy Proposals from Eligible Renewable Resource Suppliers (SCE, 2005). If the project were not licensed, replacement power could not be generated by SCE and would have to be purchased to meet its load requirement.

To anticipate how the demand for electricity is expected to change in the region, we looked at the regional need for power as reported by the Western Electricity Coordinating Council (WECC) (WECC, 2004). The project is located in the California-Mexico Power (CMP) area of the WECC. The CMP area encompasses most of California and a part of Baja California in Mexico. The CMP area has a significant summer peak demand. For the period from 2004 through 2013, WECC forecasts peak demand and annual energy requirements in the area to grow at annual compound rates of 2.2 and 2.4 percent, respectively. Severe weather conditions in 1998 and 2000 affected the area, resulting in numerous curtailments of service to interruptible customers. Even with assumptions about future generation and transmission extension projects, statewide and local reliability problems exist in the short term. Resource capacity margins for the CMP area range between 22.8 and 39.4 percent of firm peak demand for the next 10 years. WECC anticipates that 5,541 MW of new capacity will come on line within the next 10 years in the CMP region of the WECC region. We conclude that the region has a need for power over the near term and power from the project could continue to help meet that need in the future.

SCE uses the electricity from the project to displace the use of gas-fired energy in California's South Coast Air Basin and to reduce air pollutant emissions. If the project were not relicensed, SCE would need to replace the capacity and output from the operation of the Portal Project, most likely through the operation of gas-fired generation facilities. This would increase air pollutant emissions in the basin. If SCE is unable to comply with South Coast Air Quality Management District's emission limits, SCE says that it will be required to compensate by further reducing emissions through boiler modification and installing emissions control equipment.

In summary, if licensed, the power from the project would continue to be useful in meeting SCE's needs as well as meeting a small part of the local and regional need for power. The project helps displace fossil-fueled electric power generation that the region now uses, thereby conserving non-renewable fossil fuels and reducing the emission of noxious byproducts caused by fossil-fuel combustion.

# III. PROPOSED ACTION AND ACTION ALTERNATIVES

## A. PROPOSED ACTION

SCE does not plan any major changes to the operational mode of the Portal Project. The project would continue to be operated as it has been in the past, but with minimum instream flow releases into Camp 61 Creek and channel and riparian maintenance flows released into Camp 61 Creek in above normal and wet water year types. Otherwise, SCE proposes only temporary modifications as needed to complete maintenance activities.

In addition, SCE proposes five modifications to the existing FERC project boundary; three areas to be removed, and two areas to be added. The areas proposed for removal from the current project boundary include (1) Camp 61 Creek from Portal forebay dam outlet works downstream to the confluence with the SFSJR, (2) Eastwood Overflow Campground, and (3) Rancheria Creek downstream of Portal powerhouse. The areas proposed to be added to the current project boundary include (1) gaging stations on the East and West Forks of Camp 61 Creek, and (2) the Adit 2 leakage weir.

In its December 16, 2004 reply comments to the U.S. Forest Service (FS) preliminary Section 4(e) conditions, SCE described a new proposal to address the active erosion in Adit 2 Creek (figure 3). This proposal included two components. The first component involves the construction of a new channel to re-route runoff from Adit 2 Creek to Camp 61 Creek so as to reduce flows in the Adit 2 channel. The second component includes the installation of porous check dams in Adit 2 Creek to prevent further downcutting of the channel and the establishment of vegetation to improve channel stability. We analyze the environmental effects of SCE's new proposal in this final EA.

### 1. Project Facilities

The Portal Project is one of seven FERC-licensed projects that are part of a hydroelectric system owned and operated by SCE and known collectively as the Big Creek Hydroelectric System (BCHS). Water is conveyed from Florence Lake (SCE's Project No. 67), through the Portal Project to Huntington Lake (SCE's Project No. 2175). Figure 1 depicts the upper portion of the BCHS, which includes the Portal Project.

The existing Portal Hydroelectric Project consists of (1) a 795-foot-long compacted earth and rock-fill dam; (2) Portal forebay, with a 325-acre-foot usable storage capacity at elevation 7,180 feet mean sea level (msl); (3) an open channel spillway at the left abutment of the dam, discharging into Camp 61 Creek; (4) an outlet channel consisting of (a) the Adit 2 tunnel and shaft between Portal forebay and Ward tunnel (*see* figure 3), (b) a rock trap immediately downstream of a surge chamber, and

(c) a 1,180-foot-long penstock from the rock trap to where it bifurcates just upstream of the Portal powerhouse; (5) a 10.8-MW turbine-generating unit located in the concrete powerhouse; and (6) a 2.5-mile-long 480-volt distribution line. The Ward tunnel is used to convey water from the Portal forebay to the powerhouse, although the tunnel is included under SCE's license for Project No. 67.

### 2. Project Safety

The Portal Project has been operating for over 50 years under the existing license and during this time, Commission staff has conducted operational inspections focusing on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance. In addition, the project has been inspected and evaluated every 5 years by an independent consultant and a consultant's safety report has been submitted for Commission review. As part of the relicensing process, the Commission staff would evaluate the continued adequacy of the proposed project facilities under a new license. Special articles would be included in any license issued, as appropriate. Commission staff would continue to inspect the project during the new license term to assure continued adherence to Commission-approved plans and specifications, special license articles relating to construction (if any), operation and maintenance, and accepted engineering practices and procedures.

### 3. Project Boundary

The Portal Project FERC boundary consists of two non-contiguous areas. One area encompasses the Portal powerhouse adjacent to Rancheria Creek (figure 2) and the second area encompasses the Portal Forebay dam (figure 3).

The project facilities located within the project boundary in the powerhouse area include the powerhouse, penstock, surge chamber, and a buried overflow pipe between the surge chamber and Rancheria Creek. The overflow pipe includes an energy dissipation structure and dike at Rancheria Creek. The Eastwood Overflow Campground and the segment of Rancheria Creek downstream of the powerhouse to its confluence with Huntington Lake, a distance of approximately 1,000 feet, is also included within the project boundary.

The project facilities within the project boundary in the forebay area include the forebay dam and spillway, Adit 2 tunnel, an inlet structure to the Adit 2 tunnel, gaging station SCE 168 (measuring forebay water surface elevations), and the Portal Forebay Campground. A short segment of the East and West Forks of Camp 61 Creek (approximately 200 feet) are within the project boundary as these creeks flow into the forebay. Some upland area immediately adjacent to the forebay is also within the project boundary and is used for dispersed recreation activities (e.g., fishing).

Two linear features contiguous with the forebay area are also included in the project boundary. The communication and distribution line is 50 feet wide and follows approximately a southwest direction from the forebay for 2.5 miles. Camp 61 Creek from the forebay to its confluence with the SFSJR includes an area of 50 feet on each side of the center line of Camp 61 Creek following a northerly direction for a distance of 1.9 miles.

Short segments of roads accessing project facilities (e.g., powerhouse) are within the project boundary; while other road segments that are not within the project boundary also provide access to project facilities. Short segments of the Kaiser Pass Road (FS Road 5S80) traverse the project boundary in both the powerhouse and the forebay areas.

### 4. Project Operation

The Portal powerhouse is located at the downstream end of Ward tunnel and adjacent to Rancheria Creek immediately upstream of Huntington Lake (figure 2). Ward tunnel (FERC Project No. 67) transports water from upper SFSJR diversions and reservoirs (FERC Project Nos. 67 and 2086) to Huntington Lake for power production in the lower BCHS. The Portal powerhouse produces power from the differential head available while transferring water from the upper SFSJR diversions and reservoirs to Huntington Lake.

The majority of the water transferred within the Ward tunnel, and being used for power production at the Portal Powerhouse, is associated with other FERC projects (Nos. 67 and 2086) within the BCHS. The remainder of the water within the Ward tunnel is a direct result of diversions specifically for the Portal Project. The Portal Project impounds water from the East and West Forks of Camp 61 Creek to create the Portal forebay (figure 3). The Portal forebay has a usable capacity of 325 acre-feet and does not serve as a water storage facility. Water from the Portal forebay is diverted into Ward tunnel through a vertical shaft into the Adit 2 tunnel. The Adit 2 tunnel is a small branch of the Ward tunnel that diverts water from the Portal forebay into Ward tunnel. A primary function of the Portal forebay is to equilibrate the head in the downstream portion of the Ward tunnel to facilitate power production at the Portal powerhouse. Depending on project operating conditions, the adit, at different times, allows water to flow into or out of the Portal forebay.

The volume of water being transferred through the Ward tunnel is determined by the needs of the BCHS (FERC Nos. 67 and 2086) and is not adjusted to meet power production goals at the Portal powerhouse. The Portal powerhouse therefore serves as a means to capture excess head from water that is being transferred between other hydroelectric projects.

The Portal powerhouse operation may be controlled either locally from the powerhouse or remotely from the Big Creek No. 3 control center. When the flow in

Ward tunnel exceeds 746 cfs, the excess is bypassed through the Howell-Bunger (H-B) valve at the Portal powerhouse. Because of the construction of the bifurcation device that splits the penstock to supply the turbine and the H-B valve, the bypassed release flow immediately begins to negatively affect the pressure at the turbine. As flow increases above 746 cfs, pressure and generator load incrementally decrease. When the flow in Ward tunnel exceeds 1,500 cfs, the turbine must be shut down because of insufficient head, and all flow goes through the H-B valve.

### 5. Environmental Measures

SCE proposes the following programs, measures, or facilities to augment conditions in the existing FERC license.

**Water Resources and Aquatic Resources**

- Provide a minimum instream flow to Camp 61 Creek downstream of the Portal forebay. The proposed flows are based on anticipated benefits to aquatic habitat and would mitigate temperature and dissolved oxygen (DO) effects in Camp 61 Creek.

| Date | Flow (cfs) |
|---|---|
| March 1–July 31 | 7 day average of 1.0 cfs, instantaneous floor of 0.7 cfs |
| August 1–February 28/29 | 7 day average of 0.5 cfs, instantaneous floor of 0.3 cfs |

- Provide channel and riparian maintenance flows into Camp 61 Creek between April 1 and July 31 during above normal or wet water year types. Flows would be released over a 10-day period, ramping up to 28 cfs in an above normal water year and up to 39 cfs in a wet water year type.

- Construct a new channel to re-route runoff from Adit 2 Creek to Camp 61 Creek. This measure is intended to reduce the flow of water down Adit 2 Creek and prevent further erosion of the channel.

- Install porous check dams in Adit 2 Creek to stabilize channel downcutting and establish vegetation to prevent ongoing erosion. This measure would be conducted after the completion of a new channel to route flow away from Adit 2 Creek.

- Modify the existing catchment basin downstream of Portal dam to increase the rate of aeration downstream of the catchment basin and better contain elevated iron concentrations.

- Investigate the feasibility of conducting periodic iron residue removal from the catchment basin, using a vacuum truck. Removal of the iron residue would mitigate the visual effect of the iron staining and reduce the potential for iron residue to be transported downstream into Camp 61 Creek.

- Perform limited additional water quality sampling and analyses, as needed and appropriate, in consultation with resource agencies to determine the effectiveness of this measure. If the Regional Water Quality Control Board (RWQCB) determines that a National Pollution Discharge Elimination System (NPDES) permit is required, SCE will work with the RWQCB to obtain any necessary permits.

- Develop and implement a plan to monitor fish populations in Camp 61 Creek in years 5, 10, and 20 during the term of any new license issued.

- Develop and implement a plan to monitor project-related sediment accumulation and spawning gravel in Camp 61 Creek upstream and downstream of the confluence with the Adit 2 channel. Sediment monitoring would include baseline surveys plus three additional surveys in conjunction with the fish population monitoring.

**Terrestrial Resources**

- Monitor bank stability and riparian vegetation along Camp 61 Creek in conjunction with baseline sediment survey described above, then again in years 10, 20, and 30.

- Develop a vegetation management plan that addresses special-status plant species, wetlands, and other sensitive habitats, including riparian communities. This plan would include a noxious weed management program that would address the use of herbicides.

**Recreational Resources**

- Conduct recreation surveys and file a report on project-induced recreation every sixth year.

- Develop and implement, in consultation with FS, a recreation plan addressing the development and management of project-related recreation use and opportunities, including scheduling the implementation of several improvements at the Portal Forebay Campground.

**Land Management**

SCE proposes five modifications to the existing project boundary, including areas proposed for removal and areas for inclusion. Figures 2 and 3 depict the location of these

areas. SCE also proposes to develop management plans to address the use and occupancy of FS lands.

- Areas proposed for removal from the current project boundary include:

    1. Camp 61 Creek from Portal forebay dam outlet works downstream to the confluence with the South Fork San Joaquin River—This reach, bypassed by the current diversion at Portal forebay, is a natural stream channel, not part of the project features, and SCE does not require any special access to the stream banks beyond its outlet works. SCE believes it is not necessary for this reach to be included within the project boundary for the safe and efficient operation and maintenance of the project, nor for other specified project purposes, such as public recreation or protection of environmental resources.[3]

    2. Eastwood Overflow Campground—The campground is already within the project boundary of two other FERC-licensed projects owned and operated by SCE; Big Creek Nos. 1 & 2 (FERC Project No. 2175) and Big Creek Nos. 2A, 8, and Eastwood (FERC Project No. 67), which are the subject of pending relicensing proceedings. The inclusion of the same land within three project boundaries is confusing and unnecessary. SCE believes this area would be more properly included within FERC Project No. 2175 because it serves recreation visitors to Huntington Lake.

    3. Rancheria Creek downstream of Portal powerhouse (Portal tailrace)—SCE believes Rancheria Creek should be deleted from the project boundary because it is a natural streambed and SCE does not require any special access to the stream banks beyond its outlet works. SCE believes it is not necessary for this reach to be within the project boundary for the safe and efficient operation and maintenance of the project, nor for other specified project purposes, such as public recreation or protection of environmental resources.

- Areas proposed for incorporation into the project boundary include:

    1. Gaging stations on the East and West Forks of Camp 61 Creek—The gages are currently included in the project boundary of FERC Project No. 67 (Big Creek Nos. 2A, 8, and Eastwood), but their purpose is to allow SCE to measure the contribution of flow from the East Fork and West Fork Camp 61 Creek into the Portal forebay. Therefore, SCE believes

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[3] SCE proposes to construct a channel between Adit 2 Creek and Camp 61 Creek. If this proposal were to be adopted, the portion of Camp 61 Creek affected by the channel would be included under the Portal Project license to provide for operation and maintenance of the channel.

these gages should be removed from the project boundaries of FERC Project No. 67 and included in the Portal Project boundary.

2. Adit 2 leakage weir—SCE believes the weir should be included within the Portal Project boundary because it is one of the principal project works and it is necessary for SCE to maintain and monitor it for the safe and efficient operation of the project.

- Development of plans to address transportation and road management, fire management, signage, hazardous substances, and visual management.

**Cultural Resources**

- As part of the Big Creek Alternative Licensing Process (ALP), SCE is developing a comprehensive historic properties management plan (HPMP) that is intended to cover operation and maintenance activities for all of the BCHS projects. The comprehensive HPMP would also address historical properties associated with the Portal Project.

## B. STAFF'S ALTERNATIVE

We recommend the implementation of SCE's proposed measures, except their proposed minimum instream flow regime, construction of a new channel between Adit 2 Creek and Camp 61 Creek, and installation of porous check dams and vegetation in Adit 2 Creek. In addition, we recommend that SCE be required to do the following:

**Water Resources and Aquatic Resources**

- Provide a flow release to Camp 61 Creek as follows, in all water year types:

| Date | Flow (cfs) |
|---|---|
| March 1–July 31 | 7 day average of 1.0 cfs, instantaneous floor of 0.7 cfs |
| August 1–September 30 | 7 day average of 0.5 cfs, instantaneous floor of 0.3 cfs |
| October 1–December 15 | 7 day average of 1.0 cfs, instantaneous floor of 0.7 cfs |
| December 16–February 28/29 | 7 day average of 0.5 cfs, instantaneous floor of 0.3 cfs |

- Develop and implement an instream flow management plan that would describe existing or proposed provisions for the purposes of measuring and

documenting compliance with the required minimum instream flows in the Camp 61 Creek bypassed reach.

- Implement a restriction on downramping rates to less than 6 inches per hour with channel and riparian maintenance flows.

- Develop, in consultation with California State Water Resources Control Board (SWRCB), and implement a water temperature and dissolved oxygen (DO) monitoring plan to document the effectiveness of increasing DO through modification of the catchment basin.

- Develop and implement a plan in coordination with the FS and the California State Water Resources Control Board (SWRCB) to reduce the active channel and stream bank erosion that is occurring in Adit 2 Creek between river mile (RM) 0.3 and 0.5.

- Continue stocking rainbow trout from SCE's own trout-rearing facility in consultation with the California Department of Fish and Game (CDFG) to support recreational fishing in the Portal forebay, and provide 50 percent of the costs of fish production.

**Terrestrial Resources**

- Prepare a biological evaluation (BE) for FS approval before constructing any new project features on National Forest System (NFS) lands to evaluate potential effects on Forest Service sensitive (FSS) species or management indicator species (MIS) and monitor effectiveness of mitigation measures, if any are needed.

- Monitor riparian vegetation along Camp 61 Creek as part of fish population and sediment monitoring.

- Consult with FS to identify and implement measures to protect existing populations of subalpine fireweed growing near the distribution/ communication line corridor.

- Develop and implement a fish and wildlife management plan to address stocking fish in the Portal forebay, limited operating periods to protect special status birds, and monitoring for special status amphibians and bats.

- Monitor ground-disturbing activities annually for three years following implementation to detect and map new weed populations.

- Conduct systematic surveys for noxious weeds and non-native invasive plant occurrences at project facilities, roads, trailheads, and recreation features every five years through the term of any new license.

**Threatened and Endangered Species**

- Develop and implement a plan to monitor bald eagles as part of the fish and wildlife management plan.

**Recreational Resources**

- Develop and implement a recreation report and recreation plan in consultation with the FS. The recreation plan should include scheduling the implementation of several improvements at the Portal Forebay Campground. The recreation report should include results from the recreation use survey and be filed every sixth year following the schedule of Form 80 filing. Recreation surveys should include specific questions about angler interactions with the power line crossing Portal forebay.

**Land Management**

- Develop and implement a single comprehensive land management plan in consultation with the FS. This plan should included components to address transportation and access roads, fire prevention and response, signage requirements, and the management of hazardous substances.

**Cultural Resources**

- Develop SCE maintenance procedures to ensure that adverse effects on archaeological sites PL-KAI-001 and CA-FRE-369 are avoided.

## C. NO-ACTION ALTERNATIVE

Under the No-action Alternative, the project would continue to operate under the terms and conditions of the existing license and no new environmental protection, mitigation, or enhancement measures would be implemented. We use this alternative to establish baseline environmental conditions for comparison with other alternatives.

## D. ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

We eliminated the following alternatives from detailed study in the final EA.

### 1. Federal Government Takeover

We do not consider federal takeover to be a reasonable alternative. Federal takeover of the Portal Project would require Congressional approval. Although that fact alone would not preclude further consideration of this alternative, there is currently no evidence showing that a federal takeover should be recommended to Congress. No party has suggested that federal takeover would be appropriate and no federal agency has expressed an interest in operating the Portal Project.

### 2. Nonpower License

A nonpower license is a temporary license the Commission would terminate whenever it determines that another governmental agency is authorized and willing to assume regulatory authority and supervision over the lands and facilities covered by the nonpower license. At this time, no governmental agency has suggested a willingness or ability to take over the project. No party has sought a nonpower license, and we have no basis for concluding that the Portal Project should no longer be used to produce power. Thus, we do not consider a nonpower license a reasonable alternative.

### 3. Project Retirement

Retiring the project would require denying SCE's license application and require the surrender and termination of SCE's existing license with any necessary conditions. The project would no longer be authorized to generate power. There would be substantial costs involved with retiring the project or removing any project facilities. Because the project is integral to the remaining Big Creek System, it is likely that hydraulic control works would still remain in place even if the turbine-generations were removed. Finally, retirement would foreclose any opportunity to add environmental enhancements to the existing project. At this time, no governmental agency, tribal interest, non-governmental organization, or individual has recommended project retirement. For these reasons, we do not consider project retirement to be a reasonable alternative.

## IV. CONSULTATION AND COMPLIANCE

## A. AGENCY CONSULTATION AND INTERVENTIONS

The Commission's regulations require applicants to consult with appropriate state and federal environmental resource agencies, Native American tribes, and the public before filing a license application. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, the Endangered Species Act (ESA), the National Historic Preservation Act of 1966 (NHPA), and other federal statutes. Pre-filing

consultation must be completed and documented in accordance with the Commission's regulations.

### 1. Scoping

Before preparing the draft EA, we conducted scoping to determine what issues and alternatives should be addressed. Scoping document 1 (SD1) was distributed to interested agencies and other parties on April 1, 2004.

The following entities filed written comments on the SD1:

| Entity | Date Filed |
|---|---|
| Southern California Edison | April 27, 2004 |
| U.S. Forest Service, Sierra National Forest | April 27, 2004 |

In its comment letter, SCE offered corrections and clarifications regarding project facilities and operations. SCE also clarified its proposal regarding additional water quality sampling and provided additional information about the absence of listed fish species in the Portal Project vicinity. We have incorporated this information into the final EA.

FS commented on the need for instream flow releases into Camp 61 Creek that would assist SCE in meeting basin water quality objectives, improving conditions for aquatic species, and supporting riparian habitat. FS also recommended that the EA address entrainment at the project powerhouse and reiterated that the EA should address potential project effects on the relictual salamander, a sensitive species on the SNF. FS further provided additional description of recreational facilities in the project area and identified FS objectives for recreational opportunity and visual quality management in the project area. FS made one recommendation regarding cultural resources, requesting that the EA include a discussion on the current status of the Huntington Lake Historic Recreation District. We have addressed each of the FS comments in this final EA.

### 2. Interventions

On May 21, 2003, the Commission issued a notice that SCE's license application for the Portal Project had been accepted and requested motions to intervene and protests. The deadline for interventions to be filed was July 21, 2003. The following entities filed motions to intervene:

| Intervenor | Date Filed |
|---|---|
| U.S. Department of Interior, Office of the Solicitor | July 21, 2003 |
| U.S. Department of Agriculture, Forest Service | July 18, 2003 |

### 3. Ready for Environmental Analysis

The Commission issued a Ready for Environmental Analysis (REA) notice on August 12, 2004. The deadline for filing comments, terms and conditions was October 11, 2004. FS provided preliminary Section 4(e) terms and conditions for the project by letter filed with the Commission on October 8, 2004.

### 4. Comments on the Draft EA

The Commission issued the draft EA for the Portal Project on August 4, 2005, and requested that any comments be filed within 30 days. The following entities commented:

| Entity | Date Filed |
|---|---|
| U.S. Fish and Wildlife Service | September 1, 2005 |
| Southern California Edison | September 1, 2005 |
| U.S. Forest Service | September 2, 2005 |
| U.S. Geological Survey | September 7, 2005 |

We modified the text of the final EA in response to these comments, where necessary. Appendix A summarizes each of the comments received, according to resource area, and provides a staff response.

## B. COMPLIANCE

### 1. Water Quality Certification

By letter dated July 15, 2004, SCE applied to the California SWRCB for Water Quality Certification (WQC) for the Portal Project, pursuant to Section 401 of the Clean Water Act. On August 27, 2004, the SWRCB acknowledged receipt of the request. The SWRCB informed SCE that receipt of the letter started a one-year time clock, beginning July 15, 2004, for the agency to act on SCE's request.

By letter dated July 5, 2005, SCE simultaneously withdrew and re-filed its application for a water quality certificate, as recommended by SWRCB staff (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA to C. Cantu, Executive Director, SWRCB, Sacramento, CA).

### 2. Section 18 Fishway Prescriptions

Section 18 of the FPA, 16 U.S.C. § 811, states that the Commission shall require construction, maintenance and operation by a licensee of such fishways as the Secretaries of the Department of Commerce or the Department of the Interior (Interior) may prescribe, as appropriate. Neither department submitted Section 18 prescriptions for the Portal Project.

### 3. Section 4(e) Conditions

FS filed preliminary Section (4e) terms and conditions for the project on October 8, 2004. SCE filed comments on the FS preliminary Section 4(e) conditions on December 16, 2004, in which it modified the original proposals for flow releases, resource monitoring, and recreation and land management measures (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004).

SCE also objected to several of the conditions that FS considers standard, explained its disagreement with FS recommendations regarding boundary revisions, provided additional flow data for Camp 61 Creek, and proposed alternative channel and riparian maintenance flows for Camp 61 Creek. FS filed revisions to preliminary 4(e) condition no. 12, relating to instream and channel maintenance flows, on March 30, 2005. SCE informed the Commission that they planned to meet with FS to discuss flow conditions, and would file written comments thereafter (letter from R.W. Krueger, Vice President for Power Production, SCE, to the Commission, dated April 21, 2005). FS filed final 4(e) conditions on September 30, 2005. These can be found in Appendix B, and are summarized as follows:

Condition nos. 1 through 11, *Standard Conditions*—These are standard FS administrative provisions that would require SCE to consult with the FS on a yearly basis regarding measures to ensure protection and use of National Forest resources affected by the project.

Condition no. 12, *Flow Management*—SCE shall (a) provide minimum instream flows in Camp 61 Creek downstream of the Portal forebay[4], (b) provide a year-round gage on Camp 61 Creek downstream of the Portal forebay and document all flow releases in a publicly available format, (c) provide channel and riparian maintenance flows in Camp 61 Creek downstream of the Portal forebay during the spring runoff period, (d) monitor fish populations in Camp 61 Creek downstream of Portal forebay, (e) monitor sediment accumulations in Camp 61 Creek upstream and downstream of the confluence with the Adit 2 channel, (f) conduct quantitative riparian monitoring in the Camp 61 Creek bypassed reach, and (g) study structural methods that can be implemented to reduce sediment delivery from Adit 2 Creek to Camp 61 Creek.

Condition no. 13, *Protection of Forest Service Special Status Species*—Before taking any actions to construct new project features, SCE shall prepare a BE to assess the potential effects on FS sensitive status species or their critical habitat.

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[4] FS-specified minimum instream flows and channel and riparian maintenance flows are shown in tables 13 and 35.

Condition no. 14, *Recreation Resource Management*—SCE shall (a) prepare a report on the use of recreational resources every 6 years, (b) prepare a plan addressing the development and management of project-related recreational opportunities, (c) contribute funding to the FS for the operation and maintenance of project-related recreational facilities, and (d) fund and perform construction and rehabilitation of project-related recreational facilities.

Condition no. 15, *Transportation System*—SCE shall (a) prepare a transportation system management plan for the protection and maintenance of roads associated with the Portal Project, (b) implement safety measures during construction or maintenance activities on FS roads open to public travel that are associated with the Portal Project, (c) allow unrestricted use of roads within the project area for the administration and management of federal lands and resources, and (d) confine all project vehicles to roads or specifically designed access routes.

Condition no. 16, *Land Resource Plans*—SCE shall prepare the following plans for mitigation of the project effects on NFS resources; (a) fire management and response plan, (b) visual management plan, (c) sign plan, and (d) hazardous substance plan.

Condition no. 17, *Vegetation and Invasive Weed Management Plan*—SCE shall (a) prepare an invasive weed management plan to identify actions and strategies to prevent and control the spread of aquatic and terrestrial weeds, and (b) prepare a vegetation management plan to address revegetation of disturbed sites and hazard tree removal.

Condition no. 18, *Cultural Resource Management Plan*—SCE shall prepare and implement a cultural resources management plan.

Condition no. 19, *Coordination with Projects in the Big Creek System*—FS reserves the right to revise the Section 4(e) conditions based on the results of the Basin-Wide Big Creek Analysis and the relicensing efforts for the Big Creek Hydropower Projects.[5]

Condition no. 20, *Reservation of Rights to Revise 4(e) Conditions in Response to Other Agency Requirements*—FS reserves the right to modify the conditions in response to the U.S. Fish and Wildlife Service (FWS) biological opinion issued for the Portal Project and the WQC issued by the SWRCB.

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[5] Currently, SCE is in the process of collaboratively developing a basin-wide cumulative impacts assessment for the Big Creek basin as a component of their relicensing efforts for other projects within their Big Creek Hydroelectric System; Big Creek Nos. 1 and 2, Project No. 2175; Big Creek Nos. 2A, 8 and Eastwood, Project No. 67; Big Creek No. 3, Project No. 120; Mammoth Pool Project No. 2085; and Vermillion Valley Project No. 2086.

### 4. Alternative Section 4(e) Conditions under the Energy Policy Act of 2005

On December 19, 2005, the Commission received a copy of SCE's filing to the FS proposing alternative 4(e) conditions in response to FS final 4(e) conditions and seeking a trial-type hearing to resolve disputed issues of material fact with respect to certain FS 4(e) conditions. The rules establishing the trial-type hearing and consideration of alternative conditions and prescriptions submitted by any party to a license proceeding implement section 241 of the Energy Policy Act of 2005 and are contained in *Resource Agency Procedures for Conditions and Prescriptions in Hydropower Licenses: Interim Final Rule*.[6]

On March 10, 2006, FS notified SCE that an answer to the request for a trial-type hearing, including a decision whether to refer the case for hearing, would be issued no later than June, 30, 2006 (letter from Joel D. Holtrop, Deputy Chief for National Forest System, U.S. Department of Agriculture, to Nino J. Mascolo, Senior Attorney, SCE).

SCE's alternatives to FS 4(e) conditions include a recommendation to eliminate FS condition no. 7 (Surrender of License or Transfer of Ownership) or, in the alternative, recommends language changes to condition no. 7 that address the timing and level of National Forest System restoration associated with license surrender, financial assurances, and SCE's role in the transfer of a project license. SCE's alternative conditions also recommend language changes to condition no. 8 regarding indemnification; and to condition no. 9 regarding damage to the lands, property and interests of the United States arising from construction, maintenance, and operation of the project works. Furthermore, SCE requests a hearing of, and makes proposed revisions to: (1) FS condition no. 12 (a), minimum flow requirements; (2) FS condition no. 12 (c), channel and riparian maintenance flows; (3) FS condition no. 12 (d)(2), sediment monitoring program within Camp 61 Creek; (4) FS condition no. 14 (c), annual funding of Portal Forebay Campground policing, monitoring and maintenance of concessionaires and dispersed recreation; (5) FS condition 14 (d)(14), relocation of the electric line that crosses Portal forebay for angler safety; (6) FS condition 14 (d)(15), installation of a water supply system at Portal Forebay Campground; and (7) FS condition 16 (b), relocation of the electric line that crosses Portal forebay to meet visual standards. These seven project-specific alternative conditions, as proposed by SCE, are analyzed within the corresponding resource areas in section V, *Environmental Analysis*, and section VII, *Comprehensive Development*.

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[6] 70 Fed. Reg. 69,808 (November 17, 2005), issued jointly by the U.S. Department of Agriculture, the U.S. Department of the Interior, and the U.S. Department of Commerce (NOAA).

### 4. Endangered Species Act

Section 7 of the ESA requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered and threatened species or to cause the destruction or adverse modification of the critical habitat of such species. In section V.C.4, *Threatened and Endangered Species*, of this final EA, we conclude that continued operation of the Portal Project would not likely adversely affect the bald eagle. By letter filed September 1, 2005, FWS stated their concurrence with this finding.

### 5. National Historic Preservation Act

Section 106 of the NHPA (Section 106) requires that federal agencies consider the effects of their actions along with actions that they may assist, permit, or license, on historical properties, and that those agencies give the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such actions. Section 106 applies to properties that have been listed in the National Register of Historic Places (National Register), properties that have been determined to be eligible for inclusion in the National Register and that may be eligible but which have not yet been evaluated.

Cultural resource assessments of the Portal Project were submitted to the California State Historic Preservation Officer (SHPO) and the ACHP on March 28, 2002 and March, 26, 2003. The Commission resubmitted these assessments to the SHPO and ACHP on February 4, 2005, along with its finding that, in accordance with 36 CFR 800.5(c), no historic properties would be adversely affected by relicensing the Portal Project.

### 6. Section 10(j) Recommendations

Under Section 10(j) of the Federal Power Act (FPA), each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project.

There were no Section 10(j) recommendations filed by federal and state fish and wildlife agencies on the Portal Project.

FWS made several recommendations regarding the project in its comments on SCE's draft license application (letter from D.L. Harlow, Acting Field Supervisor, FWS, Sacramento, CA, to N.J. Mascolo, Senior Attorney, SCE, Rosemead, CA, dated March 11, 2003). Because the letter was filed prior to filing of the application, we do not consider the comments as formal 10(j) recommendations. However, we note FWS concerns and reference the comment letter in each of the applicable sections of our environmental analysis. In their letter of September 1, 2005, commenting on the draft EA, FWS states their support for FS 4(e) conditions regarding instream flows and

monitoring and management plans regarding vegetation, fish and wildlife, but submits no Section 10(j) recommendations.

# V. ENVIRONMENTAL ANALYSIS

The environmental analysis section is divided into four parts. In addition to the No-action Alternative, these contain (1) a general description of the project vicinity, (2) an explanation of the scope of our cumulative effects analysis, and (3) our analysis of the proposed action and other recommended environmental measures.

## A. GENERAL DESCRIPTION OF THE RIVER BASIN

The Portal Project is located in the central Sierra Nevada within the upper SFSJR watershed, approximately 40 miles northeast of the city of Fresno. The terrain is rugged, with elevations ranging from 6,952 feet msl at the Portal powerhouse to 7,180 feet msl at the Portal forebay. The climate of the project area is typical of the central Sierra Nevada at this elevation, with warm, dry summers and cold winters. Annual precipitation averages 20 to 40 inches and occurs mostly in the form of snow. More precipitation occurs on the west side of Kaiser Ridge where the Portal powerhouse is located than on the east side of the ridge where the Portal forebay is located.

The geology of the project vicinity is characterized primarily by Mount Givens granodiorite, a component of the eroded and weathered granitic rock of the Sierra Nevada batholith. Glacial and colluvial soils surround the powerhouse site and are also found near the Portal forebay. Soils are generally poor and acidic, supporting mixed conifer forest and mixed montane chaparral. Common wildlife species include mule deer, black bear, western gray squirrel, mountain quail and band-tailed pigeon.

Stream gradients are mostly steep. Steep gradients limited the distribution of fish to elevations below 5,900 feet msl, until European-American settlers began stocking trout well over 100 years ago. Currently, project area streams support populations of rainbow, brown, and brook trout. A single rainbow-golden trout hybrid was also captured in East Fork Camp 61 Creek in 2001.

The Portal Project is located on public land administered by the FS. Land uses adjacent to the project are primarily forest management and recreation. The Ansel Adams Wilderness borders the north side of the Portal forebay, while the Kaiser Wilderness is located a short distance north of the Portal powerhouse.

## B. SCOPE OF CUMULATIVE IMPACT ANALYSIS

According to the Council on Environmental Quality's regulations for implementing NEPA (15 CFR § 1508.7), a cumulative effect is the effect on the environment that results from adding the effect of an action to other past, present, and

reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and water development activities.

Based on information in the license application, scoping, agency comments, and preliminary staff analysis, we have identified that water resources, aquatic resources, native aquatic amphibians, and recreation have the potential to be cumulatively affected by the continued operation of the Portal Project in combination with other activities in the basin.

### 1. Geographic Scope

Our geographic scope of analysis for cumulatively affected resources is defined by the physical limits or boundaries of (1) the proposed actions' effect on the resources, and (2) the contributing effects from other hydropower and non-hydropower activities within the Upper San Joaquin River Basin.

The Portal Project uses the interbasin transfer of flow from SCE's Project No. 67 to SCE's Project No. 2175 for generation, and therefore is included in the Big Creek Hydro System (figure 1). We identified the Upper San Joaquin River Basin above Millerton reservoir as the appropriate geographic area for evaluating cumulative effects because ongoing activities throughout the basin (such as flow diversions and recreational development) could potentially cumulatively affect water resources, aquatic resources, native aquatic amphibians, and recreation.

### 2. Temporal Scope

The temporal scope of our cumulative analysis in the final EA will include a discussion of past, present, and future actions and their effects on each resource that could be cumulatively affected. Based on the term of a new license, the temporal scope will look 30 to 50 years into the future, concentrating on the effect on the resources from reasonably foreseeable future actions. The historical discussion will, by necessity, be limited to the amount of available information for each resource. The quality and quantity of information, however, diminishes as we analyze resources farther away in time from the present.

## C. PROPOSED ACTION AND ACTION ALTERNATIVES

In this section, we discuss the effects of the project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which we measure effects. We then discuss and analyze the specific environmental issue. Only the resources that would be affected, or

about which comments have been made by interested parties, are included in detail in this final EA and discussed in this section. Unless otherwise noted, all information presented in our affected environment descriptions is based on SCE's final application for new license, SCE's responses to our additional information requests (AIRs), FS preliminary 4(e) terms and conditions, and SCE's response to those conditions.

## 1. Water Resources

a. Affected Environment:

### Water Quantity

The Portal Project uses water resources of the upper portion of the SFSJR Basin and its tributaries to generate electricity. The basin drains a portion of the central Sierra Nevada in east-central California. Major tributaries include Evolution, Paiute, Bear, and Mono Creeks.

The flows from East Fork Camp 61 Creek (2.2-square mile drainage area) and West Fork Camp 61 Creek (2.9-square mile drainage area) are intercepted at the Portal forebay. Camp 61 Creek watershed encompasses 7.9 square miles of drainage area at the confluence with the SFSJR, so the project affects about 65 percent of the Camp 61 Creek watershed by intercepting the East and West fork flows. The confluence is located about 1.9 miles northeast of the forebay. Currently, there is no minimum instream flow downstream of the forebay into Camp 61 Creek. Water from the forebay flows into Ward tunnel and, from there, either to the Portal powerhouse and then into the tailrace or through the Howell-Bunger valve directly into the Portal tailrace. *See* the "Project Operation" section (III.A.3), above. Water from the Portal tailrace flows southwesterly into Rancheria Creek and after passing under State Highway 168, Rancheria Creek flows into Huntington Lake.

Groundwater resources in the project vicinity are formed by aquifers including river alluvium or cracks, fissures, and pockets in bedrock. Groundwater is recharged by spring and summer snowmelt, as well as rainfall.

*Climate*

The basin above the Portal Project is characterized by dry, cool summers and moderate fall and winter precipitation falling primarily as snow between November and March. The elevation of the project ranges from 6,952 feet msl at the Portal powerhouse to 7,180 feet msl at the Portal forebay. Mean annual precipitation in the basin ranges from 20 inches in eastern portions of the basin in the vicinity of the forebay to 40 inches in the western portion of the basin including the west side of Kaiser Ridge where the powerhouse is located. Most of the snow pack in the project area melts during June and July.

*Water Use*

Water use associated with the Portal Project is for hydroelectric power production; water use for consumptive purposes does not occur at the project. The majority of water used for generation at the Portal Project is routed from SCE's Vermilion Valley Project (FERC No. 2086) and SCE's Big Creek 2A, 8 and Eastwood Project (FERC No. 67). The Vermilion Valley Project includes the 125,035 acre-foot Lake Thomas Edison. The Big Creek 2A, 8 and Eastwood Project includes the 64,506-acre-foot Florence Lake. Water is routed through the Ward tunnel from these two reservoirs to the Portal Project. Additional water is diverted from Mono Creek, Bear Creek and several other small creeks into the Ward tunnel. These diversions are also part of the Big Creek 2A, 8 and Eastwood Project. Because SCE is using the Ward tunnel primarily[7] to serve the Big Creek 2A, 8 and Eastwood Project, the hydro project effects associated with the aforementioned facilities will be evaluated under that proceeding (SCE, 2003).

*Water Rights*

Water rights for the Portal Project are based on SWRCB Permit No. 20672. This permit was issued July 20, 1993, and allows up to 84 cfs to be diverted for power[8] (SWRCB, 2004). SCE applied to cancel a second permit (SWRCB Permit No. 20704) as unnecessarily duplicative because the maximum possible diverted flow is 30 cfs from East Fork Camp 61 Creek and 47 cfs from West Fork Camp 61 Creek, totaling 77 cfs, which is encompassed by SWRCB Permit No. 20672. A search of the California Water Rights database indicates that SWRCB Permit 20704 no longer exists.

*Hydrology*

Three gages are used to measure stream and diversion flows and one gage measures forebay elevation (reported as storage in acre-feet) in the project area (see figures 2 and 3 and table 1). SCE states that the gages in both East and West Forks Camp 61 Creek upstream of the diversion are typically monitored from April or May through October. Camp 61 Creek below the forebay and Adit 2 Creek are monitored using notch weirs.

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[7] Per page E-2.1-1 of the application for new license (SCE, 2003), "SCE does not adjust either the timing or the volume of water flowing through Ward tunnel to generate more or less power at the Portal Powerhouse." *See* "Project Operation," section III.A.3, above.

[8] During our search of the California SWRCB's Water Rights Information Management System, we noticed two additional water rights identified as belonging to SCE. Application S001815 referenced a water right for 1.5 cfs for power and storage of 330 acre-feet/annum on East Fork Camp 61 Creek. Application S001816 referenced a water right for 2.4 cfs for power and storage of 330 acre-feet/annum on West Fork Camp 61 Creek.

Table 1. Stream and lake gage summary. (Source: SCE, 2003; USGS, 2003)

| Gage Number[a] | Gage Name and Type | Period of Record (water year) | Drainage Area (square mile) | Elevation (feet NGVD 1929) |
|---|---|---|---|---|
| USGS No. 11235500 | Portal powerhouse (combined powerhouse and H-B valve flow in cfs) | 1927–2003 | NA | 6,980 |
| SCE 107[b] | East Fork Camp 61 Creek (stream flow in cfs) | 1992–1996 and 1967–1997[c] | 2.2 | 7,180[d] |
| SCE 108[b] | West Fork Camp 61 Creek (stream flow in cfs) | 1992–1996 and 1967–1997[c] | 2.9 | 7,180[d] |
| SCE 168 | Portal forebay (elevation feet msl) | 1995–2002 | NA | 7,180[d] |
| SCE notch weir, unnumbered | Camp 61 Creek weir (stream flow in cfs below Portal forebay) | 1999–2001 | < 7.9 | Unknown |
| SCE notch weir, unnumbered | Adit 2 Creek weir (stream flow in cfs) | 1999–2001 | Unknown | Unknown |

Note: cfs – cubic feet per second
NA – not applicable
NGVD – National Geodetic Vertical Datum

[a] SCE owns and operates these gages, and the U.S. Geological Survey (USGS) reviews and publishes the data.

[b] Data from this SCE gage are not reviewed or published by the USGS.

[c] Estimated volume of diverted flows in acre-feet only.

[d] Estimated elevation based on diversion pool elevation.

To complete our analysis of project effects and project generation, we needed to establish a consistent period of record for flows through the project. We note that a longer period of record is available for Portal powerhouse discharge (1957–2003) than for estimated flows in East Fork and West Fork Camp 61 Creek (1967–1997). The average flow through the Portal powerhouse for the period from water year 1957 through water year 2003 was 528 cfs, while the average flow through the powerhouse for the period from water year 1967 through water year 1997 (excluding 1973–1975) was 522 cfs. This comparison indicates a very small difference (i.e., less than 1 percent) in the average flow between the two periods of record. For this reason, we are confident that adopting a consistent period of record for powerhouse flows and flows in both forks—

calendar years 1967 through calendar year 1997—enables us to accurately complete our analysis.

*East Fork Camp 61 Creek and West Fork Camp 61 Creek*—On pages E-2.1-4 and E-2.1-5 of Exhibit E of the application for new license, SCE provide estimates of diversion flows for both the East and West Forks of Camp 61 Creek for calendar years 1967 through 1997 (excluding 1973–1975) (SCE, 2003). Because essentially all creek flows are diverted, creek flows and diversion flows are the same. The mean flow in East Fork Camp 61 Creek at the diversion is 2.6 cfs (table 2). The mean flow in West Fork Camp 61 Creek at the diversion is 3.5 cfs (table 3). The tables also present minimum and maximum monthly flow values and various percent exceedance values[9].

Table 2. East Fork Camp 61 Creek flows.[a] (Source: SCE, 2004b, 2003, as modified by staff)

| Month | Mean Flow (cfs) | Max. Flow (cfs) | 5% Exceed-ance Flow (cfs) | 10% Exceed-ance Flow (cfs) | 25% Exceed-ance Flow (cfs) | 50% Exceed-ance Flow (cfs) | 75% Exceed-ance Flow (cfs) | 90% Exceed-ance Flow (cfs) | Min. Flow (cfs) |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 0.8 | 7.5 | 1.5 | 1.3 | 1.0 | 0.5 | 0.3 | 0.2 | 0.1 |
| Feb. | 0.8 | 3.0 | 2.8 | 1.7 | 1.0 | 0.6 | 0.4 | 0.2 | 0.1 |
| March | 1.0 | 2.1 | 1.9 | 1.8 | 1.2 | 1.0 | 0.5 | 0.4 | 0.2 |
| April | 3.4 | 12.0 | 5.9 | 5.5 | 4.5 | 3.1 | 2.1 | 1.2 | 0.7 |
| May | 10.4 | 29.5 | 18.2 | 16.7 | 13.0 | 9.1 | 6.1 | 5.0 | 2.5 |
| June | 9.5 | 27.9 | 26.5 | 23.2 | 13.1 | 6.6 | 2.8 | 1.9 | 0.3 |
| July | 3.1 | 18.1 | 13.3 | 10.5 | 3.6 | 1.2 | 0.2 | 0.1 | 0.0 |
| Aug. | 0.7 | 5.2 | 2.7 | 2.1 | 0.7 | 0.2 | 0.1 | 0.0 | 0.0 |
| Sept. | 0.4 | 3.5 | 1.2 | 0.7 | 0.4 | 0.1 | 0.1 | 0.0 | 0.0 |
| Oct. | 0.4 | 2.6 | 0.8 | 0.6 | 0.4 | 0.2 | 0.1 | 0.1 | 0.1 |
| Nov. | 0.4 | 1.9 | 0.8 | 0.7 | 0.5 | 0.3 | 0.2 | 0.1 | 0.0 |
| Dec. | 0.5 | 2.4 | 1.1 | 0.9 | 0.7 | 0.4 | 0.3 | 0.2 | 0.1 |
| Year | 2.6 | 29.5 | 13.0 | 8.5 | 2.6 | 0.6 | 0.3 | 0.1 | 0.0 |

Note: cfs – cubic feet per second

[a] Flows are based on mean monthly flows, and percent exceedance values are computed using the Microsoft Excel percentile function.

[9] We define exceedence values as the percent of time the flow is greater than or equal to the flow listed. For example, in January flows are equal to or exceed 1.3 cfs 10 percent of the time, and are less than 1.3 cfs 90 percent of the time.

Table 3. West Fork Camp 61 Creek flows.[a] (Source: SCE, 2004b, as modified by staff; SCE, 2003)

| Month | Mean Flow (cfs) | Max. Flow (cfs) | 5% Exceed-ance Flow (cfs) | 10% Exceed-ance Flow (cfs) | 25% Exceed-ance Flow (cfs) | 50% Exceed-ance Flow (cfs) | 75% Exceed-ance Flow (cfs) | 90% Exceed-ance Flow (cfs) | Min. Flow (cfs) |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 1.1 | 7.2 | 3.3 | 2.4 | 1.4 | 0.7 | 0.3 | 0.3 | 0.2 |
| Feb. | 1.0 | 4.5 | 2.4 | 2.1 | 1.3 | 0.7 | 0.5 | 0.3 | 0.0 |
| March | 1.4 | 6.2 | 3.0 | 2.1 | 1.6 | 1.2 | 0.8 | 0.5 | 0.0 |
| April | 5.7 | 17.8 | 12.0 | 11.1 | 6.9 | 4.9 | 3.7 | 1.9 | 0.9 |
| May | 15.8 | 46.4 | 28.0 | 25.8 | 20.1 | 14.1 | 9.4 | 7.4 | 0.0 |
| June | 10.7 | 40.1 | 33.3 | 26.2 | 14.5 | 6.0 | 2.5 | 1.9 | 0.0 |
| July | 2.8 | 15.0 | 13.0 | 10.1 | 2.9 | 0.9 | 0.3 | 0.2 | 0.0 |
| August | 0.7 | 2.9 | 2.3 | 2.0 | 0.9 | 0.4 | 0.2 | 0.2 | 0.1 |
| Sept. | 0.6 | 3.4 | 1.3 | 0.8 | 0.6 | 0.4 | 0.3 | 0.2 | 0.1 |
| Oct. | 0.5 | 2.1 | 1.0 | 0.7 | 0.5 | 0.3 | 0.3 | 0.2 | 0.2 |
| Nov. | 0.6 | 1.4 | 1.0 | 0.9 | 0.7 | 0.5 | 0.3 | 0.2 | 0.2 |
| Dec. | 0.8 | 4.6 | 2.3 | 1.3 | 0.9 | 0.5 | 0.3 | 0.3 | 0.2 |
| Year | 3.5 | 46.4 | 17.8 | 11.0 | 2.9 | 0.8 | 0.4 | 0.2 | 0.0 |

Note: cfs – cubic feet per second

[a] Flows are based on mean monthly flows and percent exceedance values are computed with the Microsoft Excel percentile function.

In an AIR dated July 2, 2004, we requested that SCE provide daily flow data to assist us in a detailed hydrologic analysis. In response to the AIR, SCE provided daily flows for the East Fork and West Fork, based on synthetic flow data developed for the Big Creek ALP (i.e., SCE utilized actual flows from USGS Gage No. 11237500 Pitman Creek below Tamarack Creek, CA to develop synthetic flows for the East and West Fork). We compared the synthetic flows with SCE's estimated flows in West Fork and East Fork Camp 61 creeks. We found that using the synthetic data appears to overestimate the actual flow by a factor of 1.7 in West Fork Camp 61 Creek, and by a factor of 1.3 in East Fork Camp 61 Creek. Monthly average flow comparisons between the two data sets showed even greater variation. SCE provided additional daily flow data for the East Fork and West Fork creeks (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004). We extracted the data for those months where information for both streams had been updated, and incorporated these data along with the monthly data[10] originally filed by

[10] If there was a difference of more than a couple of hundredths of a cfs, we updated the monthly values with the monthly average of the new daily values.

SCE. Because of the magnitude of the differences in estimated flow values, we did not use any of the daily synthetic flow data based on Pitman Creek.

*Portal Forebay*—The Portal forebay acts as a regulating reservoir for the Portal powerhouse, and as such it is subject to frequent fluctuations as water flows in from Ward tunnel. The average daily inflow to Portal forebay is about 532 cfs or 385,600 acre-feet per year, based on the water year 1983 to 2002 period of record.

The outlet works include a 24-inch steel pipe with a 24-inch square manually operated slide gate valve located in the eastern half of the forebay dam at elevation 7,130 feet msl and draining into Camp 61 Creek. SCE characterizes this drain pipe as currently inoperable and in need of repair (SCE, 2004a).

According to SCE, the Portal forebay has a usable capacity of only 325 acre-feet, so it functions strictly as a reregulating reservoir and serves no carryover function. Table 4 shows the median, minimum, and maximum end-of-month elevation data for Portal forebay, which ranged from 7,157.9 to 7,181.5 feet msl. Elevations over 7,180 feet msl would indicate spilling. Table 4 also illustrates the median, maximum and minimum water surface fluctuation in Portal forebay, which varied from 0 to 20.5 feet.

Table 4. End-of-month elevation and fluctuation data for Portal forebay. (Source: SCE, 2003, modified by staff)

| Month | Approx. Median Elevation (feet msl) | Approx. Max. Elevation (feet msl) | Approx. Minimum Elevation (feet msl) | Median Water Surface Fluctua-tion (feet) | Max. Water Surface Fluctuation (feet) | Min. Water Surface Fluctuation (feet) |
|---|---|---|---|---|---|---|
| Jan. | 7,168.3 | 7,181.5 | 7,157.9 | 7.8 | 15.3 | 0.1 |
| Feb. | 7,168.4 | 7,175.7 | 7,159.1 | 6.8 | 14.9 | 0.0 |
| March | 7,168.8 | 7,175.6 | 7,157.9 | 8.5 | 14.4 | 0.0 |
| April | 7,168.5 | 7,176.8 | 7,158.6 | 4.8 | 15.8 | 0.2 |
| May | 7,168.8 | 7,176.8 | 7,160.3 | 4.2 | 16.6 | 0.5 |
| June | 7,167.8 | 7,175.2 | 7,157.9 | 5.0 | 12.5 | 0.2 |
| July | 7,168.5 | 7,177.0 | 7,160.1 | 3.2 | 14.2 | 0.1 |
| August | 7,167.5 | 7,175.7 | 7,159.2 | 1.8 | 13.3 | 0.1 |
| Sept. | 7,167.1 | 7,179.5 | 7,160.6 | 3.1 | 16.0 | 0.0 |
| Oct. | 7,167.1 | 7,180.1 | 7,157.9 | 5.0 | 16.3 | 0.1 |
| Nov. | 7,167.4 | 7,180.3 | 7,157.9 | 8.7 | 16.8 | 0.0 |
| Dec. | 7,167.4 | 7,178.4 | 7,157.9 | 9.0 | 20.5 | 0.5 |

Note: msl – mean sea level

### Adit 2 Creek

Adit 2 Creek developed as a leak from the Ward tunnel, before the Portal Project was constructed. In addition to leakage from the plugged Adit 2 conduit, seepage of groundwater through the Portal forebay saddle dike also provides some flows to Adit 2 Creek. From its source near the forebay, Adit 2 Creek flows about 1 mile to its confluence with Camp 61 Creek. SCE recorded spot flow measurements at a v-notch weir near the Portal forebay between 1997 and 2002. Measured flows ranged between 0.030 to 0.253 cfs, although several days in 1997 were shown as 0-cfs discharge.

### Camp 61 Creek below Portal Forebay

The primary sources of water in Camp 61 Creek under current conditions are seepage from Portal forebay and seepage from the Adit 2 conduit. Additional flow results from runoff from the local watershed below the forebay. SCE recorded spot measurements of flow at a v-notch weir immediately downstream of the Portal forebay between 1997 through 2002. Those flows ranged from 0.034 to 0.123 cfs. SCE indicates that spill from Portal forebay is not a substantial component of flow and mentions only three spill events in the application for new license (SCE, 2003, page E-2.1-14).

### Water Quality

The Portal Project lies within the upper San Joaquin River watershed and is subject to water quality standards set forth in the Central Valley Regional Water Quality Control Board (Central Valley Board) Basin Plan for the Sacramento and San Joaquin River basins (Central Valley Board, 1998). The Basin Plan does not specifically designate existing beneficial uses for waterbodies within the project area, although it establishes beneficial uses for source waters to Millerton Lake, about 40 miles downstream of the project area. Designated beneficial uses include hydropower generation, municipal, and domestic supply; irrigation and stock watering; water contact recreation; non-water contact recreation; warm freshwater habitat; cold freshwater habitat; and wildlife habitat.

Water quality standards applicable to surface waters in the project area are defined in three primary documents:

1. The Central Valley Board Basin Plan for the Sacramento and San Joaquin River basins (Central Valley Board, 1998);

2. Water Quality Standards, Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California commonly referred to as The California Toxics Rule (40 CFR § 131); and

3. Drinking water standards set in Title 22, California Code of Regulations, Division 4, which are applicable to surface waters that are designated for municipal water supply.

Table 5 summarizes selected applicable water quality criteria.

The California SWRCB (2003) did not include any waterbodies in the project area on its EPA-approved 2002 303(d) list of water-quality impaired waterbodies.

*Temperature*

SCE used thermographs to monitor water temperatures during late spring to early fall at several locations in 2000, 2001, and 2003. Monitoring locations were selected to measure well-mixed flows and avoid groundwater influence. In 2000 and 2001, SCE monitored hourly temperatures of source waters to the Ward tunnel and surface waters in the project area. In 2003, SCE conducted supplemental monitoring of water temperatures in water bodies associated with the Portal forebay in response to a request by the SWRCB. SCE summarized the hourly data by computing the daily mean, minimum, and maximum water temperatures for each station and filed this summary with the Commission (SCE, 2004a). Data provided for source waters of Ward tunnel consist of values for days when the diversion was in operation and when water temperatures were recorded. In table 6, we summarize the summer (June to September) data provided by SCE to determine the range of temperatures and average temperature for each station during each of the months and years that SCE monitored temperatures.

Table 5. Selected applicable water quality criteria for the Portal Project.

| Constituent | Objectives of Basin Plan for the Sacramento and San Joaquin River Basins[a] | California Toxics Rule[b] | California Drinking Water Standards[c] |
|---|---|---|---|
| Temperature | Natural water temperatures shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration does not adversely affect beneficial uses. At no time or place shall the temperature be increased more than 5°F (2.8ºC) above the natural receiving water. | -- | -- |
| DO | Monthly median of the mean daily DO concentration shall not fall below 85% of saturation in the main water mass, and the 95 percentile concentration shall not fall below 75% of saturation. DO concentrations shall not be reduced below 7.0 mg/l. | -- | -- |
| pH | The pH shall not be depressed below 6.5 nor raised above 8.5 units. Changes in normal ambient pH levels shall not exceed 0.5 units. | -- | -- |
| Fecal coliform | Based on a minimum of not less than five samples for any 30-day period, shall not exceed a geometric mean of 200/100 ml, nor shall more than 10% of the total number of samples taken during any 30-day period exceed 400/100 ml. | -- | Shall not exceed 20/100 ml, in at least 90 percent of the measurements made for the six previous months that the water system served unfiltered approved surface |

| Constituent | Objectives of Basin Plan for the Sacramento and San Joaquin River Basins[a] | California Toxics Rule[b] | | | California Drinking Water Standards[c] |
|---|---|---|---|---|---|
| | | | | | water to the public on an ongoing basis. |
| Turbidity | Shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following: increases of 1 NTU where natural turbidity is 0–5 NTU, increases of 20% where natural turbidity is 5–50 NTU, increases of 10 NTU where natural turbidity is 50–100 NTU, and increases of 10% where natural turbidity is >100 NTU. | -- | | | Secondary MCL 5 NTU[d] |
| Methyl-*tert*-butyl ether | -- | -- | | | Primary MCL 0.013 mg/l; Secondary MCL 0.005 mg/l |
| | | **Dissolved Concentrations** | | | |
| **Trace Metals** | | **4-day average** | **1-hour average** | **Instan. max.** | |
| Copper (mg/l) | -- | 0.0013[e] | 0.0015[e] | -- | Secondary MCL 1.0 mg/l |
| Iron (mg/l) | -- | -- | -- | 1.0 | Secondary MCL 0.3 mg/l |

| Constituent | Objectives of Basin Plan for the Sacramento and San Joaquin River Basins[a] | California Toxics Rule[b] | | | California Drinking Water Standards[c] |
|---|---|---|---|---|---|
| Lead (mg/l) | ≤0.015 mg/l in waters designated as domestic or municipal supply[f] | 0.0002[e] | 0.0049[e] | -- | -- |
| Manganese (mg/l) | -- | -- | -- | -- | Secondary MCL 0.05 mg/l |
| Inorganic mercury (μg/l) | -- | 0.77 | 1.4 | -- | Primary MCL 2 μg/l |
| Silver (μg/l) | -- | -- | -- | 0.07[e] | Secondary MCL 0.1 mg/l |
| Zinc (mg/l) | -- | 0.017[e] | 0.017[e] | -- | Secondary MCL 5.0 mg/l |

Note: -- – no applicable criteria
ºC – degrees Celsius
°F – degrees Fahrenheit
DO – dissolved oxygen
MCL – maximum contaminant level
mg/l – milligram/liter
NTU – nephelometric turbidity unit
μg/l – microgram/liter

[a] Source: Central Valley Board, 1998.

[b] Source: 40 CFR § 131.

[c] Title 22, California Code of Regulations, Division 4 surface water criteria.

[d] Unless the Department determines that any such event was caused by circumstances that were unusual and unpredictable and as a result of any such event, there have not been more than two events in the past 12 months the system served unfiltered approved surface water to the public, or more than five events in the past 120 months the system served

unfiltered approved surface water to the public, in which the turbidity level exceeded 5 NTU. An “event” is one day or a series of consecutive days during which at least one turbidity measurement each day exceeds 5 NTU.

[e] Hardness-dependent criteria. The listed criteria are for a hardness of 10 mg/l.

[f] Drinking water standard included by reference in the Basin Plan.

Table 6. Monthly range and average water temperatures (°C) for continuous monitoring between June and September of 2000–2003. (Source: SCE, 2004a, as modified by staff)

| Year | June | July | August | September |
|---|---|---|---|---|
| **Ward Tunnel Intake at Florence Lake[a]** | | | | |
| 2000 | 7.1–15.8 (10.7) | 12.0–19.6 (16.1) | 17.3–19.5 (18.3) | 15.1–17.5 (16.3) |
| 2001 | 11.4–18.6 (15.9) | 16.7–19.4 (18.0) | 17.7–21.1 (19.3) | -- |
| **Chinquapin Creek Diversion[b]** | | | | |
| 2001 | 4.8–10.3 (7.8) | 9.3–12.0 (10.9) | -- | -- |
| **Bear Creek Diversion[a]** | | | | |
| 2000 | 2.2–14.1 (8.5) | 7.8–17.3 (13.0) | 11.2–17.5 (14.2) | 7.9–15.9 (11.4) |
| 2001 | 8.6–17.8 (13.1) | 10.8–20.1(15.3) | 14.9–21.0 (18.2) | 12.5–19.4 (15.2) |
| **Mono Creek Diversion[a]** | | | | |
| 2000 | 9.6–16.2 (13.6) | 9.0–15.4 (11.0) | 10.0–11.8 (10.7) | 10.1–14 (11.6) |
| 2001 | 9.8–17.6 (13.6) | 9.6–15.4 (10.8) | 10.7–15.8 (12.5) | 13.6–18.4 (15.9) |
| **Camp 62 Creek Diversion[c]** | | | | |
| 2001 | 4.0–11 (8.4) | 8.5–12.9 (10.6) | -- | -- |
| **Bolsillo Creek Diversion[d]** | | | | |
| 2001 | 6.6–12.4 (9.1) | 11.3–13.3 (12.1) | -- | -- |
| **East Fork Camp 61 Creek Upstream of Portal Forebay** | | | | |
| 2000 | 3.5–13.1 (9.6) | 6.9–13.1 (10.3) | 8.4–13.4 (10.7) | 6.0–10.0 (8.0) |
| 2001 | 5.1–12.7 (9.3) | 8.5–13.5 (10.7) | 8.8–12.4 (10.8) | 7.0–11.1 (8.9) |
| 2003 | 5.5–11.7 (9.2) | 7.7–14.5 (11.5) | 9.4–12.5 (11.1) | 7.7–11.7 (9.2) |
| **West Fork Camp 61 Creek Upstream of Portal Forebay** | | | | |
| 2003 | 6.1–12.3 (9.3) | 7.7–15.4 (11.8) | 8.8–13.9 (11.2) | 6.9–12.5 (9.1) |
| **Portal Forebay at about 6 Meters Depth** | | | | |
| 2000 | 8.1–20.2 (12.6) | 7.6–17.5 (12.3) | 12.1–19.4 (14.8) | -- |
| 2001 | 8.9–20.2 (11.7) | 11.5–20.8 (12.7) | 12.1–16.5 (13.9) | 14.7–18.4 (16.6) |
| 2003 | 8.4–15.5 (9.8) | 9.0–15.4 (11.7) | 10.4–17.6 (13.3) | 11.3–18.4 (14.2) |
| **Portal Powerhouse Tailrace[e]** | | | | |
| 2001 | (9.4) | (11.7) | (13.4) | (16.9) |
| **Adit 2 Creek at Catch Basin** | | | | |
| 2001 | -- | -- | 8.6–9.8 (9.1) | 9.0–10.1 (9.6) |
| 2003 | 6.3–8.4 (7.2) | 6.4–9.8 (8.2) | 7.3–9.7 (8.6) | 6.7–10.1 (7.8) |
| **Adit 2 Creek Upstream of Camp 61 Creek** | | | | |
| 2001 | -- | -- | 7.4–12.7 (10.2) | 6.4–10.8 (8.6) |
| 2003 | 7.0–13.1 (10.2) | 7.5–14.8 (11.6) | 7.8–13.2 (11.1) | 6.4–12.9 (9.5) |
| **Seepage Downstream of Portal Forebay** | | | | |
| 2001 | 7.2–12.0 (9.0) | 8.1–13.1 (9.6) | 7.3–13.8 (9.8) | 7.0–11.5 (8.7) |
| 2003 | 7.6–8.7 (8.0) | 8.2–10.4 (9.2) | 8.8–10.1 (9.3) | 8.2–9.9 (8.8) |
| **Camp 61 Creek Downstream of Portal Forebay** | | | | |
| 2000 | 6.0–17.9 (12.8) | 8.8–16.7 (13.0) | 9.1–16.6 (12.8) | 6.2–12.7 (9.3) |

| Year | June | July | August | September |
|---|---|---|---|---|
| 2001 | 6.3–15.8 (10.5) | 8.1–15.5 (11.0) | 8.7–14.7 (11.5) | 7.0–12.2 (9.6) |
| 2003 | 8.0–16.4 (12.2) | 9.5–18.3 (14.2) | 9.7–16.2 (13.0) | 7.8–14.6 (10.6) |
| **Camp 61 Creek Upstream of Adit 2 Creek** | | | | |
| 2003 | 8.4–16.7 (12.2) | 9.6–19.3 (14.4) | 9.9–16.3 (13.1) | 7.7–14.4 (10.4) |
| **Camp 61 Creek Downstream of Adit 2 Creek** | | | | |
| 2003 | 7.2–13.6 (10.4) | 7.7–15.0 (11.8) | 8.0–13.4 (11.2) | 6.4–13.0 (9.5) |
| **Camp 61 Creek Upstream of South Fork San Joaquin River** | | | | |
| 2000 | 10.1–14.7 (12.4) | 8.1–14.9 (11.9) | 8.2–15.2 (11.9) | 5.7–12.2 (9.2) |
| 2001 | 7.3–15.1 (11.5) | 9.3–15.9 (12.3) | 8.9–16.7 (12.6) | 7.2–14.3 (10.1) |
| 2003 | 7.7–14.9 (11.4) | 8.7–16.8 (13.3) | 9.4–14.9 (12.6) | 7.4–14.1 (10.6) |
| **Rancheria Creek Upstream of Portal Powerhouse** | | | | |
| 2000 | 8.6–15.5 (11.9) | 6.2–15.9 (11.1) | 6.8–15.9 (11.4) | 4.8–12.7 (8.1) |
| 2001 | 4.8–15.5 (10.1) | 7.9–16.7 (11.8) | 7.1–16.3 (11.9) | 5.5–14.1 (9.2) |

Note: Temperatures presented are the range of daily mean values followed by the mean of daily mean values in ( ).

[a] Operated all season in 2000 and 2001.

[b] Not operated in 2000; operated May 9–June 9, June 12–14, and July 6–10 in 2001.

[c] Not operated in 2000; operated May 12–June 29, and July 4–18 in 2001.

[d] Not operated in 2000; operated April 5–June 17 and July 5–6 in 2001.

[e] Values represent monthly mean values reported by SCE (2003). SCE did not file hourly temperature data or indicate the range of average temperatures for the Portal powerhouse tailrace.

As table 6 shows, water temperatures reported for source waters to Ward tunnel are quite variable both spatially and temporally. Florence Lake inflows tend to be much warmer than many of the other inflows. SCE stated that Chinquapin, Camp 62, and Bolsillo creeks were not diverted into Ward tunnel during much of the summer because of their low flows. Both East Fork Camp 61 and West Fork Camp 61 creeks generally have cooler and more stable summer temperatures in comparison to Chinquapin, Camp 62, and Bolsillo creeks. Temperatures reported for the seepage downstream of Portal dam and at the Adit 2 Creek catch basin indicate stable temperatures, as expected, because of the subsurface source of the flow.

Reported water temperatures for Rancheria Creek upstream of the Portal powerhouse show that mean monthly summertime temperatures were similar for June, July, and August but considerably cooler conditions occurred in September. Comparison of Portal forebay subsurface temperatures and Rancheria Creek temperatures suggests that Portal powerhouse discharges substantially increase the variability of water temperatures entering Huntington Lake (table 7). The largest differences in summer temperatures for the two sources of water occurred in September, when the average difference for daily means was 7.1°C and daily maximums was 4.7°C.

Table 7. Summary of differences in daily mean and daily maximum temperatures at Portal forebay compared to Rancheria Creek upstream of Portal powerhouse.[a] (Source: SCE, 2004a, as modified by staff)

| Parameter | June | July | August | September |
|---|---|---|---|---|
| **Daily Mean Temperature** | | | | |
| Number of days | 30 | 45 | 48 | 17 |
| Range (ºC) | –2.0 to 3.9 | –1.8 to 5.3 | –0.1 to 6.9 | 5.3 to 8.6 |
| Average (ºC) | 1.0 | 1.2 | 2.8 | 7.1 |
| Frequency with difference >5°F (2.8°C) | 3% | 13% | 46% | 100% |
| **Daily Maximum Temperature** | | | | |
| Number of days | 30 | 45 | 48 | 17 |
| Range (ºC) | –3.2 to 5.3 | –4.2 to 5.3 | –2.9 to 5.2 | 2.6 to 7.0 |
| Average (ºC) | 0.3 | –0.6 | 0.6 | 4.7 |
| Frequency with difference >5°F (2.8°C) | 10% | 7% | 17% | 88% |

Note: ºC – degrees Celsius
°F – degrees Fahrenheit

[a] Positive range and average values indicate that Portal forebay was warmer than Rancheria Creek, whereas negative range and average values indicate Rancheria Creek was warmer than the forebay.

Temperatures reported for a depth of approximately 20 feet (6 meters) in Portal forebay were generally warmer than in East Fork Camp 61 and West Fork Camp 61 creeks (table 6). Based on mean monthly values, the temperature difference between Portal forebay and East Fork Camp 61 and West Fork Camp 61 creeks was largest in late summer and early fall. SCE (2003) reported that monthly mean temperatures for the Portal powerhouse tailrace were similar (within 1.7°C) to subsurface conditions in Portal forebay, indicating that temperatures do not change substantially in this section of Ward tunnel. However, SCE did not provide the Commission with temperature data for the Portal powerhouse along with other water temperature data (SCE, 2004a).

Results of seasonal monitoring of temperature at different depths in Portal forebay show that at times the forebay is thermally stratified. As figure 4 shows, the surface of the forebay was substantially warmer than the deeper water during May, June, July, and August 2001. In the single September 2001 profile, temperature stratification was negligible. In 2002, which had substantially higher Portal powerhouse discharges (USGS, 2004), temperature differences within the water column were also

noticed in the June and July profiles, but nearly the same temperature range throughout the column was noted for August and September.

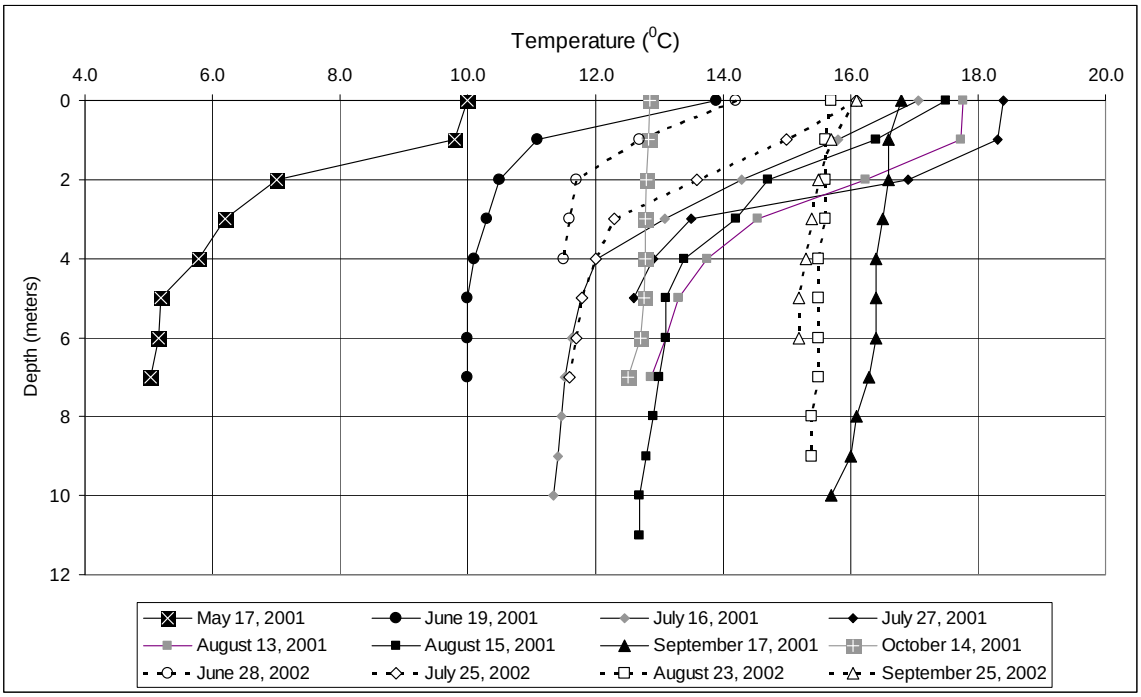



Figure 4. Vertical profiles of Portal forebay water temperature, 2001 and 2002. (Source: SCE, 2003, as modified by staff)

*General Water Quality*

General water quality largely depends on the geologic and hydrologic characteristics of a basin. Table 8 summarizes water quality parameters that SCE monitored in project-influenced waters during 2001 and 2002. These measurements indicate that source water to the project generally has low-to-moderate total suspended solids and turbidity, and low concentrations of nitrogen available for primary productivity. Due to nondetection of orthophosphate at relatively high detection limits, the level of available phosphorus can not be determined. Low alkalinity levels measured throughout the study area indicate that surface waters have minimal capacity to buffer changes in pH. Measurements of pH were generally low for surface waters, and values below the applicable standard of 6.5 to 8.5 units occurred in most samples. Fecal coliform concentrations indicate relatively low levels of contamination. Sampling results indicate low concentrations of total petroleum hydrocarbons (TPH) and methyl-*tert*-butyl ether (MTBE); however, a single sample collected from Portal forebay on September 17, 2001, had a detectable MTBE concentration of 13 mg/l, which substantially exceeded the secondary drinking water MCL of 0.005 mg/l. SCE (2003) speculates that the elevated MTBE concentration in this sample may have been caused by contamination from the motorized boat used to collect the sample, as recreational

motorized boating is prohibited at Portal forebay[11] and no other potential sources are apparent.

Table 8. Water quality data ranges for samples collected upstream of, within, and downstream of Portal forebay between May and September 2001 and June and September 2002. (Source: SCE, 2004a, 2003, as modified by staff)

| Parameter (units) | Upstream of Portal Forebay[a] | Within Portal Forebay[b] | Downstream of Portal Forebay[c] |
|---|---|---|---|
| Temperature (°C)[d] | 5.4–13.6 | 10.0–18.4 | 6.2–16.6 |
| DO (mg/l) | 7.0–12.5 | 5.5–12.4 | 1.3–18.1 |
| pH, in situ (standard units) | 4.7–8.1 | 6.5–7.2 | 5.2–7.6 |
| pH (laboratory), (standard units) | 5.2–6.5 | 5.1–6.6 | 5.5–7.8[e] |
| Specific conductance ($\mu$S/cm) | 5–46 | 10–28 | 16–160[f] |
| Total dissolved solids (mg/l) | 8.0–56 | 5.0–31 | 37–68 |
| Turbidity, in situ (NTU) | 0–38 | 0.2–12 | 0–99 |
| Turbidity, laboratory (NTU) | ND–0.1 | ND–0.9 | ND–9.1 |
| Total suspended solids (mg/l) | <5–17 | <5–24 | <5–23 |
| Nitrate (mg/l) | <1–2[g] | <1 | <1 |
| Orthophosphate (mg/l) | <0.2 | <0.2 | <0.2 |
| Fecal coliform (MPN) | <2–23 | <2–2 | <1.1–6.9 |
| MTBE (mg/l) | <0.005 | <0.005–0.013 | <0.005 |
| TPH as diesel and gasoline ($\mu$g/l) | <50–1,800[h] | <50 | <50 |
| Total alkalinity (mg $CaCO_3$/l) | 2.0–26 | 4.0–6.0 | 10.0–34 |
| Total hardness (mg $CaCO_3$/l) | 2.2–18 | 2.7–5.3 | 7.7–38 |
| Total copper (mg/l) | <50 | <50 | -- |
| Total iron (mg/l) | <0.005–0.24 | <0.005–0.1 | 0.05–3.1 |

[11] SCE noted that although the motor was removed from the boat during the sampling event, residual fuel may still have been present in the boat and resulted in contamination of the sample. MTBE was not detected in any other samples.

| Parameter (units) | Upstream of Portal Forebay[a] | Within Portal Forebay[b] | Downstream of Portal Forebay[c] |
|---|---|---|---|
| Dissolved iron (mg/l) | <0.05 | <0.05 | <0.05–6.4 |
| Total lead (mg/l) | <0.005 | <0.00025–0.005 | -- |
| Total manganese (mg/l) | <0.01–0.050 | <0.01–0.01 | <0.01–1.0 |
| Total mercury ($\mu$g/l) | <0.4 | <0.05–<0.4 | -- |
| Total silver ($\mu$g/l) | <10 | <0.2–<10 | -- |
| Total zinc (mg/l) | <0.050 | <0.005–<0.1 | -- |

Note: -- – no applicable criteria
°C – degrees Celsius
DO – dissolved oxygen
MCL – maximum contaminant level
mg $CaCO_3$/l – milligrams as calcium carbonate per liter
mg/l – milligram/liter
MPN – most probable number
MTBE – methyl-*tert*-butyl ether
ND – non-detectable
NTU – nephelometric turbidity unit
TPH – total petroleum hydrocarbons
$\mu$S/cm – micro-Siemens/centimeter
$\mu$g/l – microgram/liter

[a] Upstream sampling locations include Florence Lake near dam, streams and forebays diverted into Ward tunnel, and East Fork Camp 61 and West Fork Camp 61 creeks.

[b] Portal forebay locations include surface and profile data.

[c] Downstream locations include Camp 61 and Adit 2 creeks.

[d] Spot measurements.

[e] Except for the pH value of 7.8 that SCE indicated was a questionable value, the highest value sampled was 6.6.

[f] Excluding values of 4,380 and 0.800 $\mu$S/cm reported for May 31, 2001; these values appear to be unrepresentative of actual stream conditions.

[g] No values reported for nitrate; these values represent nitrate plus nitrite concentrations.

[h] Values reported separately for TPH as diesel and TPH as gasoline. TPH as diesel ranged from <50–1,800 $\mu$g/l and TPH as gasoline remained below 50 $\mu$g/l. Sample collected from Florence Lake near dam.

DO concentrations varied considerably by location (see table 8), due to site-specific effects, and also at the same location seasonally, as a function of water temperature. SCE conducted in situ monitoring in project area waters upstream of, within, and downstream of Portal forebay. Figure 5 shows box plots summarizing the results of this monitoring. Results of in situ DO sampling performed by SCE generally exceeded the 7 mg/l criterion in the Portal forebay. SCE also monitored DO concentrations in vertical profiles of Portal forebay. Figure 6 displays results of this monitoring. Results of this monitoring show that DO concentrations of less than 7 mg/l occurred throughout the water column in June, July, and September 2002, and near the bottom in September 2001.

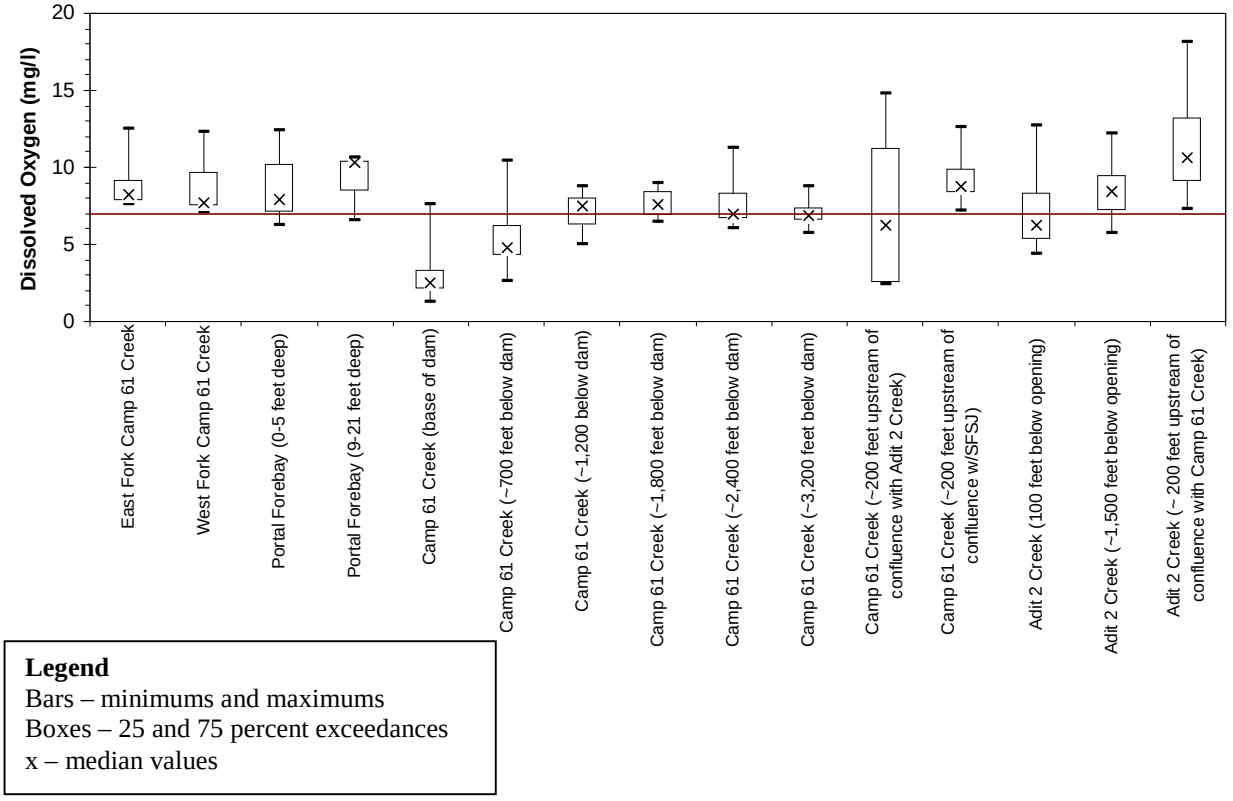



Figure 5. Box plots of DO sampling results for in situ monitoring conducted by SCE in project related waterbodies. (Source: SCE, 2003, as modified by staff)

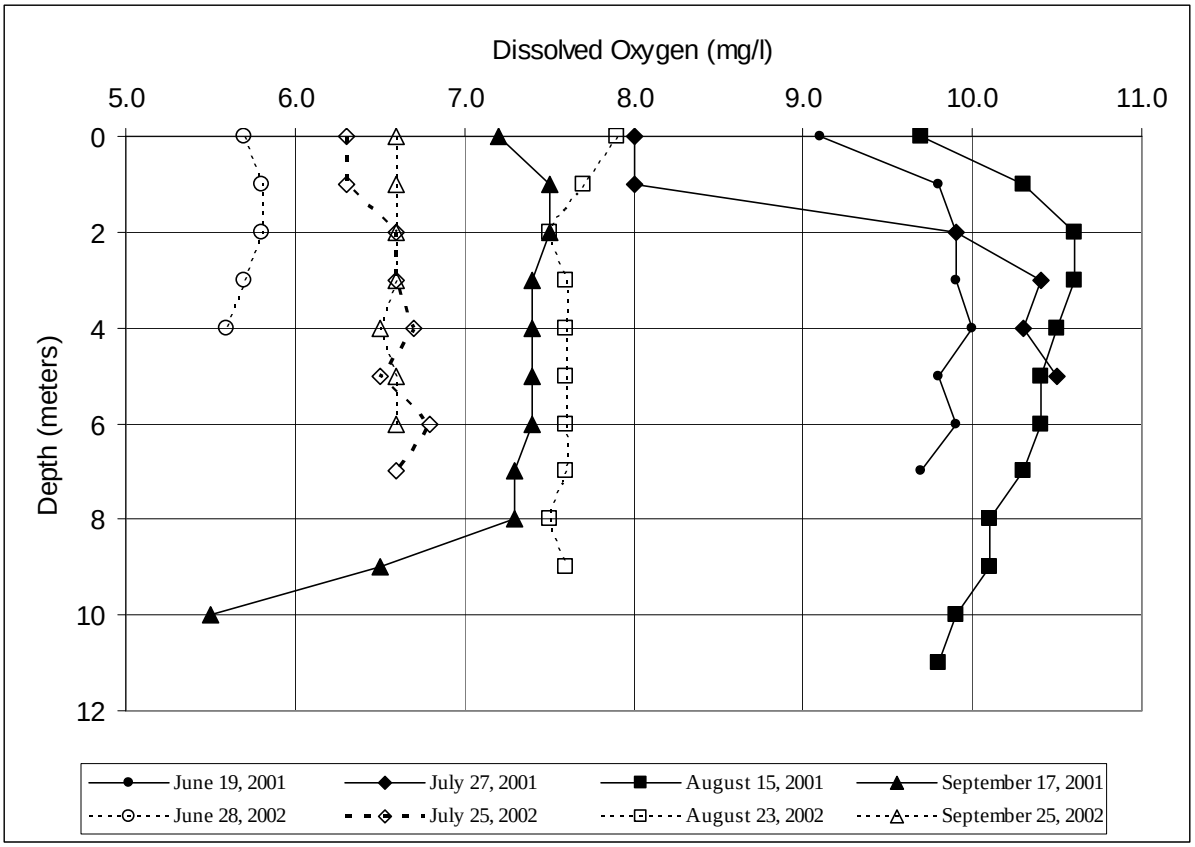



Figure 6. Dissolved oxygen vertical profiles for Portal forebay. (Source: SCE, 2003; as modified by staff)

Copper, lead, mercury, silver, and zinc concentrations were not detected in many of the samples analyzed for these metals. SCE reported mercury concentrations in Portal forebay between the method detection limit (0.05 $\mu$g/l) and the detection limit for reporting (0.4 $\mu$g/l). The maximum estimated total mercury concentration was 0.20 $\mu$g/l, which is substantially less than both the 1-hour and 4-day average criteria set for inorganic mercury by the California Toxics Rule (CTR) and the primary drinking water maximum contaminant level (MCL) (table 5).

Reported concentrations of iron and manganese were much more variable than other metals monitored by SCE (table 8). At times, the total iron concentrations in some of the source waters to the project (Mono diversion forebay and East Fork Camp 61 Creek) were high, although the results indicate that concentrations seldom exceed the 0.3-mg/l secondary MCL. High total manganese concentrations also were reported for Mono diversion forebay, although none of the reported values exceeded the 0.050-mg/l secondary MCL. Reported concentrations of both total and the dissolved fraction of iron and total manganese were highest in Camp 61 and Adit 2 creeks. Table 9 presents iron and manganese concentrations for Camp 61 and Adit 2 creeks.

Table 9. Iron and manganese concentrations at SCE monitoring stations in Camp 61 Creek and Adit 2 Creek, June–September 2002. (Source: SCE, 2003, as modified by staff)

| | Total Iron (mg/l) | | | | Dissolved Iron (mg/l) | | | | Total Manganese (mg/l) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **June 18** | **July 25** | **Aug. 23** | **Sept. 26** | **June 18** | **July 25** | **Aug. 23** | **Sept. 26** | **June 18** | **July 25** | **Aug. 23** | **Sept. 26** |
| **Camp 61 Creek** | | | | | | | | | | | | |
| At weir at base of Portal dam | **9.00** | **11.00** | **9.80** | **9.70** | -- | 0.39 | **6.40** | 0.95 | **0.7** | **0.72** | **0.7** | **0.72** |
| Approx. 700 feet downstream of Portal dam | **23.00** | **6.90** | **1.60** | **1.70** | -- | 0.62 | 0.51 | 0.17 | **1** | **0.65** | **0.3** | **0.18** |
| Approx. 1,200 feet downstream of Portal dam | **2.80** | **3.90** | **1.10** | **0.32** | -- | 0.47 | 0.33 | 0.12 | **0.4** | **0.45** | **0.24** | **0.06** |
| Approx. 1,800 feet downstream of Portal dam | **1.00** | **0.50** | **1.00** | 0.24 | -- | 0.22 | 0.21 | 0.11 | 0.04 | 0.02 | **0.14** | <10 |
| Approx. 2,400 feet downstream of Portal dam | **0.67** | 0.30 | 0.24 | **0.55** | -- | 0.15 | 0.12 | 0.09 | 0.02 | 0.02 | 0.01 | **0.09** |
| Approx. 3,200 feet downstream of Portal dam | **0.49** | **3.40** | 0.14 | **0.50** | -- | 0.12 | 0.06 | 0.06 | 0.02 | **0.18** | <10 | 0.03 |
| Approx. 200 feet upstream of Adit 2 Creek | 0.05 | 0.14 | 0.14 | **0.39** | -- | 0.06 | 0.06 | 0.07 | <10 | 0.01 | 0.02 | **0.2** |
| Approx. 200 feet upstream of SFSJR | 0.27 | **1.10** | **0.77** | 0.26 | -- | 0.57 | 0.25 | 0.14 | <10 | 0.02 | 0.02 | <10 |
| **Adit 2 Creek** | | | | | | | | | | | | |
| 100 feet downstream of Adit 2 opening | 0.14 | 0.10 | 0.14 | 0.16 | -- | <0.05 | <0.05 | <0.05 | <10 | <10 | <10 | <10 |
| Approx. 1,500 feet downstream of Adit 2 culvert | **0.40** | **1.60** | **3.10** | **0.33** | -- | 0.33 | 0.10 | 0.06 | 0.03 | 0.04 | **0.1** | 0.02 |
| Approx. 200 feet upstream of Camp 61 Creek | **0.49** | **1.40** | **0.92** | **0.56** | -- | 0.73 | 0.22 | 0.13 | 0.01 | 0.02 | 0.02 | 0.02 |

Note: -- no value reported
CTR – California Toxics Rule
MCL – Maximum contaminant level
mg/l – Milligram per liter
**Bold** values exceed applicable criteria (total iron—0.3-mg/l secondary MCL, dissolved iron—1.0-mg/l CTR instantaneous maximum, and total manganese—0.05-mg/l secondary MCL)

SCE (2003) noted that an orange-red residue was observed in three locations: (1) the catchment basin at the foot of Portal dam, (2) in Adit 2 Creek along the meadow downstream of the Portal dam saddle dike, and (3) in the riparian/wet meadow complex between Portal dam spillway and Camp 61 Creek. SCE hypothesizes that water seeping through chemically reductive conditions in the Portal dam and saddle dike dissolves iron and manganese from rock and parent material used to construct the dam, and subsequently iron precipitates (likely as ferric hydroxide) from solution when the water is oxygenated.

b. Environmental Effects:

**Instream and Channel Maintenance Flows in Camp 61 Creek**

In the application for new license (SCE, 2003), SCE proposes to release minimum instream flows at the base of the forebay dam into Camp 61 Creek as follows:

| Date | Flow (cfs) |
|---|---|
| March 1–July 31 | 7 day average of 1.0 cfs, instantaneous floor of 0.7 cfs |
| August 1–February 28/29 | 7 day average of 0.5 cfs, instantaneous floor of 0.3 cfs |

SCE also proposes to release channel and riparian maintenance flows of between 28 and 39 cfs for a period of 10 days into Camp 61 Creek between April 1 and July 31 of above normal and wet water year types (see table 34). Flows in Camp 61 Creek under the SCE Proposal are summarized in table 10.

Table 10. Characterization of combined flow releases, as simulated by staff, to Camp 61 Creek under the SCE proposal.[a] (Source: SCE, 2004b, 2003, as modified by staff)

| Month | Mean Flow (cfs) | Max. Flow (cfs) | 5% Exceed-ance Flow (cfs) | 10% Exceed-ance Flow (cfs) | 25% Exceed-ance Flow (cfs) | 50% Exceed-ance Flow (cfs) | 75% Exceed-ance Flow (cfs) | 90% Exceed-ance Flow (cfs) | Min. Flow (cfs) |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Feb. | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| March | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| April[b] | 1.2 | 39.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| May[b] | 3.5 | 39.0 | 28.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| June[b] | 2.6 | 39.0 | 22.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| July[c] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| August | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |

| Month | Mean Flow (cfs) | Max. Flow (cfs) | 5% Exceed-ance Flow (cfs) | 10% Exceed-ance Flow (cfs) | 25% Exceed-ance Flow (cfs) | 50% Exceed-ance Flow (cfs) | 75% Exceed-ance Flow (cfs) | 90% Exceed-ance Flow (cfs) | Min. Flow (cfs) |
|---|---|---|---|---|---|---|---|---|---|
| Sept. | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Oct. | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Nov. | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Dec. | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Year | 1.1 | 39.0 | 1.0 | 1.0 | 1.0 | 0.5 | 0.5 | 0.5 | 0.5 |

Note: cfs – cubic feet per second

[a] During certain months, daily target instream and channel maintenance flows vary within the month. This table accounts for the within-month flow variation. Percent exceedance values are computed with the Microsoft Excel percentile function.

[b] SCE proposes to release channel and riparian maintenance flows during a 10-day period that could occur at any time between April 1 and July 31. Note that in any given year the pulse flow would occur in either April, May or June.

[c] SCE proposes to release channel and riparian maintenance flows during a 10-day period that could occur at any time between April 1 and July 31. However, our analysis of flow data indicates that the highest flows during this period never occurred during July in any of the 40 years of record, and thus, for our analysis, we assume channel and riparian maintenance flows would not be implemented during July.

FS under its 4(e) condition no. 12 specifies that SCE should release instream flows ranging from 1.25 cfs to 10 cfs depending on the water year type and season, as shown in table 13. Additionally, under the same condition, FS specifies that SCE release channel and riparian maintenance flows into Camp 61 Creek between May 1 and May 16 of below average, above average and wet water year types (see table 35). The resulting flows in Camp 61 Creek as specified by the FS are summarized in table 11.

In section V.C.2.b., *Aquatic Resources*, we consider a staff alternative for instream flows in Camp 61 Creek. This flow regime would be the same as SCE proposes, except that flow would be incrementally increased by 0.5 cfs from October 1 through December 15 to support brown trout spawning, as shown below:

| Date | Flow (cfs) |
|---|---|
| March 1–July 31 | 7 day average of 1.0 cfs, instantaneous floor of 0.7 cfs |
| August 1–September 30 | 7 day average of 0.5 cfs, instantaneous floor of 0.3 cfs |

| Date | Flow (cfs) |
|---|---|
| October 1–December 15 | 7 day average of 1.0 cfs, instantaneous floor of 0.7 cfs |
| December 16–February 29 | 7 day average of 0.5 cfs, instantaneous floor of 0.3 cfs |

Table 11. Characterization of combined flow releases, as simulated by staff, to Camp 61 Creek under the FS Section 4 (e) conditions.[a] (Source: FS letter dated September 30, 2005, modified by staff; SCE, 2004b, 2003, as modified by staff)

| Month | Mean Flow (cfs) | Max. Flow (cfs) | 5% Exceed-ance Flow (cfs) | 10% Exceed-ance Flow (cfs) | 25% Exceed-ance Flow (cfs) | 50% Exceed-ance Flow (cfs) | 75% Exceed-ance Flow (cfs) | 90% Exceed-ance Flow (cfs) | Min. Flow (cfs) |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 1.7 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.3 | 1.3 | 1.3 |
| Feb. | 1.7 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.3 | 1.3 | 1.3 |
| March | 2.3 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 1.3 | 1.3 | 1.3 |
| April | 4.8 | 10.0 | 10.0 | 10.0 | 10.0 | 5.0 | 1.3 | 1.3 | 1.3 |
| May | 12.1 | 45.0 | 45.0 | 30.0 | 20.0 | 10.0 | 1.3 | 1.3 | 1.3 |
| June | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 1.3 | 1.3 | 1.3 |
| July | 2.3 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 1.3 | 1.3 | 1.3 |
| August | 2.3 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 1.3 | 1.3 | 1.3 |
| Sept. | 1.7 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.3 | 1.3 | 1.3 |
| Oct. | 1.7 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.3 | 1.3 | 1.3 |
| Nov. | 1.7 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.3 | 1.3 | 1.3 |
| Dec. | 1.7 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.3 | 1.3 | 1.3 |
| Year | 3.2 | 45.0 | 10.0 | 5.0 | 3.0 | 2.0 | 1.3 | 1.3 | 1.3 |

Note: cfs – cubic feet per second

[a] During certain months, daily target instream and channel maintenance flows vary within the month. This table accounts for the within-month flow variation. Percent exceedance values are computed with the Microsoft Excel percentile function.

In section V.C.2.b., *Aquatic Resources*, we also include channel and riparian maintenance flows. Under this alternative, channel and riparian maintenance flows would be the same as those SCE proposes. Flows under our approach are summarized in table 12.

Table 12. Characterization of combined flow releases, as simulated by staff, to Camp 61 Creek under the staff alternative.[a] (Source: SCE, 2004b, 2003, as modified by staff)

| Month | Mean Flow (cfs) | Max. Flow (cfs) | 5% Exceed-ance Flow (cfs) | 10% Exceed-ance Flow (cfs) | 25% Exceed-ance Flow (cfs) | 50% Exceed-ance Flow (cfs) | 75% Exceed-ance Flow (cfs) | 90% Exceed-ance Flow (cfs) | Min. Flow (cfs) |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Feb. | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| March | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| April[b] | 1.2 | 39.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| May[b] | 3.5 | 39.0 | 28.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| June[b] | 2.6 | 39.0 | 22.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| July[c] | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| August | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Sept. | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Oct. | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Nov. | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Dec. | 0.7 | 1.0 | 1.0 | 1.0 | 1.0 | 0.5 | 0.5 | 0.5 | 0.5 |
| Year | 1.2 | 39.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.5 | 0.5 | 0.5 |

Note: cfs – cubic feet per second

[a] During certain months, daily target instream and channel maintenance flows vary within the month. This table accounts for the within-month flow variation. Percent exceedance values are computed with the Microsoft Excel percentile function.

[b] Staff recommends that SCE release channel and riparian maintenance flows during a 10-day period that could occur at any time between April 1 and July 31. Note that in any given year the pulse flow would occur in either April, May or June.

[c] Staff recommends that SCE release channel and riparian maintenance flows during a 10-day period that could occur at any time between April 1 and July 31. However, our analysis of flow data indicates that the highest flows during this period never occurred during July in any of the 40 years of record, and thus, for our analysis, we assume channel and riparian maintenance flows would not be implemented during July.

*Our Analysis*

Comparing tables 5, 6 and 7, we note that mean annual flow is 1.2 cfs under the staff alternative or just 0.1 cfs (about 8 percent) higher than under the SCE proposal (1.1 cfs) while the FS revised preliminary 4(e) condition specifies nearly three times as much flow (3.2 cfs). The primary difference between the staff alternative and the SCE proposal is the 0.5 cfs higher instream flow for the period October 1 through December 15. Mean flows would be higher under the FS 4(e) condition in every month relative to both the

SCE proposal and staff alternative, due to higher minimum instream flow specifications. Higher mean flows would reduce energy generation at the Portal Project and downstream projects.

FS also specifies higher channel and riparian maintenance flows, which further increase the difference between the FS specified flows and the SCE proposed and staff recommended flows. For example, the 5 percent exceedance flow for May is 28 cfs under the staff alternative and SCE proposal, compared to 45 cfs under the FS 4(e) condition. We continue our analysis of flows in section V.C.2.b, *Aquatic Resources*.

SCE, in its December 19, 2005, filing with FS of alternative 4(e) conditions, supported the staff alternative minimum instream flows, and altered the time period for release of channel and riparian maintenance flows from between April 1 and July 31 to between June 1 and July 31 (see section V.C.2.b, Aquatic Resources).

In conjunction with SCE's proposal to release channel and riparian maintenance flows, SCE also proposes to construct a 1,300-foot-long new channel that would convey water from Adit 2 Creek to a location farther upstream on Camp 61 Creek. This would provide a modest increase in flows in Camp 61 Creek in an additional 0.55 mile[12] of Camp 61 Creek. We discuss this measure below as part of our water quality analysis, but note here that flows conveyed through the new channel to upper Camp 61 Creek would typically be less than 1 cfs (although possibly as high as 5 cfs under very wet conditions), based on weir data SCE obtained between 1966 and 1970. SCE has yet to file the supporting flow measurements for the record and it is not clear whether they are referring to a retired weir closer to the confluence with Camp 61 Creek or the existing weir located closer to the Portal forebay.

**Flow and Water Level Monitoring**

SCE proposes to monitor flow releases associated with minimum instream flows and channel and riparian maintenance flows at or near the point of release. This would entail the construction of a new gaging station on Camp 61 Creek or other appropriate flow measuring device, as described in SCE's response to FS preliminary 4(e) conditions (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004). The actual release would be made using a currently inoperable drain pipe located at elevation 7,130 feet msl (SCE, 2004a). SCE

[12] Although SCE states on page 26 of its letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004, that the confluence of the Adit 2 channel would be 0.7 mile farther upstream than exists today, we notice that SCE describes the existing Adit 2 gully channel as entering Camp 61 Creek at stream mile 0.9 versus entering at stream mile 1.45 for its proposed new channel. Thus, we have assumed that additional flow from Adit 2 Creek would affect 0.55 mile of Camp 61 Creek.

proposes to repair the drain pipe to enable releases. SCE proposes to continue monitoring other project flows and water levels with their existing stream and flow gages, v-notch weirs and Portal forebay level gage (see table 1 for a list of these facilities).

FS 4(e) condition no. 12(b) specifies that SCE should measure and document all instream flow releases in publicly available and readily accessible formats. To this end, FS recommends that SCE prepare and file with the Commission an instream flow measurement plan (IFMP) that would be approved by the FS. FS would also require a year-round gage on Camp 61 Creek immediately downstream of the Portal forebay to monitor instream flow compliance on a continuous basis. SCE also included such a gage in its proposal. Specifically, the IFMP would require a description of existing and proposed instream flow measurement gages and devices, including flow gages and spillway or reservoir outlet discharge measurement devices, and a detailed proposal for measuring instream flow in each of the project reaches with existing or proposed devices. The IFMP would also describe the method for making daily flow data available to the public and within-day data available to the FS. Furthermore, the IFMP would include information on gage calibration and historical and recent cross-section data.

*Our Analysis*

The purpose of flow and water level monitoring would be to allow the Commission and other agencies to verify SCE's compliance with minimum instream flow and channel and riparian maintenance flow requirements and permit SCE to undertake water surface elevation measurements for the Portal forebay that may be useful in estimating inflow. To verify flow compliance with requirements discussed in section V.C.2.b., *Aquatic Resources*, it would be necessary to continuously monitor flows in Camp 61 Creek immediately downstream of the Portal forebay. Although the gages listed in table 1 would allow for partial evaluation of compliance, they would not provide the capability for continuous monitoring of Camp 61 Creek. It is likely that the notch weir on Camp 61 Creek would provide calibration information, provided it does not disrupt the measurement capability of the new stream gage, but it would not provide instantaneous flow compliance monitoring. Installation of a permanent, continuously recording gage or other appropriate flow measuring device would assure SCE of the ability to check and report compliance, as needed. Developing an IFMP would support this effort.

**Water Temperature**

The source and quantity of inflow to Camp 61 Creek have a large influence on temperatures in the creek, as does air temperature. The existing license for the Portal Project does not require a minimum instream flow, but seepage from Portal forebay and the Adit 2 Creek conduit provide some flows into Camp 61 Creek downstream of the dam during the summer. Because Portal forebay seepage flows are often low, flows in

Camp 61 Creek upstream of the Adit 2 Creek confluence are often intermittent. For this reason, inflows from Adit 2 Creek are often the primary influence on water temperatures in the lower end of Camp 61 Creek below the confluence with Adit 2 Creek. Camp 61 Creek is subject to warming even in summer periods when flow is not intermittent. This warming is due, in part, to the very low rate of flow. According to data supplied by SCE, the amount of water temperature alteration by the project does not meet the Basin Plan objective of a limit of 5°F (2.8°C) increase above the natural receiving water in Camp 61 Creek downstream of Portal forebay dam. Sampling evidence provided by SCE indicates that water within the Ward tunnel and the surface of Portal forebay is often warmer than the natural ambient water temperature within the two forks of Camp 61 Creek upstream of Portal forebay. Sampling evidence also indicates that the temperature of Adit 2 Creek and the seepage water downstream of the Portal forebay dam is typically cooler than the surface water within the Portal forebay.

SCE proposes to release flows into Camp 61 Creek downstream of Portal forebay. SCE would provide a minimum instream flow of 1.0 cfs from March 1 to July 31, and 0.5 cfs from August 1 through the end of February. A summary of Camp 61 Creek flows resulting from SCE's proposal is presented in table 10.

As part of FS 4(e) condition no. 12, FS also specifies that SCE release flows into Camp 61 Creek. The FS recommended minimum instream flows are shown in table 13. Flow releases would vary, depending on the period and water year type. A summary of Camp 61 Creek flows resulting from the FS recommendation is presented in table 11.

Table 13. FS specified minimum instream flows for Camp 61 Creek downstream of Portal dam. (Source: FS letter filed September 30, 2005)

| | |
|---|---|
| **Below Average, Above Average and Wet Water Year Types:** | |
| Sept 1 – Feb 28/29 | 7 day average of 2 cfs, instantaneous floor of 1 cfs |
| March 1 – 31 | 7 day average of 3 cfs, instantaneous floor of 2 cfs |
| April 1 – April 15 | 7 day average of 5 cfs, instantaneous floor of 4 cfs |
| April 16 – 30 | 7 day average of 10 cfs, instantaneous floor of 8 cfs |
| May 1 – 16 | Channel and riparian maintenance flows (table 35) |
| May 17 – 31 | 7 day average of 10 cfs, instantaneous floor of 8 cfs |
| June 1 – 30 | 7 day average of 5 cfs, instantaneous floor of 4 cfs |
| July 1 – Aug 31 | 7 day average of 3 cfs, instantaneous floor of 2 cfs |
| **Dry Water Year Type:** | |
| May 16 – June 30 | 7 day average of 5 cfs, instantaneous floor of 4 cfs |
| Remainder of year | 7 day average of 1.25 cfs, instantaneous floor of .75 cfs |
| **Critically Dry Water Year Types:** | |
| Year long | 7 day average of 1.25 cfs, instantaneous floor of .75 cfs |

Note: cfs – cubic feet per second

As discussed above, the staff developed an alternative minimum instream flow regime. The alternative would be the same as SCE's proposal for the period of December 16 through September 30, but would have a 0.5-cfs higher minimum instream flow from October 1 through December 15 (refer to section V.C.2.b., *Aquatic Resources*).

*Our Analysis*

Tables 14 through 16 provide an analysis of the hourly temperature data collected at several different locations. The information presented in these tables is important to understanding how the project influences the temperature regime of Camp 61 Creek. These tables are also useful for analyzing the possible effects of the proposed and specified minimum instream flows.

Table 14. Summary of differences[a] for 2001 and 2003 in daily mean and daily maximum temperatures at Portal forebay compared to Adit 2 Creek upstream of Camp 61 Creek. (Source: SCE, 2004a, 2003; Staff)

| Temperature | June | July | August | September |
|---|---|---|---|---|
| **Daily Mean Temperature** | | | | |
| Number of days | 7 | 31 | 55 | 47 |
| Range (ºC) | –1.6 to 0.8 | –1.0 to 2.0 | 0.6 to 6.1 | 2.6 to 9.2 |
| Average (ºC) | -0.3 | 0.1 | 3.1 | 5.9 |
| Frequency with difference >5°F (2.8°C) | 0% | 0% | 56% | 91% |
| **Daily Maximum Temperature** | | | | |
| Number of days | 7 | 31 | 55 | 47 |
| Range (ºC) | –2.8 to 4.0 | –2.3 to 3.4 | –0.4 to 5.4 | 1.7 to 9.1 |
| Average (ºC) | –0.8 | –0.2 | 2.4 | 5.2 |
| Frequency with difference >5°F (2.8°C) | 14% | 3% | 33% | 89% |

Note: °C – degrees Celsius
°F – degrees Fahrenheit

[a] Positive range and average values indicate that the forebay was warmer than Adit 2 Creek, whereas negative range and average values indicate Adit 2 Creek was warmer than the forebay.

Table 15. Summary of differences[a] for 2001 and 2003 in daily mean and daily maximum temperatures at Camp 61 Creek downstream of Portal forebay compared to East Fork Camp 61 Creek. (Source: SCE, 2004a, 2003; Staff)

| Temperature | June | July | August | September |
|---|---|---|---|---|
| **Daily Mean Temperature** | | | | |
| Number of days | 37 | 62 | 62 | 60 |
| Range (°C) | 0.4 to 3.5 | –0.8 to 3.3 | 0.5 to 2.7 | 0.3 to 1.9 |
| Average (°C) | 1.5 | 1.5 | 1.3 | 1.0 |
| Frequency with difference >5°F (2.8°C) | 19% | 29% | 0% | 0% |
| **Daily Maximum Temperature** | | | | |
| Number of days | 37 | 62 | 62 | 60 |
| Range (°C) | 2.5 to 4.8 | –0.7 to 5.0 | 1.0 to 4.2 | –0.1 to 2.9 |
| Average (°C) | 3.8 | 2.9 | 2.5 | 2.0 |
| Frequency with difference >5°F (2.8°C) | 95% | 48% | 37% | 5% |

Note: % – percent
°C – degrees Celsius
°F – degrees Fahrenheit

[a] Positive range and average values indicate Camp 61 Creek downstream of Portal forebay was warmer than East Fork Camp 61 Creek, whereas negative range and average values indicate East Fork Camp 61 Creek was warmer than Camp 61 Creek.

Table 16. Summary of differences[a] for 2003 in daily mean and daily maximum temperatures at Camp 61 Creek downstream of Adit 2 Creek compared to East Fork Camp 61 Creek. (Source: SCE, 2004a, 2003; Staff)

| Temperature | June | July | August | September |
|---|---|---|---|---|
| **Daily Mean Temperature** | | | | |
| Number of days | 7 | 31 | 31 | 30 |
| Range (°C) | 0.8 to 2.3 | –0.3 to 0.8 | –0.3 to 0.6 | –0.3 to 1.1 |
| Average (°C) | 1.2 | 0.3 | 0.1 | 0.3 |
| Frequency with difference >5°F (2.8°C) | 0% | 0% | 0% | 0% |

| Temperature | June | July | August | September |
|---|---|---|---|---|
| **Daily Maximum Temperature** | | | | |
| Number of days | 7 | 31 | 31 | 30 |
| Range (°C) | 1.6 to 2.5 | 0.0 to 1.7 | 0.2 to 1.6 | 0.7 to 1.6 |
| Average (°C) | 1.9 | 1.0 | 0.9 | 1.2 |
| Frequency with difference >5°F (2.8°C) | 0% | 0% | 0% | 0% |

Note: % – percent
°C – degrees Celsius
°F – degrees Fahrenheit

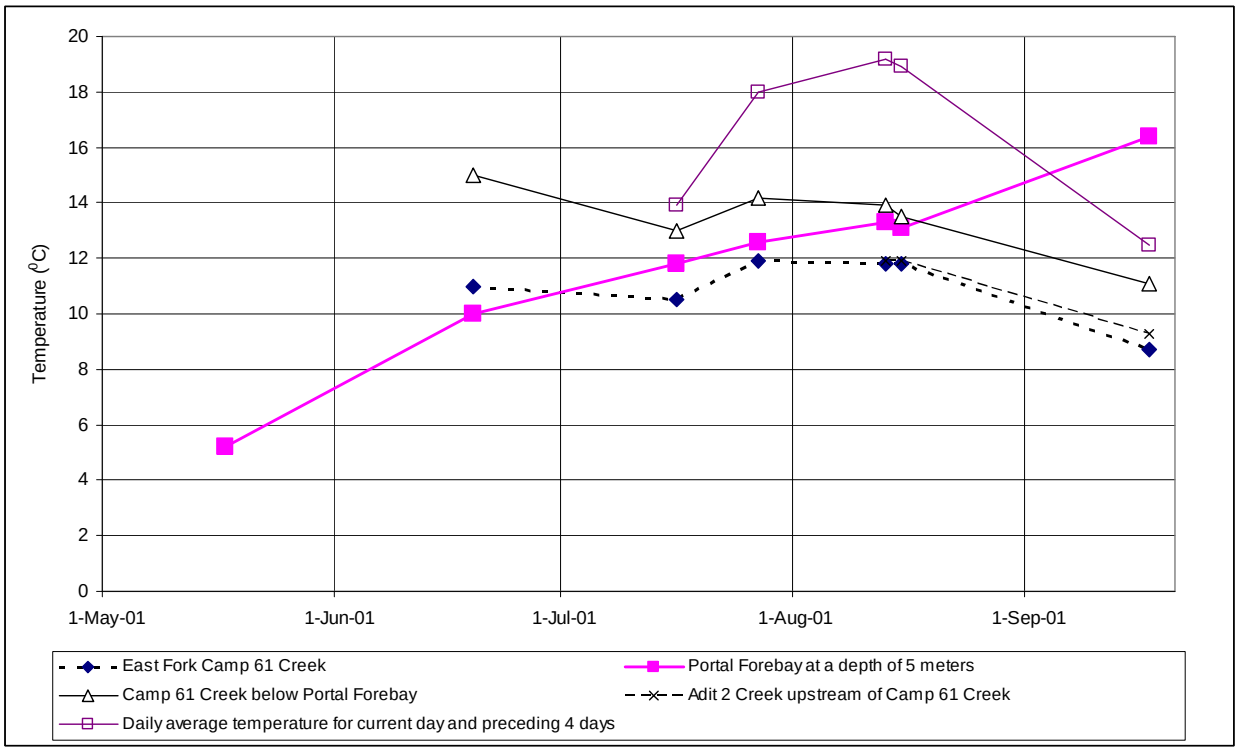
[a] Positive range and average values indicate Camp 61 Creek below Adit 2 Creek was warmer than East Fork Camp 61 Creek, whereas negative range and average values indicate East Fork Camp 61 Creek was warmer than Camp 61 Creek.

Tables 14 through 16 show that:

- The upper levels of the Portal forebay are generally warmer than Adit 2 Creek.
- Camp 61 Creek downstream of Portal forebay is generally warmer than East Fork Camp 61 Creek upstream of the Portal forebay. During June, July and August, the difference between these two locations is often greater than 5°F (2.8°C) suggesting exceedance of the Basin Plan temperature objective. Furthermore, the low flows that occur under existing operations result in the creek becoming intermittent, and likely subjects it to additional warming by the ambient air temperature as water stagnates in isolated pools.
- Camp 61 Creek downstream of the Adit 2 Creek confluence also is generally warmer than East Fork Camp 61 Creek upstream of Portal forebay. However, due to the influence of the generally cold inflow of Adit 2 Creek, there were no days during the 2003 sampling period that showed an increase of greater than 5°F (2.8°C) either for the average or the maximum daily readings, which suggests that Basin Plan temperature objective is currently satisfied. Camp 61 Creek downstream of Adit 2 Creek was not sampled by SCE in 2001; therefore, the comparison of temperatures for these stations was limited to 2003.

The likely release method for minimum instream flows would involve modifications to the 24-inch drain pipe through the Portal forebay dam, which has a slide-gate valve at its upper end. This would result in drafting water from near the bottom of Portal forebay. Therefore, water temperature immediately downstream of the dam would continue to be relatively cool compared to the upper levels of Portal forebay

during summer and fall. Because the flow from Adit 2 Creek is typically less than 0.1 cfs, the minimum instream flow released into Camp 61 Creek from the lower levels of Portal forebay would tend to dominate the thermal regime downstream of Portal forebay. As a result, Camp 61 Creek temperatures immediately below the Portal forebay dam would be frequently reduced during the summer (refer to Portal forebay at a depth of 5 meters and Camp 61 Creek below Portal forebay in figure 7), although they may continue to be warmer than ambient conditions in East Fork Camp 61 Creek. During late summer, however, this cooling effect could be limited for two reasons. First, Portal forebay is not stratified in late summer, and hence cooler water would not be withdrawn from the forebay (see figure 4). Second, source water from Florence Lake is warmer than water in nearby small streams, such as East Fork Camp 61 Creek, that have started to cool due to the falling air temperatures (refer to September in figure 7).




Note: Temperature for a depth of 5 meters was used to represent the approximate temperature of water within the forebay that would be released by the 24-inch sluice pipe. As shown in figure 4, the temperature at and below this depth is relatively constant and does not change substantially with increasing depth.

Figure 7. Comparison of water and air temperatures reported for periods when SCE monitored vertical profiles in Portal forebay, 2001. (Source: SCE, 2003)

The ability to draft cooler water off the bottom of Portal forebay is limited by the potential to store cool water below the outlet tunnel to the Portal powerhouse along with the rate at which water is drafted from this area. Based on the forebay storage capacity curve, approximately 75 acre-feet of storage exists below the invert of the outlet tunnel

leading to the Portal powerhouse. Operating the project to meet the higher minimum instream flows specified by the FS would deplete the supply of cooler water in the lower region of the forebay considerably faster than the smaller minimum instream flows proposed by SCE and those described in the staff alternative (table 17). Although some cool water could possibly replenish a portion of the cool water withdrawn from the lower depths of the forebay, it is likely that warmer water more similar to the upper levels of Portal forebay would be released to Camp 61 Creek under the FS specification than under the SCE proposed or staff alternative operations. However, under some meteorological conditions, such as hot sunny days, the higher flows specified by FS would result in less instream warming in Camp 61 Creek than the lower flows proposed by SCE and those described in the staff alternative. We anticipate that these meteorological conditions would result in warmer water temperatures at the lower end of Camp 61 Creek with the lower SCE proposed or staff alternative flows than with the minimum instream flows specified by the FS. Although the natural rate of warming has not been determined, our analysis indicates that providing the SCE proposed, FS specified, or staff alternative minimum instream flows would generally continue to satisfy the Basin Plan temperature objectives in lower Camp 61 Creek. Providing these minimum instream flows also is expected to generally bring the upper Camp 61 Creek reach into compliance with the Basin Plan temperature objective during June and July, but may not typically satisfy this temperature objective during August and September. Providing the SCE proposed or staff alternative minimum instream flows would tend to conserve the cool water in the Portal forebay, and may increase the likelihood of satisfying the Basin Plan objective in upper Camp 61 Creek.

Table 17. Summary of depletion rates for the 75 acre-feet of dead storage volume within Portal forebay. (Source: SCE, 2003; Staff)

| **Proposed and Recommended August MIF Rates** | **Number of days** |
|---|---|
| FS: 7 day average of 3 cfs (below average, above average and wet water years) | 13 |
| FS: 7 day average of 1.25 cfs (dry and critically dry water years) | 30 |
| SCE: 0.5 cfs | 76 |

Note: cfs – cubic feet per second
FS – U.S. Forest Service
MIF – minimum instream flow

**Dissolved Oxygen**

DO concentrations below the Basin Plan objective of 7.0 mg/l for cold freshwater habitat were observed in Camp 61 Creek immediately downstream of Portal forebay dam, other portions of Camp 61 Creek, and Adit 2 Creek. Sampling evidence indicates that

water within Ward tunnel (and consequently Adit 2 Creek) is low in DO as is the water that seeps through the dam into Camp 61 Creek.

SCE proposes two measures that would affect DO in Camp 61 Creek. In addition to providing a minimum instream flow to Camp 61 Creek downstream of Portal forebay, SCE would modify the existing catchment basin downstream of Portal dam to increase the aeration of water flowing from this basin. No other entities have made recommendations specifically related to DO in project waters. However, FS 4(e) condition no. 12 for minimum instream flows in Camp 61 Creek would also affect DO concentrations.

*Our Analysis*

Under SCE's proposed action, water for releases to Camp 61 Creek would be drafted from near the bottom of Portal forebay; this would correspond to moderately oxygenated water during portions of summer and fall of some years. Results of SCE's monitoring indicate that DO concentrations in the forebay are considerably higher than in seepage flows at the base of the Portal forebay dam (refer to figure 5). These measurements indicate that water seeping through the dam is deficient in oxygen. The typical DO concentration reported for the seepage was less than 4.0 mg/l with a single value of 7.6 mg/l taken on July 25, 2002. The highest summer (June–September) flow recorded by SCE in the Camp 61 Creek weir was 0.123 cfs in June 2001 while all other recordings were below 0.09 cfs. Adherence to a minimum instream flow of at least 0.75 cfs (the minimum flow for a dry water year as recommended by the FS; used here as the most conservative flow rate for June) would significantly increase the proportion of surface water in comparison to seepage water immediately downstream of the forebay dam, which would increase DO concentrations in Camp 61 Creek down to about the Adit 2 Creek confluence. Increases in DO concentrations would be largest immediately below the dam, where the lowest levels currently occur, although it is possible that the 7.0-mg/l Basin Plan criterion occasionally would not be satisfied at this location. Larger increases in DO concentrations would occur with higher releases from the Portal forebay.

Adoption of the FS specified minimum instream flow would further increase the proportion of surface water immediately downstream of the dam and consequently further increase DO concentrations. Even during dry years, flow downstream of the dam would be about five times higher than the 0.123 cfs recorded by SCE in June 2001 and would likely increase DO concentrations to above the 7.0-mg/l Basin Plan criterion in Camp 61 Creek for more than 1,000 feet downstream of the dam.

Reconfiguration of the catchment basin with the goal of increasing the aeration of water flowing out of the basin would likely further increase DO concentrations to levels above the 7.0-mg/l Basin Plan criteria regardless of whether the SCE proposed, FS specified, or staff alternative minimum instream flow regime is implemented under any

new license. An effective aeration design would increase the exposure of water to the atmosphere and result in more atmospheric oxygen being entrained in the water, thereby increasing DO concentrations downstream of the basin, although it likely would increase summer temperatures slightly and thereby may limit the amount of oxygen that can be dissolved in the water column.

**Iron in Waters Downstream of Portal Forebay**

Water chemistry within the watershed plays a significant role in the quality of project waters. The slightly acidic pH values are characteristic of the granitic watersheds found in the upper San Joaquin River Basin and Sierra Nevada Mountains. Reduced pH levels cause the water to be slightly corrosive, which accelerates weathering of the substrate. SCE has hypothesized that the orange-red residue at the three seepage points is the result of water seeping through the Portal dam and saddle dike material under reducing conditions, resulting in the dissolution of iron and manganese in parent material used to construct the dam. Once the water enters the oxygenated environment in Camp 61 and Adit 2 creeks, the iron precipitates from solution, likely as ferric hydroxide, $Fe(OH)_3$, an insoluble form of iron.

SCE proposes to modify the catchment basin below Portal dam, in consultation with the resource agencies, to increase the rate of aeration below the catchment basin and improve iron containment. SCE also proposes to investigate the feasibility of conducting periodic iron residue removal from this catchment basin. At this time, SCE proposes to use a vacuum truck to remove iron residue and clean the catchment basin once per year. SCE also proposes limited water quality sampling and/or analyses to determine the effectiveness of this measure.

*Our Analysis*

The applicable criteria for iron in the San Joaquin River Basin are the EPA instantaneous maximum of 1.0 mg/l for the dissolved fraction (40 CFR § 131) and the 0.3-mg/l total iron secondary MCL for drinking water (see table 8). SCE reported that total iron concentrations in seepage water collected in the weir at the base of Portal forebay dam exceeded Basin Plan limits in all eight samples collected during the 2001–2002 sampling program (range 9.1–14.0 mg/l). The presence of particulate iron compounds in the water also compromises the clarity of the water in Adit 2 and Camp 61 creeks to levels exceeding applicable state turbidity criteria. In general, total iron concentrations diminish with distance from the dam, and SCE states there is no evidence of orange-red stains downstream of where the water seeps from the forebay.

As indicated by the sampling program, the South Fork of the San Joaquin River at times receives waters in violation of the state's iron standard. However, as mentioned in section V.C.1.a, this threshold criterion is based on municipal or domestic water supply beneficial uses. SCE also notes that the iron standard is a secondary standard designed to

protect the aesthetic qualities of the water (visual staining, taste and odor), and that current iron levels do not pose a human health risk.

SCE's proposal to use a vacuum method to remove particulate iron accumulations could be effective in mitigating the aesthetic effect of the orange-red stains within the catchment basin. We anticipate that the vacuuming process would remove most sediments including iron precipitates along with water from the catchment basin. However, the vacuuming process would increase the potential to disturb the substrate in the catchment basin, loosening sediments, soil, and iron precipitate attached to those solids. The extent of resulting adverse effects would be largely dependent on the rate and amount of water allowed to flush through the catchment basin during and immediately following vacuuming. Therefore, it could be important to implement best management practices (BMPs) to prevent the disturbed particles from being flushed out of the catchment basin. If appropriate BMPs are not implemented, large quantities of iron-rich sediments could be flushed into Camp 61 Creek, and could result in transport of the orange-red material further downstream, thereby increasing the areal extent of staining and compromising water clarity and aesthetics during such events, and could have adverse effects on benthic communities in the creek.

As for the significance of dissolved iron, SCE reported that a single sample, taken from below the forebay dam during the 2001–2002 sampling program, exceeded the EPA dissolved iron criterion of 1.0 mg/l. Elevated dissolved iron concentrations pose a localized risk to freshwater aquatic resources within the catchment basin; however, dissolved iron concentrations downstream of the catchment basin satisfy the applicable standard. Implementation of SCE's proposed modification of the catchment basin would help ensure that waters downstream of the basin are oxygenated, and could slightly accelerate the oxidation process in outflow from the basin. If this were to occur, iron would precipitate out of the water column thus reducing dissolved iron concentrations. Implementation of SCE's proposed minimum instream flow into this area would contribute a significant increase in water quantity that could result in extending the orange-red iron precipitate further down Camp 61 Creek. It is unlikely that the proposed vacuum efforts would contribute dissolved iron to the waters of the Camp 61 reach.

Overall, the primary benefits of implementing vacuum procedures would be to aesthetics surrounding the catchment basin, while increasing the instream flows and modifying the catchment basin as proposed by SCE would primarily benefit water quality (temperature, DO, and dissolved iron concentrations) throughout the reach by significantly increasing the amount of water mixing with the seepage. Vacuum procedures without a reconfigured catchment basin or minimum instream flow would pose the greatest risk to water quality as the iron-rich sediments could be disturbed and distributed in a low flow and oxygen poor environment, compromising the aquatic resources in the immediate stream reach.

SCE's current proposal to use a vacuum truck as the treatment method for iron precipitates resulting from seepage through the dam has not been universally accepted in this proceeding. As we discussed above, vacuum removal of iron precipitates from the catchment basin would not necessarily remedy the situation without having some adverse effects on water quality, aesthetics, and benthic aquatic resources downstream of discharges from the catchment basin. Monitoring water quality and aesthetic conditions during and immediately following the vacuuming process would facilitate documentation of the effectiveness of removing the iron precipitates from the catchment basin and any adverse conditions resulting from the process. If the vacuuming process is found to be ineffective or results in significant adverse effects to water quality or aesthetics, it may be appropriate to implement other technologies to address this issue. Both active and passive treatment methods have been developed for acid mine drainage (Skousen et al, 1998). The effectiveness of treatment methods would be highly dependent on the flow and quality of water being treated. Based on measurements of water quality in the area, the seepage from Portal dam generally has a pH of 5.7 to 6.8 units, DO concentration of 1.3 to 3.6 mg/l, total iron concentration of 9 to 23 mg/l, and total manganese concentration of 0.7 to 1.0 mg/l. The method commonly selected to treat water with these general characteristics is use of natural or constructed wetlands (Ford, 2003; Skousen, 2001). Numerous studies have shown that wetlands can effectively remove iron and manganese from waters with elevated concentrations of these metals (Ziemkiewicz et al, undated; Ye et al, 2001). Study results also indicate that effectiveness of wetlands at removing metals from contaminated water is increased by wetland plants such as cattails, rushes, and bulrushes (*Typha*, *Juncus*, and *Scirpus* sp.) that encourage more uniform flow, help stabilize the substrate, and help maintain microbial populations.

**Sediment Source Reduction in Adit 2 Creek**

Adit 2 Creek is a relatively new geomorphic feature that has formed as a result of leakage from Adit 2. This channel originates at Adit 2 and passes through two wetland areas before entering Camp 61 Creek at approximately RM 0.9 on Camp 61 Creek. The upper wetland on Adit 2 Creek is located between approximately RM 0.7 and RM 0.55 and the lower wetland is located between approximately RM 0.3 and 0.15.

The Adit 2 Creek channel is actively incising, and as it erodes, it contributes sediments into Camp 61 Creek. According to SCE, most active channel erosion in Adit 2 Creek is occurring between RM 0.5 and 0.3 (between the two wetlands).

In its December 20, 2004, filing with the Commission, SCE proposes a measure to reduce this sediment in order to improve water quality and aquatic habitat in Camp 61 Creek. Flow would be intercepted immediately downstream of the upper wetland at Adit 2 Creek (RM 0.55) and conveyed in a newly constructed channel to Camp 61 Creek, entering Camp 61 Creek near RM 1.45 (see figure 3). The new channel would be constructed using native rock to provide boulder/cobble run and boulder cascade habitats.

SCE proposes to use a backhoe, 10-wheel truck, and a labor crew, although FS comments on the draft EA indicate no machinery could be used within the Ansel Adams Wilderness boundary.

The proposed engineered channel would be approximately 1,300 feet in length, with a 5-foot bankfull width and a 1-foot wide low flow thalweg. SCE anticipates that the new channel would usually carry less than 1.0 cfs to Camp 61 Creek, with peak streamflows not exceeding 5 cfs. Although all water would be diverted from Adit 2 Creek just below the upper wetland, SCE believes that the lower wetland would continue to be supported by hillside seepage and springs that provide localized flow accretion. According to SCE, the new channel would reduce the amount of flow in the unstable portion of Adit 2 Creek, and thereby assist with reducing associated erosion and sediment transport. Existing flows through the upper wetland would be unchanged.

In addition to diverting water into the new channel, SCE would install check dams in the existing Adit 2 Creek channel to prevent down cutting and, theoretically, reduce ongoing erosion in the channel. Six porous rock check dams would be constructed between RM 0.5 and 0.3 (approximately 175 feet apart). Five porous straw wattle check dams would also be constructed to reduce spacing between adjacent structures to approximately 75 feet. Material used to construct the check dams would be delivered using packhorses or mules and labor crews to minimize site disturbance. Once the dams have stabilized the channel and sediment has collected behind the dams, SCE would plant riparian vegetation into the bottom of the channel.

SCE explains that there are several reasons to expect that these measures would be effective and would improve water quality and aquatic habitat. These include:

- When properly designed for site conditions, porous check dams have a good track record of reducing hydraulic forces on streambanks.
- Much of the surface flow that has been causing erosion of the Adit 2 channel would be diverted into Camp 61 Creek upstream of the active erosion sites.

FS 4(e) condition no. 12(d) specifies that SCE should consult with FS to evaluate structural measures that could be effective in reducing erosion in Adit 2 Creek. If such measures are deemed practicable, SCE would implement, maintain and monitor them through any new license period. As mentioned above, FS also indicates that work would have to be accomplished using hand tools and pack animals, because of the site's location in the Ansel Adams Wilderness, where even wheelbarrows are prohibited.

*Our Analysis*

Under existing conditions, erosion and down-cutting along Adit 2 Creek causes episodic increases of suspended sediments and turbidity in Adit 2 Creek and delivery of

fine-grained particles to Camp 61 Creek. Constructing a new channel to re-route water from this portion of Adit 2 Creek would influence water quality in varied ways. During construction, the use of heavy equipment to haul material onsite, excavate and grade the new channel could disturb upland areas and increase the risks of erosion, sedimentation, and oil-spill contamination at the new confluence of Adit 2 Creek and Camp 61 Creek. Using packhorses or mules to haul material onsite also could disturb upland areas and increase the risks of erosion and sedimentation, although we anticipate that the level of impact would be less severe than from using heavy equipment. The use of pack animals also would increase the risk of contaminating surface waters with their waste. SCE could minimize all of the above risks by constructing the channel during the low-flow period of the year, and by implementing appropriate best management practices.

We anticipate that initial diversion of water into the new channel would result in high turbidity in the new channel and in Camp 61 Creek below the channel outlet, although the level of turbidity could be minimized by implementation of appropriate best management practices. Levels of turbidity would gradually decrease over time (i.e., 2 to 3 months following initial diversion), but storm events could result in pulses of turbid water in the new channel. Over the long term, erosion, suspended sediments, and turbidity would be reduced compared with existing conditions.

Routing water through the new channel, which would discharge into Camp 61 Creek about 0.55 mile upstream of the Adit 2 Creek confluence, would reduce temperatures and dilute trace metals in a longer reach of Camp 61 Creek, compared to current conditions. The extent of temperature and dilution effects would depend primarily on the ratio of outflow from the new channel to the flow in Camp 61 Creek at the confluence of the two streams.

Implementing SCE's proposed construction of porous rock check dams and straw wattle check dams would elevate turbidity in lower Adit 2 Creek during and shortly after the construction period. Construction during the dry season, using pack animals to transport materials to the site, and hand placing materials for each check dam would limit the occurrence of turbidity and contamination of Adit 2 Creek. Following construction of the check dams, suspended sediments would be deposited upstream of the dams, and turbidity in this portion of the creek would decrease. This would result in a long-term enhancement of turbidity levels in lower Adit 2 Creek and in Camp 61 Creek.

Diverting water from Adit 2 Creek would further reduce the erosive forces that currently cause downcutting of the channel and resultant increases in turbidity. This would result in a long-term benefit to water quality in both lower Adit 2 Creek and Camp 61 Creek. However, diverting water around lower Adit 2 Creek could potentially increase temperatures in this reach, because there would be less water mass to absorb nearly the same energy input. The extent of thermal effects in the lower wetland primarily would depend on the interchange of water between the creek and the wetland. SCE's filing indicates there is little or no interchange (letter from T.J. McPheeters,

Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004).

We present the costs of stabilization measures in Section VI, *Developmental Analysis*. We present our final recommendations regarding these measures in Section VII, *Comprehensive Development*.

**Water Quality Monitoring**

Implementation of measures under any new license has the potential to affect water temperature and water quality in waters affected by the project. As discussed above, we anticipate that the recommended measures would affect water temperature, DO, and iron concentrations in Camp 61 Creek.

SCE proposes to conduct limited water quality sampling and/or analyses to determine the effectiveness of measures designed to mitigate visual impacts of iron staining and reduce the potential for iron residue and turbidity to be transported down Camp 61 Creek (SCE, 2003). If the RWQCB determines that a NPDES permit is required, SCE proposes to work with the RWQCB to obtain necessary permits.

*Our Analysis*

Because the level of effectiveness of the proposed iron particulate vacuum program is uncertain, water quality monitoring before and after a vacuum clean up would be very useful in determining whether to continue or eliminate the program, or how to modify it to improve its effectiveness. Implementing a water sampling plan designed with or approved by the RWQCB would ensure that the sampling program would satisfy needs of the RWQCB to evaluate compliance with state water quality regulations and provide input to obtain necessary discharge permits. Implementation of an adaptive program would ensure that the licensee has the necessary flexibility to modify the clean-up program while continuing to remedy iron staining in the area. Documentation of iron concentrations would assist the RWQCB in evaluating consistency with the Basin Plan objectives and assist in determining the need for altering future actions.

Additional monitoring of water temperature and DO concentrations in the catchment basin and Camp 61 Creek bypassed reach also would provide a means of documenting the effectiveness of selected and implemented measures to reduce summer water temperatures and increase DO concentrations. Such monitoring would ensure consistency with the Basin Plan objectives.

c. Cumulative Effects:

The development and operation of hydroelectric facilities in the San Joaquin River Basin has resulted in the diversion of numerous small, high-elevation streams from their original channels. The construction of dams has impounded miles of streams, converting these inundated reaches from flowing water to reservoir conditions. The Portal Project contributes to changes in hydrology, geomorphology and water quality in the basin through its diversions of the East and West Forks of Camp 61 Creek and the Camp 61 Creek mainstem into the Portal forebay and finally into Huntington Lake. Implementation of minimum instream flows or channel and riparian maintenance flows at the Portal Project would restore some of the natural flow to Camp 61 Creek, and could contribute to basin-wide benefits associated with increased instream flows at other projects in the watershed. Increased flows proposed in the license measures for the Vermilion Valley Project (FERC No. 2086) in association with the proposed flows in Camp 61 Creek would produce a cumulative benefit to aquatic resources in the upper South Fork of the San Joaquin River watershed. Instream flow measures for other hydroelectric projects in the SFSJR are being addressed in the Big Creek ALP and may also provide additional benefits to aquatic resources when these measures are implemented.

d. Unavoidable Adverse Effects:

Operation of the Portal Project would continue to alter the natural hydrograph in Camp 61 Creek, to impound creek flow in the forebay, and to divert flows from the Camp 61 Creek system to the Rancheria Creek system.

**2. Aquatic Resources**

a. Affected Environment:

The upper reaches of the San Joaquin watershed, including those streams affected by the Portal Project, were fishless prior to European-American settlement. Since settlement, many species of trout have been stocked in high-elevation areas for recreational and consumptive purposes (Moyle, 2002).[13] Hatchery-reared rainbow trout have been stocked most frequently; brown trout, brook trout, and golden trout have been stocked to a lesser extent. Today, four species of resident trout and Sacramento sucker

[13] Prior to extensive trout planting programs in the late nineteenth and early twentieth centuries, most streams and lakes at elevations above 5,900 feet msl were without fish (Moyle, 2002). Elevations in the project area range from 6,952 feet msl at the Portal powerhouse to 7,180 feet msl at the Portal forebay.

are present in the Portal Project area (table 18). A single rainbow-golden trout hybrid was also captured in East Fork Camp 61 Creek in 2001.

Table 18. Fish species known to occur in the Portal Project area. (Source: SCE, 2003)

| **Common Name** | **Scientific Name** | Origin |
|---|---|---|
| Rainbow Trout[a] | *Oncorhynchus mykiss* | Introduced |
| Brown Trout | *Salmo trutta* | Introduced |
| Brook Trout | *Salvelinus fontinalis* | Introduced |
| Kokanee[b] | *Oncorhynchus nerka* | Introduced |
| Sacramento Sucker[c] | *Catostomus occidentalis* | Introduced |

[a] Includes rainbow-golden trout hybrids.
[b] Kokanee are only present in Rancheria Creek.
[c] It is not known how Sacramento sucker became established in Rancheria Creek.

No state or federally threatened or endangered fish species have been documented in the project area, although FS considers three fish species (resident rainbow, brown, and brook trout) as MIS. According to SCE, CDFG's principal fishery management objective for the project area is to maintain or enhance recreational angling opportunities of target species (rainbow trout) with a focus on the Portal forebay. CDFG and SCE currently maintain a "put-and-take" catchable rainbow trout fishery in Portal forebay. The annual CDFG stocking goal for Portal forebay is to plant 6,000 pounds of catchable rainbow trout per year.[14] The number of rainbow trout from the CDFG's San Joaquin hatchery that were stocked annually in Portal forebay from 1994 through 2001 is presented below (SCE, 2003):

- 1994—13,515 rainbow trout;
- 1995—8,595 rainbow trout;
- 1996—8,670 rainbow trout;
- 1997—8,350 rainbow trout;
- 1998—5,550 rainbow trout;
- 1999—10,060 rainbow trout;
- 2000—10,440 rainbow trout; and
- 2001—11,491 rainbow trout.

[14] Weighing approximately one-half pound each.

The general life history and habitat requirements of the trout species present in the Portal Project area are relatively similar (Moyle, 2002).[15] They are found throughout their life cycle in perennial rivers or streams with moderate- to fast-moving waters and gravel to rocky substrates. They also occur in lakes; however, in most cases, trout must have access to streams to reproduce. All three species prefer cold water temperatures, with preferred upper range limits of 18°C, 16.0°C, and 21.3°C for rainbow trout, brook trout, and brown trout, respectively (table 19). Rainbow trout are primarily surface feeders feeding on aquatic and terrestrial insects; however, they will feed on plankton, larger invertebrates, and small fish, as well. Juvenile brown trout feed on benthic organisms, while adults eat fish, tadpoles, and larger items. Brook trout feed upon a wide variety of aquatic insects and other invertebrates as well as fish and terrestrial insects that fall into the water.

Table 19. Preferred and upper lethal temperatures for rainbow trout, brook trout, and brown trout. (Source: Reiser and Bjornn, 1979; Baltz et al., 1987 as cited in Moyle, 2002)

| Species | Preferred Temperature Range (ºC) | Upper Lethal Temperature (ºC) |
|---|---|---|
| Rainbow trout | 15 to 18 | 24.1 |
| Brook trout | 14.0 to 16.0 | 25.8 |
| Brown trout | 3.9 to 21.3 | 24.1 |

All three species of trout generally reach reproductive maturity during their second or third year of life and spawn in gravel riffles in streams with sufficient current to aerate the eggs and prevent silting over the gravel in which the eggs are buried. Brown and brook trout generally spawn in the fall or early winter. In the project area, they begin their spawning migration in September with peak spawning occurring in October and November. Brown trout and brook trout eggs hatch in 11 to 16 weeks, depending on water temperature, and fry emerge from the gravel several weeks later. Rainbow trout generally spawn from February through June. Rainbow trout eggs hatch in 11 to 15 weeks, depending on water temperature, and fry emerge from the gravel 2 or 3 weeks after hatching. After emerging from the gravel, trout fry inhabit quiet water close to banks among large rocks or overhanging vegetation, and as they mature, they may migrate into downstream areas or remain in the stream and defend a small home range.

Kokanee, the non-anadromous form of sockeye salmon, have been introduced in many of California's coldwater lakes. Kokanee planted in Huntington Lake have been observed to spawn in the tailrace of Portal powerhouse (during the 1980–1981 season),

[15] For this analysis, we assume that the life history and habitat requirements for the rainbow-golden trout hybrid are similar to those of the rainbow trout.

and in the tailrace and lower portion of Rancheria Creek. Kokanee are pelagic zooplankton feeders that inhabit well-oxygenated waters of lake and reservoirs. Preferred water temperatures range from 10 to 15°C. Kokanee feed mainly on Daphnia, copepods, emerging insects and, on occasion, larval fish. Depending on water temperature, kokanee spawn from September through February in water temperatures ranging from 6 to 13°C. Kokanee fry emerge in April through June and immediately migrate downstream and generally do not start feeding until they reach the lake or reservoir.

In addition to fish, the waterbodies in the Portal Project area support an abundance of aquatic macroinvertebrate fauna. Aquatic macroinvertebrates are important for two major reasons. First, they are a major source of food for birds, mammals, reptiles, amphibians, fish, and other invertebrates. Second, aquatic macroinvertebrates are relatively sensitive to changes in their habitats and so have been used historically to indicate quality of, and changes in, aquatic habitat. Some of the more abundant and larger macroinvertebrates found in the project area included chironomids (midges), Plecoptera (stoneflies), and Tricoptera (caddisflies).

In the following sections, we describe the physical features, aquatic habitat, and aquatic biota in six project area waterbodies. These include:

- East Fork Camp 61 Creek;
- West Fork Camp 61 Creek;
- Adit 2 Creek;
- Camp 61 Creek downstream of the Portal forebay dam to the confluence with the SFSJR;
- Rancheria Creek below the energy dissipater; and
- Portal forebay.

**Aquatic Resources in East Fork Camp 61 Creek**

East Fork Camp 61 Creek is a small unregulated reach of the Camp 61 Creek system located upstream of Portal forebay (figure 3). Its perennial stream channel extends approximately 1 mile from its headwaters (7,480 feet msl) to its confluence with Portal forebay (7,180 feet msl). The stream is generally steep and entrenched, with channel gradients ranging from 4.6 to 24.5 percent. Cascades, shallow step pools (less than 2 feet deep), step runs, and high-gradient riffles are the prevailing habitat types;

however, plunge pools, runs, and pocket water habitats are also present (table 20).[16] Substrates are primarily cobbles (39 percent) and boulders (36 percent), with small amounts of gravel, sand, bedrock, and fines. In the low-gradient riffles and pool tail-outs, cobbles and gravels are approximately 50 percent embedded. The riparian corridor in East Fork Camp 61 Creek is approximately 50 to 60 feet wide and is dominated by alder. Large woody debris (LWD) is very abundant in the active and bankfull channels. In 2000, 2001, and 2003, the maximum water temperature in East Fork Camp 61 Creek was 14.5°C, well within the preferred range for trout. A 10-foot bedrock waterfall located 1,134 feet upstream from Portal forebay is the only upstream fish passage barrier in the surveyed reach.

Table 20. Habitat type frequencies for East Fork 61 Creek. (Source: SCE, 2003)

| Habitat Type | Percent of Habitats |
|---|---|
| Cascade | 49.5 |
| Dammed pool | 1.5 |
| High-gradient riffle | 7.6 |
| Main channel pool | 2.2 |
| Plunge pool | 4.9 |
| Pocket water | 1.1 |
| Road crossing | 3.1 |
| Run | 2.1 |
| Step pool | 16.5 |
| Step run | 11.5 |

Median monthly flows (50 percent exceedance flow) in East Fork Camp 61 Creek range from approximately 0.1 cfs in August to 8.5 cfs in May (see table 2). Although flows in East Fork Camp 61 Creek are not affected by project operations, all water from this system eventually enters Portal forebay before being diverted into the Ward tunnel.

SCE sampled fish populations in the Portal Project area streams in fall 2001 and summer 2002 using a backpack electrofisher (SCE, 2003). Fish species captured in East Fork Camp 61 Creek included rainbow trout, brook trout, and brown trout (table 21). SCE also captured one rainbow-golden trout hybrid. Brook trout accounted for approximately 90 percent of the captured fish. The abundance of brook trout was estimated to be 2,090 fish per mile (table 21)[17]. The abundance of rainbow trout and brown trout was estimated to be 130 and 79 fish per mile, respectively. The majority of the brook trout captured during sampling (30 fish) were young of the year (age 0+). The

[16] Aquatic habitats were evaluated in a continuous reach with a length of 1,440 feet.

[17] Fish populations were sampled with a backpack electrofishing unit and fish population estimates were derived using the maximum likelihood technique of Zippin (1958).

three brown trout were age 0+, 1+, and 2+; and the five rainbow trout were age 0+ (three fish) and 2/3+ (two fish). Although one rainbow trout-golden trout hybrid was captured in East Fork Camp 61 Creek, golden trout are native only to the upper Kern River Basin in California (Moyle, 2002). CDFG records indicate that golden trout have been planted in nearby Bear Creek.

According to SCE (2003), the densities of trout reported for East Fork Camp 61 Creek are similar to or greater than trout population densities that were found for other productive trout waters in the region.

Table 21. Fish species capture totals and estimated abundance in the Portal Project streams, 2001 and 2002. (Source: SCE, 2003)

| Site | Species | Size Range (mm) | Number Captured | Population Estimate (fish/mile) |
|---|---|---|---|---|
| East Fork Camp 61 Creek | Brook trout | 29–238 | 77 | 2,090 |
| | Brown trout | 46–141 | 3 | 79 |
| | Rainbow trout | 38–214 | 5 | 130 |
| | Rainbow trout-golden trout hybrid | 145 | 1 | 26 |
| West Fork Camp 61 Creek | Brook trout | 37–231 | 185 | 3,283 |
| | Rainbow trout | 63–244 | 6 | 105 |
| Camp 61 Creek (2001) | Brown trout | 34–246 | 85 | 1,439 |
| Camp 61 Creek (2002) | Brown trout | 42–254 | 79 | 1,513 |
| Rancheria Creek (Above Energy Dissipater) | Brook trout | 34–181 | 51 | 916 |
| | Brown trout | 42–207 | 12 | 212 |
| | Rainbow trout | 38–276 | 71 | 1,550 |
| | Sacramento sucker | 147–308 | 28 | 494 |
| Rancheria Creek (Below Energy Dissipater, Rosgen B Channel) | Brook trout | 55–122 | 14 | 248 |
| | Brown trout | 43–193 | 10 | 177 |
| | Rainbow trout | 61–193 | 58 | 1,093 |
| | Sacramento sucker | 172–275 | 8 | 142 |
| Rancheria Creek (Below Energy Dissipater, Rosgen A Channel) | Brook trout | 70–119 | 3 | 53 |
| | Brown trout | 144–170 | 2 | 35 |
| | Rainbow trout | 35–227 | 51 | 933 |
| | Sacramento sucker | 151–226 | 5 | 53 |

| Site | Species | Size Range (mm) | Number Captured | Population Estimate (fish/mile) |
|---|---|---|---|---|
| Adit 2 Creek (lower site) (2002) | Brown trout | 71–295 | 47 | 967 |
| Adit 2 Creek (upper site) (2002) | -- | -- | 0 | -- |

**Aquatic Resources in West Fork Camp 61 Creek**

Like East Fork Camp 61 Creek, West Fork Camp 61 Creek is a small, unregulated reach of the Camp 61 Creek system (figure 3). It extends approximately one mile from its perennial headwaters (7,440 feet msl) to Portal forebay. At 2.9 square miles, its watershed is slightly larger than that of the East Fork watershed. The stream is relatively steep and entrenched with channel gradients ranging from 15.1 to 22.3 percent. Shallow step pools (less than 2 feet deep), high gradient riffles, and step runs are the prevailing habitat types (table 22). The substrate in West Fork Camp 61 Creek is very similar to that found in East Fork Camp 61 Creek. Boulders (38 percent) and cobbles (16 percent) are the most common substrates, with smaller amounts of bedrock, gravel, and sand. Embeddedness was measured to be 30 to 40 percent for cobble and 50 percent for gravel-sized elements.

Table 22. Habitat type frequencies in West Fork 61 Creek. (Source: SCE, 2003)

| Habitat Type | Percent of Habitat |
|---|---|
| Cascade | 4.7 |
| High-gradient riffle | 24.6 |
| Lateral scour pool | 2.5 |
| Not applicable | 3.0 |
| Plunge pool | 0.8 |
| Road crossing | 1.9 |
| Step pool | 43.2 |
| Step run | 19.3 |

Not applicable = Habitat types not included in the USFS stream survey methodology.

LWD is abundant and very functional in West Fork Camp 61 Creek. The riparian corridor spans a width of approximately 75 feet and is dominated by alder. An abandoned 13-foot high diversion structure located 1,166 feet upstream of Portal forebay is the only fish migration barrier in West Fork Camp 61 Creek. The structure is currently used for stream gaging. In 2003, the maximum water temperature recorded in West Fork Camp 61 Creek was 15.4 °C, well within the preferred range for brook, brown, and rainbow trout (table 19).

Median monthly flows (50 percent exceedance flows) in West Fork Camp 61 Creek range from approximately 0.3 cfs in August to 12.5 cfs in May (see table 3). Like East Fork Camp 61 Creek flows, water in West Fork Camp 61 Creek is collected in Portal forebay and is diverted through the Ward tunnel.

The fish species in West Fork Camp 61 Creek included brook trout and rainbow trout (table 21). Brook trout accounted for 97 percent of the captured fish in 2001. The abundance of brook trout was estimated to be 3,283 fish per mile and was much greater than East Fork Camp 61 Creek (table 21). The abundance of rainbow trout was estimated to be 105 fish per mile. The majority of the captured brook trout (103 fish) were age 0+. The captured rainbow trout were age 0+ (five fish) and 4+ (one fish). According to SCE (2003), the densities of trout reported for West Fork Camp 61 are similar to or greater than trout population densities that were found for other productive trout waters in the region.

### Aquatic Resources in Camp 61 Creek Downstream of Portal Forebay

Camp 61 Creek extends approximately 2 miles from Portal forebay dam (7,117 feet above msl) to its confluence with the SFSJR (6,413 feet msl) (figure 3). Channel gradients range from 2 to 10 percent. Step runs, step pools, and lateral pools are the prevailing habitat types (table 23). The majority of the pools in the reach are shallow, measuring less than 2 feet deep. Substrates are mainly boulders (37 percent), sand (19 percent), and bedrock (12 percent), with smaller amounts of cobble, gravel, and fines. A moderate amount of spawning gravel is present in run, pool, and riffle habitats. Although quantitative data are limited, lower Camp 61 Creek (downstream of the confluence with Adit 2 Creek) was reported as having 90 to 100 percent embeddedness. In addition, accumulations of fine sediment in pools in Camp 61 Creek downstream of Portal forebay dam were nearly 2.5 times that observed in East Fork Camp 61 Creek and West Fork Camp 61 Creek.

Table 23. Habitat type frequencies for Camp 61 Creek below Portal forebay dam. (Source: SCE, 2003)

| Habitat Type | Percent of Habitat |
|---|---|
| Bedrock sheet | 0.6 |
| Cascade | 0.8 |
| High-gradient riffle | 3.7 |
| Low-gradient riffle | 0.2 |
| Lateral scour pool | 8.2 |
| Not applicable | 3.1 |
| Plunge pool | 1.1 |
| Step pool | 30.4 |
| Step run | 52.0 |

Not applicable = Habitat types not included in the USFS stream survey methodology.

Alder, willow, and some mature cottonwood dominate the riparian corridor. The width of the riparian corridor ranges from 15 to 50 feet. LWD is only intermittent within the active channel, and, where present, it has a minimal influence on channel morphology. In 2000, 2001, and 2003, the maximum water temperature in Camp 61 Creek, upstream from its confluence with Adit 2 Creek, was 19.3 °C. The maximum water temperate in Camp 61 Creek downstream of its confluence with Adit 2 Creek was 16.8 °C. Four fish passage barriers are present in Camp 61 Creek below Portal forebay. All four are complete barriers to upstream fish migration at low flows. Three of the barriers are short waterfalls located 8,117, 7,040, and 5,247 feet upstream of the confluence with the SFSJR; the fourth barrier is a bedrock sheet located 5,194 feet upstream of the confluence with the SFSJR. The barrier at 7,040 feet is a barrier at all flows.

Under existing conditions, Camp 61 Creek has no minimum instream flow requirement. Flow below the forebay is present as a result of seepage emanating from Portal forebay dam and from accretion and surface runoff during the spring snowmelt or precipitation events. Additional water is also provided to Camp 61 Creek from leakage from Adit 2 (via Adit 2 Creek). Adit 2 Creek converges with Camp 61 Creek approximately one mile downstream of Portal forebay dam (figure 3). Upstream from the Adit 2 Creek confluence, Camp 61 Creek is often completely dry. Based on limited weir data collected from 1997 through 2002, flows in Camp 61 Creek immediately below Portal forebay dam are typically less than 0.123 cfs (see section V.C.1., *Water Resources*).

Brown trout was the only fish species captured in Camp 61 Creek, and they are only present in the reach below the confluence with Adit 2 Creek (table 21). There is little flow in the reach between Adit 2 Creek and Portal dam, and during fish population sampling in 2001 and 2002, much of this reach was completely dry. Downstream of Adit 2 Creek, the density of brown trout was estimated to be 1,439 fish per mile in 2001 and 1,513 fish per mile in 2002 (table 21). Camp 61 Creek had the highest estimated density of brown trout among the project streams, and according to SCE (2003), this density is similar to the brown trout population densities that were found for Cold Creek and Mono Creek (two Vermilion Project reference streams). Several age classes of brown trout were captured during sampling in Camp 61 Creek; however, age 0+ fish were relatively rare, possibly indicating a lack of suitable spawning habitat or a lack of access to suitable spawning habitat during the spawning season due to low flows. As described previously, the extent of upstream movement of brown trout in Camp 61 Creek is limited due to low flow related migration barriers within the stream channel.

**Aquatic Resources in Adit 2 Creek**

Adit 2 Creek is a 0.9-mile-long channel that extends from the east side of the Portal forebay (7,217 feet msl) to Camp 61 Creek (6,706 feet msl) (figure 3). The creek

developed as a result of construction of the Ward tunnel, and it is fed primarily by leakage from the Ward tunnel, with additional seepage from the Portal forebay saddle dike. It is a relatively steep, sand-dominated stream; channel gradients range from 2 to 11 percent. Step runs and cascades are the prevailing habitat types (table 24); however, a portion of the stream flows through meadow habitat. The pools observed in Adit 2 Creek are relatively small and shallow, measuring less than 2 feet deep. Substrates are primarily sand (40 percent) and boulder (23 percent), with smaller amounts of cobbles, fines, and gravel. A small amount of spawning gravel is located in step runs. The upper 200 feet of Adit 2 Creek lack a riparian corridor. The riparian corridor in the remainder of the reach is dominated by alder and varies in width from 5 to over 40 feet, and some segments of the channel display substantial encroachment by alder and willow. Abundant LWD is present above the flood-prone channel, but little reaches the active channel. A cascade located 236 feet upstream of the confluence with Camp 61 Creek and a waterfall located 1,461 feet upstream of the confluence with Camp 61 Creek form complete barriers to upstream fish migration. The meadow section and Portal forebay dam are also complete barriers to fish migration.

Table 24. Habitat type frequencies for Adit 2 Creek. (Source: SCE, 2003)

| Habitat Type | Percent of Habitat |
|---|---|
| Cascade | 12.7 |
| Dammed pool | 0.2 |
| Meadow habitat | 13.1 |
| Step pool | 0.7 |
| Step run | 73.3 |

Under existing conditions, all water in upper Adit 2 Creek is the result of leakage from the Ward tunnel and the Portal forebay saddle dike. The Portal Project removes no water from Adit 2 Creek. Based on limited weir data collected from 1997 through 2002, flows in Adit 2 Creek immediately below Portal forebay dam are typically less than 0.253 cfs (see section V.C.1., *Water Resources*). In 2003, the maximum water temperature in Adit 2 Creek was 13.2°C.

Two sites were sampled for fish in Adit 2 Creek. The upper site was located immediately downstream of the upper meadow. The lower site was located close to the confluence with Camp 61 Creek. Brown trout was the only fish species captured in Adit 2 Creek, and all were captured at the lower site. The density of brown trout was estimated to be 967 fish per mile (table 21). Although age 1+, 2+, 3+, and 4+ brown trout were captured during sampling, no age 0+ fish were collected in Adit 2 Creek.

**Aquatic Resources in Rancheria Creek**

Rancheria Creek is located upstream of Huntington Lake (figure 2). Downstream of the energy dissipater (the project affected reach), Rancheria Creek has a low-to-moderate gradient with a 2.1 percent channel slope. Low gradient riffles, step runs, and pools are the prevailing habitat types (table 25). Substrates are primarily cobbles, with smaller amounts of boulders and gravel. A small amount of spawning gravel is present in low-gradient riffle and main channel pools. Instream sediment conditions are similar to the upstream reach, with interstitial sand and other depositional features associated with large boulders and LWD, although values for embeddedness of cobbles and gravels are approximately 50 to 60 percent. The riparian corridor is healthy and intact, measuring 20 to 40 feet wide on each bank, although the potential for LWD recruitment is very poor due to the clearing of large trees. Dominant species include alder, aspen, and willow. No barriers to fish migration were observed in the reach downstream of the energy dissipater. Summer water temperatures in Rancheria Creek are typically less than 17°C. No flow data are available for Rancheria Creek.

Table 25. Habitat type frequencies for Rancheria Creek below the energy dissipater. (Source: SCE, 2003)

| Habitat Type | Percent of Habitat |
|---|---|
| Cascade | -- |
| Dammed pool | -- |
| Glide | -- |
| High-gradient riffle | 11.3 |
| Low-gradient riffle | 30.3 |
| Lateral scour pool | 10.1 |
| Main channel pool | 18.0 |
| Plunge pool | -- |
| Run | 9.1 |
| Step run | 21.2 |

Three sites were sampled for fish in Rancheria Creek. One site was located upstream of the energy dissipater and two sites were located downstream of the energy dissipater. The downstream sites were located immediately below the energy dissipater (Rosgen B Channel) and immediately upstream of the powerhouse tailrace (Rosgen A Channel) (Rosgen, 1996). Brook trout, brown trout, rainbow trout, and Sacramento sucker were captured at all three sites. Rainbow trout was the most abundant species at all three sites (58 percent), and brown trout was the least abundant (7 percent). The Rosgen A Channel sample site located just upstream of the powerhouse tailrace had the lowest population estimate for each species (table 21). The abundance of rainbow trout at this site was estimated to be 933 fish per mile, while brook trout and brown trout

densities were 53 and 35 fish per mile, respectively. The density of rainbow trout at the sample site upstream of the energy dissipater was estimated to be 1,550 fish per mile (table 21). Densities of brook trout and brown trout were estimated to be 916 and 212 fish per mile. Multiple age classes of all three species of trout were captured in Rancheria Creek including an abundance of age 0+ fish.

Kokanee have been observed spawning in the Portal powerhouse tailrace and in the lower portion of Rancheria Creek upstream of the tailrace confluence (CDFG, 1982 as cited in SCE, 2003). Kokanee migrate from Huntington Lake to these stream reaches to spawn.

**Aquatic Resources in Portal Forebay**

Portal forebay was constructed at the intersection of Camp 61 Creek and Ward tunnel (figure 3). At 7,180 feet msl, it has a surface area of approximately 20 acres and a capacity of 325 acre-feet. Portal forebay receives water from three sources: East Fork Camp 61 Creek, West Fork Camp 61 Creek, and Ward tunnel. Water passes from Portal forebay downstream to Huntington Lake via Ward tunnel and the Portal powerhouse or through the H-B valve into Rancheria Creek.

SCE evaluated the shallow-water habitat of Portal forebay in June 2002. Habitat adjacent to the shoreline of Portal forebay between the East and West Forks of Camp 61 Creek was mostly composed of fines (50 percent), followed by sand (20 percent), gravel (20 percent), cobble (8 percent), and boulders (2 percent). Small rooted aquatic vegetation was present in approximately 50 percent of the area.

The shoreline along the Portal forebay dam had the highest percentage of cobbles and boulders in the forebay. The area was predominantly sand (35 percent), with equal amounts of fines, gravel, and cobble (20 percent). Boulders comprised 5 percent of the shoreline area. Aquatic vegetation was not present; however, boulders and cobbles provide cover for fish.

In the cove located near the vertical shaft to Ward tunnel, the substrate was primarily sand (85 percent), followed by fines (10 percent) and boulders (5 percent). Small rooted vegetation was present in approximately 20 percent of the area. The substrate on the bottom of the forebay was entirely composed of fines in this area.

The Portal forebay water surface elevation fluctuates frequently (table 26). Daily fluctuations have ranged from 20.5 feet in December 1995 to 0 feet in September 1999. During dry water years, elevation changes tended to be variable. During wet and above normal water years, elevation changes tended to be relatively large during the fall, winter, and spring. The change in available storage area resulting from these fluctuations ranged from 275.4 acre-feet in December 1995 to 0 acre-feet in September 1999. The change in surface area resulting from the fluctuations ranged from 12 acres in December 1995 to 0

acres in September 1999. In 2000, 2001, and 2003, the maximum water temperature recorded in Portal forebay was 20.8 °C.

Table 26. Monthly average of daily elevation variations (in feet) in Portal forebay by water year type (1995–2001). (Source: SCE, 2003)

| Month | Wet | Above Normal | Dry |
|---|---|---|---|
| October | 4.6 | 7.6 | 0.3 |
| November | 8.3 | 8.9 | 2.8 |
| December | 7.9 | 8.7 | 8.6 |
| January | 7.5 | 8.5 | 3.2 |
| February | 6.9 | 9.2 | 2.4 |
| March | 4.8 | 10.2 | 6.3 |
| April | 4.0 | 9.2 | 4.5 |
| May | 2.9 | 7.2 | 6.6 |
| June | 5.0 | 2.8 | 5.3 |
| July | 4.8 | 3.3 | 3.2 |
| August | 2.3 | 3.0 | 1.4 |
| September | 4.9 | 2.1 | -- |

SCE sampled fish populations in Portal forebay in June 2002 using gill nets and electrofishing. Fish species captured included brook trout, brown trout, and rainbow trout. Eighteen percent of the fish captured were brook trout, 24 percent were brown trout and 58 percent were rainbow trout (table 27). Most of the fish caught were between 200 and 350 mm in length (fork length). Of the 22 rainbow trout captured in Portal forebay, 15 exhibited signs of hatchery origin, such as eroded fins.

Table 27. Fish species captured in Portal forebay, June 2002. (Source: SCE, 2003)

| Species | Number Captured | Percent of Total |
|---|---|---|
| Brook trout | 7 | 18 |
| Brown trout | 9 | 24 |
| Rainbow trout | 22 | 58 |

### Benthic Macroinvertebrates in the Project-Affected Stream Reaches

During project relicensing, SCE sampled benthic macroinvertebrates in the project-affected stream reaches using the California Stream Bioassessment Protocol (CSBP) (SCE, 2003). The upper project area (i.e., East Fork Camp 61 Creek, West Fork Camp 61 Creek, Camp 61 Creek downstream of Portal forebay, and Adit 2 Creek) was sampled in September 2001. Sites in Rancheria Creek upstream of Portal powerhouse tailrace were sampled in September 2002.

The benthic macroinvertebrate indices described in the CSBP were used as indicators of potential project effects on the chemical, physical, and biological integrity of the project area waterbodies. The values associated with these indices (such as benthic macroinvertebrate density and abundant taxa) and metrics (such as taxa richness; Ephemeroptera, Plecoptera, and Tricoptera [EPT] taxa), EPT index; and the Shannon-Weaver diversity index tend to decrease in response to impairment (i.e., habitat disturbance).

The most abundant taxa in the upper project area streams were Diptera (flies) of the Orthocladiinae and Tanytarsini groups. Both are from the family Chironomidae (midges) and are considered moderately tolerant of disturbance or pollution. The *Zapada* taxon of the EPT group, or mayfly-stonefly-caddisfly group, was relatively abundant in the upper project area streams. *Zapada* is a stonefly and member of the family Nemouridae and considered intolerant of pollution and habitat deterioration.

The abundant taxa collected at the Rancheria Creek sites were similar to the other project area sites. The most abundant taxa were Diptera of the order Orthocladiinae, representing 28 to 42 percent of the total. The stonefly *Zapada* was also abundant at all of the Rancheria Creek sites.

According to SCE (2003), the benthic macroinvertebrate densities among upper project area sites were not significantly different ($p = 0.9$). West Fork Camp 61 Creek site 1 had the highest mean density, and East Fork Camp 61 Creek site 1 had the lowest mean density (table 28). In Rancheria Creek, there also was no statistically significant difference in benthic macroinvertebrate densities among sites ($p = 0.11$). Rancheria Creek above the energy dissipater had the highest mean density value, and Rancheria Creek below the energy dissipater (site ED 2) had the lowest (table 28).

At the Rancheria Creek sites, taxa richness values ranged from 29.3 at the altered channel site to 38.7 at site 2 below the energy dissipater (table 29). The EPT taxa metrics ranged from 16.3 at the altered channel site to 2.3 at site 2 downstream of the energy dissipater. The EPT index metrics ranged from 34.0 at the altered channel site to 49.4 at site 1 below the energy dissipater. The percent tolerant organisms metric ranged from 2.7 at site 1 below the energy dissipater to 4.7 at site 2. These metrics were not statistically significantly different among sites; however, the differences in EPT index metrics approached levels of statistical significance.

Table 28. Macroinvertebrate densities of samples collected in the waters of the Portal Project area. (Source: SCE, 2003)

| Water Body | Site | Mean Density (number/square foot) |
|---|---|---|
| East Fork Camp 61 Creek | 1 | 107 |
| | 2 | 409 |
| West Fork Camp 61 Creek | 1 | 411 |
| | 2 | 247 |
| Adit 2 Creek | 1 | 359 |
| Camp 61 Creek | 1 | 174 |
| | 2 | 303 |
| | 3 | 212 |
| | 4 | 159 |
| Rancheria Creek | Above ED | 1,311 |
| | Altered Channel | 402 |
| | Below ED 1 | 683 |
| | Below ED 2 | 338 |

Note: ED – energy dissipater

Table 29. Metric value means by site for benthic macroinvertebrates in waters of the Portal Project area. (Source: SCE, 2003)

| Waterbody | Site | Taxa Richness | EPT Taxa | EPT Index | Percent Tolerant Organisms |
|---|---|---|---|---|---|
| East Fork Camp 61 Creek | 1 | 36.3 | 23.7 | 66.7 | 4.9 |
| | 2 | 25.3 | 15.7 | 37.9 | 9.4 |
| West Fork Camp 61 Creek | 1 | 27.3 | 16.3 | 55.2 | 2.1 |
| | 2 | 29.0 | 18.7 | 56.5 | 4.2 |
| Adit 2 Creek | 1 | 34.5 | 18.0 | 70.2 | 1.3 |
| Camp 61 Creek | 1 | 20.3 | 10.3 | 15.6 | 3.0 |
| | 2 | 29.3 | 16.7 | 29.5 | 1.0 |
| | 3 | 32.3 | 14.3 | 31.8 | 12.2 |
| | 4 | 36.0 | 20.3 | 47.2 | 0.7 |

| Waterbody | Site | Taxa Richness | EPT Taxa | EPT Index | Percent Tolerant Organisms |
|---|---|---|---|---|---|
| Rancheria Creek | Altered channel | 29.3 | 16.3 | 34.0 | 2.8 |
| | Downstream of ED 1 | 38.7 | 23.3 | 40.9 | 2.7 |
| | Downstream of ED 2 | 37.0 | 21.7 | 49.4 | 4.7 |

Note: ED – energy dissipater
EPT – Ephemeroptera, Plecoptera, and Tricoptera

In the upper project area, the metrics for Shannon-Weaver diversity index ranged from 0.7 at West Fork Camp 61 Creek site 1 to 1.3 at East Fork Camp 61 Creek site 1. There was no statistically significant difference among sites. The Shannon-Weaver diversity index metrics for Rancheria Creek ranged from 1.0 at the altered channel site to 1.1 at the other three sites. These metrics were not significantly different.

According to SCE (2003), there were statistically significant differences in the ANOVA for the following metrics: sensitive EPT index, tolerance value, percent intolerant organisms, percent Baetidae, percent collectors, percent filterers, and percent predators. Camp 61 Creek site 1 had the lowest mean sensitive EPT index, the highest mean tolerance value, the lowest mean percent intolerant organisms, and the highest percent filterers. Camp 61 Creek site 1, therefore, had either the highest or the lowest mean value in four of the six metrics that contained significant statistical differences. In each case, the metric values for Camp 61 Creek site 1 indicated increased disturbance. Camp 61 Creek site 1 also was most dissimilar to the other sites based on cluster analysis of benthic macroinvertebrate taxa.

b. Environmental Effects:

**Minimum Instream Flows**

The timing and magnitude of the flow regime in Camp 61 Creek below Portal forebay dam is altered from natural conditions. Except during extremely rare spill events at Portal forebay dam, all water in East Fork Camp 61 Creek and West Fork Camp 61 Creek enters Portal forebay and is diverted directly into Ward tunnel. Flow in Camp 61 Creek below the forebay is present only as a result of seepage emanating from Portal forebay dam and from accretion and surface runoff during the spring snowmelt or precipitation events. Upstream of the Adit 2 Creek confluence, Camp 61 Creek is often completely dry. Additional water is provided to Camp 61 Creek via Adit 2 Creek at their confluence approximately 1 mile below the dam. This altered flow regime affects the

quantity and quality of aquatic habitat for trout and other aquatic biota and may favor non-native brown trout over native fish species. The diversion of water from Camp 61 Creek may also substantially influence water quality (see section V.C.1, *Water Resources*), habitat availability for native aquatic amphibians (see section V.C.3, *Terrestrial Resources*), recreation (see section V.C.4, *Recreational Resources*), and project generation (see section VI, *Developmental Analysis*).

SCE initially proposed flow releases into Camp 61 Creek downstream of Portal forebay of1.0 cfs, with an instantaneous floor of 0.7 cfs, from March 1 through July 31 and 0.5 cfs, with an instantaneous floor of 0.3 cfs, from August 1 through the end of February. The flow releases would be made from Portal forebay to a point below the existing catchment basin using a currently inoperable drain pipe (SCE, 2004a). SCE proposes to repair the drain pipe to enable releases. According to SCE (2003), its flow recommendation would provide perennial flow throughout Camp 61 Creek and enhance habitat available for the existing brown trout population. SCE would monitor the flow release at or near the point of release.

FS 4(e) condition no. 12(a) specifies that SCE maintain a range of minimum flows (based on water year types), as measured at a gage to be installed immediately below the Portal forebay dam (table 13). According to the FS, their variable flow regime would:

- provide for fish passage and habitat for all life stages of brown trout;
- improve water quality downstream of Portal forebay;
- mimic the timing and duration of the natural hydrograph; and
- provide habitat connectivity.

FS 4(e) condition no. 12(b) also specifies that SCE prepare and file with the Commission an Instream Flow Measurement Plan (IFMP) that is approved by the FS. The IFMP would describe existing or proposed provisions for making mean daily flow data for Camp 61 Creek (below Portal forebay dam) available to the public, and for making 15-minute or hourly gage data available to the FS.

After reviewing SCE's proposed minimum instream flow regime and the FS 4(e) condition no. 12, staff developed and analyzed a third stream flow option, as discussed below. This option is similar to SCE's orginal proposal, but provides slightly higher minimum instream flows during the late fall and early winter to support brown trout spawning.

SCE, in its December 19, 2005, filing with FS of alternative 4(e) conditions, put forward the staff's third stream flow option as their alternative flow regime.

*Our Analysis*

SCE used the wetted perimeter method to evaluate the effects of flow (discharge) on the amount of available habitat for fish and macroinvertebrates (Annear and Conder, 1984). The wetted perimeter method uses a hydraulic relationship between discharge and the wetted area of the streambed as an index of area available for macroinvertebrate production and, to a lesser extent, for fish, in riffles. As discharge increases, the wetted cross section of the channel increases. Although results vary depending on the shape of the channel cross-section, the wetted perimeter typically increases rapidly with increasing discharge, until water covers the entire channel bottom. The wetted perimeter then increases more slowly with discharge after the channel bottom is inundated. An inflection point occurs in the plot of wetted perimeter versus flow when there is an abrupt change of wetted perimeter with small changes in flow. Usually, there are one to two inflection points in a wetted perimeter versus discharge curve. Flow recommendations are often based on the single inflection point, or on a flow between two inflection points (if present). When the wetted perimeter method is used, it is assumed that the protection of riffles ensures that the spawning and rearing habitat required by fish would also be protected.

A wetted perimeter analysis also provides information about the depth of flow across the channel and the proportion of the stream cross section achieving a particular depth at a given flow (to help assess fish passage over shallow riffles). As a component of its wetted perimeter analysis, SCE assessed fish passage at each of the transects based on the channel profile and the simulated water surface elevations. This evaluation was based on Thompson's (1972) criteria for the passage of adult trout. These criteria call for a minimum depth of 0.4 foot occurring over a minimum of 25 percent of the channel width.

The wetted perimeter method used in the Portal Project area streams was developed during the Big Creek ALP process, and the transects used in the study were selected in consultation with the stakeholders during a meeting held on September 25, 2001, and during field meetings held on October 15 and 16, 2001. After reviewing several potential sites, agreement was reached on the placement of transects in Camp 61 Creek, East Fork Camp 61 Creek, West Fork Camp 61 Creek, and Adit 2 Creek. Flows in East Fork Camp 61 Creek and West Fork Camp 61 Creek are not affected by current project operations but were also studied as potential reference sites.

SCE analyzed 10 transects in Camp 61 Creek. Seven transects were located in the upper sub-reach (upstream of RM 0.74), and three were located in the lower sub-reach (located downstream of RM 0.74). Inflection points associated with the wetted perimeter analyses in Camp 61 Creek are presented in table 30. The flows at the inflection points in the transects located in the upper sub-reach ranged from 0.5 to 1.7 cfs, with a median value of 0.7 cfs and an average value of 1.0 cfs. In the lower sub-reach, the flow at the inflection point ranged from 0.5 to 2.0 cfs. Both the median and average were 1.2 cfs.

Table 30. Flow at the wetted perimeter inflection points for Camp 61 Creek. (Source: SCE, 2003)

| Stream and Site | Subreach | Transect Designation | Habitat Type | Inflection Point Flow (cfs) |
|---|---|---|---|---|
| Camp 61 Creek Site 1 | Upper | 1A | Step run | 0.7 |
| | Upper | 1B | Step run | 0.7 |
| | Upper | 1C | High-gradient riffle | 0.5 |
| Camp 61 Creek Site 2 | Upper | 2A | High-gradient riffle | 1.0 |
| | Upper | 2B | High-gradient riffle | 1.5 |
| | Upper | 2C | High-gradient riffle | 1.7 |
| | Upper | 2D | Step run | 0.7 |
| Camp 61 Creek Site 3 | Lower | 3A | Step run | 1.2 |
| | Lower | 3B | Step run | 0.5 |
| | Lower | 3C | Step run | 2.0 |

Note: cfs – cubic feet per second

In the upper reach, flows sufficient to allow upstream passage of adult trout at the selected transects ranged from 0.03 to 1.2 cfs, with an average of 0.48 cfs. In the lower sub-reach, passage flows ranged from 0.1 to 1.2 cfs, with an average of 0.53 cfs. It should be noted that this wetted perimeter approach only applies to the unique transect being evaluated; however, the 10 transects used in the study were likely representative of habitat conditions throughout Camp 61 Creek.

In response to our AIR 12, SCE provided synthetic hydrographs for Camp 61 Creek using an area-based approach relative to the nearby Pitman Creek drainage. Using this approach, the estimated peak discharges for Camp 61 Creek at the confluence with the SFSJR often exceed 150 cfs during wet years and 50 cfs during dry years. In our analysis of these hydrographs, we compared the average annual flows calculated from the synthetic data for both forks of Camp 61 Creek to the average annual flows diverted into Ward tunnel (West Fork Camp 61 Creek and East Fork Camp 61 Creek) for the period 1967 through 1997 (excluding 1973–75). We found that using the synthetic data appears to overestimate the annual flows by a factor of 1.7 in West Fork Camp 61 Creek and by a factor of 1.3 in East Fork Camp 61 Creek. Monthly average flow comparisons between the two data sets showed even greater variation.

Following submittal of their final license application, SCE was able to locate daily discharge records representing 25 years of overlapping data for both forks of Camp 61 Creek in an off-site storage facility that had not previously been accessible (letter from T.J. McPheeters, manager, Northern Hydro Division, SCE, Big Creek CA, to the Commission, dated December 16, 2004). Rather than rely on the synthetic data described above, we based our analysis of minimum instream flow needs in Camp 61 Creek on the results of SCE's wetted perimeter and fish passage analyses, the fish habitat and fish population data included in the license application, and on SCE's analysis of the daily hydrology data for the East and West forks.

Based on our review of existing information, we conclude that the existing Portal Project operations have negatively affected aquatic habitat in Camp 61 Creek. The reach between Portal forebay dam and the Adit 2 Creek confluence does not support fish under existing conditions, or does so rarely, and in 2000 and 2001 it was largely dewatered. Clearly, the availability of aquatic habitat in this reach is limited by the lack of an instream flow release. BMI metrics at the sample sites in Camp 61 Creek upstream from Adit 2 Creek (immediately downstream of Portal Forebay) also exhibited some of the lowest values within the project area, which may be another indicator of flow related habitat impairment. In 2000 and 2001, the estimated trout densities (all ages) in Camp 61 Creek downstream of the Adit 2 Creek confluence were substantially lower than estimated trout densities observed in both the unregulated East and West forks (table 21). In addition to having higher trout densities, the East and West forks also support three species of trout (rainbow, brook, and brown trout), while brown trout was the only species captured in Camp 61 Creek. Although brown trout were fairly abundant in Camp 61 Creek downstream of the confluence with Adit 2 Creek and exhibited several age classes, age 0+ fish were relatively rare, possibly indicating a lack of suitable spawning habitat (adequate gravel). In addition, the extent of upstream movement of brown trout is likely limited because of low-flow related migration barriers within the stream channel.

SCE's proposed 0.5-cfs minimum flow release below Portal forebay dam during the late summer, fall, and winter (August 1 through the end of February) and the 1.0-cfs release flow during the spring and early summer (March 1 through July 31), plus leakage from the dam, would substantially increase the amount of wetted area in Camp 61 Creek compared to existing conditions (table 31). The flow regime would provide perennial flow throughout Camp 61 Creek, and according to SCE's fish passage analysis; it would improve trout passage in some areas both above and below the confluence with Adit 2 Creek. This increase in instream flow over existing conditions would likely increase the distribution and abundance of brown trout, expand the abundance and diversity of important benthic macroinvertebrate species, and provide cold-water refugia for native aquatic species residing in the SFSJR. The increase in flow may also facilitate rainbow trout colonization of lower Camp 61 Creek. Water temperatures in Camp 61 Creek immediately below Portal forebay dam would be frequently reduced during the summer, compared to existing conditions, and would remain well within the preferred range for

brown trout and rainbow trout (table 19). Summer water temperatures in Camp 61 Creek below the confluence with Adit 2 Creek would slightly increase under SCE's proposed flow regime; however, they would continue to be suitable for trout (table 19) (see section V.C.1., *Water Resources*). The proposed flow regime would also improve water quality throughout Camp 61 Creek.

Table 31. Summary of mean monthly flows (cfs) in Camp 61 Creek below Portal forebay dam for each instream flow option.

| Month | Existing Conditions [a] | SCE | FS | Staff |
|---|---|---|---|---|
| Jan. | <0.123 | 0.5 | 1.7 | 0.5 |
| Feb. | <0.123 | 0.5 | 1.7 | 0.5 |
| March | <0.123 | 1 | 2.3 | 1 |
| April | <0.123 | 1.2 | 4.8 | 1.2 |
| May | <0.123 | 3.5 | 12.1 | 3.4 |
| June | <0.123 | 2.6 | 4.0 | 2.5 |
| July | <0.123 | 1 | 2.3 | 1 |
| August | <0.123 | 0.5 | 2.3 | 0.5 |
| Sept. | <0.123 | 0.5 | 1.7 | 0.5 |
| Oct. | <0.123 | 0.5 | 1.7 | 1 |
| Nov. | <0.123 | 0.5 | 1.7 | 1 |
| Dec. | <0.123 | 0.5 | 1.7 | 0.7 |
| Year | <0.123 | 1.1 | 3.16 | 1.2 |

[a] SCE recorded spot measurements of flow at a v-notch weir immediately downstream of the Portal forebay between 1997 through 2002. Those flows ranged from 0.034 to 0.123 cfs.

Although SCE's proposed instream flow regime would improve habitat connectivity and aquatic habitat conditions for trout and other aquatic biota over existing conditions, SCE's proposed 0.5-cfs flow release in the fall and early winter may continue to limit the amount of accessible spawning habitat for brown trout. SCE based its recommended 0.5-cfs flow release recommendation on the "average" of the flow releases needed for trout passage at the seven surveyed transects in the upper Camp 61 Creek subreach. According to SCE's analysis, flows of up to 1.2 cfs are needed to allow passage of adult trout at all surveyed transects.

Unlike SCE's proposed flow regime, the revised FS 4(e) condition no. 12(a) variable flow regime for Camp 61 Creek is designed to more closely mimic the timing and duration of the natural hydrograph (table 13).

The FS developed their specified minimum flow regime using hydrologic statistics generated from the daily discharge records for the East and West Forks of Camp 61 Creek and synthetic hydrology data sets for Camp 61 Creek, the results of the wetted perimeter study, and other information provided by SCE and FS personnel (FS, 2005).

All hydrology data were analyzed by water year type because the amount of flow in any given month tends to be much lower during dry and critically dry water years (FS, 2005).

The FS also expressed concern regarding the adequacy of the synthetic flow data for Camp 61 Creek. According to the FS analysis, in dry and critically dry water years, the July through February (low flow period) monthly mean, median, and maximum flows generated from the daily discharge records for Camp 61 Creek were either greater than or equal to the mean, median, and maximum flows generated by the synthetic data (table 32) (FS, 2005). However, from March through June (high flow period), the monthly mean, median, and maximum flows were substantially higher for the synthetic data. In wet, below normal and above normal water years, the difference in the mean, median, and maximum flows between the daily discharge records and synthetic data sets is even more apparent (table 33).

Table 32. Comparison of daily discharge records and synthetic data sets for Camp 61 Creek during dry and critically dry water years. (Source: FS, 2005)

| | **Mean** | | **Median** | | **Min** | | **Max** | |
|---|---|---|---|---|---|---|---|---|
| **Dry/Critically Dry Water Years** | **Daily Dis-charge** | **Syn-thetic** | **Daily Dis-charge** | **Syn-thetic** | **Daily Dis-charge** | **Syn-thetic** | **Daily Dis-charge** | **Syn-thetic** |
| October | 0.9 | 0.2 | 0.6 | 0.1 | 0.1 | 0 | 17.4 | 2.2 |
| November | 1 | 0.4 | 0.8 | 0.3 | 0.2 | 0 | 7.6 | 6 |
| December | 1.3 | 0.4 | 0.9 | 0.3 | 0.3 | 0.1 | 15.2 | 2.2 |
| January | 1.2 | 0.6 | 0.8 | 0.4 | 0.3 | 0.1 | 5.5 | 2.6 |
| February | 1.2 | 1.1 | 1.1 | 0.7 | 0.2 | 0.1 | 7.4 | 5.7 |
| March | 2.1 | 5.2 | 1.5 | 4 | 0.5 | 0.4 | 7.9 | 26 |
| April | 9.6 | 21.5 | 8.5 | 20.8 | 0.7 | 3.3 | 27.6 | 50.5 |
| May | 14.2 | 23 | 13.4 | 19.8 | 3.4 | 4.4 | 33 | 73.4 |
| June | 5 | 5.2 | 3.9 | 3.1 | 0.2 | 0.8 | 23 | 42.6 |
| July | 0.7 | 0.7 | 0.5 | 0.5 | 0 | 0.1 | 20 | 5.5 |
| August | 0.3 | 0.1 | 0.3 | 0.1 | 0.1 | 0 | 1 | 0.5 |
| September | 0.6 | 0.1 | 0.4 | 0 | 0.2 | 0 | 22 | 1.1 |

Table 33. Comparison of daily discharge records and synthetic data sets for Camp 61 Creek during wet, below normal and above normal water years. (Source: FS, 2005)

| Wet/Below and Above Normal Water Years | Mean | | Median | | Min | | Max | |
|---|---|---|---|---|---|---|---|---|
| | Daily Discharge | Synthetic | Daily Discharge | Synthetic | Daily Discharge | Synthetic | Daily Discharge | Synthetic |
| October | 0.7 | 1.3 | 0.5 | 0.2 | 0.2 | 0 | 6.1 | 79.8 |
| November | 1 | 2.5 | 0.8 | 0.4 | 0.2 | 0.1 | 15 | 50.7 |
| December | 1.6 | 3.4 | 1.1 | 1.5 | 0.3 | 0.1 | 7.8 | 99.2 |
| January | 1.7 | 7.4 | 1.4 | 2.9 | 0.2 | 0.1 | 14.4 | 485.1 |
| February | 1.8 | 6.6 | 1.2 | 5.5 | 0 | 0.3 | 10.3 | 104.1 |
| March | 2 | 12.3 | 1.4 | 8.4 | 0 | 0.4 | 7.9 | 114.2 |
| April | 7.9 | 28.8 | 5.7 | 24.8 | 0.9 | 5.3 | 47.5 | 173.5 |
| May | 35.6 | 58.1 | 32 | 49.1 | 2 | 10.1 | 158 | 363.8 |
| June | 33.1 | 49.4 | 31 | 21.3 | 1.8 | 1.7 | 158 | 186.8 |
| July | 8.9 | 12.9 | 5.1 | 2 | 0.5 | 0.3 | 66 | 89.5 |
| August | 2 | 1.2 | 1.3 | 0.4 | 0.2 | 0.1 | 38.8 | 9 |
| September | 1.6 | 0.4 | 0.7 | 0.1 | 0.2 | 0.1 | 70 | 4.4 |

The difference in the results from the two data sets prompted the FS to further analyze the Pitman Creek flow record used in the synthetic analysis. As discussed in section V.C.1 (*Water Resources*), the hypothesis in the Pitman Creek data analysis was that flow statistics for Pitman Creek would be approximately the same for the period of record represented by the daily discharge data set (1958 to 1990) and synthetic data set (1983 to 2002). Hydrologic statistics generated from the Pitman Creek data showed that there was a substantial difference in high flow magnitudes between the years represented by the daily discharge and synthetic data (i.e. there were more and higher magnitude flow events in the period of record represented by the synthetic data set than the daily discharge data set). The FS interpretation is that the synthetic record may be too short to accurately reflect the flow variation in the watershed.

Based on their analysis of the hydrology data sets and their review of the channel cross-sections provided by SCE, the FS believes that their minimum instream flows presented in Table 13 are appropriate for Camp 61 Creek. The FS recognizes that lower flows occurred in Camp 61 Creek during dry and critically dry water years. To account for this, FS has provided three instream flow regimes during these "dry" years. According to the FS, the dry and critically dry year scenarios would provide for fish passage and stream productivity (when combined with flows from Adit 2). In the remaining water year types (below normal, above normal and wet years) there would be

eight flow periods per year to allow for various components of the hydrograph and associated riparian and aquatic needs.

Based on our analysis of the daily discharge data, the mean monthly flows released into Camp 61 Creek under the FS flow scenario would more closely mimic the timing and duration of the natural hydrograph. As a result, mean monthly flows in Camp 61 Creek would be substantially higher than those proposed by SCE during the spring run-off period (April through July) and approximately 0.7 to 1.8 cfs higher than those proposed by SCE from August through March (table 31). These higher flows would likely increase the amount of available aquatic habitat in Camp 61 Creek under the FS flow scenario compared to SCE's proposal and would further improve passage conditions for brown trout, especially during the spring and early summer.

Summer water temperatures in Camp 61 Creek under the FS flow regime would be slightly warmer than those under SCE's proposal (i.e., more similar to the upper levels of Portal forebay); however, they would remain within the preferred range for brown and rainbow trout (table 19). The FS specified flows, like SCE's proposed minimum flows, would also improve water quality throughout all of Camp 61 Creek, likely benefiting aquatic resources (see section V.C.1., *Water Resources*).

Because the FS and SCE differ on the appropriate level of instream flows needed in Camp 61 Creek, we identified objectives inherent in both of these flow regimes and developed a staff instream flow option. We reviewed the wetted perimeter study results; hydrology data for both the East and West Forks of Camp 61 Creek; the FS management goals, objectives, and direction; and SCE's proposed channel and riparian maintenance flows (discussed below). As stated previously, an evaluation of this information indicated that SCE's proposed flow regime would substantially increase the amount of available aquatic habitat in Camp 61 Creek compared to existing conditions and improve brown trout passage. However, during brown trout spawning in the fall and early winter, SCE's flow release may continue to limit the amount of accessible spawning habitat for brown trout (i.e., limit habitat connectivity in the affected reach), as flows ranging from 0.1 to 1.2 cfs are needed to meet fish passage criteria at all of the study transects. Under our instream flow option, implementing SCE's proposed flow regime, with a slight increase in flow during the brown trout migration and spawning period (1.0-cfs instream flow release, with an instantaneous floor of 0.7 cfs during October, November, and early December), would likely facilitate access to a greater amount of spawning habitat than would occur under the SCE proposal, providing even greater benefit to brown trout.[18]

Although our recommended 1.0-cfs flow release from October 1 through December 15 would further improve fish passage for brown trout during their critical fall spawning

[18] SCE filed a request for adoption of alternative 4(e) conditions with the FS on December 19, 2005. In this filing they requested that the FS revise their condition no. 12 to reflect the Staff's recommended instream flows for the Portal Project.

period, it is our understanding that a natural fish passage barrier located approximately 7,000 feet upstream from the Camp 61 Creek confluence is a complete barrier at all flows (SCE, 2003). This barrier would limit fish movement into upper Camp 61 Creek even under the FS's recommended flow regime.

As stated previously, the primary objective of the FS minimum flow regime is to more closely mimic the timing and duration of the natural hydrograph. We agree with the FS that natural hydrologic variation plays a role in maintaining the health of riverine ecosystems and is often instrumental in restoring native fish assemblages (see *Channel and Riparian Maintenance Flows* below). However, while the higher flows specified by the FS may provide an additional benefit to trout, the FS's recommended flow regime would provide more flow than is reasonably needed to protect aquatic resources in Camp 61 Creek. Measuring flows in Camp 61 Creek at a gage located below Portal forebay dam, as specified in FS 4(e) condition no. 12(b), or at or near the point of release (as recommended by SCE) would provide information for determining compliance with any flow requirements included in a new license and would also provide accurate flow information for consideration along with data collected during fish population monitoring.

We discuss the cost of our recommended instream flows, flows proposed by SCE, and flows specified by FS in section VI, *Developmental Analysis*. We present our final recommendation pertaining to instream flows in section VII, *Comprehensive Development and Recommended Alternative*.

**Channel and Riparian Maintenance Flows**

As discussed in the previous section, operation of the Portal Project diverts all water from East Fork Camp 61 Creek and West Fork Camp 61 Creek into the Ward tunnel. The only water in Camp 61 Creek above the Adit 2 Creek confluence is the result of seepage emanating from the base of the dam and from accretion and surface runoff. This altered flow regime affects the natural sediment transport characteristics of the Camp 61 Creek stream channel downstream of the dam (i.e., results in the accumulation of fine sediments), and in turn, affects the quality of aquatic and riparian habitat. Channel and riparian maintenance flows (periodic controlled high-flow releases) are often implemented at hydroelectric projects and other water diversions to remove or "flush" this fine sediment to restore or improve aquatic and riparian habitat (i.e., remove fine sediment and facilitate gravel transport). Desired channel maintenance occurs when the prescribed flow regime can transport the quantity and sizes of sediment imposed on the channel without aggrading or degrading the channel over the long term (Schmidt and Potyondy, 2004).

SCE did not propose to release channel and riparian maintenance flows in its final application for new license; however, SCE later suggested a proposal to release channel and riparian maintenance flows into Camp 61 Creek over a 10-day period between April

1 and July 31 in above normal and wet water year types (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004). The magnitude and duration of these proposed channel and riparian maintenance flows is presented in table 34. Water year types are those developed by the California Department of Water Resources (CDWR) based upon April 1 projected flow at the "San Joaquin Four Rivers" index or its successor. According to SCE, the purpose of the channel and riparian maintenance flow is to provide adequate sediment transport, maintenance of streambank stability, and proper management of riparian vegetation.

Table 34. SCE's proposed channel and riparian maintenance flows for Camp 61 Creek.

| | **Flow Release by Water Year Type (mean daily cfs)** | |
|---|---|---|
| | **Above Normal** | **Wet** |
| Day 1 | Ramp up to 22 cfs | Ramp up to 28 cfs |
| Days 2–3 | 22 | 28 |
| Days 4–7 | 28 | 39 |
| Days 8–9 | 22 | 28 |
| Day 10 | Ramp down to MIF | Ramp down to MIF |

Note: cfs – cubic feet per second
MIF – minimum instream flow

SCE's proposed channel and riparian maintenance flows could commence any day during the April 1 to July 31 period during above normal and wet water years, but once started, the flow schedule would be followed to completion. The annual start date for the channel and riparian maintenance flows would be discussed at the annual consultation meeting between SCE and the FS specified in FS 4 (e) condition no. 1. SCE believes that these flows, combined with sediment source reduction, would increase the fine sediment transport capacity and reduce the sediment load in Camp 61 Creek. SCE extended the channel and riparian maintenance flow release period to the end of July so that flows could be released after alevins have emerged from spawning gravels. Because high flows can cause mechanical damage or mortality to young brown trout fry and alevins, July releases could be used to minimize potential impacts on brown trout recruitment, unless water temperatures exceed the preferred range for brown trout.

FS 4(e) condition no. 12(c) specifies that SCE release channel and riparian maintenance flows into Camp 61 Creek between May 1 and May 16 of below normal, above normal, and wet water year types. Table 35 shows the duration in days of the FS specified flow and the average daily flow required during each day for each water year type. According to the FS, the purpose of its specified channel and riparian maintenance flows is to provide flows for adequate sediment transport, maintenance of streambank stability, and proper management of riparian vegetation.

Table 35. The magnitude and duration of FS 4(e) channel and riparian maintenance flows in Camp 61 Creek by water year type.

| Date | Below Normal | Above Normal/Wet |
|---|---|---|
| May 1-2 | 10 | 20 |
| May 3-4 | 20 | 30 |
| May 5-8 | 30 | 45 |
| May 9-12 | 20 | 30 |
| May 13-16 | 10 | 20 |

Note: cfs – cubic feet per second

In its December 19, 2005, alternative 4(e) conditions filed with FS, SCE maintains the magnitude and duration of its channel and riparian maintenance flow proposal, but alters the timing of the release period from between April 1 and July 31 to between June 1 and July 31.

*Our Analysis*

SCE conducted several studies to evaluate the channel morphology and sediment transport regime in Camp 61 Creek. SCE also evaluated appropriate channel maintenance flows and the effects of project operations on aquatic habitat. Results of these studies indicate that nearly 80 years of diversion altered the channel morphology of Camp 61 Creek. The effects of flow diversion are most pronounced in lower Camp 61 because of sediment accumulations derived from Adit 2 Creek. Although quantitative data are limited, SCE describes lower Camp 61 Creek as having 90 to 100 percent embeddedness. In addition, measures of sediment accumulation in pools are nearly 2.5 times greater in Camp 61 Creek below Portal forebay than in both East Fork Camp 61 Creek and West Fork Camp 61 Creek. These sediment accumulations have reduced the quality of aquatic habitat through filling of pools and covering of gravels that otherwise could provide suitable spawning substrate for trout. These fine sediment accumulations may also be at least partially responsible for the low number of age 0+ brown trout observed in Camp 61 Creek.

In its final application for new license, SCE predicted the flows required to initiate sediment movement using Shield's Criterion (Shields, 1936). The objective of this analysis was to predict flows required to initiate movement of ecologically significant grain-sized sediment. The Shield's relationship was applied to particle diameters of 6 mm, 32 mm, and 80 mm. In this analysis, material finer than 6 mm in size, if not periodically flushed from the system, is considered detrimental to aquatic habitat and trout reproductive success. Particle diameters ranging from 6 to 80 mm were considered suitable for trout spawning (i.e., material from 6 to 80 mm should remain in the system if possible). According to this analysis, flows less than 10 cfs are sufficient to mobilize fine

gravels (less than 6 mm) in Camp 61 Creek. Flows of approximately 20 cfs can mobilize coarser gravels, up to 32 mm, but would not mobilize 80-mm gravels.

Because insufficient hydrologic data existed prior to submittal of its license application, SCE also estimated bankfull flows in East Fork Camp 61 Creek, West Fork Camp 61 Creek, and Camp 61 Creek using Manning's Equation. Bankfull flows in Camp 61 Creek ranged from approximately 20 cfs in upper Camp 61 Creek to approximately 23 cfs in lower Camp 61 Creek. Bankfull flows in East Fork Camp 61 Creek were approximately 33 cfs, and bankfull flows in West Fork Camp 61 Creek were approximately 44 cfs. A widely accepted concept in fluvial geomorphology is that the bankfull, or 1.5 year, flow event is sufficient to initiate bedload sediment transport in gravel-bed channels (Rosgen, 1996).

Following submittal of its final application for new license, SCE was able to locate daily discharge records for East and West Fork Camp 61 Creek, representing 25 years of flow data for both forks. These daily discharge records were combined and analyzed to determine the Camp 61 Creek flood frequency at Portal forebay using the USGS computer program "Peak Frequency" (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004). Based on the flood frequency analysis using the mean daily discharge records, the 1.5-year flow is 28 cfs and the 2-year flow is 39 cfs (table 36).

Table 36. Camp 61 Creek flood frequency based on 25 years of recorded flow data.

| Return Interval (years) | Flow (cfs) |
|---|---|
| 1.25 | 24 |
| 1.5 | 28 |
| 2 | 39 |
| 5 | 65 |
| 10 | 87 |
| 25 | 120 |

Note: cfs – cubic feet per second

According to SCE, the magnitude of its proposed channel and riparian maintenance flows for the above normal water year type (28 cfs) is based on the 1.5-year flow event, and the wet water year type (39 cfs) is based on the 2-year event. Using the historic distribution of water year types for the San Joaquin Four Rivers Index during the period 1955 to 2000, above normal and wet water years occurred 52 percent of the time or once every 2 years. The 8-day duration proposed by SCE (not including days needed for up-ramping and down-ramping) was based on the average duration of bankfull or greater flows in gravel bed streams located in the Rocky Mountains (Andrews, 1984, as cited in letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004).

The channel and riparian maintenance flows included in the FS condition no. 12(c) are designed to reflect the variable pattern of the natural hydrograph and its importance for maintaining channel morphology and riparian vegetation. According to the FS, a combination of "available hydrology data, synthetic hydrology data, and conceptual geomorphic concepts were used to design the proposed flow regime." The rationale used to develop the channel and riparian maintenance flows primarily follows the bedload transport model described in Andrews and Nankervis (1995) for gravel bed streams. In this document, channel maintenance flows are recommended to range from 0.8 to 1.6 x bankfull flow and to occur, on average, 15 to 16 days per year. FS also recognized that channel patterns and dimensions in Camp 61 Creek have adjusted to nearly 80 years of diversion with only minimal dam leakage present in the channel (i.e., the sum of bankfull discharges from East and West Forks Camp 61 Creek exceed the existing bankfull discharge estimate for Camp 61 Creek by about 3.5 times).

FS channel and riparian maintenance flows for above average and wet water years peak at 45 cfs, 6 cfs higher than the 2-year flow event suggested by the daily discharge records for Camp 61 Creek. The below normal water year flows peak at 30 cfs, 2 cfs higher than the 1.5-year event suggested by the daily discharge records. The San Joaquin Index shows that below normal, above normal, and wet water years occurred about 61 percent of the time. In all three water year types, FS channel and riparian maintenance flow would be implemented for 16 days, roughly twice as long as SCE's proposed channel and riparian maintenance flows. No channel and riparian maintenance flow was recommended for dry or critically dry water year types, which have historically occurred about 39 percent of the time.

Based on our review of the aquatic habitat conditions in the project area and on the hydrology and geomorphology information presented in the application for new license (SCE, 2003), it is apparent that channel and riparian maintenance flows are needed to flush fine sediments out of Camp 61 Creek. SCE's proposed above normal and wet water year channel and riparian maintenance flows would likely mobilize and transport these accumulated sediments out of the system, leading to improved aquatic and riparian habitat conditions, while maintaining an adequate quantity of gravel for trout spawning. Their proposed channel and riparian maintenance flows are equivalent to the 1.5- and 2-year flow events for Camp 61 Creek (based on 25 years of overlapping discharge records for East and West Fork Camp 61 Creek). Flows of this magnitude exceed the 0.8 to 1.6 x bankfull flow recommended in Andrews and Nankervis (1995) to transport most of the bedload over a period of years in gravel-bed rivers common in the western United States. In addition, studies of coarse-grained channels in Colorado and Wyoming have found that the transition from Phase 1 transport (surface deposits of sand sized particles or fine gravels) to Phase 2 transport (the initial coarse sediment movement from the coarse surface layer and underlying channel bed) occurs when flows are between 60 to 100 percent of the 1.5-year flow event (Schmidt and Potyondy, 2004). According to Schmidt and Potyondy (2004), releasing flows adequate to achieve and exceed Phase 2 transport

begins to provide the minimum flows needed to achieve channel maintenance. Because SCE's wet water year channel and riparian maintenance flows are substantially higher than the calculated bankfull flow in Camp 61 Creek, they would likely maintain the ability of the channel to convey stream flow and bedload sediment. These higher flows would also contribute to the formation and movement of physical habitat features such as riffles, pools, runs, and point bars and would maintain riparian habitat. While SCE's channel and riparian maintenance flows would be less frequent and the duration of the channel and riparian maintenance flows would be slightly shorter than Andrews and Nankervis's (1995) recommendation, they likely would be adequate to meet FS objectives for sediment transport (Andrews, 1984, as cited in letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004).

To evaluate the need for channel and riparian maintenance flows during dry and below normal water year types, we reviewed San Joaquin Four Rivers Index water year types for a 46-year period of record (1955 through 2000). During this period, 52 percent of the years were classified as either above normal or wet water year types (i.e., these water year types occurred approximately 1 out of every 2 years). The literature suggests that these types of flows are effective at transporting bedload at about this frequency (Hill et al., 1991; Rosgen, 1996). Consequently, channel and riparian maintenance flows during critically dry, dry, and below normal water year types would likely not be needed to substantially improve aquatic habitat conditions in Camp 61 Creek.

We conclude that FS 4(e) condition no. 12(c) for channel and riparian maintenance flows would also mobilize and transport fine sediment out of the Camp 61 Creek system. However, these flows would be slightly higher than the 1.5 and 2 year flood event for Camp 61 Creek, exceeding the magnitude needed for sediment transport in gravel-bed channels (Hill et al., 1991; Rosgen, 1996). The 16-day release period would also likely exceed the amount of time needed to reduce the sediment load and increase the sediment transport capacity in Camp 61 Creek, as the average duration of natural bankfull or greater flows on gravel-bed streams in the Rocky Mountains is approximately 8 days (Andrews 1984).

SCE in its December 19, 2005, alternative 4(e) conditions indicates that the timing of its proposed channel and riparian maintenance flows be changed from between April 1 and July 31 to between June 1 and July 31. Channel and riparian maintenance flow releases made between June 1 and July 31 would protect young brown trout and likely minimize impacts on juvenile trout recruitment, as emergence from the gravel would likely occur prior to June 1. Movement of gravels prior to brown emergence could result in physical damage to the incubating embryos and alevins still present in redds or among other substrate. Following emergence, juvenile brown trout would be able to seek cover from high flows along the channel margins and would not be subject to redd scour. The

later releases proposed by SCE are less likely to have adverse effects on brown trout recruitment than during the time period stipulated by FS.

Because rapid decreases in streamflow associated with any channel and riparian maintenance flows included in a new license for the Portal Project have the potential to strand fish and other aquatic biota in shallow, low-gradient areas and off-channel habitat, causing immediate or delayed mortality (Hunter, 1992), a downramping rate restriction for channel and riparian maintenance flows of 6 inches per hour may be appropriate. Because a 6-inch-per-hour or less downramping rate is believed to be similar to decreases in stage resulting from natural events such as rainstorms, a downramping rate limited to no more than 6 inches per hour would likely protect aquatic resources from rapid decreases in regulated streamflow.

An analysis of the effects of these channel and riparian maintenance flows on riparian vegetation is discussed in section V.C.3., *Terrestrial Resources*.

We discuss the cost of our recommended channel and riparian maintenance flows in section VI, *Developmental Analysis*. We present our final recommendation pertaining to channel and riparian maintenance flows in section VII, *Comprehensive Development and Recommended Alternative*.

**Sediment Source Reduction in Adit 2 Creek**

As discussed in the Geomorphology section of SCE's final application for new license, "Adit 2 Creek is an actively incising channel that has not achieved a geomorphic equilibrium. The channel is down cutting through fine granitic sediments, and is likely a sediment source to the lower reach of Camp 61 Creek." SCE's final application for new license also describes lower Camp 61 Creek as having 90 to 100 percent embeddedness and as having sediment accumulation in pools that are nearly 2.5 times greater than that observed in the East and West forks of Camp 61 Creek. Based on these observations, it is likely that sediment contributions from Adit 2 Creek, combined with a lack of channel and riparian maintenance flows in Camp 61 Creek, are adversely affecting the quality and quantity of fish habitat in Camp 61 Creek. Sediment accumulations are known to reduce trout egg-to-fry survival, decrease the amount of summer rearing area through infilling of pools, and impair winter survival (Waters, 1995; Murphy, 1995; Cordone and Kelley, 1961). Sediment accumulations can also reduce the production and survival of aquatic invertebrates, affecting the primary food source of resident salmonids (Bjornn and Reiser, 1991).

SCE did not identify any sediment or erosion control measures for the Adit 2 Creek channel in its final application for new license; however, SCE recently proposed a plan to stabilize the Adit 2 Creek channel in order to reduce input into Camp 61 Creek (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004). As described in section V.C.1, *Water*

*Resources*, SCE's proposed measure has two components. The first of these is to re-route runoff from downstream of the upper Adit 2 Creek wetland to Camp 61 Creek, via a new engineered channel, so as to reduce flows in the Adit 2 Creek channel. The second component is to install check dams to prevent downcutting in the Adit 2 Creek channel. SCE believes this approach, together with implementation of the channel and riparian maintenance flows described above, would help to improve habitat conditions in both Adit 2 and Camp 61 creeks.

SCE believes aquatic resources would not be affected by this proposal, because:

- Only a modest change is expected in snowmelt- and rainfall-derived streamflow in the lower 0.3 mile of the Adit 2 channel.
- No check dams would be installed in the portion of the Adit 2 channel that presently supports fish.
- Little to no change is expected in summer, fall, or winter base flow in the lower 0.3 mile of the Adit 2 channel.
- Streamflow diverted from the Adit 2 channel near RM 0.55 and released into Camp 61 Creek would augment streamflow in approximately 0.55 mile of Camp 61 Creek, resulting in improved aquatic habitat above that which might be obtained within the Adit 2 channel.

FS 4(e) condition no. 12(c) specifies that SCE coordinate with the FS to determine whether there are structural methods that can be implemented to reduce sediment delivery from Adit 2 Creek to Camp 61 Creek. If SCE and FS jointly determine that such measures can be implemented and maintained over the life of the license, SCE would develop and implement the stabilization measures, including maintenance over the term of the license. SCE would also develop a monitoring plan, approved by the FS, to document the effectiveness of the stabilization measures.

*Our Analysis*

Movement of sediment into streams is directly related to the amount of channel down cutting in a disturbed stream channel or to the amount of bare soil exposed to rainfall and runoff (Chamberlin et al., 1991). Based on our review of information included in SCE's final application for new license, it is clear that portions of Adit 2 Creek channel are actively eroding and delivering a substantial amount of fine sediment into Camp 61 Creek. It is also clear that this sediment has an adverse effect on aquatic habitat in Camp 61 Creek downstream of RM 0.9. Reducing the amount of sediment entering Camp 61 Creek, in conjunction with channel and riparian maintenance flows, would likely improve aquatic habitat conditions in Camp 61 Creek.

According to SCE, the proposed channel would usually carry less than 1 cfs (typically less than 0.253 cfs)[19] to a point in Camp 61 Creek located approximately 0.55 mile upstream of the existing Adit 2 Creek confluence. This additional flow, in combination with any minimum instream flow requirement for Camp 61 Creek, would provide a slight increase in the amount of aquatic habitat (wetted area) in Camp 61 Creek between RM 0.9 and 1.45. This incremental increase in wetted area would likely improve fish passage conditions in the 0.55-mile-long affected reach and may also slightly increase the abundance of trout and other aquatic biota below Portal forebay dam. However, the diversion of flow into Camp 61 Creek would also reduce the amount of aquatic habitat in the lower 0.55 mile of Adit 2 Creek. This reduction in flow would have an adverse effect on the relatively abundant brown trout population in the lower 0.2 mile of Adit 2 Creek (the known limit of fish distribution in Adit 2 Creek). The degree of impact would depend on the ecological carrying capacity of the Adit 2 channel under the new flow regime. As previously stated in the *Water Resources* section, diverting the water from Adit 2 Creek into Camp 61 Creek would reduce water temperatures in Camp 61 Creek compared to current conditions. These lower water temperatures would likely benefit the aquatic biota in Camp 61 Creek.

In section V.C.1.b, *Water Resources*, we concluded that SCE's proposed channel would reduce erosion, suspended sediments, and turbidity compared with existing conditions. This reduction in sediment input, in combination with increased minimum flows and annual channel and riparian maintenance flows, would likely improve aquatic habitat conditions in the lower 0.9 mile of Camp 61 Creek, benefiting trout and other aquatic biota. However, SCE's proposed new channel would require a substantial amount of in-channel and off-channel construction. Channel construction activities may temporarily affect the fish and aquatic organisms in the lower 1.45 miles of Camp 61 Creek as a result of erosion and sedimentation related to ground disturbance, accidental release of hydrocarbons into area drainages, or increased human activity. Construction activities could also increase the probability of mass movement and localized erosion, which could subsequently increase suspended sediment levels in Camp 61 Creek downstream from the engineered channel. Following channel construction, channel stabilization and its associated effects on water quality could also adversely affect fish populations in lower Camp 61 Creek for years, especially during periods of high runoff (see *Water Resources*). In this case, the 1.45 miles of aquatic habitat in Camp 61 Creek that would be adversely affected is greater than the 0.9 mile currently affected by erosion in Adit 2 Creek.

FS does not specify any specific measure to reduce sediment delivery from Adit 2 Creek to Camp 61 Creek. Instead, FS specifies that SCE coordinate with FS to identify a

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[19] Based on limited weir data collected from 1997 through 2002, the amount of flow in Adit 2 Creek downstream of the Portal forebay dam is typically less than 0.253 cfs.

sediment reduction method for Adit 2 Creek. Entering into an agreement with the FS to develop and implement a channel restoration plan would likely address sediment concerns in Adit 2 Creek and limit any potential adverse effects associated with channel restoration activities in such a highly erosive channel.

We present the costs of SCE's proposed measure in section VI, *Developmental Analysis*. We present our final recommendation pertaining to this measure in section VII, *Comprehensive Development and Recommended Alternative*.

**Fish Population Monitoring**

Maintaining or enhancing fish populations in rivers and streams requires adequate streamflow (i.e., water depth, water velocity, and habitat space); access to sufficient spawning habitat; complex rearing habitat; appropriate food sources at different life stages; and suitable water temperatures, DO, and other water quality parameters (Bjornn and Reiser, 1991). It is likely that any new license for the Portal Project would include a number of measures, such as modified instream flows and channel maintenance flows that would change existing aquatic habitat conditions in Camp 61 Creek. These altered habitat conditions could affect the distribution and abundance of brown trout (the only species present in Camp 61 Creek), and may expand the distribution of brook trout, rainbow trout, and Sacramento sucker. Rainbow, brown, and brook trout are FS management indicator species on the SNF and are important game species of the SFSJR Basin.

Fish population monitoring is often conducted to determine if environmental measures, such as those proposed by SCE and required by the FS, are achieving the desired level of protection or enhancement. Monitoring can also aid in the development of adaptive management strategies. Fish population monitoring is typically focused on the presence or absence of particular species, numbers of particular species, or on community parameters (such as productivity, density, and diversity) and is usually conducted over multiple years.

SCE did not initially propose any measures to monitor fish populations in the project-affected reaches. However, FS 4(e) condition no. 12(d)1 specifies that SCE conduct quantitative fish population monitoring within Camp 61 Creek downstream of the Portal forebay dam after years 2, 5, 10, 15, and 20 of license implementation. According to the FS, the objectives of the fish population monitoring are to determine fish species composition in the bypassed reach and to estimate, for each species present, the abundance by life stage, the size distribution, total biomass, and condition. A draft technical report with the results of the fish population survey would be prepared each year that monitoring occurred and presented to the FS and other interested agencies at least 2 months prior to the annual consultation meeting specified in FS 4(e) condition no 1.

FS also believes that fish population monitoring results may provide insight into the potential effects of channel and riparian maintenance flows on brown trout recruitment.

In their December 16, 2004, comments on the FS preliminary 4(e) conditions SCE suggested a fish population monitoring program in years 5, 10, and 20 of a new project license (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004). A draft technical report providing the results of the surveys would be prepared each year that monitoring occurred and provided to the FS and other interested agencies at least 2 months prior to the succeeding annual consultation meeting specified in FS 4(e) condition no. 1. The objectives of SCE's proposed fish population monitoring program are the same as those included in FS 4(e) condition no 1.

*Our Analysis*

Continued operation of the Portal Project under any alternative would alter aquatic habitat conditions in the project area and potentially affect the distribution and abundance of existing fish populations. Monitoring the effects of implementing a new flow regime would help determine whether the intended fish population objectives are being met. Monitoring fish populations according to the schedule specified in the FS terms and conditions would allow for timely identification of major fish population shifts under any new flow regime but may be excessive to determine broad-scale trends in species composition and relative abundance. We discuss the cost of our recommended fish monitoring program in section VI, *Developmental Analysis*. We present our final recommendation pertaining to fish monitoring in section VII, *Comprehensive Development and Recommended Alternative*.

**Sediment Monitoring**

Sediment in streams has several forms and sources, but fine inorganic particles, which are either suspended in the water column and cause turbidity or are deposited in the streambed and negatively affect fish and macroinvertebrate habitat, are usually the primary concern (Waters, 1995). Common sources of sediment include erosion of uplands, lateral movement of channels into stream banks, and incision of streambeds. Most natural sediment contributions are not destructive, because the quantities are usually small enough for the stream to assimilate into the stream channel without deleterious effects on the biological community (Waters, 1995). It is excessive sediment, often from human influence, that frequently overwhelms the stream sediment transport capacity (Cairns, 1977) and negatively affects the biological community (Waters, 1995). These effects include impairment of salmonid spawning and rearing success, reduction of the diversity and abundance of fish and other aquatic organisms such as macroinvertebrates, and lowered productivity of aquatic populations (Waters, 1995). Sediment/substrate

monitoring is often conducted to (1) characterize the general nature of stream substrate or size-class composition (e.g., boulder, gravel, sand), (2) determine the extent that interstitial spaces between coarse substrate particles are filled with fine material (embeddedness), and (3) quantify substrate size composition in a way that can be related to land use influences at the watershed scale (pebble counts).

SCE did not initially propose any measures to monitor sediment conditions in the Portal Project area streams; however, based on review of FS preliminary 4(e) condition no. 12(d), SCE adopted the FS monitoring plan in its alternative 4(e) conditions with a revised emphasis on the use of data collected in the Camp 61 Creek reach above the confluence with Adit 2 Creek. FS 4(e) condition no. 12(d)2 specifies that SCE develop a plan to monitor project related sediment accumulation in Camp 61 Creek above and below the confluence with the Adit 2 channel. In conjunction with the sediment monitoring, SCE would monitor the effects of the channel and riparian maintenance flow releases on spawning gravel volumes. Sediment monitoring would include baseline surveys plus three additional surveys in conjunction with the fish population monitoring in years 5, 10, and 20. Monitoring would consist of a combination of methods that may include V*[20], substrate embeddedness, Wolman pebble counts, monumented cross sections, or other quantitative methods agreed upon and approved by the FS. The section of Camp 61 Creek above its confluence with Adit 2 Creek would be used as a reference with which to compare downstream sediment conditions. The sediment monitoring plan would be designed to assess the effects of the channel and riparian maintenance flows on the quality and quantity of spawning gravels, recruitment, gravel additions, and other factors influencing gravel conditions.

Although SCE recommends the same sampling frequency as that specified by FS, it removes the use of Camp 61 Creek above the Adit 2 Creek confluence as a reference stream reach because it has a different Rosgen channel type than the downstream reach. SCE's alternative 4(e) indicates instead proposes that sediment monitoring results should be based on a comparative trend over time between the baseline monitoring year and subsequent years of survey in lower Camp 61 Creek. SCE estimates that comparison of the two channel types could lead to inaccurate results, and potential recommendations for changes in project operations or additional mitigation and monitoring based on those results.

*Our Analysis*

As previously mentioned, nearly 80 years of diversion has altered the channel morphology and hydrology of Camp 61 Creek (SCE, 2003). In addition, Adit 2 Creek is an actively incising channel that is downcutting through fine granitic sediments, which

[20] V* is a method used to measure the fraction of pool volume filled with fine sediment. V* is the ratio of fine sediment volume to pool water volume plus fine sediment volume.

are transported to Camp 61 Creek. This sediment load from Adit 2 Creek exceeds the ability of Camp 61 Creek to transport and assimilate the material into the channel. Thus, fine sediment has accumulated in Camp 61 Creek downstream of the confluence with Adit 2 Creek, negatively affecting aquatic habitat conditions.

In its 4(e) conditions, the FS specified a new flow regime in Camp 61 Creek that would alter sediment transport characteristics in the stream and thereby affect substrate conditions in Camp 61 Creek. Monitoring sediment and spawning gravel conditions in Camp 61 Creek would determine the response of stream channel to the changes in the hydrologic regime that may be prescribed in any license issued. Monitoring would also help determine if identified sediment transport objectives are being met.

The survey methods and monitoring schedule included in the FS condition would characterize sediment future conditions in Camp 61 Creek and would facilitate comparison to existing conditions. However, we agree with SCE that using the section of Camp 61 Creek above its confluence with Adit 2 Creek as a reference reach with which to compare downstream sediment conditions may lead to erroneous conclusions. Lower Camp 61 Creek is a moderate-gradient, moderately to highly retrenched Rosgen G5 channel type (with A2 inclusions) for stream miles 0.0 to 0.41 and B2 for stream miles 0.41 to 0.9. Upper Camp 61 Creek is predominantly a high-gradient, highly entrenched A2/A3 channel with some sections A2a+. Consequently, sediment transport capacity is likely to be greater for a given discharge in the upper reach compared with the lower reach. Due to the difference in sediment transport capacity, the amount of sediment that is naturally deposited on the streambed should be less in this upper reach compared with the lower reach.

Although conditions upstream of the Adit 2 Creek confluence may be useful to examine as part of the monitoring program, it should not be considered as the sole basis for comparison with the lower reach. Instead, interpretation of sediment monitoring results should be based on a comparative trend over time.

We discuss the cost of sediment monitoring in section VI, *Developmental Analysis*. We present our final recommendation pertaining to sediment monitoring in section VII, *Comprehensive Development and Recommended Alternative*.

**Fish Stocking**

The Portal forebay is stocked with rainbow trout to provide recreational fishing opportunities and harvest in excess of that which could be supported by the natural productivity of the project area. This forebay rainbow trout put and take fishery is heavily used by anglers throughout the fishing season and is one of the important public benefits of this project. In its letter filed April 14, 2003, CDFG states that its primary management objective for Portal forebay is a “put-and-take” fishery and that it plants 6,000 pounds of catchable sized rainbow trout in the forebay each year. Given the annual

cost of sustaining this objective and to offset the effects of project related instream flow reductions, CDFG recommends that any license issued for the project require SCE to contribute a reasonable portion (50 percent) of the costs of fish production that is needed to sustain a fishery in Portal forebay.

SCE proposes to continue stocking rainbow trout in the Big Creek area, including the Portal forebay, from its trout-rearing facility, in consultation with CDFG, to support recreational fishing in the project area (in addition to those fish stocked by CDFG). However, SCE feels its participation in fish stocking efforts is, and should remain, voluntary and should not be required as part of any new license that may be issued for this project.

*Our Analysis*

Because the forebay diversion and powerhouse penstock are unscreened, SCE evaluated fish entrainment at Portal powerhouse by sampling the tailrace for fish passing through the powerhouse turbine. The tailrace was sampled in December 2001, and in January, March, and July 2002. Entrainment sampling was conducted using a custom framed net measuring 10 feet high by 10 feet wide at the mouth, and 60 feet in length from the center of the mouth to the cod end of the bag. The mesh size on the net measured 1 inch at the mouth and 0.25 inch at the cod end. A framed live car was used to minimize trauma on captured fish. During each sampling period, the net was checked for fish once in the morning and once in the late afternoon before dusk.

According to SCE (2003), a complete sample period was not achieved in December due to net tangling. In January, only one sampling period was completed. A single fish in an advanced stage of decomposition was collected in the net (likely a kokanee that was dead when entrained). In March, the tailrace was sampled during two daytime periods and one nighttime period. No fish were captured in March. During May through June, operation of the H-B valve prevented sampling of the powerhouse tailrace. In July, the powerhouse tailrace was sampled during two daytime and two nighttime periods. Only one rainbow trout was captured in each of the daytime sets. Both rainbow trout were hatchery fish; only one was captured alive. The estimated catch per unit effort for the daytime sampling in July (corrected by percent flow sampled) was 0.17 and 0.21 fish per hour. The estimated catch per unit effort for the nighttime sampling in July was 0.10 fish per hour.

Following SCE's sampling in 2001 and 2002, SWRCB expressed concern regarding the limited amount of entrainment sampling in the Portal forebay and noted that the entrainment study did not occur in winter during wetter water year types when trout are most likely to be entrained due to greater daily fluctuations in forebay elevation (letter from A. Britt Fecko, Environmental Specialist, SWRCB, Sacramento, CA, to the Commission, dated May 23, 2003). As a result, SWRCB feels that study results cannot accurately represent the amount of fish being entrained.

During discussions of entrainment as part of the Big Creek ALP, a request for additional entrainment sampling at Portal Powerhouse was made to SCE. This request was for additional sampling during the period of high flows through the Portal Powerhouse (during the summer and fall). Additional sampling was successfully carried out in August and September 2003. No fish were collected during those additional samplings.

Although entrainment sampling in 2001, 2002 and 2003 indicated that entrainment rates at the project were very low, there is inadequate information available to determine the total number of fish being entrained and the effects of this entrainment on fish populations residing in Portal forebay and its tributaries. It is also impossible to know if the fish collected during tailrace sampling originated from the Portal Project area or from other diverted waterbodies located upstream of the Portal Project (entering the Portal powerhouse via Ward tunnel).

Under existing conditions CDFG manages Portal forebay as a put-and-take fishery that is maintained by annual stocking. Between 1994 and 2001, CDFG stocked between 5,550 and 11,491 trout in Portal forebay per year. SCE sampled Portal forebay in 2002 and confirmed that many of the fish captured during sampling were stocked hatchery trout. As noted previously, the fishery in Portal forebay is in relatively good condition under current operations.

We discuss the cost associated with this issue in section VI, *Developmental Analysis* and present our final recommendation pertaining to fish stocking in section VII, *Comprehensive Development and Recommended Alternative*.

c. Cumulative Effects:

The Portal Project diverts flows from Camp 61 Creek and the East and West Forks of Camp 61 Creek into the Portal forebay, and then into Huntington Lake. This diversion of water alters the natural hydrology, geomorphology and water quality in these creeks, which in turn affects aquatic resources, including the benthic macroinvertebrate community. Implementation of minimum instream flows or channel and riparian maintenance flows or both into Camp 61 Creek would provide somewhat more natural flows and habitat conditions in Camp 61 Creek, but the effects of diversion would continue to combine with the biological changes resulting from historic non-native salmonid introductions.

Minimum instream flows and channel and riparian maintenance flows in Camp 61 Creek would likely increase the amount and quality of available habitat for brown trout and macroinvertebrates below Portal dam. These improved conditions may increase wild trout production that would in turn contribute to improved fisheries in both Camp 61 Creek and in the SFSJR. Improved aquatic habitat conditions may also lead to the colonization of Camp 61 Creek by additional species of trout entering the system from

the SFSJR. Partially funding annual CDFG fish stocking efforts in Portal forebay would also help to maintain this popular recreational fishery and contribute a cumulative benefit to recreation resources within the upper SFSJR watershed. While an increase in trout production and species diversity would benefit the existing trout fishery, increased numbers of trout could continue to suppress mountain yellow-legged frog populations that might otherwise be present in the project area.

Increased flows proposed in the license measures for the Vermilion Valley Project (FERC No. 2086) in association with the proposed flows in Camp 61 Creek would produce a cumulative benefit to aquatic resources in the upper SFSJR watershed. Instream flow measures for other hydroelectric projects in the SFSJR are being addressed in the Big Creek ALP and may also provide additional benefits to aquatic resources when these measures are implemented.

d. Unavoidable Adverse Effects:

Unavoidable adverse effects of the Portal Project include the continued replacement of a small amount of stream habitat with forebay habitat, blockage of fish migrations at Portal forebay dam, losses of fish from entrainment and turbine passage, and interruption of sediment transport processes. Portal forebay would continue to inundate riverine habitat that existed at the confluence of East Fork Camp 61 Creek and West Fork Camp 61 Creek. Portal forebay would also continue to interrupt the transport of larger sediments including gravel, most likely reducing the availability of substrates suitable for trout spawning in the upper reach of Camp 61 Creek.

## 3. Terrestrial Resources

a. Affected Environment:

### Vegetation

Based on aerial photographs and ground-truthing, SCE mapped vegetation communities in a study area that included lands and waters within the project boundary and within 0.25 mile of the project boundaries (table 37). SCE classified vegetation in the study area into five primary plant communities: Jeffrey pine/fir forest, Jeffrey pine forest, montane riparian scrub, mixed montane chaparral, and wet montane meadow. The study area also includes ruderal (disturbed areas dominated by non-natives), open ground (sparsely vegetated sites), and water cover types.

Table 37. Vegetation communities in the Portal Project area. (Source: SCE, 2003, modified by staff)

| Vegetation Communities | Habitat Characteristics |
|---|---|
| Jeffrey pine/white fir | Dominant throughout project area. Open canopy includes lodgepole, red fir, and western juniper. Sparse understory of greenleaf manzanita, mountain whitethorn, Sierra gooseberry, wax current, mountain sagebrush. |
| Jeffrey pine/rock outcrop | Scattered throughout project area. Sparse Jeffrey pine on rocky substrate. |
| Mixed montane chaparral | Characterized by a mix of Sierra chinquapin, greenleaf manzanita, pinemat manzanita, mountain whitethorn, with sparse herbaceous cover. |
| Riparian | Mountain alder and willows predominate, although small stands of quaking aspen and scattered black cottonwood are also present. |
| Wet montane meadow | Mix of rushes, California corn lily, wandering daisy, great red paintbrush, white-flowered bog orchid |
| Ruderal | Disturbed area around the powerhouse and along access roads, dominated by weedy forbs and grasses. |
| Open ground | Includes non-vegetated disturbed areas, as well as rocky outcrops. |
| Water | Portal forebay. |

In addition to vegetation cover type mapping, SCE conducted a "proper functioning condition" (PFC) analysis[21] of riparian habitat in Camp 61 Creek and Rancheria Creek to evaluate the potential effects of project operations. Using the PFC methodology (Prichard, 1998), SCE compared segments of Camp 61 Creek and Rancheria Creek (below the energy dissipater) to reference reaches (i.e., segments of similar streams). SCE concluded that the surveyed reaches are in properly functioning condition in terms of hydrology, vegetation, and erosion/deposition.

The Portal forebay does not support any substantial riparian habitat because of daily surface fluctuations. Vegetation growing within the fluctuation zone (between elevations 7,170 and 7,180 feet msl) includes a variety of unidentified grasses and native

[21] The PFC analysis relies on assessment of a number of channel and riparian habitat attributes (e.g., bank stability, vegetation canopy cover) to evaluate overall stream health.

forbs, sedges, and rushes. Small patches of mountain alder and willow grow at the inlets of West Fork Camp 61 and East Fork Camp 61 creeks. Vegetation density varies from about 5 percent cover along the eastern shoreline of the forebay to about 90 percent along the western shoreline.

*Special Status Plants*

SCE developed an initial list of 94 special status plant species that could occur in the Portal study area. By comparing the range, known occurrences, and habitat requirements of these species with conditions in the study area, SCE narrowed the list to 42 target species for the field surveys. Information provided by FS was used to further refine the list to 37 species (table 38).

Table 38. Special status plants that could occur in the project area, based on range and the presence of suitable habitat. (Source: Staff based on SCE, 2003; FS, 2003)

| Common Name/Scientific Name | Status | Habitat |
|---|---|---|
| Scalloped moonwort (*Botrychium crenulatum*) | CNPS 2, FSS | Lower montane conifer forest, oak woodland, chaparral, open rocky slopes; 4,900–10,765 feet. |
| Common moonwort (*Botrychium lunaria*) | CNPS 2 | Lower montane conifer forest, oak woodland, chaparral, open rocky slopes; 7,480–11,155 feet. |
| Yosemite moonwort (*Botrychium simplex*) | FSW | Lower montane conifer forest, oak woodland, chaparral, open rocky slopes; 7,215–10,830 feet. |
| Berry's morning-glory (*Calystegia malacophylla* var. *berryi*) | CNPS 3, FSW | Chaparral, lower montane conifer forest; 2,000–8,010 feet. |
| Shore sedge (*Carex limosa*) | CNPS 2 | Bogs, fens, meadows, seeps, marshes, swamps, lower to upper montane conifer forest; 3,937–8,858 feet. |
| Fell-fields claytonia (*Claytonia megarhiza*) | CNPS 2, FSW | Alpine boulder and rock fields, subalpine conifer forest, rocky or gravelly substrate; 8,530–10,826 feet. |
| Marsh claytonia (*Claytonia palustris*) | CNPS 4, FSW | Meadows, seeps, marshes and swamps; 3,280–8,200 feet. |

| Common Name/Scientific Name | Status | Habitat |
|---|---|---|
| Fresno County bird's beak (*Cordylanthus tenuis* ssp. *barbatus*) | FSC, CNPS 4, FWS | Lower montane conifer forest; 4,265–6,561 feet. |
| Mountain lady's slipper (*Cypripedium montanum*) | CNPS 4, FSS | Broad-leaved upland and lower montane conifer forest, moist or dry shaded slopes; 700–7,200 feet. |
| Unexpected larkspur (*Delphinium inopinum*) | CNPS 4, FSS | Alpine boulder and rock fields in rocky soil at southern boundary of SNF; 7,200–9,200 feet. |
| Tulare bleeding heart (*Dicentra nevadensis*) | CNPS 4, FSS | Subalpine conifer forest in gravelly openings; 7,200–10,000 feet. |
| Subalpine fireweed (*Epilobium howellii*) | CNPS 1B, FSS | Meadows, subalpine conifer forest, wet meadows, mossy seeps; 6,500–9,000 feet. |
| Hall's daisy (*Erigeron aequifolius*) | CNPS 1B, FSS | Broad-leaved upland forest, lower and upper montane conifer forest, pinyon-juniper woodland, rocky soils; 4,900–8,000 feet. |
| Keil's daisy (*Erigeron inornatus* var. *keilii*) | CNPS 1B, FSW | Lower montane conifer forest, meadows and seeps; 5,905–7,215 feet. |
| Kettle Dome buckwheat (*Eriogonum prattenianum* var. *avium*) | CNPS 4, FSS | Upper montane conifer forest on granitic soils; 3,900–8,500 feet. |
| Southern Sierra wooly sunflower (*Eriophyllum lanatum* var. *obovatum*) | CNPS 4, FSW | Lower to upper montane conifer forest; 4,265–8,205 feet. |
| Shuteye Peak fawn lily (*Erythronium pluriflorum*) | CNPS 1B, FSS | Upper montane and subalpine conifer forest, meadows, rocky granitic outcrops and slopes; 6,758–8,366 feet. |
| Short-leaved hulsea (*Hulsea brevifolia*) | CNPS 1B, FSS | Granitic or volcanic soils in openings or under canopy in mixed conifer and red fir forest; 4,900 to 8,900 feet. |
| Veined water lichen (*Peltigera hydrothyria*) | FSS | Cold, clear, unpolluted streams in mixed conifer forest; 4,000–8,000 feet. |

| Common Name/Scientific Name | Status | Habitat |
|---|---|---|
| Field ivesia (*Ivesia campestris*) | CNPS 1B, FSW | Meadows and seep edges, upper montane and subalpine conifer forest; 6,480–10,995 feet. |
| Yosemite ivesia (*Ivesia unguiculata*) | CNPS 4, FSW | Upper montane and subalpine conifer forest, moist open slopes and meadows; 4,900–9,600 feet. |
| Rosy-petaled cliffbush (*Jamesia americana* var. *rosea*) | CNPS 4, FSW | Alpine boulder and rock field, Great Basin scrub, pinyon and juniper woodland, subalpine conifer forest, granitic or carbonate soils; 7,380–12,140 feet. |
| Yosemite lewisia (*Lewisia disepala*) | CNPS 1B, FSS` | Lower to upper montane conifer forest, pinyon juniper woodland, fine gravel on rock outcrops or domes; 6,200–11,000 feet |
| Yosemite tarplant (*Madia yosemitana*) | CNPS 3, FSW | Lower montane conifer forest, meadows and seeps; 3,940–7,550 feet. |
| Moss (*Meesia triquetra*) | CNPS 2, FSS | Bogs and wet woods; 6,000–8,000 feet |
| Moss (*Meesia uliginosa*) | CNPS 2, FSS | Bogs and rock fissures, usually in alpine or arctic regions, sometimes in lowlands; 7,500 to 9,000 feet. |
| Cut-leaved monkeyflower (*Mimulus laciniatus*) | CNPS 4, FSW | Chaparral, lower to upper montane conifer forest, mesic, granitic soils; 1,605–8,695 feet. |
| Flax-like monardella (*Monardella linoides* ssp. *oblonga*) | CNPS 1B, FSC | Lower to upper montane conifer forest, pinyon and juniper woodland; 2,952–8,103 feet. |

Status: CNPS – California Native Plant Society
CR – State-designated as rare
FSC – FWS species of concern
FSS – Forest Service sensitive
FSW – Forest Service watch
1B – Rare, threatened or endangered in California and elsewhere
2 – Rare in California but more common elsewhere
3 – Need more information
4 – Plants of limited distribution; a watch list

Biologists conducting the surveys detected one population of a special status plant, subalpine fireweed (*Epilobium howellii*), growing in a wet meadow near the Portal forebay distribution line. FS has designated subalpine fireweed as a sensitive species in Region 5, and the California Native Plant Society (CNPS) considers it to be rare, threatened, or endangered in California.

Surveyors also noted the occurrence of potential habitat for veined water lichen (*Peltigera hydrothyria*). Veined water lichen is a Forest Service sensitive aquatic species that occurs in cold, clean streams at elevations from about 4,000 to 8,000 feet. It is known from 27 sites on the western slopes of the Sierra Nevada (FS, 2004)

*Noxious Weeds and Invasive Non-Native Plants*

SCE identified 21 non-native invasive plants that could occur in the study area. During field surveys, biologists documented the occurrence of two of these, cheatgrass and common mullein. The California Department of Food and Agriculture (CDFA) does not designate either species as a noxious weed[22], but the California Invasive Plant Council (Cal-IPC) considers both to be wildland pests (CalEPPC, 1999[23]). Cal-IPC identifies exotic pest plants of greatest ecological concern in California. Cal-IPC lists cheatgrass as A-1, meaning it is an aggressive invader that displaces natives and disrupts natural habitats, and is widespread in large areas of the state. SCE surveys documented cheatgrass growing along approximately 500 feet of the northwest shoreline of Portal forebay. They observed an estimated 1,000 plants covering about 0.5 acre growing along the Portal dam, concentrated at the north end. Cheatgrass was also observed to be growing under the tree canopy at the Portal powerhouse parking area.

Cal-IPC considers common mullein to be of lesser invasiveness (CalEPPC List B), in that it spreads less rapidly and causes a lesser degree of habitat disruption than cheatgrass. SCE surveys documented common mullein at several locations along the road and north bank of the Portal powerhouse. One plant was observed along East Fork Camp 61 Creek.

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[22] The California Department of Food and Agriculture (CDFA) lists 135 plants as noxious weeds in California (CDFA, 2002). CDFA is responsible for regulating weeds that are important to the state's economy and agriculture. A-listed weeds are targeted for eradication or containment. B-listed weeds are more widespread, and counties may determine control efforts. C-listed weeds are very widespread; control efforts are typically targeted only in nurseries or seed lots. Q-listed weeds are those for which information is insufficient to assign a classification. To be conservative, CDFA treats Q-listed weeds as though they were A-listed.

[23] In 2003, California Exotic Pest Plant Council (CalEPPC) changed its name to the California Invasive Plant Council (Cal-IPC). Cal-IPC is in the process of updating the 1999 CalEPPC weed list, and anticipates producing a new list sometime in 2006. Because the revisions have not yet been completed, this EA refers to CalEPPC weed status, based on the 1999 list.

**Wildlife**

Based on species/habitat associations documented in the California Wildlife Habitat Relationships System, the project area would support a number of wildlife species common to Jeffrey pine forest and chaparral at high elevations in the Sierra Nevada. Mammals would include mule deer, long-tailed weasel, yellow-bellied marmot, western gray squirrel, and northern flying squirrel. The most common bird species are likely to include red-breasted nuthatch, mountain chickadee, brown creeper, hairy woodpecker, western tanager, mountain quail, and dusky flycatcher. Riparian areas and wet meadows would provide habitat for gray fox, long-tailed vole, western harvest mouse, yellow-rumped warbler, white-crowned sparrow, garter snakes, and Pacific tree frogs. The Portal forebay provides resting and foraging habitat for American coot, common merganser, and great blue heron.

*Special Status Wildlife Species*

In consultation with FS, FWS and CDFG, SCE initially determined that 21 special status wildlife species could occur in the study area (table 39). In addition to important species, FS has designated several groups or guilds of wildlife species as being of management concern. These include migratory birds, upland game birds, and birds that are strongly associated with four sensitive habitats: oak woodlands, riparian, meadow edge, and mature mixed conifer forest. Based on habitat mapping provided by SCE, no oak woodlands are present in the project area. The project area supports riparian areas, meadows, and mature mixed conifer stands, and members of these three guilds (e.g., downy woodpecker, dark-eyed junco, and red-breasted nuthatch) are known to occur in the project vicinity.

Table 39. Special status wildlife species that may occur or are known to occur in the project area. (Source: SCE, 2003, modified by staff)

| Common Name | Status | Habitat Characteristics and Occurrence |
|---|---|---|
| **Amphibians** | | |
| Mount Lyell salamander (*Hydromantes platycephalus*) | FSC; CSC | Known from high elevation rock outcrops associated with seeps and streams on the SNF. |
| Relictual salamander (*Batrachoseps relictus*)[a] | FSC; FSS; CSC | Known historically on SNF. Usually found under rocks, bark, woody debris, but habitat requirements not well understood. |

| Common Name | Status | Habitat Characteristics and Occurrence |
|---|---|---|
| Yosemite toad (*Bufo canorus*) | FC; FSS; CSC | Montane meadows and forest edges, breeds in shallow pools, lake margins, quiet streams. Known from Rancheria Creek about 2.5 miles from the project area; Kaiser Pass Meadow, about 2.5 miles away; and Lakecamp Lake and Lakecamp Creek, about 4.5 miles from project area. |
| Mountain yellow-legged frog (*Rana muscosa*) | FC; FSS; CSC | Streams, lakes and ponds in montane riparian habitat and wet meadows, lodgepole pine, subalpine conifer. Known from Lakecamp Lake and Lakecamp Creek. |
| **Birds** | | |
| Cooper's hawk (*Accipiter cooperi*) | CSC | Nests in dense stands of oak and riparian woodland, forages in grasslands. |
| Northern goshawk (*Accipiter gentilis*) | FSC; FSS; MIS; CSC | Nests in mid- to high-elevation mature, dense conifer forest. Nearest known location is Huntington Lake, about 1 mile from the powerhouse. |
| Golden eagle (*Aquila chrysaetos*) | CSC | Nests in secluded cliffs or large trees in the open; forages in grasslands and shrublands. Possible foraging in the project area, but no nesting habitat available. |
| Bald eagle (*Halieetus leucocephalus*) | FT; SE; MIS | Nests in large, canopy-dominant trees near adequate forage base. Nearest known nests are at Lake Edison (5 miles from forebay) and Shaver Lake (15 miles from powerhouse). |
| Osprey (*Pandion haliaetus*) | CSC; MIS | Nests in large conifers or man-made structures near fish-bearing waters. Huntington Lake supports approximately 7 active nests. |
| American peregrine falcon (*Falco peregrinus anatum*) | FSS; MIS; SE | Nests in high cliffs in woodlands or forests near lakes or rivers, and along the coast. Nearest known location is 3.5 miles from Portal power plant. |
| California spotted owl (*Strix occidentalis occidentalis*) | FSC; FSS; MIS; CSC | Nests in dense mature, multi-layered and old-growth forest from sea level to 7,600 feet. Several PACs in and near project area; one response detected during field survey. |
| Black swift (*Cypseloides niger*) | CSC | Nests in moist crevices or caves, cliffs near waterfalls in deep canyons, but forages widely. May forage in vicinity, but no suitable nesting habitat available in project area. |

| Common Name | Status | Habitat Characteristics and Occurrence |
|---|---|---|
| Willow flycatcher (*Empidonax traillii brewsteri*) | FSS; MIS; SE | Wet meadow and montane riparian habitats from 2,000–8,000 feet. Known on SNF; potential foraging and nesting habitat occurs in project area, but species more often associated with large scrub-shrub wetlands in broad, open river valleys. |
| Migratory landbirds | MIS | SNF supports about 40 species of neotropical migrants, many of which are known or likely to occur in the project area, e.g., Cooper's hawk, osprey, and northern goshawk. Some of these are also designated as FSS. |
| Upland game birds (various species) | MIS | Band-tailed pigeon and mountain quail occur in the project area, but turkey and mourning doves are not likely to be present. |
| Avian guilds (various species) | MIS | Birds associated with three avian guilds (riparian, meadow edge, and mature mixed conifer habitat) likely occur in the project area. |
| **Mammals** | | |
| Spotted bat (*Euderma maculatum*) | FSC; CSC | Habitats range from deserts and grasslands to mixed conifer forests. Forages over water and marshlands. Roosts in rocky outcrops. Known from Big Creek project area. |
| Pale big-eared bat (*Plecotus townsendii pallescens*) | CSC | Occurs in all but alpine and subalpine habitats; uses caves, mines, tunnels, or human-made structures for roosting. Known from Big Creek project area. |
| California mastiff bat (*Eumops perotis californicus*) | FSC; CSC | Uses a wide variety of habitats from low to high elevations. Typically roosts in caves, crevices, and rocky outcrops. Known from Big Creek project area. |
| Sierra Nevada red fox (*Vulpes vulpes necator*) | FSC; FSS; ST | Dens in forested habitats, hunts in open areas throughout the Sierra Nevada at elevations above 7,000 feet. Nearest known location is 1.5 miles from Portal power plant. |
| California wolverine (*Gulo gulo luteus*) | FSC; FSS; ST | Occurs in Sierra Nevada from 4,300–10,800 feet, primarily in mixed conifer, red fir and lodgepole habitats. Nearest known location is 2.5 miles from Portal power plant. |
| American marten (*Martes americana*) | FSS; MIS | Occurs in Sierra Nevada in high elevation forested habitats with abundant snags and large woody debris. Nearest known location is 0.25 mile from project area. |

| Common Name | Status | Habitat Characteristics and Occurrence |
|---|---|---|
| Pacific fisher (*Martes pennanti pacifica*) | FSC; FSS; MIS; CSC | Known from 3,500–8,000 feet on the SNF, in mature dense forests with abundant snags and large woody debris. Nearest known location is adjacent to Portal power plant. |
| Mule deer (*Odocoileus hemionus*) | MIS | Use dense forest and brush for cover; forage in open areas or young stands. Two deer herds use the project vicinity. The San Joaquin herd winters about 10 miles southwest of the forebay and summers about 1 mile southwest. The Huntington herd winters about 15 miles west of the powerhouse and summers around Kaiser Pass Meadow, between the powerhouse and forebay. |

Status: CSC – California species of concern
FC – Federal candidate
FE – Federally endangered
FP – Federally proposed
FSC – FWS species of concern
FSS – Forest Service Sensitive
FT – Federally threatened
MIS – FS Management Indicator Species
PAC – Protected activity center
SE – State endangered
SNF – Sierra National Forest
ST – State threatened

[a] Based on taxonomic reclassification in 1998 (Jokusch et al., 1998), the slender salamander family is currently considered to comprise four species, including the relictual salamander. Based on the reclassification, the Sierra Nevada Framework states that the relictual salamander does not occur on the SNF. However, in its May 24, 2003, letter, FS commented that it will continue to treat all slender salamanders within this complex as relictual salamanders until the Regional Forester updates the 1998 sensitive species list. FS states there are known occurrences of the relictual salamander in the Kings River and San Joaquin watersheds on the SNF.

SCE conducted focused surveys for several special status species, including Yosemite toad, mountain yellow-legged frog, bald eagle and osprey, California spotted owl, and special status bats. We present the bald eagle survey results in section V.C.4, *Threatened and Endangered Species*.

*Yosemite Toad*—The Yosemite toad is found in wet meadows and forest edges, breeding in shallow pools, quiet stream backwaters, or along lake margins at elevations from about 4,800 to 12,000 feet. The nearest documented occurrences in the project area are at Rancheria Creek, about 2.5 miles upstream of the Portal powerhouse. The species

is also known to occur at Kaiser Pass Meadow, about 2.5 miles from the project area and Lakecamp Lake and Lakecamp Creek, approximately 4.5 miles from the project area. SCE determined that suitable habitat for this species occurs in the wet meadow north of Portal forebay, but observed no Yosemite toads during focused surveys of this site. SCE determined that poor-to-moderate habitat also occurs in Camp 61 Creek downstream of the forebay, Adit 2 Creek, and Rancheria Creek between the energy dissipater and the Portal tailrace, but did not survey these areas.

*Mountain Yellow-legged Frog*—The mountain yellow-legged frog occurs in Sierra Nevada streams, lakes, and ponds at elevations ranging from approximately 4,500 to almost 12,000 feet. The species is known to occur at Lakecamp Lake and Lakecamp Creek. SCE conducted focused surveys for mountain yellow-legged frogs in Camp 61 Creek, but did not observe this species. SCE classified Camp 61 Creek as moderate quality habitat with small portions of poor and good habitat. Adit 2 Creek and Rancheria Creek between the energy dissipater and the Portal tailrace contain some poor and some moderate quality habitat. Some moderate and some good quality habitat was identified above the energy dissipater, and SCE indicates suitable habitat also occurs downstream of the dissipater.

*California Spotted Owl*—The California spotted owl is found in mature and old growth, multi-layered mixed conifer, redwood, Douglas fir, and oak woodland habitats from sea level to approximately 7,600 feet. As of 1998, the SNF (and private lands within the SNF) supported about 150 owl pairs (FS, 2004). Two protected activity centers (PACs) are located less than 0.25 mile from the powerhouse, and four are located in and around the forebay. SCE conducted surveys for California spotted owls by establishing calling stations along project roads. Surveys were conducted between May and August 2002. Biologists detected one response during the 2002 surveys, but no owls responded during the follow-up daytime survey.

*Osprey*—The osprey is strongly associated with large rivers, lakes, and reservoirs with an abundant prey base. In northern California, most osprey build their nests in large conifers, but artificial platforms and poles are also frequently used for nesting. SCE surveyed for osprey in conjunction with the bald eagle surveys. None were observed within the project area, although suitable habitat is present. During the Big Creek ALP studies, biologists observed seven active nests and one inactive nest at Huntington Lake. All of the nests are located a mile or more from the Portal powerhouse.

*Bats*—Special status bats that may occur in the project area include the spotted bat, pale big-eared bat, and California mastiff bat. SCE conducted surveys of potential roost sites for these species at the Portal powerhouse and the Portal forebay campground restroom. No special status bats were observed at either location.

The spotted bat is found in habitats from low deserts and grasslands up through mixed conifer forests over 10,000 feet. The spotted bat forages primarily for moths, hunting over water and marshlands. The spotted bat typically roosts in rock crevices of

cliffs and occasionally in caves and buildings. Most documented occurrences of this species are from southern California. No occurrences have been reported from the Portal Project area, but SCE documented this species during Big Creek ALP studies.

The pale big-eared bat occurs in a variety of California habitats, from sea level to mid-elevation montane habitats. The pale big-eared bat usually forages by gleaning moths from vegetation. It roosts in caves, mines, tunnels, building, and other man-made structures. The species was documented during the Big Creek ALP studies, but there are no records of occurrence in the Portal Project area.

The California mastiff bat is found at low- to mid-elevations, in dry, open habitats, coniferous and deciduous woodlands, and urban areas. The California mastiff bat forages over water, wetlands and grasslands, and roosts in rocks, caves, and crevices. SCE reported evidence of this species during the Big Creek ALP studies, but there are no known occurrences of California mastiff bat in the Portal Project area.

b. Environmental Effects:

**Effects of Instream Flows on Riparian Vegetation**

Riparian vegetation serves a number of important ecological functions. These include stabilizing streambanks; supporting unique microclimates and high levels of structural complexity; and providing food resources, hiding cover, and movement corridors for wildlife. SCE proposes to establish and maintain minimum instream flows in Camp 61 Creek downstream of Portal forebay. SCE would release a flow of 1.0 cfs from March through July, and 0.5 cfs from August through February. SCE believes that these flows, plus leakage from the dam, would provide the wetted perimeter recommended flow for habitat in Camp 61 Creek. Although SCE did not initially propose to release channel and riparian maintenance flows, it later proposed to release such flows into Camp 61 Creek over a 10-day period between April 1 and July 31 in above normal and wet water year types (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004). The magnitude and duration of these flows are presented in table 34. Flows would be ramped up to 28 cfs in above normal years and up to 39 cfs in wet water years. SCE would conduct qualitative monitoring of riparian vegetation every 15 years to evaluate its response to new minimum instream flows and channel and riparian maintenance flows.

FS 4(e) condition no. 12 specifies higher minimum instream flows than those SCE is proposing. Table 13 (see section V.C.1.b., *Water Resources*) shows the seasonal pattern recommended for each water type year. FS 4(e) condition no. 12 also specifies channel and riparian maintenance flows for 16 days (depending on water year type) from May 1 to May 16 (as shown in table 35). In below average years, channel and riparian maintenance flows would be 30 cfs, and in above average and wet years would be 45 cfs.

FS specifies that SCE should monitor several attributes of riparian vegetation at 10-year intervals through any new license period.

In its comments on the draft EA, SCE proposes changes to the schedule for monitoring riparian vegetation. SCE proposes to assess bank stability by the state of riparian vegetation in conjunction with the first sediment monitoring event, then continue qualitative observations of bank stability and riparian vegetation in years 10, 20, and 30.

*Our Analysis*

SCE compared vegetation in three segments of Camp 61 Creek to a reference reach in Kaiser Creek. SCE concluded that each creek showed a diverse age-class distribution and a diverse composition of woody and herbaceous vegetation. With the exception of "localized areas where some premature leaf drop and tip burn were observed," SCE described vegetation in Camp 61 Creek as healthy and vigorous.

Using the Properly Functioning Condition (PFC) protocol described in section V.C.3.a., above, SCE evaluated a number of factors relating to hydrology, vegetation, and erosion/deposition. SCE found that all of the surveyed reaches, including Camp 61 Creek, were in properly functioning condition. Based on these results, SCE concluded that project operation does not affect riparian communities in Camp 61 Creek.

The PFC results indicate that riparian habitat along Camp 61 Creek has adjusted to flow regulation over the past 80 years, in terms of its ability to help dissipate stream energy, minimize erosion, maintain water quality, and provide wildlife habitat. However, the PFC results did not provide any measure of encroachment of riparian vegetation into the Camp 61 Creek stream channel. In unregulated river systems, pioneer species (e.g., alder and willow) may establish on banks and bars within the active channel, but plants are soon scoured out by high flows. In regulated river systems, however, riparian vegetation often encroaches into the active channel as a result of reduced base flows, reduced flood magnitude and frequency, and changes in flood timing and duration. These riparian communities can provide valuable habitat for numerous wildlife species; however, they also have the potential to reduce habitat quality for others, such as native amphibians, that evolved in streams where the canopy conditions are more open. For this reason, encroachment may limit the proper functioning of riparian habitat.

The existing riparian vegetation below the bankfull elevation in Camp 61 Creek has developed as a result of the reduction in the magnitude, timing, and frequency of flows, allowing seedlings to become established and grow without a natural flow disturbance regime. SCE's minimum flow proposal would provide additional soil moisture for vegetation within and immediately adjacent to the bankfull channel width. However, our review of the cross-section diagrams of Camp 61 Creek, the Rosgen channel classifications, photographs of stream cross sections, and the existing instream flow quantity in Camp 61 Creek indicates that the primary hydrologic support to existing

riparian vegetation comes from runoff and upslope groundwater originating from annual snowmelt. Therefore, the minimum instream flows proposed by SCE would not likely affect the distribution, composition, or vigor of vegetation adjacent to, or present within, the stream channel. Because of the v-shape of the channel cross-section through most of Camp 61 Creek, the proposed flows would not provide additional support to vegetation above the bankfull channel width. The flows would not likely adversely affect (i.e., either inundate or scour) the vegetation below the bankfull elevation. The proposed flows would also not serve to reconnect the channel with its limited floodplain.

SCE's proposed channel and riparian maintenance flows during above normal and wet water years (table 34) could affect existing vegetation within the active channel, depending on the age and size of the vegetation. The proposed flows could also prevent seed germination, seedling establishment, and vegetative sprouting within the active channel. As a result, encroachment would be reduced over time, as existing vegetation matures and dies and is not replaced by new plants. It is important to note, however, that the results would depend to a great extent on the pattern of water year types that occurs through any new license period because SCE proposes to release channel and riparian maintenance flows only in above normal and wet water years; no changes from existing conditions would occur in dry or below normal years.

FS 4(e) condition no. 12 specifies a minimum instream flow throughout the year that is greater than the existing instream flow, and also greater than the instream flow proposed by SCE. Table 13 shows the minimum instream flow specified by the FS for each water type year.

FS minimum instream flows could result in mortality of vegetation that is within the wetted channel width, as a result of inundation. Existing vegetation above the wetted channel may benefit from the FS minimum flows during critically dry years. The additional flows would not likely provide any additional benefit during other years because the soil moisture for vegetation growth in this area is not lacking; based on the valley type and topography adjacent to Camp 61 Creek, it originates from upslope groundwater movement and snowmelt infiltration. Hill (1991) notes that not all valley types support riparian vegetation, and that riparian maintenance flows are only appropriate for valley types where the stream provides hydrological support of the adjacent vegetation. Steep-sided valleys, such as the Rosgen stream and valley types represented by Camp 61 Creek below the Portal forebay, lack floodplains or terraces that can support substantial amounts of riparian habitat. Therefore, we conclude that minimum flows as specified by the FS would do little to maintain vegetation adjacent to streams in this type of valley.

In addition to these minimum flows, FS specifies channel and riparian maintenance flows for Camp 61 Creek, shown in table 35. The FS-specified channel and riparian maintenance flows could remove existing vegetation within the bankfull channel and prevent new vegetation from becoming established within the bankfull channel due

to the scouring effect of high flows and the redistribution of sediment within the channel. The FS channel and riparian maintenance flows, in combination with the FS minimum instream flows over a multiple year period, would likely result in the removal of vegetation within the active channel area. SCE's proposed channel and riparian maintenance flow could also result in the removal of some existing vegetation within the bankfull channel, although the flow levels are more typical of natural historic bankfull flows and would occur with less frequency than the flows specified by the FS, and therefore would likely result in less scouring of existing vegetation. In addition, SCE's channel and riparian maintenance in combination with its proposed minimum flow would more likely allow vegetation to become established within the bankfull channel than the flows specified by the FS. However, the degree of scouring of vegetation in the stream, or the encroachment of vegetation upon the stream, would depend to a great extent on the sequence of water year types that occur during any new license period because channel and riparian maintenance flow would not occur during dry water years.

As discussed in section V.C.1., *Water Resources*, and V.C.2., *Aquatic Resources*, we evaluated a third (staff) option for minimum instream flows. Minimum instream flows would be similar to those proposed by SCE, but would step up flows from 0.5 cfs to 1.0 cfs during the fall. We would expect the effects on vegetation to be similar to SCE's proposal, because the 1.0-cfs fall releases would occur during the dormant season for most riparian vegetation.

Monitoring riparian vegetation would provide valuable information about several aspects of Camp 61 Creek's response to any new flow regime that is implemented. Because it influences bank erosion, sediment transport and deposition, and bank stability, monitoring riparian vegetation would be useful in evaluating geomorphic processes. Monitoring at 10-year intervals, as specified in FS condition no. 12(d)3, and similarly proposed by SCE, would provide a broad-level view of long-term changes.

In their December 19, 2005, alternative 4(e) conditions SCE proposes revisions to the FS channel and riparian maintenance flow requirements, but does not propose changes to the riparian vegetation monitoring schedule.

We discuss the cost of releasing minimum instream flows and channel and riparian maintenance flows and monitoring riparian vegetation in section VI, *Developmental Analysis*. We present our final recommendations pertaining to flow releases in section VII, *Comprehensive Development and Recommended Alternative*.

**Effects of Proposed Adit 2 Creek Sediment Reduction Measures on Upland, Riparian, and Wetland Habitat**

As described in sections V.C.1., *Water Resources*, and V.C.2., *Aquatic Resources*, SCE recently proposed a conceptual design for a measure to improve habitat conditions in Camp 61 Creek by conveying flows from upper Adit 2 Creek into Camp 61 Creek and

reducing sediment contributions from Adit 2 Creek. To accomplish these objectives, SCE would construct a new channel to re-route flows from upper Adit 2 Creek into Camp 61 Creek near RM 1.45, about 0.55 mile upstream of the current confluence (see figure 3), and install check dams in the eroding section of Adit 2 Creek between RM 0.5 and RM 0.3.

The exact alignment of the new channel would be determined during development of a detailed design for the project. At this point, SCE estimates that the new channel would be about 1,300 feet long and 5 feet wide. Six rock check dams and five straw check dams would be installed to stabilize the existing Adit 2 Creek channel. Once the existing channel is stable, SCE would plant willow, alder, and other riparian shrub species to further improve stability. SCE indicates that wetland/wet meadow habitats located along the Adit 2 channel would not be disturbed by construction.

FS 4(e) condition no. 12(d)4 also addresses stabilizing the eroding section of Adit 2 Creek. FS specifies that SCE should coordinate with FS to determine whether structural methods should be implemented in Adit 2 Creek. If SCE and FS jointly determine they would be practicable, SCE would implement, maintain and monitor the stabilization measures through any new license period.

*Our Analysis*

We estimate that the proposed channel would occupy a total of 0.15 acre. Based on SCE's cover type mapping, construction of the channel would convert about 0.1 acre of Jeffrey pine/white fir and approximately 0.05 acre of riparian habitat to perennial stream habitat. Some additional acreage (also composed of Jeffrey pine/white fir and riparian habitat) adjacent to the channel would be disturbed during construction, but could be revegetated upon completion of the project.

The dewatered section of Adit 2 Creek would also be revegetated, after the existing channel has been stabilized. Assuming the stabilized channel is about 1,056 feet long and about 5 feet wide, SCE could establish approximately 0.12 acre of willow/alder shrub in an area that currently is shown on topographic maps (USGS Mount Givens quad.) as perennial stream.

The net change in cover types would be a small increase in the area of perennial stream (0.03 acre) and riparian shrub (0.07 acre). About 0.10 acre of Jeffrey pine/white fir would be lost. We conclude that a loss of 0.1 acre of this cover type would not be significant at a landscape level, because it is the most common cover type in the project vicinity.

SCE maintains that rerouting flows from upper Adit 2 Creek would not affect either of the two wetlands that are located along the existing Adit 2 Creek channel. SCE describes both wetlands as "wet meadow/wetland complex", although the upper site is

shown on cover type maps as a 5.4-acre "riparian" polygon adjacent to a 4.6-acre "dry meadow" (attachment J to SCE response to AIR No. 13, SCE, 2004). The lower wetland is shown as a 2.5-acre "riparian" polygon.

Because flows would be maintained through the upper wetland, we would not anticipate any changes in wetland size, characteristics or function as a result of the proposed construction of a new channel to reroute Adit 2 Creek flows. Effects on the lower wetland and the lower 0.2 mile of Adit 2 Creek are less clear, because of limited information about hydrologic support for these habitats. Assuming Adit 2 leakage plays no part in their support, no effects would occur as a result of rerouting flows. If Adit 2 flows do currently reach the wetland and channel below it, rerouting the creek would (1) reduce the size of the wetland, (2) favor conversion from a wetland plant community to a facultative or upland type; and (3) impair some functions (e.g., support for primary productivity).

The FS approach to reducing sediment delivery from Adit 2 Creek into Camp 61 Creek could encompass a range of measures. Effects on upland, riparian and wetland habitats would vary, depending on the scope of treatments, if any, that SCE and FS jointly determine would warrant implementation.

We present costs of these measures in section VI, *Developmental Analysis*. We discuss our final recommendation pertaining to these measures in section VII, *Comprehensive Development and Recommended Alternative*.

**Vegetation Management and Noxious Weeds**

Construction and maintenance activities that cause ground disturbance have the potential to adversely affect native plant communities by causing erosion or soil compaction. They also can contribute to the establishment and spread of noxious weeds and invasive non-native plants.

At the current time, SCE manages vegetation by preparing an annual work plan to outline vegetation control projects that should be implemented, based on agency or staff inspections or requests. The plan outlines a schedule and treatment procedures for the proposed activities. SCE files the work plan with FS for review and approval. If approved, FS issues a Decision Memorandum authorizing SCE to implement the vegetation control measures. The Decision Memorandum addresses the use of certain chemicals, the timing of herbicide applications, and any other specific requirements. SCE must also obtain a yearly permit from Fresno County to implement vegetation control measures and comply with county Pest Control Advisory requirements.

SCE proposes to consult with FS and FWS to develop and implement a vegetation management plan for the Portal Project. The plan would include measures addressing weed control, special status plant species, wetlands, riparian areas, and other sensitive

habitats. In commenting on the DEA, SCE indicated that it would monitor areas treated for noxious weeds for one year to verify that the method was effective, and monitor for noxious weeds at project facilities, roads, trails, and recreation features at 10-year intervals.

FS concurs with SCE's proposal to develop a vegetation management plan for the Portal Project but states that it would not eliminate the need for annual notification and review of SCE's plans for pesticide use. FS 4(e) condition no. 11 specifies that SCE would require prior written approval for application of pesticides to NFS lands.

FS 4(e) condition no. 17, *Vegetation and Invasive Weed Management Plan*, specifies that SCE consult with the county and California Department of Food and Agriculture (CDFA), and within 2 years of license issuance, file plans for managing noxious weeds and other vegetation (e.g., hazard trees). Under this condition, SCE would inventory and map new weed occurrences; implement strategies to prevent and control spread of known weed populations; develop a schedule for eradication of all A, B, Q and selected other rated invasive weed species; conduct annual monitoring of known populations; and monitor ground-disturbing activities annually for 3 years following implementation to detect and map new weed populations. In addition to specifying certain measures to prevent the establishment and spread of terrestrial weeds, FS specifies the plan should include an adaptive management element that would provide for monitoring and control of aquatic plants, as necessary.

FWS comments that the plan should include methods for protection, mitigation, enhancement, and monitoring the effects of project operations and maintenance on special status species, habitats, and riparian vegetation within the project area (letter from D.L. Harlow, Acting Field Supervisor, FWS, Sacramento, CA, to N.J. Mascolo, Senior Attorney, SCE, Rosemead, CA).

*Our Analysis*

SCE did not observe any state-designated noxious weeds growing in the project area, but two CalEPPC-listed non-native invasive plants (cheatgrass, List A-1; and common mullein, List B) were observed at several locations. Most occurrences were associated with project features, including the Portal forebay, Portal dam, the powerhouse access road, and the powerhouse parking area. At these sites, project-related operations and maintenance and visitor traffic could serve as vectors for the spread of existing weed populations to new sites.

If implemented, SCE's proposed measures to reduce sediment sources in Adit 2 Creek would cause ground disturbance in both the existing Adit 2 Creek channel and along a 1,300-foot corridor where the new channel would be constructed. Weed prevention, monitoring, and control measures would be of particular importance during construction and until native vegetation is well-established, because ground-disturbance

creates conditions that promote weed colonization and spread. Over the long term, stabilization of currently-eroding sections of the Adit 2 Creek channel would reduce the risk of weed spread in the project area.

Implementation of proposed recreation facility and road improvements would also cause some ground disturbance. However, we would anticipate no substantial increase in the risk of weed spread, abundance, or distribution, because only small areas would be affected by construction.

Currently, weeds do not appear to be affecting undeveloped habitats; a single occurrence of common mullein was noted along East Fork Camp 61 Creek. Common mullein requires bare ground for seedling emergence (Hoshovsky, 2003). Populations are usually ephemeral in undisturbed sites, as other plants grow up and provide ground cover. By contrast, cheatgrass rapidly outcompetes other plants, has severe ecological impacts, and is much more difficult to control. Long-term management usually requires a "cumulative stress" approach, i.e., a combination of chemical and physical controls and vegetative suppression, and prevention of re-infestation (Carpenter and Murray, 2002).

Development and implementation of a vegetation management plan, including an element to address monitoring and control of noxious weeds and invasive non-native plants, would help maintain native plant diversity, protect sensitive plants and habitats (e.g., wetlands, riparian areas) from damage, and assist SCE in complying with federal and state weed laws. Monitoring of project facilities at 10-year intervals may be inadequate to provide for early detection and treatment of weeds, which is generally most effective and most economical. However, monitoring at one-year intervals may be unwarranted in light of the relatively low level of project maintenance and recreation activities.

We discuss the cost of developing and implementing a vegetation management plan in section VI, *Developmental Analysis*. We present our final recommendation pertaining to vegetation management in section VII, *Comprehensive Development and Recommended Alternative*.

**Protection of Special Status Plants**

During rare plant surveys, biologists observed a small population (about 15 individuals) of subalpine fireweed growing in a wet meadow about 30 feet from the Portal forebay distribution line. No veined water lichen was observed during the surveys, but SCE notes that it could occur in project-area creeks.

To protect special status species, SCE has established an Endangered Species Alert Program and an Environmental Training Program that address projects throughout its service territory. As part of these efforts, SCE designs maintenance protocols to reduce potential effects and trains staff in identification of special status species and

measures to protect them. SCE would continue to implement these programs under any new license issued. SCE also states that its proposed vegetation management program would help to protect special status species.

FS 4(e) condition no. 13 specifies that SCE prepare a biological evaluation prior to constructing any new project features on NFS lands to evaluate potential effects on Forest Service Sensitive Species, management indicator species, or critical habitat. The biological evaluation would identify any mitigation measures needed to minimize adverse effects and include plans for monitoring the effectiveness of such measures. SCE would submit the biological evaluation to FS for approval.

In a letter dated March 11, 2003, FWS commented that SCE should include measures to protect special status plants as part of the vegetation management plan (letter from D.L. Harlow, Acting Field Supervisor, FWS, Sacramento, CA, to N.J. Mascolo, Senior Attorney, SCE, Rosemead, CA).

*Our Analysis*

SCE indicates there is some potential for adverse effects on subalpine fireweed growing near the Portal forebay distribution line as a result of routine maintenance activities. Currently, SCE manages vegetation growing along the distribution line corridor by annually hand-pulling or hand-trimming vegetation in spring or early summer. Unless occurrences of rare plants are marked and protected, vegetation management practices or vehicle or foot traffic during maintenance of the distribution line could damage this resource. Implementation of site-specific measures, such as placement of barriers around rare plant populations and monitoring the effectiveness of those measures would provide long-term protection for these populations.

SCE indicates there is potential habitat for veined water lichen in the project area. The occurrence of this species in other cold, clean streams in mixed conifer forest on the SNF suggests that it could be present in East Fork Camp 61 Creek or West Fork Camp 61 Creek. We note that, under current conditions, veined water lichen would not be likely to occur in Camp 61 Creek because of intermittent flows, warm water temperatures, low DO levels, high turbidity, and low pH. However, implementation of minimum instream flows in Camp 61 Creek could provide conditions (e.g., perennial flow, cooler temperatures, higher DO, lower turbidity) that would be more suitable for the establishment of veined water lichen at some time in the future. Establishment of channel and riparian maintenance flows would also be likely to support more suitable conditions for this species, because veined water lichen is adapted to streams where spring flushing flows are an annual occurrence.

We discuss the cost of developing and implementing protective measures for special status plants in section VI, *Developmental Analysis*. We present our final

recommendations pertaining to special status plant protection in section VII, *Comprehensive Development and Recommended Alternative*.

**Special Status Amphibians**

Declines in several native amphibian populations have been observed in California (Jennings and Hayes, 1994). Reasons for decline are thought to include habitat loss or alteration, disease, climate change, predation, or a combination of these factors. Four special status amphibians may occur in the project area. These include the Mount Lyell salamander, relictual salamander, mountain yellow-legged frog, and Yosemite toad.[24] All four species are considered FSS species on the Sierra National Forest. FWS has found listing of Yosemite toad and mountain yellow-legged frog warranted but precluded from listing by higher priority actions.

The Mount Lyell salamander and relictual salamander are primarily terrestrial. The Mount Lyell salamander inhabits rocky substrates in mixed-conifer and lodgepole forests, where seeps or melting snow keep soils moist. The relictual salamander is usually found under rocks, large woody debris, boards, or other surface litter. Neither species was observed in the project area during wildlife reconnaissance surveys, and SCE proposes no specific measures to protect potential habitat.

SCE proposes no specific measures to protect habitat for the mountain yellow-legged frog or Yosemite toad. Neither species was observed during focused surveys at two sample sites. However, ongoing project operations may affect habitat suitability for these species in Camp 61 Creek, and SCE proposes several new measures that could affect habitat suitability. Measures to reduce iron concentrations are intended to improve water quality, and provision of various minimum instream flow regimes (SCE, FS, or staff) and channel and riparian maintenance flows is intended to improve support for aquatic life. Rerouting flows from Adit 2 Creek into upper Camp 61 Creek could reduce habitat in Adit 2 Creek, but could improve conditions in upper Camp 61 Creek.

SCE would continue its Endangered Species Alert and Environmental Training programs. These would help to prevent adverse effects on amphibians, if present, that could otherwise result from project operation and maintenance.

In regard to special status amphibians, FS condition no. 13 specifies that SCE should prepare and submit a biological evaluation to FS for approval before taking action to construct new project features on NFS lands to evaluate their potential effects on Forest Service Sensitive and management indicator species.

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[24] As mentioned in section V.C.4.a, SNF will continue to manage the relictual salamander as an FSS species until it is removed from the Regional Forester's List of Sensitive Species, although recent taxonomic changes indicate this species does not occur on the SNF.

FWS commented that SCE should develop a wildlife management plan (letter from D.L. Harlow, Acting Field Supervisor, FWS, Sacramento, CA, to N.J. Mascolo, Senior Attorney, SCE, Rosemead, CA, dated March 11, 2003). FWS indicated that specific measures to protect mountain yellow-legged frog and Yosemite toad should be included in the plan.

*Our Analysis*

SCE did not observe any Mount Lyell or relictual salamanders during general wildlife field reconnaissance surveys. Campground improvements appear to be the only actions proposed at this time that could affect potential habitat for these species. Focused surveys for these species may be needed prior to relocating or improving campsites or constructing new parking spurs or trails, depending on the final siting of new campground features.

Based on field reconnaissance and habitat queries developed as part of the Big Creek ALP amphibian studies, SCE concluded that potential habitat for the mountain yellow-legged frog and Yosemite toad is present in Adit 2 Creek, Camp 61 Creek, East and West Forks of Camp 61 Creek, and Rancheria Creek. SCE conducted focused surveys for these two species at sites considered to be representative of good habitat but observed no mountain yellow-legged frogs or Yosemite toads.

SCE's proposal to provide a minimum instream flow in Camp 61 Creek of 1 cfs during the summer and 0.5 cfs during the winter, and to release spring channel and riparian maintenance flows of up to 28 or 39 cfs (in above normal or wet water year types, respectively) could slightly increase the area of available breeding habitat for the mountain yellow-legged frog through its gradual effects on vegetation. Releasing the range of flows specified by FS could further improve breeding and overwintering habitat for the mountain yellow-legged frog, by further reducing the encroachment of riparian vegetation. Higher base flows could slightly improve overwintering habitat by providing deeper pools with more opportunity for refuge. Implementation of channel and riparian maintenance flows specified by FS could also contribute to reducing encroachment, by flushing silts and sands that could otherwise accumulate and be colonized by riparian vegetation. In general, the month-to-month variability of FS-recommended flows would mimic the natural hydrograph to some degree and, for this reason, would be likely to help support all lifestages of the mountain yellow-legged frog.

As discussed above, we evaluated a third flow regime for Camp 61 Creek, that would include higher minimum instream flows in the fall than those proposed by SCE. The effects on vegetation (and consequently, on mountain yellow-legged frog habitat) would be essentially the same as those we would anticipate to result from SCE's proposal, because the only difference would be in the late fall/early winter, when plants are dormant.

None of the aforementioned flow regimes would be likely to affect Yosemite toads, because of their reliance on meadows and moist upland habitat associated with streams. Because of the steep gradient of most of Camp 61 Creek, higher flows would not be likely to create shallow backwaters within the channel or wetlands on the adjacent banks that could support this species.

Existing habitat quality in Camp 61 Creek may be limited by high concentrations of iron, regardless of the flow regime. Because of their ecology and physiology, amphibians are especially vulnerable to water-borne contaminants. Their skin is semi-permeable, and rapidly absorbs pollutants from the environment (Zug, 1993). For this reason, improvements to the catchment basin that are intended to reduce iron concentrations in Camp 61 Creek could improve habitat for native amphibians.

Existing habitat quality in Camp 61 Creek could also be limited by predation. CDFG no longer stocks brown trout, but this species is abundant in Camp 61 Creek as a result of historical stocking, migration from the SFSJR, or both, and rainbow trout are stocked in Portal forebay. Brown trout and rainbow trout are known to prey on amphibians, and several recent studies indicate that where trout populations have been introduced, native amphibian populations have disappeared (Vredenburg, 2004; Knapp and Matthews, 2000).

Implementing higher base flows and shaping seasonal flows to resemble the natural hydrograph would provide a range of benefits in the system, which could eventually help to support special status amphibians. Higher base flows and spring flushing flows would promote more active stream processes, in terms of surface water/ground water interactions, instream habitat complexity, and primary productivity. However, predation could continue to limit habitat quality.

Re-routing of Adit 2 Creek flows and construction of rock and straw check dams in the existing Adit 2 Creek channel would have the potential to disturb habitat for mountain yellow-legged frog and Yosemite toad. Camp 61 Creek and the lower 0.9 mile of Adit 2 Creek both contain suitable habitat for these species, based on SCE's Big Creek ALP analysis. Neither species has been observed, but SCE's surveys for mountain yellow-legged frog were limited to one 500-meter segment of Camp 61 Creek and surveys for Yosemite toad occurred only in the upper wetland along Adit 2 Creek.

Development of a wildlife management plan for the Portal Project as recommended by FWS could benefit native amphibians by serving as a means of coordinating habitat protection and population monitoring under any flow regime. Results of amphibian monitoring in Camp 61 Creek, combined with the results of sediment and riparian vegetation monitoring, would be a valuable tool for evaluating the effects of any new flow regime that is implemented.

We discuss the cost of developing and implementing a wildlife management plan, including measures to protect special status amphibians, in section VI, *Developmental Analysis*. We present our final recommendation pertaining to wildlife management in section VII, *Comprehensive Development*.

**Special Status Birds and Mammals**

As described in section V.C.3.a., SCE evaluated the potential occurrence of several special status birds and mammals in the project area. Based on historical records, documented occurrences, available habitat, and agency consultation, SCE concluded that focused surveys were needed to assess potential project effects on the California spotted owl, osprey, spotted bat, pale big-eared bat, and California mastiff bat.

*California Spotted Owl and Osprey*

The Portal dam and forebay are located at the southeastern edge of a California spotted owl Protected Activity Center (PAC). The PAC also includes the upper reaches of Camp 61 Creek, portions of the access road, and approximately 1.25 miles of the communication/power line. The Portal powerhouse is located approximately 0.25 mile from the edges of two owl PACs.

SCE documented five osprey nests at Huntington Lake approximately 1 mile from any project feature. One active nest is located at Rancheria campground, about 0.5 mile from the Portal powerhouse area.

SCE would continue its Endangered Species Alert and Environmental Training programs, which could provide protection for the California spotted owl and osprey. SCE would also continue its Raptor Protection Program. The Raptor Protection Program is designed to help prevent electrocution and injury. Under this program, SCE identifies problem poles, installs protective equipment, monitors and reports mortalities, and minimizes disturbance to nests associated with primary power lines.

As described above, FS condition no. 13 specifies preparation of a BE for FS approval prior to constructing any new project features on NFS lands. FS Section 4(e) condition no. 14 addresses recreation resource management, but in specifying relocation of the distribution line over the Portal forebay to improve angler safety and success, could also reduce the risk of avian collision.

FWS commented that SCE should develop and implement a wildlife management plan, and that such a plan should address protection for the California spotted owl and osprey (letter from D.L. Harlow, Acting Field Supervisor, FWS, Sacramento, CA, to N.J. Mascolo, Senior Attorney, SCE, Rosemead, CA, dated March 11, 2003).

*Our Analysis*

The breeding season for the California spotted owl extends from February to September. Construction activity, traffic and noise associated with campground upgrades or project maintenance during this time of the year would have the potential to cause disturbance to nesting owls. Typically, limited operating periods (LOPs) are implemented within specified distances of owl nest sites to prevent disturbance. The specific requirements of an LOP depend on factors such as the type of activity and presence or absence of topographic or vegetative screening,

Although many osprey pairs appear to tolerate relatively high levels of disturbance, LOPs are often implemented to protect nesting osprey, as well. The breeding season for this species extends from March through September. SCE is not proposing any measures that would remove or alter osprey habitat, but there would be some potential for minor disturbance of osprey foraging at Portal forebay during road and campground improvements.

The only measures SCE proposes at the current time that could remove potential habitat or cause disturbance to nesting owls are those intended to reduce sediment sources in Adit 2 Creek. These include construction of a new channel to convey flows from Adit 2 Creek into Camp 61 Creek, and construction of check dams in the eroding section of the existing Adit 2 Creek channel.

We estimate that construction of the new channel would result in the removal of approximately a tenth of an acre of Jeffrey pine/white fir within a California spotted owl PAC. This proposal may not be compatible with FS standards and guidelines for PACs. However, impacts on habitat could be minimized by aligning the channel to avoid removing large-diameter live trees and snags; retaining coarse woody debris on the site; and re-establishing native trees, shrubs, and groundcover in any areas where soils are disturbed.

SCE proposes to use a backhoe, 10-wheeled truck, and a labor crew to construct the channel. SCE has not indicated the amount of time that would be required to complete construction or the period of the year that construction would occur. We assume that construction would occur during the summer dry period to minimize the risk of erosion. If so, work would coincide with the breeding season for the California spotted owl, which extends from February to September. Construction activity, traffic, and noise associated with the construction of the new channel during this time of year would have the potential to cause disturbance to nesting owls. If no machinery is allowed, as indicated by FS comments, less noise would occur, but construction activity would occur over a much longer period of time.

Construction of rock and straw weirs in the Adit 2 channel is also assumed to occur during the summer dry period. The construction methods proposed for installing

these weirs do not require mechanized equipment and the potential noise disturbance to wildlife would be low.

SCE's proposal to continue its Endangered Species Alert, Environmental Training and Raptor Protection programs throughout its service territory would provide opportunities to evaluate potential adverse effects and implement appropriate mitigation measures. Implementation of FS 4(e) condition no. 13 would provide for consultation and evaluation of project-specific effects, if ground-disturbing activities are undertaken (e.g., channel construction). Development of a wildlife management plan could employ a more comprehensive framework for protection, by incorporating mechanisms for regular monitoring and reporting over the long term, and would focus on the Portal Project.

We discuss the cost of developing and implementing a wildlife management plan, including measures to protect special status birds, in section VI, *Developmental Analysis*. We present our final recommendation pertaining to wildlife management in section VII, *Comprehensive Development*.

*Spotted Bat, Pale Big-Eared Bat, and California Mastiff Bat*

SCE conducted surveys for roosting bats at the Portal powerhouse and Portal forebay campground restrooms, the only project features that would be likely to provide suitable roosting habitat. Surveyors observed no evidence of use by any bat species.

As described above, SCE would continue its Endangered Species Alert and Environmental Training programs.

FWS commented that SCE should develop and implement measures to protect special status bats as part of a wildlife management plan (letter from D.L. Harlow, Acting Field Supervisor, FWS, Sacramento, CA, to N.J. Mascolo, Senior Attorney, SCE, Rosemead, CA, dated March 11, 2003).

*Our Analysis*

Maintenance and recreational activities often have the potential to disturb bats at sites where bats use project facilities for roosting. Also, proper building maintenance may require excluding bats from these facilities because of human health concerns associated with bat droppings. However, no bats were observed during SCE's surveys, and we conclude that there would be no project effects at this time.

SCE's Endangered Species Alert and Employee Awareness programs would offer opportunities to address potential changes in bat use of project facilities that may occur in the future. Implementation of FS 4(e) condition no. 13 would provide for evaluation of potential effects of ground-disturbing activities on special status bats. Development of a

wildlife management plan, as recommended by FWS, would provide similar opportunities and could also incorporate measures for monitoring and reporting.

We discuss the cost of developing and implementing a wildlife management plan, including measures to protect special status bats, in section VI, *Developmental Analysis*. We present our final recommendation pertaining to wildlife management in section VII, *Comprehensive Development*.

c. Cumulative Effects:

Construction and operation of the Portal Project, along with numerous other hydroelectric projects in the San Joaquin River Basin, has likely affected habitat for a number of native aquatic amphibians, and in particular, for the mountain yellow-legged frog. Flow diversion and reservoir inundation have the potential to reduce the amount and quality of available habitat. Project operation alters the natural hydrograph, which may impair breeding, rearing, dispersal, and overwintering. The historic introduction of non-native salmonids is thought to have resulted in the extirpation of native amphibians from many sites in the Sierra Nevada. Historic stocking of brown trout into Camp 61 Creek and continued stocking of rainbow trout in Portal forebay could continue to suppress mountain yellow-legged frog populations that might otherwise be present in the project area.

In addition, the Portal Project operates along with several other hydropower projects within SCE's Big Creek Hydro System. Changes in instream flows and stocking of non-native salmonids as proposed in the license measures for the Vermilion Valley Project (FERC No. 2086), in association with the measures proposed for the Portal Project would produce a cumulative adverse effect to terrestrial and amphibian resources within the upper SFSJR watershed. Instream flow and fish stocking measures for other hydroelectric projects in the SFSJR are being addressed in the Big Creek ALP and may also result in additional effects to terrestrial and amphibian resources when these measures are implemented.

d. Unavoidable Adverse Effects:

Reduced streamflow in Camp 61 Creek and the presence of introduced fish would likely continue to limit habitat suitability for native aquatic amphibians in Camp 61 Creek.

### 4. Threatened and Endangered Species

a. Affected Environment:

FWS identified one federally listed wildlife species as being of particular interest in the project area (letter from D.L. Harlow, Acting Field Supervisor, FWS, Sacramento, CA, to N.J. Mascolo, Senior Attorney, SCE, Rosemead, CA, dated March 11, 2003). The bald eagle (*Haliaeetus leucocephalus*) is listed as threatened, although FWS proposed in 1999 to remove the species from the list of threatened and endangered species because of the success of recovery efforts throughout the United States.

In California, the bald eagle breeds and winters in low- to mid-elevations in the Sierra Nevada, Cascade Range, and northern Coast Range. The bald eagle is strongly associated with large rivers, lakes, and reservoirs where prey is abundant and where large trees are available along the shoreline for nesting and perching. Bald eagles prey primarily on fish, but waterfowl are also an important part of the diet in some areas, when fish are unavailable.

SCE conducted bald eagle and osprey surveys within the ALP project area in April, May, and June 2002. Portions of the ALP project area associated with the Portal Project included Huntington Lake, the Portal powerhouse, and lower Camp 61 Creek. Although FS has documented a sighting of a bald eagle at the Portal forebay and several sightings of bald eagles around Huntington Lake near the powerhouse, no bald eagles were observed during SCE's 2002 surveys. Breeding pairs are known from Shaver Lake (approximately 15 miles from the Portal powerhouse) and Lake Edison (approximately 5 miles from the Portal forebay).

b. Environmental Effects:

Based on SCE's surveys in spring and summer 2002, suitable habitat for bald eagle nesting and wintering is located around Huntington Lake near the Portal powerhouse, and nesting habitat is located near the confluence of Camp 61 Creek with the SFSJR. No bald eagles currently nest in the project area, but bald eagles may forage in the Portal forebay.

SCE currently implements an Endangered Species Alert Program to protect special status plants and wildlife. The program centers around a manual that provides photographs, descriptions, natural history information, maps of species' distribution in relation to SCE project facilities, and a discussion of potential conflicts with SCE operations. Prior to conducting any surface-disturbing activities, SCE staff review the manual to identify potential conflicts. If risks are identified, SCE biologists evaluate the situation and coordinate, as necessary, with resource management agencies.

SCE also implements an Environmental Training Program. SCE employees attend training sessions in the field on a job-specific basis, designed to focus attention on permit conditions and techniques for avoiding environmental impacts.

SCE's Raptor Protection Program provides a mechanism for SCE to monitor and report raptor interactions with project transmission lines, identify problem poles or areas, and upgrade or install new equipment, as needed, to help prevent injury or mortality.

SCE proposes to continue all three of these programs through any new license period.

As described above, FS 4(e) condition no. 13 specifies that SCE would prepare and submit a BE to FS for approval prior to taking any actions to construct new project features on NFS lands that could affect Forest Service sensitive or management indicator species. This measure would apply to the bald eagle. The portion of FS 4(e) condition no. 14 that specifies relocation of the distribution line across Portal forebay, although it applies to recreational resource management, could also affect bald eagles.

FWS recommends SCE include management of the bald eagle as part of the wildlife management plan described above.

*Our Analysis*

SCE consulted with the resource management agencies to identify suitable bald eagle nesting habitat within the Big Creek ALP study area. SCE included the Portal Project area in this habitat assessment. The ALP assessment indicates that there is suitable nesting habitat around Huntington Lake (FERC Project No. 2175) within 0.25 mile of the Portal powerhouse, and at the confluence of Camp 61 Creek with the SFSJR, about 1 mile from the Portal forebay. Forested stands near the Portal forebay were not considered to provide suitable nesting habitat, due to the small size of the reservoir. The ALP habitat assessment assumed that large forebays in the study area, including Portal forebay, would be suitable for foraging, and SCE states that FS has records of bald eagles foraging in the Portal forebay.

No actions are proposed at the Portal powerhouse site that would cause noise disturbance. Noise during proposed road repairs and campground improvements at the Portal Forebay Campground could cause short-term, temporary disturbance to foraging eagles.

Existing project-related recreation activity is relatively low, as described in section V.C.5, *Recreational Resources*. Although some visitors use the Kaiser Pass Road for snowmobiling, cross-country skiing and dogsledding, most use occurs during the summer. Recreation surveys indicated that the 14-site Portal Forebay Campground is rarely at capacity, but the forebay is popular for anglers. Proposed improvements are not

intended or expected to increase campground capacity or recreation use at the forebay, so no long term increase in disturbance would be likely to occur.

No changes in project operation are proposed that would affect bald eagles. Bald eagles would be unlikely to forage in Camp 61 Creek, due to its relatively small size and steep gradient, even if flows are substantially increased under any of the flow regimes previously discussed. However, SCE proposes to continue stocking rainbow trout into the Portal forebay, which would continue to provide a potential forage resource for bald eagles.

The 480-volt distribution line presents a negligible risk of electrocution to bald eagles; no raptor electrocutions have been associated with very low voltage lines (APLIC, 1996). However, power lines that traverse foraging areas or intersect flight paths represent a hazard to bald eagles, other raptors, and slower-flying, less agile birds, such as waterfowl. Relocating the segment of distribution line that crosses the forebay could benefit bald eagles and other species by reducing the risk of collision.

SCE's proposal to continue its territory-wide Endangered Species Alert and Employee Training programs would enable SCE to evaluate the effects of ground-disturbing projects or maintenance activities on bald eagles. However, continuation of SCE's territory-wide Raptor Protection Program would not be likely to provide for regular review of potential hazards to bald eagles, because of the low voltage of the existing distribution line, and therefore, low risk of electrocution.

Implementation of FS 4(e) condition no. 13 regarding preparation of a Biological Evaluation would afford opportunities for protection that would be similar to SCE's proposed measures, but would focus on the project area. Implementation of FWS' recommended wildlife management plan would also focus on the project area, and would provide a more comprehensive approach to monitoring and management through any new license period.

Establishment of a bald eagle monitoring plan as part of a wildlife management plan would provide a means of evaluating the effects of proposed actions that do not require ground-disturbance, such as changes in water quality, fish abundance, reservoir operation, or recreation activities, that might not be evaluated under SCE's existing programs or FS 4(e) condition no. 13. Monitoring would be increasingly important, as bald eagle populations in California continue to grow and expand their range (CDFG, 2001). Results of monitoring would also be useful in helping to determine whether relocation of the section of distribution line that crosses the forebay is needed to protect bald eagles.

We conclude that relicensing the Portal Project under the staff alternative would not likely adversely affect the bald eagle. No potential nest or perch habitat would be removed and no changes in project operation are proposed that would adversely affect

water quality or fisheries. Noise during construction activities could cause temporary disturbance to foraging bald eagles, if present at the Portal forebay. No long term increases in disturbance would be expected as a result of the proposed recreation facility and campground improvements.

We discuss the cost of developing and implementing protective measures for bald eagles in section VI, *Developmental Analysis*. We present our final recommendations pertaining to bald eagles in section VII, *Comprehensive Development and Recommended Alternative*.

c. Unavoidable Adverse Effects:

We identified no unavoidable adverse effects on threatened or endangered species.

### 5. Recreational Resources

a. Affected Environment:

The Portal Project is located within the Pineridge Ranger District of the 1.3-million-acre SNF. Portal facilities occupy two geographically distinct areas: the Portal forebay area and the powerhouse area. Developed recreational sites within a 30-minute drive of the project are concentrated around SCE's major reservoirs, Lake Thomas Edison, Florence Lake, and Huntington Lake. Each offers extensive recreational opportunities that include campgrounds, boat launches, convenience stores, private resorts, and numerous trailheads. Two FS recreational facilities are within the Portal Project boundary, the Portal Forebay Campground and the Eastwood Overflow Campground.

Popular recreational activities in the project area in summer are camping, fishing, hiking, and wildlife and scenery viewing. Trails in the vicinity offer access to nearby wilderness areas. The Rattlesnake and Mono Crossing trailhead, located near the Portal forebay, provides access to the Ansel Adams Wilderness Area, located just north of the forebay. Fishing is also popular at the Portal forebay. Anglers make use of the streams flowing into the forebay, Rancheria Creek downstream of the powerhouse, and the SFSJR.

Winter uses include snowmobiling, cross-country skiing, dogsledding, and snow play along the Kaiser Pass Road, which is groomed in winter by the FS. Reaching an elevation of 9,300 feet, it is most heavily used for these purposes in spring and fall when other areas have less snow accumulation.

Recreational opportunities within the Portal Project boundary include the Portal Forebay Campground, a rustic, non-fee 14-acre facility developed by the FS next to the

Portal forebay. Amenities include four pit toilets, picnic tables, fire rings, and bear-proof storage boxes. Six sites can accommodate recreational vehicles (RVs) or trailers. Located near the Portal powerhouse, the Eastwood Overflow Campground is an undeveloped facility with no amenities within the project boundary. It is available for dispersed camping when developed sites at Huntington Lake are full. Both of these sites are operated and maintained by the FS.

Two additional recreational improvements are near, but not within, the Portal Project boundary. The Rattlesnake-Mono Crossing trailhead is near the Portal Forebay Campground. It offers parking, informational signs, and a pit toilet, all maintained by the FS. Downstream of the Portal powerhouse, SCE constructed the Eastwood Visitor Center as mitigation for Project No. 67. Facilities include a trail along the Portal tailrace, vault toilets, and informational signs. This site is maintained by SCE.

FS uses the Recreation Opportunity Spectrum (ROS) to manage existing recreation and to guide planning for future opportunities. The ROS identifies potential recreational uses based on the physical and social settings and management objectives. Under this system, the FS classifies public lands in the project area as Rural, Roaded Natural and Semi-Primitive Non-Motorized. Rural lands are areas where substantial modifications to the environment can be expected. Roaded Natural areas are predominately natural appearing, with human uses that harmonize with the natural environment. Motorized vehicles are permitted. Semi-Primitive Non-Motorized areas retain a predominantly natural-appearance with moderate human influence. Motorized use in not permitted.

The Portal forebay is designated as Roaded Natural and current uses appear consistent with this classification. The area adjacent to and east of the forebay is designated as Semi-Primitive, Non-Motorized. The forebay is a popular fishing destination, with an adjacent campground. The Portal Forebay Campground is a rustic, non-fee 14-acre facility developed by the FS next to the Portal forebay. The campground includes 14 camping sites within the Portal Project boundary. Most of the campsites (12 sites) are located on the north side of the forebay, with six of these sites able to accommodate trailers. Two additional campsites are located on the south side of the forebay, non-contiguous with the other 12 sites. Amenities of the Portal Forebay campground include four pit toilets, picnic tables, fire rings, and bear-proof storage boxes. Surveys conducted by SCE reveal that visitors were attracted to the site by the lack of crowding, clean facilities, scenery, camping, fishing, and opportunities for relaxing.

The Eastwood Overflow Campground is within an area categorized under the ROS as Rural, where substantial modifications to the environment can be expected. The site is within the boundary of the Portal Project, and it is available for dispersed camping for up to 24 hours. No improvements are proposed at this location. This area was not included in SCE's inventory and assessment of recreational facilities because of the absence of

amenities and SCE's proposal to remove it from the boundary of the Portal Project and transfer it to Project No. 2175.

**Recreation Use Levels and Visitor Satisfaction**

SCE conducted recreation use and user satisfaction surveys as part of its Big Creek ALP. These surveys included modules specific to the Portal Project area. A winter recreation self-census survey was conducted in 2000–2001 (SCE, 2001). A recreational opportunity and needs assessment was conducted in 2002, as was a summer recreational use survey (SCE, 2001). Additionally, an angling opportunities and experience assessment was conducted in 2002.

Of the 166 summer visitors surveyed by SCE in 2002 at the Portal forebay, a third of the overnight visitors stayed at the Portal Forebay Campground, while two-thirds stayed at other basin locations (campgrounds, cabins, or resorts) (SCE, 2003). Overall, Portal Forebay Campground visitors expressed satisfaction with the facilities provided by the FS. Those surveyed preferred the site because it is uncrowded, offers water access, facilities are clean and well-maintained, with attractive scenery. Of the overnight campers surveyed, 90 percent rated campsite conditions as highly acceptable or moderately acceptable; 86 to 92 percent rated campground facilities as highly or moderately acceptable; 76 percent rated restrooms as highly or moderately acceptable; and 87 percent rated campground road conditions as highly or moderately acceptable (SCE, 2003). Sixty-three percent of Portal overnight campers also rated the absence of fees as an important to very important factor, while 26 percent rated this as somewhat or not important. Rated as unimportant by Portal forebay overnight visitors were RV hook-ups, onsite managers, and the availability of accommodations. Visitors who stayed overnight elsewhere in the basin expressed similar preferences, although more desired developed water supply and showers (53 percent rating this as important to very important).

Only 11 groups reported using the Portal forebay area for picnicking. Between 82 and 100 percent of these respondents rated site availability, picnic site condition, table condition, parking, restroom availability, and crowding levels as acceptable. Trash disposal was rated at 30 percent acceptable, 30 percent unacceptable, and 40 percent neutral.

Campground occupancy data was collected by SCE over 23 dates in the summer of 2002 as part of the recreation user surveys. On 12 days, Portal Forebay Campground occupancy was at or below 50 percent; on 6 days, occupancy was between 51 and 75 percent; and on 5 days, occupancy was over 75 percent (SCE, 2003). The percent occupancy on non-holiday Saturdays in summer averaged 65 percent, while holiday weekend occupancy averaged 68 percent. Of all the days surveyed, the campground was at capacity on only one day (over the July 4 weekend).

Day-use data also was collected at the Portal forebay, although few completed surveys were received. Over 75 percent of these respondents identified the following factors as important or very important reasons for visiting this site: lack of fees, uncrowded areas, access to water, scenery, and site cleanliness.

The primary winter recreational use of the Portal Project area is snowmobiling along the Kaiser Pass Road (FS 80). Because of heavy snow accumulation, this road is closed in winter and groomed for snowmobile use. Generally, the Portal forebay recreational area is an infrequent destination (SCE, 2003). Of the 378 surveyed winter users in the Big Creek area, only 30 identified the Kaiser Ridge and High Sierra Station as their exclusive destination (SCE, 2003). These regions include the Portal Project area. Of these visitors, 83 percent were snowmobilers; 10 percent cross country skiers, and 7 percent snow players.

b. Environmental Effects:

Although SCE does not operate or maintain recreational facilities near the Portal Project, FS constructed and maintains the Portal Forebay Campground, which is located within the project boundary and adjacent to the Portal forebay. The Portal Forebay Campground currently offers 14 designated campsites in a semi-primitive area. In its application for new license, SCE acknowledges that the Portal forebay is a recreational attraction and that its continued presence benefits area visitors; and concludes that project operation does not adversely affect use at this site (SCE, 2003). SCE proposes recreation-related surveys and management planning, as well as rehabilitation measures at the Portal Forebay Campground. SCE also proposes to remove the Eastwood Overflow Campground from the Portal Project boundary. FS specifies several recreation-related measures, most of which would be implemented at the Portal Forebay Campground.

**Recreation Report and Management Plan**

Although SCE's application for new license did not included proposals for recreational measures at the Portal Project, several measures were added to its proposal following review of the FS October 8, 2004, preliminary 4(e) terms and conditions. SCE adopted FS 4(e) condition nos. 14(a) and 14(b) in response to FS preliminary 4(e) conditions, but did not adopt condition no. 14(c) (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, December 16, 2004).

FS 4(e) condition no. 14(a) specifies that SCE prepare a recreation report every 6 years and file it with the Commission after consulting with the FS. The report is to include the results of visitor surveys to estimate trends in user preferences.

FS 4(e) condition no. 14(b), *Recreation Plan–Facilities and Interpretive Services*, specifies that SCE develop and file a Recreation Plan with the Commission. The plan is to address the development and management of project-related recreational opportunities.

FS 4(e) condition no. 14(c) specifies operation and maintenance responsibilities that the FS recommends SCE assume under a new license. An annual contribution of $3,405 would be allocated toward two programs: (1) $1,915 would fund special use permit monitoring and compliance assurance of the Portal Forebay Campground concessionaire; and (2) $1,490 would fund monitoring and enforcement by the FS of dispersed public use sites around the Portal forebay.

SCE, in its December 19, 2005, alternative 4(e) conditions filed with FS, would remove FS condition no. 14(c) in its entirety.

*Our Analysis*

The Portal Forebay Campground is a project-induced facility. It was constructed by FS in response to dispersed recreation occurring in the area following construction of the Portal forebay. The campground is operated and maintained by the FS.

Preparation of a recreation report every 6 years, as specified in FS 4(e) condition no. 14(a) would supplement data required by the Commission to be included in FERC Form 80. The FS states that the visitor survey component of this measure would provide information it needs to assess visitor use patterns and preferences. The information would help identify if any modification of recreation measures would be necessary over the term of the license. SCE agrees to conduct recreation surveys to assess project-induced recreation needs (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, December 16, 2004).

Development of a recreation plan for the Portal Project area as detailed in FS 4(e) condition no. 14(b) would help establish the need and timing for implementation of the recreation facility development, management, and maintenance activities. This plan would provide the means to address future capacity and recreation demand issues that would, in turn, help limit the adverse effects of recreational use on other resource values.

FS 4(e) condition no. 14(c) addresses funding for administration of the campground concessionaire's FS special use permit, and monitoring, maintenance, and enforcement of dispersed public use sites within the Portal Forebay project area. The requirement that a licensee fund the policing and monitoring of a concessionaire's special use permit with FS is not appropriate for inclusion in a Commission license order as the Commission would have no authority to direct SCE to remedy any breach of the permit.

The Portal Forebay campground includes 12 developed campsites on the north side of the forebay and two developed campsites on the south side of the forebay that are

non-contiguous with the other 12 sites. The recreation survey conducted by SCE (SCE, 2003) describes dispersed recreation activities (hiking, wildlife viewing, scenery photography, and fishing) that occur near the forebay area. There is no documentation identifying the existence of specific dispersed public use sites at Portal Forebay as described in FS 4(e) condition no. 14(c). However, dispersed recreation activities occurring in the project area, such as hiking, fishing, wildlife viewing, and photography, are minimal and low impact. Unless recreation use patterns in the Portal forebay area change in the future, policing and monitoring of dispersed activities by SCE is not warranted.

SCE states in their December 19, 2005, proposed alternative 4(e) conditions that condition 14(c) should be removed in its entirety as SCE should not be required to subsidize the campground concessionaire's operating costs or pay FS to supervise its concessionaire. SCE also states that FS has not provided justification for the cost associated with (1) project operation and maintenance; (2) monitoring and permit compliance for the Portal Forebay Campground concessionaire; and (3) site policing, maintenance, monitoring, and enforcement of dispersed public use sites in the area around the Project forebay.

We discuss the cost of developing and implementing a recreation plan and providing recreation reports in section VI, *Developmental Analysis*. We present our final recommendations pertaining to recreation management in section VII, *Comprehensive Development and Recommended Alternative*.

**Recreational Facility Improvements**

SCE did not propose any improvements to the facilities at the Portal Forebay Campground in its application for new license; however, several measures were added in its December 16, 2004, response to FS preliminary 4(e) conditions (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, December 16, 2004). SCE adopts the majority of the 16 specified improvements to the campground found in FS 4(e) condition no. 14(d), listed below, with some timing adjustments and minor revisions or clarifications of construction methods or materials. SCE also modifies the installation of informational signage in the campground from four signs to two signs. SCE does not adopt the FS measures that reroute the distribution line that crosses over the Portal forebay or the provision of a water distribution system within the campground.

In FS 4(e) condition no. 14(d), FS specifies 16 projects that SCE should fund and construct at the Portal Forebay Campground. In conjunction with condition no. 14(d), FS specifies that SCE should meet barrier-free accessibility guidelines during the design or construction of recreation facilities. The 16 projects identified by the FS include:

- Restricting vehicle access to the two roadside campsites.

- Regrading and hardening all 14 campsites.
- Replacing campground furniture (fire rings, tables, bear proof containers).
- Improving, grading and surfacing parking spurs at each campsite.
- Improving interior road and add parking turnouts at each new toilet.
- Reconstructing interior road, repairing or replacing culverts and ditches.
- Installing directional signs.
- Improving erosion control along pathways and roads.
- Installing four information signs, set into aggregate pads.
- Replacing pit toilets with two prefabricated accessible vault toilets at each existing toilet location.
- Installing a compacted 5-foot-wide path to the forebay.
- Replacing dispersed area toilets (at the two Portal Forebay campsites located on the south side of the forebay) with "sweet smelling toilets."
- Relocating site(s) that are within 50 feet of high water.
- Rerouting the distribution line so anglers don't cast over it.
- Installing a water supply system, including a well, holding tank and distribution system.
- Adding more campsites when occupancy reaches 75 percent on summer weekends for three consecutive years.

SCE filed with FS, on December 19, 2005, proposed alternative 4(e) condition no. 14(d) measures to remove the requirement to reroute the distribution line across Portal forbay and install a potable water supply system.

*Our Analysis*

Some of the Portal Forebay Campground measures proposed by SCE and FS could be implemented prior to development of a recreation plan. For example, restricting vehicle access to the two roadside campsites and relocating campsites that are currently within 50 feet of Portal forebay at full pool would prevent damage to soils, vegetation, and water quality.

While SCE's recreation studies indicate that the Portal Forebay Campground is needed to meet the continued public demand at this site, these studies further indicate a high degree of public satisfaction with the type and condition of facilities (SCE, 2003). SCE's visitor surveys suggest some level of modification to project recreational facilities; however, the visitor surveys do not support the need for modifications of the magnitude specified by the FS at this time as part of FS 4(e) condition no. 14(d). Therefore, consultation with FS during development of the recreation plan would provide an opportunity to establish priorities and identify specific physical condition triggers that would initiate planning and implementation of each of the elements listed below:

- Improvements are needed to make the Portal Forebay Campground accessible to visitors with disabilities but may not be needed at each campsite. SCE proposes to consult with FS during development of the recreation plan to determine a reasonable number of facilities to modify.

- Regrading and hardening all campsites do not appear to be supported by SCE's overnight visitor-use surveys. Under current conditions, campsite condition was rated from highly acceptable to moderately acceptable by 90 percent of those surveyed. SCE proposes to develop a site improvement plan in consultation with FS that retains the semi-primitive campground character and doesn't impose extreme grading measures (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004).

- Replacing fire rings, picnic tables, and bear-proof boxes at this time also is not supported by SCE's visitor surveys. As mentioned above, 90 percent of overnight visitors surveyed expressed satisfaction with campsite condition. In addition, 92 percent found fire ring condition to be highly acceptable to moderately acceptable, and 86 percent felt the same about picnic table condition. However, SCE agrees to replace or repair these facilities, as needed, over the term of any new license.

- Three measures address road condition within the campground: improving parking spurs at each campsite, improving the interior road, and reconstructing the interior road. When surveyed, 87 percent of overnight visitors responded that road conditions within the campground are highly to moderately acceptable. SCE's position is that it will delineate and rehabilitate the interior campground road, and financially support repairs induced only by its operation and maintenance activities.

- FS indicates a need for additional directional and informational signs. These could be added along with road and trail improvements. SCE concurs with providing signs, but suggests that the number of informational signs be reduced from 4 to 2 due to the small size of the campground.

- Several measures relate to erosion control and improving trails within the campground. As facilities are upgraded to include barrier-free features, it is reasonable that drainage and surfacing of trails and pathways should be upgraded.

- FS indicates a need to replace pit toilets within the campground and toilets serving dispersed camping areas. Of the overnight visitors surveyed, 83 percent found there was an adequate number of restrooms, and 76 percent reported their cleanliness to be highly to moderately acceptable. Of day-use visitors surveyed, 90 percent found the number of facilities to be highly to moderately acceptable, while 67 percent found them acceptably clean. However, these survey responses do not address the quality of the facilities or their ability to provide a barrier-free experience. Replacement of dispersed camping area facilities with "sweet smelling toilets" would allow for barrier-free accessibility and would reduce long-term maintenance challenges. SCE concurs with these measures.

- FS specifies that SCE relocate the distribution line near the forebay to reduce angler interference. In response, SCE states in their December 19, 2005, alternative 4(e) conditions that relocation of the distribution line crossing Portal forebay is not justified and states that the distribution line has been present in the same location for approximately 50 years without written or verbal complaints. During the scoping process the distribution line was not identified as an issue by the public or agency representative, nor did SCE's angler use surveys and the overnight or day-user surveys identify any problem with the location of the line. No information has been filed with the Commission that documents either intentional or accidental angler interactions with the distribution line, or that it represents a safety concern to the recreating public during the 50 year history of the project.

- FS recommends construction of a water supply system, including a well, holding tank, and distribution system. SCE objects, in their December 19, 2005, alternative 4(e) conditions, and states that users of the Portal Forebay Campground know to bring water with them to this facility and that the lack of potable water is consistent with the primitive nature of the forest. SCE also notes that this measure would be too costly, and has identified concerns about the potential risk of water contamination, given the geology and soils in the area, and the risk of storing and using chlorine at the site. In SCE's view, construction of a water supply system would not be consistent with the designation of the campground as a semi-primitive facility. SCE suggests that signs could be installed at the campground indicating that potable water is available at two other campgrounds located within a ten minute drive from Portal forebay. The placement of these signs would be part of the sign plan

described in FS condition no. 16(c).

In reviewing the results of SCE's recreation surveys, we found they did not clearly demonstrate a current need for a water supply system. The surveys reflected an even split between the number of respondents who reported that developed restrooms, drinking water, and showers were not important to somewhat important and the number who reported that these amenities were important to very important. However, with predictions of a rapidly expanding and aging population (California Department of Aging, 2004), we anticipate that user needs may change in the future.

- The FS specifies that additional campsites be developed when occupancy rates of 75 percent are reached on summer weekends for 3 consecutive years. When the 75 percent occupancy rate over 3 consecutive years is met, SCE would consult with the FS to determine if additional campsite capacity could be accommodated within the existing campground boundary while still providing a semi-primitive, low density camping experience preferred by campground users.

With the exception of relocating the distribution line, implementation of the measures listed above would be consistent with recreation needs projected over the term of a new license.

We discuss the cost of developing and implementing recreation measures in section VI, *Developmental Analysis*. We present our final recommendations pertaining to recreation in section VII, *Comprehensive Development and Recommended Alternative*.

**Effects of Adit 2 Creek Sediment Reduction Measures on Recreation**

SCE has proposed to construct a channel between Adit 2 Creek and Camp 61 Creek to partially de-water Adit 2 Creek to assist with preventing further erosion of the stream. The channel would be located immediately north of the Rattlesnake-Mono Crossing trailhead.

FS specifies that SCE should coordinate with FS to evaluate options for stabilizing the eroding section of Adit 2 Creek. This approach could, but would not necessarily, call for construction of a new channel.

*Our Analysis*

In addition to the potentially adverse effects of the proposed new channel construction on water quality and fisheries resources described in sections V.C.1.b (*Water Resources*) and V.C.2.b (*Aquatic Resources*), the construction of the proposed new channel would cross the Rattlesnake-Mono Crossing trail approximately 500 feet

from the trailhead and would be located within the Ansel Adams Wilderness area. Depending on the design of the channel, its orientation, and its cross-section on the hill slope, it could be a hindrance to hikers on the Rattlesnake-Mono Crossing trail. The installation of a crossing feature (e.g., bridge) may be necessary to provide a continuous trail segment and maintain a safe travel route for hikers.

Assuming the channel is constructed during the dry period of the year to minimize the risk of erosion and sedimentation, work would coincide with the peak of the recreation season. We would anticipate temporary and minor effects on hikers and equestrians as a result of construction activity, but assuming a bridge is constructed across the new channel, we would expect no long-term effects on recreation.

c. Cumulative Effects:

Any recreation improvements or enhancement measures implemented at the Portal Project should enhance recreational use at the project and have a beneficial cumulative effect on recreation resources within the SFSJR watershed. Further, such improvements or enhancements would likely complement the management objectives for recreation resources in the Forest Land and Resource Management Plan for the Sierra National Forest.

In addition, the Portal Project operates along with several other hydropower projects within SCE's Big Creek Hydro System. The recreation improvements proposed in the license measures for the Vermilion Valley Project (FERC No. 2086) in association with the measures proposed for the Portal Project would produce a cumulative benefit to recreation resources within the upper SFSJR watershed. Recreation measures for other hydroelectric projects in the SFSJR are being addressed in the Big Creek ALP and may provide additional benefits to recreation resources when these measures are implemented.

d. Unavoidable Adverse Effects:

We identified no unavoidable adverse effects of the Portal Project on recreation.

## 6. Land Management and Aesthetic Resources

a. Affected Environment:

**Existing Land Use**

The Portal Project is part of an upper San Joaquin River Basin hydroelectric generating system (the BCHS) owned and operated by SCE, and licensed as seven distinct FERC projects. As currently licensed, the Portal facilities occupy 77.7 acres within the SNF in unincorporated Fresno County. The project area is within the

Pineridge Ranger District of the SNF. No state, county, or private lands are within the FERC project boundary. The boundary comprises two distinct areas known as the Portal forebay and Portal powerhouse (figures 2 and 3).

The forebay area includes a dam on Camp 61 Creek that forms the 16.8-acre Portal forebay. It is normally maintained between elevations 7,274 and 7,260 feet msl. This water is routed through the Ward tunnel, a primary feature of Project Nos. 67 and 2086, that extends 5.5 miles from the forebay to the Portal powerhouse. The forebay area also includes the project's communication/power distribution line, a 50-foot-wide corridor extending 2.5 miles southwest to an interconnection point near Kaiser Pass.

The powerhouse area includes the 6,300-square-foot concrete powerhouse, fenced to preclude public access. Adjacent to the powerhouse is a small parking area and several hundred feet downstream, the State Highway 168 bridge spans Rancheria Creek. Flow entering the powerhouse from the Ward tunnel is released through a channel into Rancheria Creek, 1,000 feet upstream of its confluence with Huntington Lake. An overflow pipeline fitted with a Howell-Bunger valve releases flow in excess of the powerhouse capacity into the same discharge channel.

Non-industrial land uses within the FERC project boundary are recreation oriented. The FS Portal Forebay Campground is adjacent to the forebay and includes 14 developed campsites, pit toilets, and parking. Near the powerhouse, the Eastwood Overflow Campground is an undeveloped FS facility with no amenities, available for dispersed camping when Huntington Lake area campgrounds are at capacity.

Land uses adjacent to the project boundary also are primarily recreation-based. Two designated wilderness areas are close to the Portal forebay: (1) Ansel Adams Wilderness Area is adjacent to the forebay; and (2) the Dinkey Lakes Wilderness boundary is 0.5 mile away. Both were established in 1964, eight years after completion of the Portal Project. North of the Portal Forebay Campground, the Rattlesnake-Mono Crossing Trailhead provides access to the Ansel Adams Wilderness Area and other trail networks in the area. Between the Portal powerhouse and Huntington Lake, SCE constructed the Eastwood Visitor Center (also known as the Eastwood or Portal Powerhouse Overlook) as mitigation for Project No. 67. The visitor center includes a short trail, vault toilets, and interpretive information.

Portal facilities are accessed via FS Road (FS) 80, also known as Kaiser Pass Road, originating from State Highway 168 at the east end of Huntington Lake. FS 80 is the primary road access to the Portal forebay and powerhouse as well as to various FS campgrounds, Florence Lake, Lake Thomas Edison, and the Kaiser and John Muir wilderness areas. This road typically is closed to vehicle traffic from mid-November until mid-May, depending on snow conditions. In winter, it is a popular snowmobile route.

*Land Management Plans and Policies*

Lands within and adjacent to the project boundary are administered by the FS for the protection of natural resources, conservation of adjacent wilderness areas, and enhancement of recreational opportunities. Long-term land management direction in the Portal Project area is provided by the Sierra National Forest Land and Resource Management Plan (LRMP) (FS, 1991). This plan follows the framework guidance of the Sierra Nevada Forest Plan, which was amended in 2001 (FS, 2001). In response to growing concern about fuels and fire management, the Sierra Nevada Forest Plan Amendment FEIS further modified this framework guidance and Record of Decision dated January 21, 2004. The standards and guidelines presented in this Sierra Nevada Forest FEIS will be made part of a future amendment to the Sierra National Forest Plan. Direction presented in the 2004 amendment that affects land management in the Portal area specifically addresses the treatment of fuels and fire (FS, 2004), as described below.

The SNF LRMP (FS, 1991) divides the forest into management and analysis areas. The Portal Project is within Management Area 1 and Analysis Areas 45 and 47. These are areas where developed recreational opportunities such as public campgrounds, day-use areas, visitor information centers, resorts, and recreational residences are emphasized. Other management considerations include protecting water quality, habitat for sensitive wildlife species, and fire protection. The 2004 Sierra Nevada Forest Plan Amendment identifies the area around Huntington Lake, including the Portal powerhouse area, as an Urban Intermix Zone. This designation overlays other land allocations and provides guidance on fuel reduction to protect communities from wildland fires and to protect wildlands from fires originating in developed areas. Two zones are defined within this designation: (1) defense zone, extending 0.25 mile from structures, and (2) threat zone, extending approximately 1.25 miles farther. Guidelines address the management of fuels in each zone.

*Wetlands and Floodplains*

Steep terrain in the project area limits wetland formation, but two wet areas have developed to the north of the Portal forebay. Leakage from the Portal dam into upper Camp 61 Creek supplies a riparian wetland about 1.25 acres in size. Leakage from the Portal saddle dike and from Adit 2 (a feature of Project No. 67) provides water to an approximately 10-acre wet meadow/riparian complex that feeds upper Adit 2 Creek. One small wet meadow is located along the Portal forebay communication/distribution line.

Portal forebay facilities are within the Camp 61 Creek subbasin, a 7.88-square-mile drainage area. The narrow Camp 61 Creek valley ranges from 42 to 48 feet wide, with the creek flowing through a boulder and bedrock channel, factors that limit the potential floodplain. The reach affected by project operations is 2 miles long, with an approximately 20-foot-wide riparian corridor. The total floodplain area is calculated as

4.85 acres (SCE, 2003) in the forebay vicinity. The project is not operated for flood management purposes.

The powerhouse is located within the Rancheria Creek drainage, discharging flow approximately 1,000 feet upstream of Huntington Lake. The project influences this short segment of stream through releases from Ward tunnel through either the powerhouse or the bypass valve. SCE did not assess floodplains in Rancheria Creek because the project does not divert or otherwise manage Rancheria Creek flows. The reach downstream of the powerhouse is a rock-lined channel with little riparian vegetation, confining the range of flows within its banks.

**Aesthetic Resources**

The Portal Project occupies terrain typical of the high Sierras, steep and densely forested, with interspersed granite outcroppings. In the powerhouse vicinity, these conditions limit views of the project features primarily to the foreground perspective, except where State Highway 168 spans Rancheria Creek a short distance downstream of the powerhouse. From this public crossing, the creek flows in a nearly straight line from the powerhouse, directing one's eye to this human-made feature. In the forebay vicinity, the expanse of open space occupied by the forebay pool and outlined by the horizontal lines of the dam, contrasts with the surrounding forest. The open landscape affords background views of peaks in the Ansel Adams Wilderness Area from the Portal Forebay Campground. The visual magnitude of project features is more significant in this area, although the undulating forested terrain limits their visibility. These landscape modifications are apparent to travelers on FS 80 (Kaiser Pass Road) where it passes the forebay.

Three key observation points (KOPs) were identified in consultation with the FS that reflect typical views of the Portal Project facilities from locations most heavily frequented by visitors. This consultation and subsequent analysis occurred as part of the visual resource assessment for the Big Creek Project area (FERC No. 63) (SCE, 2002).

- KOP 1 is a viewpoint from the Portal Forebay Campground overlooking the forebay and dam;
- KOP 2 is at the same location, looking north toward the Ansel Adams Wilderness Area; and
- KOP 3 is the view from the State Highway 168 Bridge crossing Rancheria Creek, looking northeast toward the Portal powerhouse.

The Portal forebay and dam, visible from KOPs 1 and 2, are within an area designated by the FS as Roaded Natural. Land management objectives in such areas are characterized by recreational activities, including viewing scenery, camping, boating, off-

road vehicle use, and developed recreational facilities. Visual management goals stress natural-appearing settings, with evidence of human alteration in harmony with the surroundings. In terms of scenic attractiveness, SCE describes this setting as of typical quality in the foreground, but distinctive in the middle and background due to the wilderness setting. The FS designates the entire project area as a visual retention area under its Visual Quality Objective criteria. Retention areas imply a high degree of scenic integrity where the landscape appears to be intact. Under the newer Visual Management System, the FS defines scenic integrity objectives for the project area as high.

The Portal powerhouse is visible from KOP 3, within an area designated by the FS as Rural, where land uses can include concentrated recreational development. Areas designated as rural can include substantially modified landscapes, an objective that can contrast with the FS visual designation of Retention.

b. Environmental Effects:

**Project Boundary Revisions**

SCE proposes to remove three parcels from the project boundary and to add three other parcels. Camp 61 Creek would be removed from the Portal forebay outlet downstream to the confluence with the SFSJR, a distance of 1.9 miles because it is not needed for any project-related purpose and it is not a project feature. For the same reasons, SCE is proposing to remove a 1,000-foot segment of Rancheria Creek between the Portal powerhouse and Huntington Lake from the project boundary.

The third parcel, Eastwood Overflow Campground, is currently included within the project boundaries of Project Nos. 2174, 2175, and 67. The approximately 1.5-acre undeveloped parcel is located in the vicinity of the Portal powerhouse, although its primary use is to accommodate visitors to Huntington Lake (Project No. 2175). SCE proposes to remove it from the Portal Project boundary but to retain it within the boundary of Project No. 2175. In its letter of October 8, 2004, the FS concurs that this area should be removed from the Portal Project and incorporated into the boundaries of either Project No. 67 or 2175.

SCE's proposal to add three parcels to the Portal Project area includes three gaging stations. Gages on the East Fork and West Fork of Camp 61 Creek are used to measure inflow to the Portal forebay, and a notched weir on Adit 2 Creek is used to measure leakage flow accumulated from the Portal forebay saddle dam and Adit 2.

FS objects to the removal of Camp 61 Creek from the Portal Project area, but agrees with SCE's other proposed boundary revisions. FS further recommends that Adit 2 Creek, from Adit 2 to the confluence with Camp 61 Creek, be included within the FERC Project boundary. Finally, in its October 8, 2004, letter, FS mentions that a

portion of Portal Forebay Campground is outside the project boundary and that the boundary should be adjusted to include the entire campground.

SWRCB objects to the removal of Camp 61 Creek and Rancheria Creek downstream of Portal powerhouse from the FERC project boundary on the basis that it is affected by the project and is not exempt from compliance with the Clean Water Act (letter from A. Britt Fecko, Environmental Specialist, SWRCB, Sacramento, CA, to the Commission, dated May 23, 2003).

SCE has submitted one other proposal that could affect the project boundary. SCE proposes to construct an approximately 1,300-foot-long channel, extending from Adit 2 Creek to Camp 61 Creek, to reduce erosion and sedimentation in Adit 2 Creek (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004). SCE would also construct check dams in the existing Adit 2 Creek channel, and as sediment accumulates behind each dam, would plant these areas with native shrub species.

*Our Analysis*

*Camp 61 Creek*

The FPA does not necessarily require project-affected stream reaches to be included within a project's boundary. According to 18 CFR 4.51(h), land included within a project's boundary must enclose only those lands necessary for operation and maintenance of the project, and for other project purposes such as recreation, shoreline control, or protection of environmental resources. If ongoing or frequent access to lands was required to implement or monitor environmental protection measures, or if such measures were not consistent with or protected by an existing landowner's management objectives, inclusion of those lands within the project boundary would provide the Commission the authority to condition a license for the protection of the environmental resources.

The release of instream flows from the Portal forebay would provide protection, mitigation and enhancement of the fish and riparian resources in Camp 61 Creek. These flows can be provided by SCE without requiring access to the portion of Camp 61 Creek reach that now lies within the existing project boundary. Moreover, no project works are within this reach. Monitoring of the effects of the flow release on the fish and riparian resources would not require frequent or exclusive access to the stream reach below the forebay. The protection and enhancement of the aquatic and terrestrial resources along Camp 61 Creek are consistent with the FS management objectives for this area. CDFG's fishing regulations provide additional protection and management of the fisheries resources in Camp 61 Creek.

*Rancheria Creek*

SCE suggests that the Rancheria Creek reach be incorporated within the boundary of its Project No. 67 because it is affected primarily by flows through the Ward tunnel, a feature of Project No. 67. Although flows from the Ward tunnel pass through the Portal powerhouse into Rancheria Creek, flows are not controlled by operation of the Portal Project. In our view, excluding this 1,000-foot segment of Rancheria Creek from the Portal Project boundary would be consistent with project purposes. Inclusion of this segment of Rancheria Creek within the boundary of FERC Project No. 67 would address SWRBC's concerns regarding compliance with the Clean Water Act, and protection of water quality.

*Eastwood Overflow Campground*

The Eastwood Overflow Campground is used as a designated FS dispersed camping area when developed campgrounds at nearby Huntington Lake are full. The FS allows camping here for a maximum of 24 hours. The Eastwood Overflow Campground is more strongly associated with recreational use at Huntington Lake, a primary feature of Project No. 2175, than it is with the Portal development. Removing this undeveloped parcel from the Portal boundary and including it within the boundary for Project No. 2175 would not affect the FS management capabilities or uses of this parcel.

*Gaging Stations*

Three flow monitoring stations are proposed by SCE for inclusion within the Portal Project boundary. Gaging stations on the East Fork of Camp 61 Creek and on the West Fork of Camp 61 Creek would be added, modifications that are supported by the FS in its letter dated October 8, 2004. These two isolated holdings are important to SCE's ability to monitor Portal inflows.

*Adit 2 Notch Weir and Adit 2 Creek*

SCE also proposes to include the flow measuring station at the Adit 2 notch weir within the project boundary. FS recommends inclusion of the entire length of Adit 2 Creek within the boundary. Adit 2 Creek originates at the former entrance to the Adit 2 tunnel located east of the Portal forebay saddle dike. Flow in Adit 2 Creek consists of leakage from the concrete plug in Adit 2 of Ward tunnel and from seepage of groundwater through the Portal forebay saddle dam. The Commission currently requires the monitoring of flow at the weir on Adit 2 Creek to measure flow from these sources. Therefore, including the notched weir on Adit 2 Creek in the Portal Project is necessary for the safe operation of the Portal Project facilities. We note, however, that the entire reach of Adit 2 Creek is not directly related to the purposes of the Portal Project, or

necessary for the protection of environmental resources directly related to the Portal Project.

We present our final recommendation regarding the project boundary in section VII, *Comprehensive Development and Recommended Alternative*.

**Land Management Plans**

SCE did not originally propose any administrative measures associated with its occupancy and use of National Forest System lands; however, in its response to FS preliminary 4(e) conditions SCE adopted some of the FS specified standard administrative conditions with modifications (condition nos. 1, 8, 9, and 11), while rejecting other in their entirety (condition nos. 2-5 and 7). FS standard administrative condition nos. 6 and 10 were not addressed by SCE in its response. FS preliminary 4(e) conditions nos. 15 and 16, regarding land management and aesthetic resources were accepted with minor revisions and clarifications (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004).

In its 4(e) conditions, FS specifies 11 administrative conditions deemed necessary for the administration of National Forest System lands, and nine specific resource requirements for the protection and use of NFS lands. The intent of the 11 standardized conditions is to define the responsibility, coordination, and liability associated with project operations on FS lands.

- Condition no. 1: Consultation
- Condition no. 2: Approval of changes after initial construction
- Condition no. 3: Maintenance of improvements
- Condition no. 4: Existing Claims
- Condition no. 5: Compliance with regulations
- Condition no. 6: Protection of United States property
- Condition no. 7: Surrender of license or transfer of ownership
- Condition no. 8: Indemnification
- Condition no. 9: Damage to land and interests of the United States
- Condition no. 10: Risks and hazards

- Condition no. 11: Pesticide use restrictions

In addition to these standard conditions, FS specifies 4(e) condition nos. 15 and 16, addressing plans for management of hazardous substances, visual resources, transportation, fire response, and signs. We will address visual resources as part of our *Aesthetics* discussion later in this section. Below we address transportation and access roads, fire prevention and response, signage requirements, and the management of hazardous substances.

SCE filed with FS, on December 19, 2005, alternative 4(e) conditions for FS 4(e) condition nos. 7, 8, and 9. SCE's alternative 4(e) condition no. 7 modifies the timing and level of restoration associated with license surrender or transfer. SCE also proposes to modify the language of FS standard 4(e) condition no. 8 relating to indemnification and condition no. 9 regarding damage to the lands, property, and interests of the Unites States arising from construction, operation, or maintenance of the project.

*Transportation System Management Plan*

The development of a transportation system management plan to protect and maintain roads associated with the Portal Project is proposed by SCE and identified as FS 4(e) condition no. 15(a). The plan would identify project-related roads, their condition, construction and closure needs, public safety, parties responsible for maintenance, and identify roads with respect to the project boundary. The plan would also identify existing roads damaged by erosion from project-related uses and determine appropriate rehabilitation measures.

The development of a plan for the management of project access roads is proposed by SCE and identified as FS 4(e) condition no. 15(b). This plan would specify general public safety measures that SCE would implement during project-related construction and also identify a number of specific road improvement projects. These projects would include repair and maintenance of gates on access roads to project facilities (the powerhouse access road [8S303], the surge chamber access road [5S80P], the intersection of 7S05/8S303, and the access road to the Portal Forebay Campground [7S080]). FS and SCE would also determine a maintenance cost share arrangement for use of all roads related to project operations and project related activities.

The transportation and access management plan would address public access to roads within the project boundary (FS 4(e) condition 15(c)) and restrictions on the use of roads by the applicant (FS 4(e) condition 15(d)).

*Our Analysis*

The transportation system management plan would clarify SCE use of FS roads and establish a forum for coordination of road maintenance activities between SCE and

the FS. This plan would designate SCE responsibilities for maintaining roads used for project operations and maintenance and ensure that safety and environmental measures associated with these roads are addressed in the proper manner. SCE does not object to FS conditions specifying the preparation of a transportation system management plan, but notes that SCE can be responsible only for the use and maintenance of roads within the project boundary, and for roads outside the project boundary in proportion to SCE's use (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004). SCE considers specific repair and maintenance measures listed in the 4(e) conditions to be part of ongoing project maintenance activities, and believes it is unnecessary to itemize them in any new project license.

The safety measures in FS 4(e) condition no. 15(b) are reasonable and prudent precautions for protecting the public when SCE is conducting construction activities on or immediately adjacent to FS roads that are open to the public, and for security of project facilities. No information is provided about the current condition of Road 7S080 to enable us to analyze the need for road reconstruction or the benefits that would be provided from reconstruction.

Based on our review of available information, some of the FS roads SCE uses to access project facilities for operation and maintenance purposes are also used by the FS for administrative and land management purposes, and the public for recreational activities; uses which are unrelated to the Portal Project. The establishment of a cost-sharing agreement for roads based on use classification would provide an equitable basis for funding the maintenance of project related roads among users, and could be prepared as part of the transportation management plan described above.

FS 4(e) condition nos. 15(c) and 15(d) define the use and access of project roads on FS land. In accordance with Commission regulations, a licensee has specific public safety responsibilities regarding its licensed project. Under standard license conditions, a licensee has the authority to preclude public access to project facilities, waters, and lands as necessary for the protection of life, health, or property. We would expect that appropriate public safety measures would be implemented at the project, including prohibiting public access to certain areas, if necessary, to protect the public and ensure safe project operations.

*Fire Management Response Plan*

The development of a fire management response plan for the Portal Project is proposed by SCE and identified as FS 4(e) condition no. 16(a). The plan would include the identification of project-related fuels, measures of fire preparedness, prevention and control, and cooperation with FS in reporting and investigating project related fires. SCE agrees with the FS specifications to prepare a fire management and response plan, and

notes it has already established a plan that is annually reviewed and approved by FS. SCE states that as written, the 4(e) conditions are too geographically broad, and should be more specific to project lands and project-related facilities. In the event of a fire, SCE intends to work cooperatively with the FS during an investigation, but does not agree to language that would require SCE to waive legal rights (e.g., rights to attorney work products; rights to attorney-client privileges).

*Our Analysis*

All project lands are within the SNF. The development of a fire management response plan would inform FS staff of potential threats to natural resources and project facilities from project induced fires, and how to properly protect project facilities from natural wildfires. The fire management response plan would enable the FS to prepare or train staff to assist in preventing or controlling fires on or adjacent to project facilities for the protection of the project or natural resources. The plan would also identify the cooperative roles and responsibilities of SCE and the FS in the investigation of fires on project lands.

*Sign Plan*

The development of a plan for installing and maintaining signage associated with the Portal Project is proposed by SCE and identified as FS 4(e) condition no. 16(c). This plan would include standards for appearance, placement, and maintenance of informational and directional signs on FS land.

*Our Analysis*

A sign plan would identify the types and placement of signage for project-related features and define standards of appearance for signage to ensure consistency with the SNF Forest Plan. Improved signage throughout the project area would improve safety conditions, provide directional information, and identify project recreational facilities. The sign plan would identify signage that is necessary and related to project facilities, or related to the use of NFS lands by the project, and define SCE's responsibility for providing or maintaining the signage. Because the NFS land adjacent to the project is also used by recreationists and travelers not affiliated with the Portal Project, the plan should identify the apportioned responsibility between FS and SCE for signage outside of the project area.

*Hazardous Substance Plan*

The development of a hazardous substance plan for project facilities is proposed by SCE and identified as FS 4(e) condition no. 16(d). FS specifies that SCE file a FS-approved hazardous substance plan with the Commission within one year of license

issuance. The plan is to address storage, spill prevention, and cleanup for oil and hazardous substances. At a minimum, the plan is to specify that SCE (1) cache spill cleanup equipment suitable to contain any spill from the project, (2) periodically inform the FS of the location, type, and quantity of oil and hazardous substances stored in the project area, and location of spill cleanup equipment on FS lands, and (3) inform the FS immediately of the nature, time, date, location, and action taken for any spill on or affecting FS lands.

*Our Analysis*

In accordance with 40 CFR § 112, *Oil Pollution Prevention*, which is enforced by EPA, a hazardous substance plan (also frequently referred to as a spill prevention, control, and countermeasure plan) is required to be in place for any facility that has a maximum oil storage capacity of greater than 1,320 gallons above ground or greater than 660 gallons in a single container. Drawings in Exhibit F of the license application indicate that lubricants are stored within the powerhouse. In addition to the onsite storage of lubricants and other oil products, transformers on site are likely oil-cooled. Because of the presence of the stored lubricants and the total size of the transformers at the development, we assume that the total oil capacity of the transformers (cumulatively) is greater than 1,320 gallons and, hence, the project appears to be required to have a hazardous substance plan independent of relicensing.

Implementation of an appropriate plan would provide a quick reference to procedures and notifications in the case of oil spills with the goal of reducing the effects of spills on the local area, including Rancheria Creek, if a spill occurs. Extending the plan to include other hazardous materials stored, used, or disposed of in the project area would reduce the likelihood for contamination by these products and would reduce the extent of contamination should a spill occur.

We discuss the cost of land management plans in section VI, *Developmental Analysis*. We present our final recommendation pertaining to these plans in section VII, *Comprehensive Development and Recommended Alternative*.

*Visual Management Plan*

In the Portal forebay area, SCE describes the forebay dam, pool, and power lines as partially screened from view of travelers on the nearby Kaiser Pass Road, but much more visible from the Portal Forebay Campground. The Ansel Adams Wilderness Area dominates background views from the Portal Forebay Campground, while the forebay is prominent in the foreground view. The Portal powerhouse area is visible to travelers on State Highway 168, but is screened from the view of travelers on the Kaiser Pass Road.

The FS classifies the Portal forebay and the powerhouse areas as a visual retention area based on its Visual Quality Objective (VQO) system. Forest Plan guidance for visual retention areas state that deviations from a natural landscape may be present but should not alter the character of the landscape. The visual compatibility of the Portal forebay and powerhouse is inconsistent with the retention objective, having altered the natural landscape character of these areas. SCE notes, however, that the project facilities are part of the existing character of the landscape, and their construction in 1956 preceded the designation of the retention management objective. SCE concludes that the Portal forebay facilities do not detract from the natural visual landscape and does not propose any modification to project operations or facilities for aesthetic purposes. While the powerhouse is a visible element on the landscape, SCE concludes that it does not conflict with a landscape setting that is interspersed with developments such as the nearby Eastwood Visitor Center facilities.

The development of a visual management plan for any NFS lands visually affected by the project is proposed by SCE and identified as FS 4(e) condition no. 16(b). This plan would include an evaluation of project features and facilities, identify visual mitigation measures, and establish an implementation schedule to bring the facilities into compliance with applicable FS visual resource standards and guidelines. FS also specifies that the plan address the relocation of the power line crossing Portal forebay. SCE, in its December 19, 2005, alternative 4(e) conditions indicates that the relocation of this power line be stricken from both the visual management plan and the measures proposed as recreation facility improvements (FS 4(e) condition no. 14(d)).

*Our Analysis*

The project facilities are not compatible with the current FS VQOs for the area; however, they were constructed prior to the designation of this management objective. Based on our review of the available information, we agree with SCE's assessment that the project features do not have an adverse affect on the visual character of the landscape.

FS specifies that SCE address the possible relocation of the power line crossing Portal forebay in the visual management plan. Neither SCE nor the FS provide any evaluation of the visual effect of this power line; therefore, the current effect of the power line on the visual resources cannot be assessed. The relocation of this power line to an area along the Kaiser Pass Road on the south side of the forebay would remove it from the dominant position when viewing the landscape across the forebay. A similar specification to relocate this segment of power line is part of FS 4(e) condition no. 14(d), in which the FS explains that the line should be rerouted to a location where anglers would be unable to cast fishing lines over it. Because this safety concern appears to be more a human safety measure associated with recreational use than an aesthetic consideration, we address this condition, 14(d), in the recreation analysis (*see* section V.C.5., *Recreational Resources*).

SCE's proposal to construct a new channel to convey flows from upper Adit 2 Creek into upper Camp 61 Creek and to construct check dams in the eroding section of the existing Adit 2 Creek channel would be implemented on lands FS manages under a visual retention designation. As described above, this designation allows for deviations from a natural landscape, if they do not alter the character of the landscape. Construction of a new channel likely would not be compatible with this FS designation.

Based on preliminary mapping provided by SCE, the new channel would be a straight line approximately 1,300 feet long and 5 feet wide. SCE proposes to line the channel with native boulders and cobble. Use of native trees, shrubs, and groundcovers to vegetate the channel banks and any disturbed soils would help to soften the visual impacts. Visual impacts would be reduced over time, as rocks weather and vegetation matures, but the alignment of the channel would continue to appear artificial, unless it can be constructed with some meanders or bends.

Construction of rock and straw check dams, followed by plantings of native shrubs as sediments and soils accumulate behind the check dams, would likely be compatible with FS VQOs. The area where the check dams would be constructed has been eroding for a number of years; exposed rock and immature plantings would not appear out of place. The site would take on a natural appearance over time, as vegetation matures.

We discuss the cost of visual resource management in section VI, *Developmental Analysis*. We present our final recommendation pertaining to visual resource management in section VII, *Comprehensive Development and Recommended Alternative*.

c. Unavoidable Adverse Effects:

We have identified no unavoidable adverse effects associated with the continued operation of the Portal Project on land management or on aesthetic resources.

### 7. Cultural Resources

a. Affected Environment:

The southern Sierra Nevada region has been occupied since about 7,000 years B.P. (before present). Aboriginal trails in the Portal Project vicinity played a significant role in trans-Sierra Nevada prehistoric trade, travel, and population movement by eastern and western tribal groups. Harsh winter conditions limited use of upland areas such as the Portal Project vicinity to seasonal occupation by prehistoric peoples from the middle Holocene period until late prehistoric times. In the late prehistoric period, the project area was occupied by Western Mono groups and also used by the Owens Valley Paiute. Contact with European-American trappers and surveyors in the mid-1800s substantially affected these native populations. European-American settlement in this high-elevation

area increased in the late nineteenth century in conjunction with livestock grazing, timber harvest, and hydropower development.

**Area of Potential Effect and Consultation**

In response to a December 7, 2002, letter, the Commission authorized SCE to represent it in consultation with the California SHPO, the Tribes, and other parties regarding the preparation of information necessary to comply with Section 106 of the National Historic Preservation Act, including the definition of the area of potential effect (APE), pursuant to 36 CFR 800.2(a)(3). The APE for Portal Project cultural resources has been defined by SCE as coinciding with the FERC boundary (figures 2 and 3).

SCE's application for a new license summarizes consultation efforts with the SHPO, FS, federally recognized Indian Tribes (Bishop Paiute Tribe, North Fork Rancheria, Picayune Rancheria, Big Sandy Rancheria, Cold Springs Rancheria, and Table Mountain Rancheria), and other interested parties (North Fork Mono Tribe, Dunlap Band of Mono Indians, Huntington Lake Association and Big Creek Huntington Lake Historical Conservancy, Sierra Mono Museum, Native Earth Foundation, and the Mono Nation) regarding cultural resources and the definition of the APE (SCE, 2003). Much of this consultation has occurred within the context of the Big Creek Project relicensing, and Commission staff participated in numerous meetings of the Cultural Resources Work Group for the Big Creek proceedings.

SCE reports that SHPO staff participated in a meeting on February 20, 2001 at which the APE was discussed (SCE, 2004a). The Commission advised the SHPO and other consulting parties by letter of February 4, 2005 that after reviewing the information provided by SCE we found that no historic properties would be adversely affected by relicensing the Portal Project. The California SHPO, by letter dated April 18, 2005, has concurred with our findings.

**Prehistoric Period Investigations**

SCE examined records on file with the FS and the California Historical Resources Inventory System. This review indicated the presence of several potential historic properties in the project vicinity (table 40), but revealed few archaeological investigations within the APE (SCE, 2003).

Table 40. Potential historic properties within the project APE. (Source: Morgan et al., 2002; Morgan and Jackson, 2003, as modified by staff)

| Site Number | Site Type | General Location | Administrator | National Register Evaluation |
|---|---|---|---|---|
| PL-PF-1 | Lithic scatter | Camp 61 Creek | FS | Not evaluated. Portion within APE lacks integrity. |
| CA-FRE-369 | Subsurface deposit | Distribution line | FERC | Not eligible. |
| PL-KAI-001 | Debitage | Distribution line and access road | FERC | Eligible. Would be managed to avoid adverse effects. |
| -- | Trail | Mono Trail | FS | Evaluation ongoing as part of Big Creek ALP studies. Portal relicensing would not affect qualities which might contribute to the trail's significance. |
| -- | Trail | Rattlesnake Trail | FS | Evaluation ongoing as part of Big Creek ALP studies. Portal relicensing would not affect qualities which might contribute to the trail's significance. |
| -- | Hydropower facilities | Portal forebay and powerhouse | FERC | Not eligible. Non-contributing elements to Big Creek Historic District lacking individual significance. |
| -- | Road | Kaiser Pass Road | FS | Part of eligible district. Portion within Portal Project does not contribute to significance. |
| -- | Historic Recreation District | Huntington Lake Historic District | FS | Eligible. Portal Project has no effect. |

SCE sponsored a comprehensive archaeological survey of the area within the project boundary (Morgan et al., 2002). This survey located one unrecorded prehistoric archaeological site, PL-PF-1, adjacent to Camp 61 Creek between the Portal forebay and the SFSJR. The portion of the site within the project boundary consists of re-deposited material from slope wash and colluvial erosion. Artifacts appear to have been transported downslope from the main portion of the site, located over 100 feet outside the project

boundary on NFS lands. The portion within the boundary is a lithic scatter with debitage in various stages of reduction and is considered not eligible for listing in the National Register due to an absence of site integrity. Consultation with FS concluded that the National Register eligibility of the main portion of the site would not be assessed at this time because it lies outside of the Portal Project APE.

SCE sponsored an additional survey of the 2-mile-long project distribution line (Morgan and Jackson, 2003). Two prehistoric sites were identified within this portion of the APE. The distribution line bisects both sites.

Artifacts were observed at the first site, CA-FRE-369, but their presence appears to be the result of human and geologic deposition, with disturbance noted. Test excavations performed in 1985 (Jackson, 1985, as reported in Morgan and Jackson, 2003) indicate the site is not eligible for listing in the National Register. However, neither FS nor SHPO has stated concurrence with this finding. SCE will adopt maintenance practices in the vicinity of the site which will ensure that the site is not adversely affected.

The second site, PL-KAI-001, contains a flaked stone scatter. The site was tested in 2004, assessed as containing scientific significance, and is recommended as eligible to the National Register. PL-KAI-001 would be managed in the same way as CA-FRE-369 to avoid adverse effects. Access to the site would be restricted. If power poles need to be removed they would be cut off at ground level and the stumps left in place, and SCE maintenance employees would be educated in the importance of not collecting or disturbing archaeological sites. See also discussion of Historic Properties Management Plan below.

**Historic Period Investigations**

Four European-American socioeconomic phases dominate the historic period era of the southern Sierra Nevada region: stock grazing, timber harvest, hydropower development, and recreation. Concentrated European-American use extends back to the 1860s when cattle and sheepherding occurred seasonally. Sheepherding subsequently dominated seasonal land uses from about 1870 to 1910, after which prohibitions on livestock grazing were enacted by the FS. Timber harvesting has occurred in the area since the 1880s on FS land. The most significant historic period use in the area is development associated with hydropower generation. Pacific Power and Light (predecessor to SCE) began constructing dams that created Huntington Lake in 1911. The various Big Creek Project facilities were added in subsequent years, continuing through 1956 with the completion of the Portal Project.

Short sections of the historic Mono and Rattlesnake trails are located within the APE (Morgan et al., 2002). The Mono Trail is an aboriginal network leading from the Owens Valley over Mono Pass to the lower reaches of the San Joaquin watershed

(Snyder, 2001). Approximately 600 feet of this 45-mile-long trail is within the Portal Project boundary. It follows a route used by aboriginal people, sheep and cattle herders, and now primarily recreationists. The Rattlesnake Trail is a portion of the greater aboriginal Mono Trail network (Snyder, 2001). Only 98 feet of this 6.5-mile-long trail are within the Portal boundary, and currently it is used mostly for recreation.

Hydropower development began in the basin in 1911 when Pacific Power and Light, the predecessor to SCE, began constructing the dams that form Huntington Lake. SCE expanded the generating network in the basin, known as the Big Creek Hydropower System (or BCHS) in the decade that followed. Shoup (1988) has defined the period of significance for the BCHS as extending from 1911 to 1929, when the initial development occurred. The Portal forebay and powerhouse were added to the network on Camp 61 and Rancheria creeks between 1955 and 1956. The Portal forebay and associated earth-fill dam and dike, and the powerhouse both were completed in 1956, outside the period of significance for the BCHS. Morgan et al. (2002) evaluated their significance and determined that the facilities are non-contributing elements to the BCHS and therefore are not eligible for listing in the National Register. The facilities do not conform architecturally to other BCHS Historic District components, they are not associated with the same developmental event, and they are not individually significant under any of the National Register criteria. Thus, SCE recommends that the Portal forebay and powerhouse are ineligible for nomination to the National Register.

Two segments of historic roads associated with hydropower development are within the Portal Project boundary. Kaiser Pass Road was built in 1920 for development of the network of hydropower projects in the basin. It is a contributing element to the proposed BCHS (period of significance is 1911–1929). The portion that passes through the Portal Project boundary was realigned and paved in 1955–1956; therefore, this segment does not retain integrity that might qualify it for nomination to the National Register. For this reason, it has been excluded from the proposed BCHS Historic District. Remaining portions of the Kaiser Pass Road will be evaluated as part of FERC Project No. 67.

The development of public recreational facilities occurred in the Huntington Lake basin between 1913 and 1960. Shortly after completion of the dams that form Huntington Lake, Pacific Power and Light, and the FS began development of extensive recreational facilities. Beginning in 1915, the FS established recreational tracts around the lake that targeted different activities, including resorts, campgrounds, day-use areas, and outfitter guide stations. A lodge was constructed in 1915 that remained until 1949. In the 1950s, the China Peak ski resort was developed in the basin. These developments occurred as part of the FS' nationwide effort to promote recreation in public forests (FS, 1987, as cited in Morgan et al., 2002). Because the area has been consistently managed by the FS for recreational use and development occurred within a defined period of significance, SCE examined them as a Historic District. SCE suggests that the public

recreational facilities developed in this basin present an outstanding example of this type of early twentieth century landscape architecture (Morgan et al., 2002). The FS has not adopted the Huntington Lake Historic District (HLHD) designation, but its management goals focus on recreational use in this area (Morgan et al., 2002). Most of the proposed District lies outside of the Portal Project boundary and APE; only the Portal powerhouse is within the proposed HLHD boundary. SCE's examination concludes that the industrial nature of the Portal facilities would not affect the recreational character for which the HLHD is considered National Register eligible.

**Ethnographic Study and Results**

Before European contact, areas surrounding the San Joaquin Valley were occupied by a number of aboriginal peoples, including the Northern Paiute, the Owens Valley Paiute, the Foothill Yokuts and the Western Mono people. The Owens Valley Paiute and Western Mono people regularly engaged in trans-Sierra trade along a network of aboriginal trails that include the area occupied by the Portal Project (SCE, 2003). Contact with European-American trappers and surveyors in the mid-1800s had a significant effect on the native populations. The California Gold Rush and the subsequent occupation/use of the area by large numbers of European-Americans further affected traditional ways of life.

As part of the current relicensing effort, SCE consulted with Tribal interests to obtain additional information about properties of traditional cultural or religious significance within the APE. Interest was expressed in the trail networks in the project vicinity. As described above, two short segments of the Mono and Rattlesnake trails are within the Project APE. These segments are part of an evaluation strategy proposed by the FS that will examine all of the historic/ethnographic trails in the region (SNF, 2001, as cited in SCE, 2003). Until this evaluation is complete, the significance of the segments as traditional cultural properties cannot be determined. Currently, no traditional cultural properties are defined within the Portal APE.

b. Environmental Effects:

**Historic and Ethnographic Trail Segments**

Short segments of the historic Mono and Rattlesnake trails pass through the Portal Project APE, with the majority of their length occupying other NFS land. Because the trail segments within the APE total only 698 feet, SCE did not independently analyze their integrity or the ongoing project effects and suggests that a National Register assessment be deferred to the FS. The FS proposes to evaluate the significance of the regional ethnographic trail network, of which these trails are a part, under its "Evaluation Strategy for the Mono Trail" (SNF, 2001). When the FS initiates its evaluation, SCE has agreed to contribute resource information, to provide technical expertise, and to assist with preparation of National Register nomination forms.

The area that would be affected by SCE's proposed new channel construction is not included in the APE for cultural resources. Potential effects of channel construction on the Mono Trail have not been assessed by SCE, nor has the FS or SHPO provided comments.

*Our Analysis*

The two segments of the Mono and Rattlesnake trails that are located within the Portal Project APE are part of a more extensive and actively used recreational network. They provide public access to the Ansel Adams Wilderness Area from a trailhead on Forest Road 7S80. The trails are not used to access any project features. They are located well away from project features so that ongoing operation and maintenance activities do not appear to affect either historic trail segment. However, the site of SCE's proposed new channel would affect the Mono Trail. If FS evaluation determines that the trail network is National Register eligible and identifies any project-induced effect, SCE could include specific management measures as part of the HPMP that is being developed in consultation with FS as part of its basin-wide Big Creek ALP. Otherwise, the FS would likely continue to manage the trails as it does under current conditions, and no special protection measures would be implemented.

**Huntington Lake Historic Recreation District**

SCE compiled sufficient information about recreation development in the Huntington Lake area to recommend that it be considered eligible for the National Register as a Historic Recreation District. The Portal powerhouse is within the proposed boundary of the HLHD. The potential significance of the HLHD is based on a recreational land use theme to which the Portal powerhouse (an industrial development) does not contribute. As an existing minor development on the landscape, the powerhouse also does not detract from the historical integrity of the HLHD (Morgan et al., 2002). Therefore, SCE concludes that the powerhouse is not a contributing element to the HLHD. This information was submitted to the SHPO and the FS, although at the time of this analysis, no response has been received from the SHPO. SCE reports that the FS is considering the merits of integrating the Historic District into its planning framework and may prepare a determination of National Register eligibility (Morgan et al., 2002).

*Our Analysis*

We concur with SCE's assessment that the Portal powerhouse would be a non-contributing element to the HLHD if such a district were to be established by the FS. The powerhouse does not affect any of the contributing characteristics of the historic district. Therefore, continued operation and maintenance of the project would not affect the integrity of the potential HLHD.

**Historic Properties Management Plan**

SCE operates a network of hydropower projects in the upper San Joaquin River watershed (Project Nos. 67, 120, 2017, 2085, 2086, and 2175), including the Portal Project. As mentioned above, SCE proposes to develop an HPMP for all of its Big Creek Hydroelectric project licenses. This plan would include specific elements addressing the management of resources and properties associated with the Portal Project as well as basin-wide protocols for interacting with Native American communities, and the public and consultation with federal agencies and the SHPO.

SCE consulted with the FS about the management of cultural resources within the Portal Project boundary. Based on this consultation, SCE states that it would not manage the properties as historic because (1) the resources (Portal powerhouse and forebay) are not historically significant; or (2) the principle components of the resources that contribute to their significance are located outside the Portal APE (PL-PF-1, Mono and Rattlesnake trails, Kaiser Pass Road, and the HLHD). Sites PL-KAI-001 and CA-FRE-369 would be managed to avoid adverse effects to them. Below, we summarize SCE's findings to date regarding archaeological sites and historic and cultural properties.

*Archaeological Sites*

PL-PF-1, located partially within the Portal Project boundary, is a secondary deposit of cultural material lacking in depositional integrity (Morgan et al., 2002). As agreed in consultation with the FS, SCE would perform no additional work because the site lacks the potential to yield important scientific data.

CA-FRE-369 initially was evaluated in 1985 and recommended ineligible for nomination to the National Register as having little potential to yield significant scientific data. Due to the presence of artifacts, the site would be managed to avoid adverse effects.

PL-KAI-001 was tested by SCE in 2004, found to contain scientifically significant information, and is recommended as National Register eligible. The site would be managed to avoid adverse effects.

*Historic Properties*

The Portal powerhouse and forebay were examined by SCE for their National Register eligibility, specifically as they relate to the total Big Creek Hydroelectric System and associated Historic District (BCHD). Portal facilities were constructed outside the period of significance for the BCHD, defined as 1911 to 1929. SCE concludes that the Portal facilities are not independently eligible for National Register listing under criteria a, b, c or d and are not contributing elements to the BCHD (Morgan et al., 2002).

Therefore, these facilities are recommended by SCE as ineligible for nomination to the National Register.

In its October 8, 2004, letter conveying preliminary terms and conditions for this project, FS recommends SCE develop and implement a Historic Properties Management Plan along with a Programmatic Agreement and submit it to the ACHP. As explained above, a unified HPMP that covers the Portal Project is to be developed by SCE for all of its Big Creek facilities. SCE filed a draft of the HPMP on November 29, 2005 with its application for a new license for the Mammoth Pool Project (P-2085).

*Traditional Cultural Properties*

Consultation conducted to date by SCE, as described in its application for new license, has not identified the presence of any traditional cultural properties within the Portal APE.

*Our Analysis*

Operation and maintenance of the Portal Project does not appear to affect prehistoric or historic resources outside of the project APE, although cultural resources are also being evaluated under the ALP for FERC Project No. 67, which encompasses a broader area in the basin. SCE proposes to prepare a comprehensive cultural resource management plan addressing operation and maintenance activities for all of its Big Creek hydropower facilities, including the Portal Project.

Construction of the new channel SCE is proposing as a means of reducing sediment sources in Adit 2 Creek would not affect the archaeological sites PL-PF-1, CA-FRE-369 and PL-KAI-001, or the historic Rattlesnake Trail segment that passes through the current Portal Project APE. The channel would bisect the Mono Trail in an area outside the current APE.

No known National Register-eligible sites would be adversely affected by continued operation of the Portal Project provided that SCE's management recommendations are implemented.

Preparation of a comprehensive HPMP for all of SCE's Big Creek projects would provide a more coherent, consistent approach to protection of cultural resources than development of a separate HPMP for the Portal Project. Preparation of a comprehensive HPMP would also streamline the consultation and documentation process.

We discuss the cost of cultural resource management in section VI, *Developmental Analysis*. We present our final recommendation pertaining to cultural resource management in section VII, *Comprehensive Development and Recommended Alternative*.

c. Cumulative Effects

The reservoirs developed in the upper SFSJR watershed are an important part of what makes the area attractive to recreationists. Continue recreation use of the Portal Project area by recreationists could add to the existing effect on archeological sites (vandalism and erosion from foot traffic).

d. Unavoidable Adverse Effects:

No unavoidable adverse effects on cultural resources have been identified.

## D. NO-ACTION ALTERNATIVE

The existing project represents the No-action Alternative. Under this alternative, there would be no change in current operation or facilities. SCE would provide no enhancement measures.

# VI. DEVELOPMENTAL ANALYSIS

In this section, we analyze the project's use of the water resources of the San Joaquin River Basin to generate power, estimate the economic benefits of the Portal Project, and estimate the cost of various environmental measures and the effects of these measures on project operations.

Under its approach to evaluating the economics of hydropower projects, as articulated in *Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027 (1995), the Commission employs an analysis that uses current costs to compare the costs of the project and likely alternative power with no consideration for potential future inflation, escalation, or deflation beyond the license issuance date. The Commission's economic analysis provides a general estimate of the potential power benefits and costs of a project and reasonable alternatives to project-generated power. The estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license.

For our economic analysis of alternatives, we used the assumptions, values, and sources shown in table 41.

Table 41. Staff assumptions for economic analysis of the Portal Project.

| Assumption | Value | Source |
|---|---|---|
| Base year for costs and benefits | 2005 | Staff |
| Energy value (mills/kWh)[a] | 50 | SCE |
| Capacity value ($/kW) | Included in energy value | Staff |
| Period of analysis | 30 years | Staff |

| Assumption | Value | Source |
|---|---|---|
| Term of financing | 20 years | Staff |
| Federal and state tax rate | 34.00% | Staff |
| Local tax rate[b] | 0.72% | Staff |
| Local tax rate on new capital measures | 1.01% | |
| Insurance rate on new capital measures and current net investment | 0.25% | Staff |
| Discount rate | 9.74% | Staff |
| Long term debt[c] | 8.03% | Staff/SCE |
| Return on equity[c] | 11.60% | Staff/SCE |
| Debt ratio[d] | 52% | CPUC |

Note: CPUC – California Public Utilities Commission

[a] Source: Response to AIR No. 1. In AIR No. 3, SCE indicates that $45.03 per MWh of this value applies to energy only (SCE, 2004a).

[b] The local tax rate was computed by dividing SCE's reported local tax by net investment, including appropriate adjustments for inflation.

[c] We updated SCE's (2003) application for new license assumptions with the 2003 Cost of Capital Decision issued by the CPUC.

[d] We used the 2003 Cost of Capital Decision issued by the CPUC as the basis for debt ratio.

## A. POWER AND ECONOMIC BENEFITS OF PROJECT AS PROPOSED

As proposed by SCE, the Portal Project would generate an average of 47,663,000 kWh of electricity annually, have an annual power value of $2,390,800 (50.16 mills/kWh)[25] and total annual costs of $1,747,100 (36.66 mills/kWh), resulting in a net annual benefit of $643,700 (13.50 mills/kWh).

## B. COST OF ENVIRONMENTAL MEASURES

SCE proposed and FS specified a variety of measures at the project. Staff reviewed each measure and determined the ones that were most appropriate for implementation and have either adopted the SCE costs, after reviewing or in rare instances modifying SCE's estimate. Staff simulated the effect of various flow regimes for Camp 61 Creek on energy generation, including SCE's proposal, SCE's proposal with staff modifications, and FS 4(e) conditions, and included the effect of both instream flows and channel and riparian maintenance flows. Table 42 shows the effect on costs and power values of individual measures proposed by SCE and recommended by staff and others, including the additional staff measures or staff modifications to SCE's proposal. Table 42 shows each measure as being discrete, to allow for a comparison of

[25] Value is slightly greater than 50 because the new flow regime is implemented in year 2 of any new license.

the cost of various approaches (e.g., in methodology, survey timing, survey frequency) to addressing environmental issues. The column titled "Adopted by Staff?" indicates those measures that would be included in the staff alternative.

We evaluated two additional flow regimes beyond what SCE proposed. Under the FS-specified flow regime, we found that implementation would result in generation averaging 42,960,000 kWh of electricity annually and in an annual power value of $2,170,600. This represents an energy loss of about 4,703,000 kWh and $220,200 in reduced benefits compared to the SCE Proposal. Under the staff flow regime option, we found that implementation would result in generation averaging 47,404,000 kWh of electricity annually and in an annual power value of $2,378,600. This represents an energy loss of about 259,000 kWh and $12,200 in reduced benefits compared to the SCE Proposal. We note that energy losses occur not only at the Portal Project, but also at projects downstream in the Big Creek system.

Table 42. Summary of capital and one-time costs, annual costs, total annualized costs, and annual energy costs of environmental measures proposed by SCE and recommended by staff and others for the Portal Project.[a] (Sources: SCE, 2004a, 2003; letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004)

| Environmental Measures | Entities | Capital and One-Time Costs (2005$) | Annualized Costs Including O&M (2005$) | Total Annualized Costs (2005$) | Reduction in Annual Energy Benefits (2005$) | Adopted by Staff? | Notes |
|---|---|---|---|---|---|---|---|
| **Instream flow Measures** | | | | | | | |
| Minimum instream flow and channel and riparian maintenance flow to Camp 61 Creek downstream of Portal forebay | SCE | $302,900 | $15,800 | $53,600 | $114,000 | No | **b, c, d** |
| Minimum instream flow and channel and riparian maintenance flow to Camp 61 Creek downstream of Portal forebay. Also alternative 4(e) condition proposed by SCE. | staff | $302,900 | $15,800 | $53,600 | $126,100 | Yes | **b, c, d, w** |
| Minimum instream flow and channel and riparian maintenance flow to Camp 61 Creek downstream of Portal forebay | FS | $302,900 | $15,800 | $53,600 | $334,200 | No | **b, c, d** |

| Environmental Measures | Entities | Capital and One-Time Costs (2005$) | Annualized Costs Including O&M (2005$) | Total Annualized Costs (2005$) | Reduction in Annual Energy Benefits (2005$) | Adopted by Staff? | Notes |
|---|---|---|---|---|---|---|---|
| Instream Flow Management Plan | FS, staff | $20,000 | $0 | $2,400 | $0 | Yes | |
| **Other Water Resources Measures** | | | | | | | |
| Repair drain pipe to support minimum instream flow to Camp 61 Creek downstream of Portal forebay | SCE, staff | $525,100 | $0 | $65,500 | $0 | Yes | [c] |
| Modify existing catchment basin below Portal dam for better aeration and to reduce iron concentration | SCE, staff | $35,000 | $0 | $4,400 | $0 | Yes | [c] |
| Evaluate the effectiveness of augmenting DO through modification of the existing catchment basin | staff | $0 | $1,200 | $1,200 | $0 | Yes | [e] |
| Conduct periodic iron residue removal from catchment basin below Portal dam | SCE, staff | $0 | $11,400 | $11,400 | $0 | Yes | [d] |

| Environmental Measures | Entities | Capital and One-Time Costs (2005$) | Annualized Costs Including O&M (2005$) | Total Annualized Costs (2005$) | Reduction in Annual Energy Benefits (2005$) | Adopted by Staff? | Notes |
|---|---|---|---|---|---|---|---|
| Adit 2 Creek sediment source reduction measures (new channel and check dams | SCE | $75,000 | $4,500 | $14,400 | $0 | No | f |
| Adit 2 Creek sediment source reduction plan and implementation | FS, staff | $100,000 | $6,800 | $20,000 | $0 | Yes | g |
| **Biological Resources Measures** | | | | | | | |
| Fish population monitoring in years 2, 5, 10, 15 and 20 | FS | | $3,500 | $3,500 | | No | h |
| Fish population monitoring in years 5, 10 and 20 | SCE, staff | $0 | $1,800 | $1,800 | $0 | Yes | i |
| Sediment monitoring in years 1, 5, 10, and 20 | FS | $10,000 | $3,300 | $4,500 | | No | j |
| Sediment monitoring in years baseline, 5, 10 and 20. Also alternative 4(e) condition proposed by SCE. | SCE, staff | $25,000 | $1,800 | $4,800 | $0 | Yes | k, w |

| Environmental Measures | Entities | Capital and One-Time Costs (2005$) | Annualized Costs Including O&M (2005$) | Total Annualized Costs (2005$) | Reduction in Annual Energy Benefits (2005$) | Adopted by Staff? | Notes |
|---|---|---|---|---|---|---|---|
| Fish stocking | staff | $0 | $5,000 | $5,000 | $0 | Yes | |
| Vegetation and invasive weed management and monitoring plan | SCE, FS, staff | $15,000 | $4,500 | $6,200 | $0 | Yes | [l] |
| Riparian vegetation monitoring in years 10, 20 and 30 | FS | $5,000 | $300 | $900 | $0 | No | [m] |
| Riparian vegetation monitoring in years baseline, 10, 20, and 30 | SCE, staff | $5,000 | $1,100 | $1,700 | $0 | Yes | [n] |
| Special status plant (subalpine fireweed) protection | staff | $2,000 | $0 | $200 | $0 | Yes | |
| Protection of FS special status species (BEs) | FS, staff | $0 | $500 | $500 | $0 | Yes | |
| Fish and wildlife management plan | staff | $10,000 | $200 | $1,400 | $0 | Yes | [o] |
| Bald eagle monitoring | staff | $2,000 | $100 | $300 | $0 | Yes | |

| Environmental Measures | Entities | Capital and One-Time Costs (2005$) | Annualized Costs Including O&M (2005$) | Total Annualized Costs (2005$) | Reduction in Annual Energy Benefits (2005$) | Adopted by Staff? | Notes |
|---|---|---|---|---|---|---|---|
| **Recreation Resources Measures** | | | | | | | |
| Report on recreation resources | SCE, FS, staff | $0 | $5,200 | $5,200 | $0 | Yes | p |
| Recreation plan | SCE, FS, staff | $25,000 | $2,500 | $5,500 | $0 | Yes | |
| Recreation O&M responsibilities and annual FS administration fees | FS | $0 | $3,400 | $3,400 | $0 | No | |
| Barrier-free accessibility improvements at 14 sites | FS | $70,000 | $0 | $8,300 | $0 | No | |
| Barrier-free accessibility improvements at 2 sites | SCE, staff | $10,000 | $0 | $1,200 | $0 | Yes | q |
| Restrict access to 2 campsites | SCE, FS, staff | $5,000 | $1,000 | $1,600 | $0 | Yes | |
| Regrading and hardening campsites | SCE, FS, staff | $21,000 | $0 | $2,500 | $0 | Yes | |
| Replace campground furniture | SCE, FS, staff | $62,400 | $0 | $7,400 | $0 | Yes | |

| Environmental Measures | Entities | Capital and One-Time Costs (2005$) | Annualized Costs Including O&M (2005$) | Total Annualized Costs (2005$) | Reduction in Annual Energy Benefits (2005$) | Adopted by Staff? | Notes |
|---|---|---|---|---|---|---|---|
| Improve, grade, surface parking spurs at 14 sites | SCE, FS, staff | $7,000 | $0 | $800 | $0 | Yes | |
| Improve campground road and add turnouts at toilets | SCE, FS, staff | $45,000 | $0 | $5,400 | $0 | Yes | |
| Reconstruct campground road, replacing culverts, etc. | SCE, FS, staff | $75,000 | $0 | $8,900 | $0 | Yes | |
| Install directional signs | SCE, FS, staff | $2,400 | $100 | $400 | $0 | Yes | |
| Improve erosion control on roads, paths | SCE, FS, staff | $25,000 | $2,500 | $5,500 | $0 | Yes | |
| Install 4 information signs | FS, staff | $10,000 | $0 | $1,200 | $0 | Yes | |
| Install 2 information signs | SCE | $5,000 | $0 | $600 | $0 | No | |
| Replace pit toilets with 2 prefab toilets | SCE, FS, staff | $24,000 | $1,500 | $4,400 | $0 | Yes | |
| Install path to forebay | SCE, FS, staff | $5,000 | $500 | $1,100 | $0 | Yes | |
| Replace dispersed area toilets | SCE, FS, staff | $91,200 | $500 | $11,400 | $0 | Yes | |

| Environmental Measures | Entities | Capital and One-Time Costs (2005$) | Annualized Costs Including O&M (2005$) | Total Annualized Costs (2005$) | Reduction in Annual Energy Benefits (2005$) | Adopted by Staff? | Notes |
|---|---|---|---|---|---|---|---|
| Relocate campsites now near high water | SCE, FS, staff | $30,000 | $0 | $3,600 | $0 | Yes | |
| Install water supply system | FS, staff | $187,400 | $4,000 | $26,300 | $0 | Yes | |
| Relocate distribution line | FS | $20,000 | $0 | $2,400 | $0 | No | |
| Construct additional campsites | SCE, FS, staff | $228,000 | $0 | $8,100 | $0 | Yes | [r] |
| **Land Management Measures** | | | | | | | |
| Transportation system management plan | SCE, FS | $15,000 | $1,500 | $3,300 | $0 | No | |
| Project access road maintenance | SCE, FS | $17,000 | $5,000 | $7,000 | $0 | No | |
| Fire management response plan | SCE, FS | $20,000 | $2,500 | $4,900 | $0 | No | |
| Visual management plan | SCE, FS | $15,000 | $1,500 | $3,300 | $0 | No | |
| Sign plan | SCE, FS | $3,000 | $300 | $700 | $0 | No | [s] |
| Hazardous substance plan | SCE, FS | $5,000 | $500 | $1,100 | $0 | No | [t] |

| Environmental Measures | Entities | Capital and One-Time Costs (2005$) | Annualized Costs Including O&M (2005$) | Total Annualized Costs (2005$) | Reduction in Annual Energy Benefits (2005$) | Adopted by Staff? | Notes |
|---|---|---|---|---|---|---|---|
| Single, inclusive Land Management Plan | staff | $60,000 | $9,800 | $17,000 | $0 | Yes | s/t/u |
| **Cultural Resources Measures** | | | | | | | |
| Develop comprehensive historic properties management plan (Portal portion) | SCE, staff | $40,000 | $5,000 | $9,500 | $0 | Yes | v |

[a] Costs are rounded to the nearest $100.

[b] SCE provided an estimate for a gaging station, but later in its response to FS comments requested flexibility in allowing a substantially equivalent acoustic velocity meter. Costs herein reflect SCE's estimate for the gaging station because no updated costs were submitted for any alternative approaches. Instream flow measures would benefit not only water quantity but also aquatic resources.

[c] Capital costs are assumed to occur in year 1 and have a construction period of 1 year.

[d] O&M for this measure begins in year 2.

[e] O&M costs of $5,000 are assumed for years 2, 3, and 4.

[f] Staff estimate that the capital cost for this measure is $75,000. We have assumed that O&M costs would be $5,000 for years 2 through 30, or $4,500 when annualized over 30 years.

[g] Staff estimate that the capital cost for this measure is $100,000 plus an additional $15,000 to develop the plan. We have assumed that O&M costs would be $7,500 for years 2 through 30, or $20,000 when annualized over 30 years.

[h] Under FS 4(e) condition, cash flows of $15,000 for monitoring would occur in years 2, 5, 10, 15 and 20.

[i] With staff recommendation, cash flows of $15,000 would occur in years 5, 10, and 20.

[j] Under FS 4(e) conditions, cost includes development of a plan for monitoring, plus cash flows of $15,000 for monitoring in years 1, 5, 10, and 20.

[k] With staff recommendation, cost includes development of a plan for monitoring, plus cash flows of $15,000 for monitoring in years baseline, 5, 10 and 20.

[l] Cost includes development of a plan, plus O&M cost of $5,000 beginning in year 2, and every year thereafter.

[m] Under FS 4(e) condition, cost includes development of a plan for monitoring, plus cash flows of $5,000 for monitoring in years 10, 20 and 30.

[n] With staff recommendation, costs includes development of a plan for monitoring, plus cash flows of $5,000 for monitoring in years baseline, 10, 20, and 30.

[o] Includes coordination of fish stocking; planning for LOPs, and assumes monitoring for special status amphibians ($2,500 in years 10, 20, and 30) and bats ($500 in years 10, 20, and 30). Annual cost of fish stocking is $5,000, shown as separate measure above.

[p] O&M based on recreation reports costing $40,000 in years 6, 12, 18, 24, and 30 of any new license issued.

[q] Barrier-free accessibility improvements for 2 camp sites assumed for costing purposes only.

[r] Cost assumes construction of 6 additional camp sites in year 15 and associated infrastructure improvements necessary to be comparable to existing camp sites.

[s] The sign plan assumes installation of 16 signs in year 1 and replacement of 15 signs in year 15 at a cost of $150 each.

[t] The hazardous substances plan would have its O&M portion for this measures begin in year 2.

[u] With staff recommendation, SCE would develop a land management plan that addresses transportation system management, project roads, fire response and management, sign management, and hazardous substances, rather than developing a separate plan for each. This land management plan would not include a visual resource element.

[v] SCE estimated costs to develop a comprehensive HPMP for the entire BCHS, including a capital cost of $153,000 ($2005) and annual costs of $25,700 ($2005) for the Portal Project portion of the BCHS. We have adjusted these costs to reflect site specific information associated with the Portal Project.

[w] Pursuant to the Energy Policy Act of 2005 SCE filed alternative section 4(e) condition with the FS. If accepted by the FS the alternative section 4(e) condition will replace the FS's final 4(e).

## C. COMPARISON OF ALTERNATIVES

In this section, we compare the project benefits, alternative costs and net benefits for the No-action Alternative, the SCE Proposal, and the Staff Alternative. We use a consistent set of economic assumptions as presented in table 41.

### 1. No-action Alternative

The existing project represents the No-action Alternative. Under this alternative, there would be no change in current operation or facilities. SCE would provide no enhancement measures. Because there would be no enhancement under this alternative, there would be no added costs. The annual operating cost of the existing project is about $1,481,600 (29.58 mills/kWh) as summarized in table 43. Under the No-action Alternative, the Portal Project would generate an average of 50,096,000 kWh of electricity annually and have an annual power value of $2,504,800 (50.00 mills/kWh). This results in a net annual benefit of $1,023,200 (20.42 mills/kWh).

Table 43. Current costs for economic analysis of the Portal Project.

| Assumption | Capital Cost ($) | Annual Cost ($) | Annualized Cost ($) |
|---|---|---|---|
| Total net investment[a] | $5,863,200 | | $754,600 |
| Total relicensing cost[b] | $2,394,000 | | $285,300 |
| Total net investment[c] | $8,257,200 | | $1,039,900 |
| O&M[d] | | $441,700 | $441,700 |
| Total | | | $1,481,600 |

[a] Basic project net investment is the depreciated project investment allocated to power purposes, including applicant's costs summarized in SCE's response to AIR No. 3 (SCE, 2004a).

[b] Based on relicensing costs summarized in SCE's response to AIR No. 3 (SCE, 2004a).

[c] Sum of basic project net investment and applicant's relicensing costs.

[d] O&M costs were based on SCE's average value of $355,492 in $1999 (SCE, 2003); this value was adjusted to current costs ($2005) using the GDP Implicit Price Deflator (excluding $14,700 for our assumed insurance cost). Our insurance costs are captured when we annualize the capital costs.

### 2. Proposed Project

As proposed by SCE, the Portal Project would generate an average of 47,663,000 kWh of electricity annually, have an annual power value of $2,390,800 (50.16

mills/kWh), and total annual costs of $1,747,100 (36.66 mills/kWh), resulting in a net annual benefit of $643,700 (13.50 mills/kWh).

### 3. Staff Alternative

Under the Staff Alternative (SCE Proposal with additional staff-recommended measures), the Portal Project would generate an average of 47,404,000 kWh of electricity annually, have an annual power value of $2,378,600 (50.18 mill/kWh[26]), and total annual costs of $1,789,000 (37.74 mills/kWh), resulting in a net annual benefit of $589,600 (12.44 mills/kWh).

Table 44 compares the power value, annual costs, and net benefits of the No-action Alternative, the SCE Proposal, and the Staff Alternative for the Portal Project. Table 44 also shows the power value, annual costs, and net benefits of a Composite Scenario, which represents the Staff Alternative, plus required FS 4(e) conditions not adopted by staff.

In section VII.B, *Comprehensive Development and Recommended Alternative*, we discuss our reasons for recommending the Staff Alternative and explain why we conclude the environmental benefits are worth these costs.

Table 44. Summary of the annual net benefits of the No-action Alternative, the SCE Proposal, the Staff Alternative, and the Composite Scenario. (Source: Staff)

| Item | No Action | SCE Proposal | Staff Alternative | Composite Scenario |
|---|---|---|---|---|
| Installed capacity (MW) | 10.8 | 10.8 | 10.8 | 10.8 |
| Average annual energy (MWh)[a] | 50,096 | 47,663[b] | 47,404[c] | 42,960[d] |
| Annual benefit ($)[e] | 2,504,800 | 2,390,800 | 2,378,600 | 2,170,600 |
| Annual cost ($) | 1,481,600 | 1,747,100[f] | 1,789,000[g] | 1,807,600[h] |
| Net annual benefit ($) | 1,023,200 | 643,700 | 589,600 | 363,000 |
| Change in net annual benefit from No-action Alternative (%) | -- | –37.10% | -42.38% | -64.52% |

[a] Annual energy value is based on years 1958–1997 as estimated by the staff. SCE indicates a value of 38,009 MWh might be appropriate based on data in the application for new license (SCE, 2003) and response to our AIR (SCE, 2004a), but

[26] Value is slightly greater than 50 because the new flow regime is implemented in year 2 of any new license.

the more recent period of record used tends to be more extreme, resulting in much lower average annual energy.

[b] The effect of any instream flows on energy is assumed to occur during years 2 through 30 of any new license issued. Therefore, a loss of 2,517 MWh is adjusted to 29/30 of 2,517 or 2,433 MWh, which when subtracted from 50,096, yields 47,663 MWh.

[c] The effect of any instream flows and channel maintenance flows on energy is assumed to occur over years 2 through 30 of any new license issued. Hence, a loss of 2,785 MWh is adjusted to 29/30 of 2,785 or 2,692 MWh, which when subtracted from 50,096, yields 47,404 MWh.

[d] The effect of any instream flows and channel maintenance flows on energy is assumed to occur over years 2 through 30 of any new license issued. Hence, a loss of 7,382MWh is adjusted to 29/30 of 7,382 or 7,136MWh, which when subtracted from 50,096, yields 42,960 MWh.

[e] Annual benefits are equal to the No-action Alternative benefit of $2,504,800 plus the corresponding change in benefit.

[f] This annual cost is the total cost of measures shown as recommended by SCE from table 42 plus the No-action Alternative annual cost.

[g] This annual cost is the total cost of measures shown as recommended by staff from table 42 plus the No-action Alternative annual cost.

[h] This annual cost is the total cost of measures shown as recommended by staff and FS (when items are mutually exclusive, only the cost of the required FS 4(e) condition is included) in table 42, plus the No-action Alternative annual cost.

# VII. COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a) of the FPA require the Commission to give equal consideration to all uses of the waterway on which the project is located. When reviewing a hydropower project, we consider the water quality, fish and wildlife, recreational, and other non-developmental values of the involved waterway equally with its electric power and other developmental values. Accordingly, any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses.

This section contains the basis for, and a summary of, our recommendations to the Commission for the relicensing of the Portal Project.

## A. RECOMMENDED ALTERNATIVE

Based on our independent review and evaluation of the SCE Proposal; the Staff Alternative (i.e., the SCE Proposal with additional staff-recommended measures); and the

No-action Alternative, we select the Staff Alternative as the preferred alternative. The Staff Alternative includes elements of SCE's proposed measures, the FS's FPA Section 4(e) conditions, SCE's alternative Section 4(e) conditions, and some additional staff recommended environmental measures. We recommend this alternative because issuance of a new license would allow SCE to continue to operate the project as a dependable element of the BCHS, using it to generate electric power for its customers. The electric power generated at the Portal powerhouse avoids the need to develop or use an equal amount of fossil fuel-fired electric generation and capacity, a factor which will allow SCE to continue to help conserve these non-renewable energy resources while reducing atmospheric pollution. The recommended environmental protection and enhancement measures would improve water quality, protect fish and terrestrial resources, improve public use of recreational facilities and resources, improve aesthetics, and maintain and protect historic and archaeological resources within the area affected by the project.

### 1. Measures Proposed by SCE

Staff recommends the following measures proposed by SCE be included in any license issued by the Commission for the Portal Project. We note that staff has modified SCE's proposed minimum instream flow measure and timing of channel and riparian maintenance flows as described in section VII.A.2, *Additional Measures Recommended by Staff*[27], and does not include SCE's proposed channel construction for Adit 2 Creek sediment reduction, or construction of check dams in Adit 2 Creek.

**Water Resources and Aquatic Resources**

- Provide a minimum instream flow to Camp 61 Creek downstream of Portal forebay. The proposed flows are based on anticipated benefits to aquatic habitat and would also mitigate temperature and DO effects in Camp 61 Creek.

| Date | Flow (cfs) |
|---|---|
| March 1–July 31 | 7 day average of 1.0 cfs, instantaneous floor of 0.7 cfs |
| August 1–February 28/29 | 7 day average of 0.5 cfs, instantaneous floor of 0.3 cfs |

[27] SCE proposes that FS modify its specified minimum instream flows to those recommended by staff in its December 19, 2005, alternative 4(e) conditions filed with FS.

- Modify the existing catchment basin downstream of Portal dam to increase the rate of aeration downstream of the catchment basin and better contain elevated iron concentrations.

- Investigate the feasibility of conducting periodic iron residue removal from the catchment basin. This activity would be completed once per year using a vacuum truck to remove the iron residue.

- Perform limited additional water quality sampling and analyses, as needed and appropriate, in consultation with resource agencies to determine the effectiveness of the above measure.

- Develop and implement a plan to monitor fish populations in Camp 61 Creek in years 5, 10, and 20 of a new license.

- Develop and implement a plan to monitor project-related sediment accumulation and spawning gravel in response to instream flow releases in Camp 61 Creek above and downstream of the confluence with the Adit 2 channel. Sediment monitoring would include baseline surveys plus three additional surveys in conjunction with the fish population monitoring.

**Terrestrial Resources**

- Develop a vegetation management plan that addresses special-status plant species, wetlands, and other sensitive habitats, including riparian communities. This plan would include a noxious weed management program that would address the use of herbicides.

- Monitor bank stability and riparian vegetation in Camp 61 Creek in conjunction with baseline sediment survey, then again in years 10, 20, and 30.

**Recreational Resources**

- Conduct recreation surveys and file a report on project-induced recreation every sixth year.

- Develop and implement, in consultation with FS, a recreation plan addressing the development and management of project-related recreation use and opportunities, including scheduling the implementation of several improvements at the Portal Forebay Campground.

**Land Management**

- Modify the existing project boundary by removing the Eastwood Overflow Campground, the segment of Rancheria Creek between Huntington Lake and

the powerhouse, the Camp 61 Creek from the Portal dam to the confluence with SFSJR.

- Modify the existing project boundary by adding the gaging stations on East Fork and West Fork Camp 61 Creeks; and the Adit 2 leakage weir.

- Develop plans to address transportation and road management, fire management, signage, hazardous substances, and visual management.

**Cultural Resources**

- Develop and implement a comprehensive historic properties management plan (HPMP) which would include management provisions for PL-KAI-001;[28]

**2. Additional Measures Recommended by Staff**

**Water Resources and Aquatic Resources**

- Provide a flow release to Camp 61 Creek, in addition to the minimum flow proposed by SCE, of 0.5 cfs from October 1 through December 15, for a total of 1.0 cfs during this period. The following table depicts the complete minimum instream flow release proposed by SCE as modified by staff for all water years. (The flows reflected in the table are also the flows SCE proposed in its alternative 4(e) conditions filed with FS on December 19, 2005.)

| Date | Flow (cfs) |
|---|---|
| March 1–July 31 | 7 day average of 1.0 cfs, instantaneous floor of 0.7 cfs |
| August 1–September 30 | 7 day average of 0.5 cfs, instantaneous floor of 0.3 cfs |
| October 1–December 15 | 7 day average of 1.0 cfs, instantaneous floor of 0.7 cfs |
| December 16–February 28/29 | 7 day average of 0.5 cfs, instantaneous floor of 0.3 cfs |

- Provide channel and riparian maintenance flows into Camp 61 Creek between June 1 and July 31 during above normal and wet water year types. Flows

[28] SCE is currently in the process of developing an HPMP as part of the Big Creek ALP (Project No. 67). The HPMP will include the Portal Project APE. Upon completion of the HPMP and prior to issuance of the license order for Project No. 67, the Commission will develop and execute a Programmatic Agreement to establish a process for resolving treatment of project-related effects on historic resources.

would be released over a 10-day period, ramping up to 28 cfs in an above normal water year and up to 39 cfs in a wet water year.

- Develop and implement an instream flow management plan that would describe existing or proposed provisions for the purposes of measuring and documenting compliance with the required minimum instream flows in the Camp 61 Creek bypass reach.

- Implement a restriction on downramping rates to less than 6 inches per hour with channel and riparian maintenance flows.

- Develop, in consultation with the SWRCB, and implement a water temperature and DO monitoring plan to document the effectiveness of increasing DO through modification of the catchment basin.

- Develop and implement a plan in coordination with the FS and SWRCB to reduce the active channel and stream bank erosion that is occurring in Adit 2 Creek between RM 0.3 and RM 0.5.

- Continue stocking rainbow trout from SCE's own trout-rearing facility in consultation with the CDFG to support recreational fishing in Portal forebay and provide 50 percent of the costs of fish production.

**Terrestrial Resources**

- Prepare a BE for FS approval before constructing any new project features on NFS lands to evaluate potential effects on FSS species or MIS and monitor effectiveness of mitigation measures, if any are needed.

- Monitor riparian vegetation along Camp 61 Creek as part of fish population and sediment monitoring.

- Consult with FS to identify and implement measures to protect existing populations of subalpine fireweed growing near the distribution/ communication line corridor.

- Develop and implement a fish and wildlife management plan to address stocking fish in Portal forebay, limited operating periods to protect special status birds, and monitoring for special status amphibians and bats.

- Conduct systematic surveys for noxious weeds and non-native invasive plant occurrences at project facilities, roads, trailheads, and recreation features every five years through the term of any new license.

- Monitor ground-disturbing activities annually for three years following implementation to detect and map new weed populations.

**Threatened and Endangered Species**

- Develop and implement a plan to monitor bald eagles as part of the fish and wildlife management plan.

**Recreational Resources**

- Develop and implement a recreation report and recreation plan in consultation with the FS. The recreation plan should include scheduling the implementation of several improvements at the Portal Forebay Campground. The recreation report should include results from the recreation use survey and be filed every sixth year following the schedule of Form 80 filing. Recreation surveys should include specific questions about angler interactions with the power line crossing Portal forebay.

**Land Management**

- Develop and implement a single comprehensive land management plan in consultation with the FS. This plan should include components to address transportation and access roads, fire prevention and response, signage requirements, and the management of hazardous substances.

**Cultural Resources**

- Develop SCE maintenance procedures to ensure that adverse effects on archaeological sites PL-KAI-001 and CA-FRE-369 are avoided.

Finally, we note that the recommended alternative includes most, but not all, of the 4(e) conditions specified by the FS. Most notably, we have not included or have modified the following measures (staff modifications are indicated with *italics*):

- Minimum instream flow and channel and riparian maintenance flows to Camp 61 Creek downstream of Portal forebay. *Staff recommendations modify these flows*.

- Fish population monitoring in Camp 61 Creek in years 2, 5, 10, 15 and 20 of any new license that may be issued. *Staff recommendations shorten the monitoring schedule*.

- Sediment monitoring would include baseline survey plus monitoring in years 5, 10 and 20 of any new license. *Staff recommendations modify the monitoring schedule*.

- Riparian vegetation monitoring in years 10, 20 and 30 of any new license. *Staff recommendations modify the monitoring schedule*.

- Barrier-free accessibility improvements at all 14 campsites. *Staff recommendations call for SCE to consult with FS on the number and location of sites to provide barrier-free accessibility and report the result of this consultation in the Recreation Plan*.

- Construction of additional campsites based on 75 percent capacity over three years. *Staff recommends adherence to FS designation as a semi-primitive, low density campground.*

- Relocation of the distribution line that crosses Portal forebay. *Staff recommends that the recreation survey include specific questions about angler interactions with the power line crossing Portal forebay.*

- Development of separate plans for transportation system management, project access road maintenance, fire response and management, visual resource management, signage, and hazardous substances. *Staff recommendations call for development of one land management plan that addresses each of these elements, except visual resources, which staff does not find necessary*.

We recognize, however, that the Commission may include any or all 4(e) conditions in any license issued for the Portal Project due to their mandatory nature.

## B. DISCUSSION

The following is a discussion of the basis for some of our recommended measures.

### 1. Water Resources

#### Water Quality Improvement and Monitoring

To increase DO concentrations in Camp 61 Creek, we recommend SCE's proposal to modify the catchment basin downstream of the Portal forebay dam with the goal of increasing aeration of water flowing from the basin. SCE should develop its plan to accomplish this goal through consultation with the SWRCB. In addition to developing a means to increase aeration of water exiting the catchment basin, we recommend that SCE also develop an appropriate water temperature and DO monitoring plan in consultation with the SWRCB to evaluate the effectiveness of implementing the plan. SCE should provide its plan to the SWRCB, and file the plan, along with any comments of the SWRCB, with the Commission.

Because the level of effectiveness of SCE's proposed iron removal program is uncertain, we recommend that SCE develop and implement an adaptive approach to removing the iron deposits from the catchment basin. We recommend that this be done by developing a plan for removal of the iron deposits, monitoring to enable evaluation of the effectiveness of the method of removal, evaluation of the effectiveness of the removal method used and appropriate actions to take in the next year. This plan should be developed in consultation with the SWRCB. Water quality monitoring should accompany all clean-up efforts. Remediation efforts and monitoring plans should allow flexibility, so the licensee can implement adaptive changes if the monitoring indicates that the selected and implemented method(s) is ineffective.

We estimate that development and implementation of these water quality improvement and monitoring plans would cost approximately $17,000 annually. Development and implementation of a plan to modify the existing catchment basin to increase aeration of water flowing out of the basin was estimated to cost approximately $4,400 annually. Evaluating the effectiveness of augmenting DO through modification of the existing catchment basin would cost $1,200 annually. Development and implementation of an adaptive approach to removing iron deposits was estimated to cost $11,400 annually. The potential environmental benefits associated with these measures are worth the additional costs.

### 2. Aquatic Resources

#### Instream Flows in Camp 61 Creek

SCE initially proposed to provide flow releases into Camp 61 Creek downstream of Portal forebay of 1.0 cfs from March 1 through July 31 and 0.5 cfs from August 1 through the end of February. SCE states that their proposed flow regime would provide perennial flow throughout Camp 61 Creek and enhance habitat available for the currently abundant brown trout population.

FS 4(e) condition 12(a) specifies that SCE release a range of minimum flows (based on water year types) as measured at a gage to be installed immediately below the Portal forebay dam. FS minimum flow releases would range from 1.25 cfs to 10 cfs depending on season and water year type (table 13). The objectives of the FS minimum streamflow recommendation are to provide for fish passage and habitat for all life stages of brown trout; improve water quality downstream of the forebay; mimic the timing and duration of unregulated flows within Camp 61 Creek; and provide habitat connectivity.

After reviewing SCE's proposed minimum instream flow regime and the FS 4(e) condition no. 12, staff developed and analyzed a third flow regime, as discussed below. This flow regime is similar to SCE's initial proposal, but provides slightly higher minimum instream flows during the late fall and early winter to support brown trout spawning.

On December 19, 2005, SCE filed alternative 4(e) conditions with the FS, in accordance with the November 17, 2005, interim final rule for *Resource Agency Procedures for Conditions and Prescriptions in Hydropower Licenses*. SCE is requesting that the FS adopt staff's minimum instream flow regime in place of the higher flows included in the 4(e) conditions. SCE states that the brown trout population in Camp 61 Creek downstream of Portal forebay and below the confluence of Adit 2 Creek is in good condition and that the FS flows would be unnecessarily high and seasonally inappropriate for management of the brown trout population. They further indicate that the FS flows are not supported by the results of the wetted perimeter studies conducted using an approach agreed upon during scoping of the relicensing studies.

In section V.C.2.b., *Aquatic Resources*, we considered the condition of the brown trout population in Camp 61 Creek below Portal forebay dam and how flow releases affect available habitat and habitat access. Although the existing density of brown trout in Camp 61 Creek (downstream of Adit 2 Creek) appears to be similar to the density of brown trout observed in Boggy Meadow Creek, Lower Mono Creek, and Cold Creek (Vermilion Valley Project reference streams), we concluded that aquatic habitat quality and quantity in Camp 61 Creek between Portal forebay dam and Adit 2 Creek has been negatively affected by lack of a minimum flow release. We also considered what instream flow would be needed to enhance the brown trout population (and to increase the percentage of age 0+ trout, in particular) in both upper and lower Camp 61 Creek. We agree that SCE's proposed 0.5-cfs minimum flow release below Portal forebay dam during the late summer, fall, and winter (August 1 through the end of February) and the 1.0-cfs flow release during the spring and early summer (March 1 through July 31), plus leakage from the dam, would substantially increase the amount of available aquatic habitat in Camp 61 Creek compared to existing conditions. However, we are concerned that SCE's proposed 0.5-cfs flow release in the fall and early winter may limit the amount of accessible spawning habitat for brown trout. To improve habitat access and increase the amount of spawning habitat during the brown trout spawning period, we recommend SCE not only provide a flow release of 1.0 cfs to Camp 61 Creek from March 1 through July 31 and 0.5 cfs from August 1 through February, as proposed, but that SCE also provide an additional 0.5 cfs during the period from October 1 through December 15. Our recommended flow regime would substantially improve aquatic habitat conditions in Camp 61 Creek for both brown trout and BMIs, improve fish passage conditions, and improve water quality downstream of the forebay. The environmental benefits associated with enhancing this fishery would justify some loss in downstream power benefits at Portal powerhouse.

We also recognize the need to monitor instream flow compliance and recommend that SCE install a gaging station or other appropriate flow measurement device to measure the flow in Camp 61 Creek at or just downstream of the Portal forebay.

Although the variable flow regime included in FS 4(e) condition no. 12(a) represents a range of flows that are substantially higher than those proposed by SCE and recommended by staff and would increase the area of available aquatic habitat and further improve fish passage in Camp 61 Creek compared to SCE's proposal and staff's recommended flow regimes, we believe it would provide more flow than is reasonably needed to protect aquatic resources in Camp 61 Creek. If the objective of a flow release in Camp 61 Creek were to restore a native fish assemblage, mimicking the natural hydrograph would have obvious benefits (Moyle, 2002). However, prior to Euro-American settlement, Camp 61 Creek was fishless. The brown trout now found in Camp 61 Creek are not native to California and have not evolved life-history patterns in direct response to an unimpaired flow regime in Camp 61 Creek or in the upper SFSJR watershed. In addition, the cost associated with the FS's 4(e) condition to mimic the natural hydrograph in Camp 61 Creek, in terms of lost generation, would be substantially greater than that realized under the SCE proposal and staff's recommended flow regime (see section V.C.2.b., *Aquatic Resources*). Camp 61 Creek has the highest estimated density of brown trout among the project streams, and this density was similar to or greater than brown trout densities that were found for Vermilion Project reference streams; however, age 0+ fish were relatively rare, possibly indicating a lack of available spawning habitat. We therefore do not recommend the variable flow regime included in FS 4(e) condition no. 12(a) and instead recommend our flow regime. We believe that our flow regime (SCE's proposed flow regime with a modified 1.0-cfs instream flow release in September, October, and November) would substantially improve aquatic habitat conditions in Camp 61 Creek for all life stages of brown trout, improve fish passage conditions (allowing access to additional spawning habitat), and improve water quality downstream of the forebay.

We note that while our independent analysis leads us to a different conclusion than the FS, consistent with Section 4(e), we recognize that the Commission may include in any license issued for the Portal Project the FS's minimum instream flow regime for Camp 61 Creek due to its mandatory nature.

We estimate that providing the higher FS 4(e) instream flows, including channel and riparian maintenance flows, would reduce annual benefits by about $334,200 or $220,200 more than the SCE flow regime and $208,100 more than staff's recommended flow regime. For the reasons noted above, relative to our recommended flow regime, the incremental potential environmental benefits associated with the FS 4(e) instream flow do not justfy this reduction in annual economic benefits.

**Channel and Riparian Maintenance Flows**

SCE proposed to release channel and riparian maintenance flows into Camp 61 Creek during a 10-day period between April 1 and July 31 of above normal and wet water year types. The magnitude and duration of these proposed channel and riparian

maintenance flows is presented in table 34. FS 4(e) condition no. 12(c) specifies that SCE release channel and riparian maintenance flows into Camp 61 Creek between May 1 and May 16 of below average, above average and wet water year types.

In its December 19, 2005, filing of alternative 4(e) conditions, SCE would modify FS 4(e) condition no. 12(c) to reflect the channel and riparian maintenance flows proposed by SCE as reflected in section V, *Environmental Analysis*, table 34. The alternative 4(e) condition proposes that the release period be changed from April 1 through July 31 to June 1 through July 31. We recommend a June 1 through July 31 release period since it would reduce potential adverse effects on brown trout recruitment due to redd scour, as the later releases are less likely to adversely affect young brown trout because juveniles would be able to seek cover from high flows. The effects of the magnitude and duration of these flows on aquatic habitat and fish populations are more fully described in section V.C.2, *Channel and Riparian Maintenance Flows*.

As discussed in section V.C.2.b., *Aquatic Resources*, we based our analysis of the need for channel and riparian maintenance flows in Camp 61 Creek on information provided in SCE's license application. Although quantitative data are limited, lower Camp 61 Creek was reported as having 90 to 100 percent embeddedness. In addition, sediment accumulations in pools are nearly 2.5 times greater in Camp 61 Creek below Portal forebay than in either East Fork Camp 61 Creek or West Fork Camp 61 Creek upstream from Portal forebay. These sediment accumulations have likely reduced the quality of aquatic habitat in Camp 61 Creek through filling of pools and covering of gravels that provide suitable spawning substrate for trout. These accumulations may also be partially responsible for the low number of age 0+ brown trout and the low BMI values observed in Camp 61 Creek. Based on our review of the aquatic habitat conditions in Camp 61 Creek and on the hydrology and geomorphology information presented in the application for new license, channel maintenance flows are needed to flush fine sediments from the more stable bed elements.

We recommend SCE's proposed above normal and wet water year channel and riparian maintenance flow because it would likely mobilize and transport accumulated sediments out of the Camp 61 Creek system, leading to improved aquatic and riparian habitat conditions. Their proposed channel and riparian maintenance flows are equivalent to the 1.5 and 2-year flow events for Camp 61 Creek (based on 25 years of overlapping discharge records for East and West Fork Camp 61 Creek) and exceed the 0.8 to 1.6 x bankfull flow recommended in Andrews and Nankervis (1995). Because SCE's wet water year channel and riparian maintenance flows are substantially higher than the calculated bankfull flow in Camp 61 Creek, they would likely be effective in maintaining the ability of the channel to convey streamflow and bed load sediment (Hill et al., 1991; Rosgen, 1996). These higher flows would also contribute to the formation of physical habitat features such as riffles, pools, runs, and point bars, and support dynamic geomorphic processes over time. In addition, these higher flows would help to maintain

riparian habitat in a healthy condition. Providing the CRMFs at any time between June 1 and July 31[29] of above normal and wet water year types would allow for greater operational flexibility than the timing of the CRMFs proposed by the FS, would likely capture any inter-annual variability in flow regime, and minimize impacts on juvenile brown trout recruitment.

Based on our analysis of the 46-year period of record (see section V.C.2.b, *Aquatic Resources*), above normal and wet water years occur about 52 percent of the time in the Camp 61 Creek system, i.e., every other year or so. Thus, SCE's proposal to release channel and riparian maintenance flows only in above normal and wet water years closely match the pattern of flows that would occur if the system were unregulated. Consequently, we conclude that channel and riparian maintenance flows during other water year types (critically dry, dry, and below normal) would not be needed to substantially improve aquatic habitat conditions in Camp 61 Creek.

FS-specified channel and riparian maintenance flows would also mobilize and transport fine sediment out of the Camp 61 Creek system; however, their specified flows would be higher than those recommended for sediment transport in gravel-bed channels, and the 16-day duration would exceed the amount of time needed to adequately reduce the sediment load in Camp 61 Creek, as the 8-day duration proposed by SCE (not including days needed for up-ramping and down-ramping) was based on the average duration of bankfull or greater flows in similar gravel bed streams located in the Rocky Mountains (Andrews, 1984, as cited in letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004). We are also concerned that limiting flows to a specific 16-day window in May would reduce the discretion that SCE might have to address power needs. Relative to SCE's proposed channel riparian maintence flows; the limited if any potential environmental benefits associated with the FS's maintence flows is not worth this loss in operational flexibility.

Because rapid decreases in streamflow associated with any channel and riparian maintenance flows included in a new license for the Portal Project have the potential to strand fish and other aquatic biota in shallow, low-gradient areas and off-channel habitat (causing immediate or delayed mortality), we recommend a downramping rate restriction for channel and riparian maintenance flows that has a maximum stage change of not more than 6 inches per hour in the affected stream reach.

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[29] SCE proposes to release channel and riparian maintenance flows during a 10-day period that could occur at any time between April 1 and July 31. However, our analysis of flow data indicates that the highest flows during this period never occurred during July in any of the 40 years of record, and thus, for our analysis we assume channel and riparian maintenance flows would not be implemented during July.

We have included the cost of implementing the channel and riparian maintenance flows in the previous section, *Instream Flows in Camp 61 Creek*. Although our independent analysis leads us to a slightly different conclusion than the FS, consistent with Section 4(e), any license issued for the Portal Project may include the FS's channel and riparian maintenance flows for Camp 61 Creek due to its mandatory nature.

**Adit 2 Creek Sediment Source Reduction**

As discussed in section V.C.1.b (*Water Resources*) and V.C.2.b (*Aquatic Resources*), the eroding section of Adit 2 Creek is contributing sediment to lower Camp 61 Creek, with adverse effects on water quality and fish habitat in lower Camp 61 Creek. SCE proposes two measures to address this issue. SCE would construct a new channel to convey flows from upper Adit 2 Creek into upper Camp 61 Creek, bypassing the eroding segment of the Adit 2 Creek channel. SCE would then construct check dams in the eroding segment of the Adit 2 Creek channel, planting native shrubs to stabilize soils and sediments that accumulate behind the check dams.

In 4(e) condition no. 12, FS specifies that SCE should coordinate with FS to determine whether structural methods could be implemented to reduce sediment delivery from Adit 2 Creek into Camp 61 Creek. If SCE and FS jointly determine that such measures would have a reasonable likelihood of success, SCE would implement, maintain, and monitor them through any new license period. We assume this approach could include a range of treatment options, from relatively simple, low-cost measures (e.g., planting riparian vegetation along Adit 2 Creek) to more complex, expensive treatments (e.g., construction of a new channel to divert flows, in combination with bioengineered structures in Adit 2 Creek).

While reducing sediment delivery to lower Camp 61 Creek would likely benefit aquatic resources, we conclude that developing an effective approach to managing erosion in Adit 2 Creek warrants further investigation. We are not adopting SCE's proposals, for the reasons discussed in section V of this final EA. These include the risk of unintended adverse effects on water quality and fish habitat in lower Adit 2 Creek that could result from diverting Adit 2 Creek flows into Camp 61 Creek, and potential adverse effects on wetlands, native amphibians, California spotted owl, aesthetics, and cultural resources.

Flows in Adit 2 Creek are typically about 1 cfs. While diverting an additional 1 cfs into upper Camp 61 Creek would result in a small incremental benefit to water quality and fish habitat in Camp 61 Creek, it could also result in a small incremental reduction of water quality and fish habitat in lower Adit 2 Creek, which currently supports large numbers of brown trout. The record to date does not contain information showing that flow diversion (i.e., a new channel to convey flows to Camp 61 Creek) would provide a

significant incremental benefit beyond the erosion-control benefits of the proposed check dams and plantings in Adit 2 Creek.

While we do not recommend construction of a new channel to convey flows from upper Adit 2 Creek into upper Camp 61 Creek, we concur with FS 4(e) condition no. 12, and recommend SCE consult with FS, SWRCB, and other applicable agencies or entities to develop a plan to stabilize the eroding segment of the creek. The plan, filed for Commission approval, may include (but would not be limited to) check dams and plantings, and should include a schedule for maintenance and effectiveness monitoring through any new license period, for any new measures that are proposed for implementation.

We anticipate that SCE and FS would identify a number of options for reducing sediment sources in Adit 2 Creek that could range in cost from as little as $10,000 to as much as $100,000 in capital costs. To be conservative, we have assumed the higher capital cost, and an annual cost of about $20,000. While this cost is slightly higher than the cost of SCE's proposal ($14,400), given the potential adverse effects associated with SCE's proposal, this cost is justified.

**Fish Population Monitoring**

SCE proposes to monitor fish populations in the project affected reaches in years 5, 10, and 20 of a new project license (letter from T.J. McPheeters, Manager, Northern Hydro Division, SCE, Big Creek, CA, to the Commission, dated December 16, 2004).. FS 4(e) condition no. 12(d)1 specifies that SCE would conduct quantitative fish population monitoring within Camp 61 Creek downstream of the Portal forebay dam after years 2, 5, 10, 15, and 20 of license implementation. A draft technical report providing the results of the surveys would be prepared each year that monitoring occurred and provided to the FS and other interested agencies at least 2 months prior to the annual consultation meeting specified in FS 4(e) condition no. 1.

As we stated in section V.C.2.b., *Aquatic Resources*, monitoring fish populations would allow a determination of the response of trout to any changes the Commission prescribes in a new license. In the DEA staff recommended monitoring in years 2, 4, 10, and 15 of a new license. However, monitoring in years 2 and 4 would not have allowed enough time for populations to respond to changes in the new license. The FS schedule, as revised in their 4(e) conditions, would allow for timely identification of major fish population shifts under any new flow regime and would help distinguish project-related effects from population variability associated with non-project related influences. However, we question the FS's need for monitoring in years 2, 5, 10, 15, and 20 of a new license. By monitoring only in years 5 and 10 as proposed by SCE, the immediate response to changes in project operations would be characterized. Subsequent monitoring in year 20 would occur at a rate that would adequately characterize the long-

term population trends. We expect that any fish population shifts that would result from the altered flow regimes would be evident by the conclusion of monitoring during the 20th year from license issuance, and unless warranted by previous monitoring results, do not recommend monitoring beyond this time. We recommend that SCE consult with the FS and other applicable agencies or entities to develop and implement a fish monitoring plan. Following each year of monitoring, we recommend SCE prepare a technical report documenting the results of fish population surveys. If the modified flows result in apparent adverse effects on aquatic resources, this monitoring could serve as the basis for consideration of corrective actions. Such actions could include modifying flow releases at Portal diversion dam, or modifying the timing, magnitude, and duration of the CRMFs. The Commission would have jurisdiction to reopen the existing project license to address these corrective actions. The added cost of fish population monitoring is reasonable, in light of the importance of understanding the effects of proposed measures on fishery resources.

We estimate that the fish population monitoring would have an annual cost of about $1,800. The potential environmental benefits associated with this measure are worth the additional costs. We note that while our independent analysis leads us to a different conclusion than the FS regarding the schedule of monitoring, consistent with Section 4(e), we recognize that the Commission may include the FS's fish population monitoring schedule in any license issued for the project, due to its mandatory nature.

**Sediment Monitoring**

SCE proposes to conduct sediment surveys in Camp 61 Creek above and below its confluence with Adit 2 Creek, to include a baseline survey and three additional surveys in years 5, 10, and 20 of the new license. FS 4(e) condition no. 12(d)2 stipulates sediment monitoring during the same years as SCE, but adds that the section of Camp 61 Creek above Adit 2 Creek would be used as a reference reach for comparison with downstream sediment conditions.

On December 19, 2005, SCE filed alternative 4(e) conditions with the FS, in accordance with the November 17, 2005, interim final rule for *Resource Agency Procedures for Conditions and Prescriptions in Hydropower Licenses*. They are requesting that the FS adopt SCE's recommended sediment monitoring plan in place of theirs. SCE indicates that sediment monitoring results should be based on a comparative trend over time between the baseline monitoring year and the additional years of survey.

Because nearly 80 years of flow diversion has resulted in alterations to the channel morphology and hydrology of Camp 61 Creek, including increased sedimentation in pools (SCE, 2003), we recommend SCE's alternative 4(e) condition to develop and implement a plan to monitor sediment accumulation in Camp 61 Creek above and below the confluence with the Adit 2 channel in years 1, 5, 10, and 20 of any new license

issued. Monitoring sediment conditions in Camp 61 Creek would determine the response of the stream channel to the changes in the hydrologic regime from implementation of the new minimum instream flows and channel and riparian maintenance flows, and would also help determine if identified sediment transport objectives were being met. The difference in stream channel type in Camp 61 Creek above and below the confluence with Adit 2 Creek could confound a comparison of sediment transport between the two reaches as specified in FS 4(e) condition no. 12(d)2. Therefore, we further recommend that sediment monitoring results should be based on a comparative trend over time between the baseline monitoring year and the additional years of survey, as indicated in the alternative 4(e) condition. We also recommend, in conjunction with the sediment monitoring, that SCE monitor the effects of the channel and riparian flow releases on spawning gravel volumes and quality.

We estimate that sediment and spawning gravel monitoring would have an annual cost of about $4,800. The potential environmental benefits associated with this measure are worth the additional costs.

**Fish Entrainment and Stocking**

Although we agree with the SWRCB that SCE's entrainment studies were limited in scope, we note that entrainment sampling is inherently difficult and expensive, and often leads to conflicting conclusions regarding project impacts. We note that CDFG manages Portal forebay as a put-and-take rainbow trout fishery that is maintained by annual stocking and this fishery is in relatively good condition under current project operation. Therefore, to continue this recreational enhancement, we conclude it would be appropriate for SCE to partially fund annual CDFG fish stocking efforts in Portal forebay. Because Portal forebay fishery is maintained by annual stocking, we consider annual funding for fish stocking to be a better alternative than conducting additional entrainment studies or other actions.

SCE proposes to continue stocking rainbow trout from its trout-rearing facility, in consultation with CDFG, to support recreational fishing in the project area. However, SCE states that its participation in fish stocking efforts is, and should remain, voluntary and should not be required as part of any new license that may be issued for this project.

CDFG recommends that SCE provide a fair share (50 percent) of the fish production costs that is needed to sustain a fishery in Portal forebay, unless agreed otherwise by CDFG and SCE. CDFG notes that fisheries in the project area provide high-demand angling opportunities for recreational users of the forebay and other project stream reaches and SCE's contribution to the stocking costs would offset the effects of the annual seasonal drawdowns and project-related stream flow reductions.

Portal forebay is stocked with trout to provide recreational fishing opportunities and harvest in excess of that which could be supported by the natural productivity of the

project area. Given the high-quality recreational fishing opportunities at the project, largely due to fish stocking in Portal forebay, and the importance of this public benefit of the project, SCE should support CDFG's fish stocking efforts beyond its current voluntary fish stocking program. We think it's appropriate for SCE to contribute 50 percent of the fish production costs associated with Portal forebay. The specific details regarding SCE's financial contribution and its involvement in fish stocking efforts at the project should be determined by SCE and the CDFG.

We estimate that SCE's contribution to fish production costs for sustaining a fishery in Portal forebay would have annual cost of about $5,000. The potential environmental benefits associated with this measure are worth the additional costs.

### 3. Terrestrial Resources

#### Riparian Vegetation Monitoring

We recommend SCE consult with FS and other applicable agencies or entities to develop and implement a plan to monitor the effects of changes in the flow regime on riparian vegetation in Camp 61 Creek. The existing plant community has developed in the presence of very low or intermittent flow conditions in the upper reach of the creek and large sediment loads in the lower reach. We expect that higher base flows and higher flow conditions during channel and riparian maintenance flow releases would have a direct effect on riparian vegetation. During the first few years after implementation of channel and riparian maintenance flows, riparian vegetation may be lost as encroachment is reduced. Loss of riparian vegetation could affect bank stability and patterns of erosion and sedimentation, as the channel adjusts to new flows.

SCE proposes to monitor riparian conditions in conjunction with the first sediment monitoring period, then continued monitoring in years 10, 20, and 30. These monitoring surveys would focus on factors for assessing bank protection and stability by the riparian vegetation. FS 4(e) condition no. 12(d)(3) specifies that SCE should monitor riparian vegetation at 10-year intervals through the new license period to collect data on species composition, percent cover, height and canopy structure, relative density, size classes present, evidence of unusual mortality, structural diversity, width of the riparian zone, and incidental wildlife observations. Monitoring riparian vegetation at 10-year intervals would be adequate to identify broad-level changes in the plant community over time, and SCE's monitoring event conducted with the initial sediment monitoring in year 1 would provide comparative baseline information. For this reason, we recommend SCE conduct riparian vegetation surveys in conjunction with the baseline sediment survey, then additional riparian monitoring in years 10, 20, and 30 of any new license issued. The surveys should focus on factors such as the ratio of rooting depth to streambank height, the degree of rooting density, and the degree of bank surface protection afforded by

vegetation, because these are the attributes that would be indicative of channel responses to the new flow regime.

We estimate that annual cost of riparian vegetation monitoring as recommended to be about $1,700 per year. The potential environmental benefits associated with this measure are worth the additional costs.

**Vegetation Management Plan**

SCE proposes to develop a vegetation management plan. FS supports this proposal, and FS 4(e) condition no. 17 specifies that within 2 years of license issuance, SCE should consult with the Fresno County Agricultural Commissioner, California Department of Food and Agriculture, and other applicable agencies or entities to develop a plan to manage vegetation and noxious weeds. We concur with SCE's proposal and with the FS 4(e) conditions, with the exception of the FS requirement specified in FS 4(e) condition no. 11 regarding annual review and authorization for use of pesticides on NFS lands. In our view, the purpose of developing a plan is to improve planning, coordination, and efficiency, and to reduce duplicative efforts.

We suggest that the vegetation management plan should be compatible with SCE's Environmental Training Program and Endangered Species Alert Program. The plan should meet the requirements of FS 4(e) condition no. 17, in terms of implementing BMPs for soil protection, use of certified weed-free straw, addressing hazard trees, protection and enhancement of plants of cultural importance, and use of local seed sources as a first choice for planting.

Development and implementation of a comprehensive plan would provide an opportunity to coordinate several aspects of vegetation management. These include (1) protection of sensitive species and habitats; (2) weed control; (3) fuels inventory and control; and (4) maintenance of facilities, roads, distribution line rights-of-way, and recreation sites. We make the following specific recommendations:

The vegetation management plan should describe specific measures for monitoring, mapping and controlling noxious weeds and non-native exotic plants. An appropriate monitoring schedule would be critical to the success of the plan. In commenting on the draft EA, SCE proposed to monitor areas treated for noxious weeds for one year to verify that the method was effective. We conclude that one year may not be adequate because of the high reproductive capability of many weed species. For example, cheatgrass can produce more than 1,000 viable seeds per square meter that remain viable in the soil for three or more years (Cal-IPC, 2005). Control of cheatgrass is especially important; although it is not state-designated as a noxious weed, it has the potential to reduce native plant diversity and wildlife habitat quality, alter natural fire regimes, and degrade recreation and aesthetic values.

FS 4(e) condition no. 17 specifies that SCE should monitor ground-disturbing activities annually for three years following implementation to detect and map new weed populations. We concur with this approach, and recommend SCE monitor annually for three years following implementation at 1) sites where weed control measures are implemented, and 2) sites where ground-disturbing activities are implemented (e.g., channel construction, campsite improvements).

In commenting on the draft EA, SCE proposed to monitor for noxious weeds at project facilities, roads, trails, and recreation features at 10-year intervals. Because many weed species spread rapidly (e.g., cheatgrass populations may double in size within a 10-year period), we conclude that monitoring at 10-year intervals would not allow for adequate weed detection or control. FS 4(e) condition no. 17 specifies that SCE should conduct annual monitoring of known populations at project-related facilities. Annual monitoring would provide the greatest assurance that weeds would be detected early, but this frequency may not be warranted, given the relatively low levels of project maintenance and recreation activity.

As an alternative, we recommend SCE conduct systematic surveys for noxious weeds and non-native invasive plant occurrences at project facilities, roads, trailheads, and recreation features every five years through the term of any new license. We conclude that a five-year interval would allow for reasonably early detection and treatment, which is likely to be most economical and effective. Training of project staff and contractors to identify and document weed occurrences in conjunction with routine maintenance or other resource management activities, as recommended under FS 4(e) condition no. 17, would provide additional opportunities for early detection and treatment.

We recommend SCE monitor the Portal forebay at 10-year intervals to allow for early detection of aquatic weeds. The risk of infestation in the forebay is probably low owing to the drying effects of seasonal drawdown.

Maintaining or restoring habitat conditions that support native plant communities would be of benefit in reducing the risk of weed establishment and spread. We recommend SCE select native plants for use in projects aimed at controlling erosion, revegetating disturbed areas, and landscaping recreation sites. Replacement of weed populations with native species can also help to reduce the risk of wildfire.

We estimate the annual costs of implementing these measures at $6,200. The potential environmental benefits associated with this measure are worth the additional costs.

**Subalpine Fireweed Protection**

Within 6 months of license issuance, SCE should consult with FS and other applicable agencies or entities to identify and implement site-specific measures that would be effective in protecting existing populations of subalpine fireweed along the distribution line corridor. In addition to direct protection (e.g., placement of rock barriers around rare plant populations), we recommend SCE monitor the site annually (i.e., during line inspections) to ensure that barriers are in place and evaluate any need for additional protection. Plans for monitoring should be incorporated into the vegetation management plan described above. We estimate the cost of implementing this measure would be about $200 annually. The potential environmental benefits associated with this measure are worth the additional costs.

**Protection of FS Special Status Species**

FS 4(e) condition no. 13 is designed to protect FS sensitive and management indicator species by directing SCE to prepare a BE prior to constructing any new project features on NFS lands that could affect special status species or their habitat. We recommend SCE implement this measure, because it would complement the Endangered Species Alert Program SCE implements for its Service Territory, by focusing on resources in the Portal Project area. We estimate the cost of implementing this measure would be $500 annually. The potential environmental benefits associated with this measure are worth the additional costs.

**Fish and Wildlife Management Plan**

SCE proposes to continue its Environmental Training, Endangered Species Alert, and Raptor Protection programs. We agree these are valuable mechanisms for wildlife management. To provide a mechanism for project-specific management of fish and wildlife resources, we recommend SCE consult with FS, FWS, and CDFG to develop and implement a fish and wildlife management plan. The plan should include measures to coordinate the annual stocking of fish in Portal forebay; limited operating periods to protect special status birds (osprey and California spotted owl) from disturbance; monitoring of special status amphibians in project-affected areas, including Camp 61 Creek; and monitoring of special status bats in project facilities, including the Portal Forebay Campground.

Although no special status amphibians or bats are known to be present in the project area at this time, several species have been documented in nearby locations, as discussed in section V.C.3.a., *Terrestrial Resources*. Changing conditions in the project area could increase habitat suitability, with subsequent changes in species occurrence during any new license period. SCE's existing Endangered Species Alert Program and FS 4(e) condition no. 13 are designed to protect species and habitats that could be adversely affected by ground-disturbing actions. Because actions that do not require

ground-disturbance (e.g., changes in minimum instream flow, changes in water quality, changes in fish populations, increases in recreation activity) could affect special status birds, amphibians, and bats, we conclude it would be prudent to develop a fish and wildlife plan. The plan should provide for consultation with FS, FWS, and CDFG to determine an appropriate schedule for monitoring to evaluate the need for protective measures. We recommend SCE conduct amphibian surveys in Camp 61 Creek at years 10, 20, and 30 (following license issuance) to evaluate the effects of the new flow regime on special status species. The schedule for surveys in Adit 2 Creek should be linked to implementation of sediment reduction measures.

We recommend SCE conduct surveys for special status bats on a schedule to be determined through consultation with FS and CDFG. To prevent disturbance, surveys of project facilities and campground facilities should be timed so that bat occurrences would be identified prior to scheduled maintenance, repairs, or construction activity.

We estimate that the annual cost of implementing this measure would be about $1,400. The potential environmental benefits associated with this measure are worth the additional costs.

### 4. Threatened and Endangered Species

#### Bald Eagle Management

As described in section V.C.4.a., *Threatened and Endangered Species*, SCE reports that bald eagles have been observed in the project area and may use the Portal forebay for foraging. The project area does not provide suitable nesting habitat, and the nearest known nests are located over 5 miles away. However, as noted in section V.C.4.b., *Threatened and Endangered Species*, bald eagle populations in California are increasing, and it is possible that the forebay will receive more use in the future.

SCE's continuance of the Endangered Species Alert and Raptor Protection programs for its Service Territory, plus implementation of FS 4(e) condition no. 13, would help to protect bald eagles, if present, from ground-disturbing actions. To provide project-specific protection, we recommend SCE include a bald eagle monitoring element as part of the fish and wildlife management plan described above. Like special status birds, amphibians, and bats, bald eagles may be affected by actions that require no ground-disturbance (e.g., changes in water quality, changes in fish abundance, increases in recreation activity). Such effects would not be addressed through SCE's existing programs or preparation of BEs as specified by FS 4(e) condition no. 13. For this reason, we conclude it would be prudent to provide for regular monitoring (i.e., at 5- to 10-year intervals) during any new license period. This approach would provide an opportunity for SCE to evaluate changing conditions and implement protective measures, if needed.

Results of monitoring should provide an indication of whether relocation of the segment of the project distribution line that crosses the Portal forebay may be beneficial, in the future. The distribution line represents a hazard to birds in flight between foraging habitat in the forebay, and resting areas in nearby uplands. We do not recommend relocation of the line at this time, because of the infrequent occurrence of bald eagles in the project area.

We estimate the annual cost of this measure would be about $300. The potential environmental benefits associated with this measure are worth the additional costs. With our recommended measures in place, we conclude that relicensing the Portal Project is not likely to adversely affect the bald eagle. FWS concurred with our finding in a letter dated September 1, 2005.

### 5. Recreation Resources

#### Recreation Report and Recreation Plan

SCE proposes to develop and file a Recreation Report and Recreation Plan in consultation with the FS as specified in condition nos. 14(a) and (b). We concur and recommend that the Recreation Report should be submitted every sixth year following license issuance and should include results of a recreation survey that collects visitor use information focusing on kinds of use, types of vehicles being accommodated, overnight and day use trends and visitor's facility expectations. The recreation surveys should also include specific questions about angler interactions with the power line crossing Portal forebay. The Recreation Plan should be filed with the Commission within one year of license issuance and should be developed in consultation with the FS and other applicable agencies or entities. Periodic updates to this plan should document goals for facility and site development and maintenance and obligations of the involved parties. We estimate that implementing these measures would cost about $10,700 on an annual basis and the potential environmental benefits associated with this measure are worth the additional costs.

#### Recreation Facility Operation and Maintenance

FS 4(e) condition no. 14(c) specifies that SCE contribute $3,400 per year to the FS for specific recreation facility operation and maintenance responsibilities. We believe that it should not be the responsibility of SCE to pay for the administration and enforcement of a contract between FS and its concessionaire, or to pay for the enforcement of dispersed recreation use which is documented as minimal and low impact. As part of its alternative 4(e) conditions filed with the FS on December 19, 2005, SCE suggest removal of FS condition 14(c), annual funding for administration and enforcement of the FS campground concessionaire and dispersed recreation monitoring, in its entirety as FS has provided no justification for these costs. We agree and do not recommend funding to the FS.

**Recreational Facility Improvements**

The 16 improvements for the Portal Forebay Campground specified by the FS in 4(e) condition no. 14(d) include:

1. Restricting vehicle access to the two roadside campsites.
2. Regrading and hardening all 14 campsites.
3. Replacing campground furniture (fire rings, tables, bear proof containers).
4. Improving, grading and surfacing parking spurs at each campsite.
5. Improving interior road and add parking turnouts at each new toilet.
6. Reconstructing interior road, repairing or replacing culverts and ditches.
7. Installing directional signs.
8. Improving erosion control along pathways and roads.
9. Installing four information signs, set into aggregate pads.
10. Replacing pit toilets with two prefabricated accessible vault toilets at each existing toilet location.
11. Installing a compacted 5-foot-wide path to the forebay.
12. Replacing dispersed area toilets (at the two Portal Forebay campsites located on the south side of the forebay) with “sweet smelling toilets.”
13. Relocating site(s) that are within 50 feet of high water.
14. Rerouting the distribution line so anglers don’t cast over it.
15. Installing a water supply system, including a well, holding tank and distribution system.
16. Adding more campsites when occupancy reaches 75 percent on summer weekends for three consecutive years.

SCE’s studies clearly indicate that the Portal Forebay Campground is needed to meet public demand for facilities at this location, and that the public values and intends to continue to use these facilities. SCE adopts the majority of the 16 FS specified improvements to the Portal Forebay Campground listed in FS 4(e) condition no. 14(d), with some timing adjustments, minor revisions or clarifications of amount of signage and

construction methods or material. However, SCE filed alternative 4(e) conditions to remove the measure to relocate the power line over Portal forebay, FS condition nos. 14(d)14 and 16(b), and the requirement to install a water supply system at Portal Forebay Campground, FS condition no. 14(d)15.

We find that most of the improvements are likely to be needed at some point during a new license period. However, SCE's studies indicate that not all of them are warranted at this time. As discussed in section V.C.5.b., *Recreational Resources*, we conclude that SCE should consult with FS to schedule the improvements within the context of the recreation plan. Specifically, we conclude planning is needed to establish priorities and appropriately schedule implementation of items 2 through 9 and items 11, 12, 15, and 16 (see below for more discussion of item 15). We recommend using the results of visitor surveys that will be conducted every six years to help identify when there is a demonstrated demand for improvements, and to supplement the data required by the Commission to be included in FERC Form 80.

SCE's recreation survey (SCE, 2003) identified that the capacity at the Portal Forebay Campground is sufficient to meet recreation demand. Only 1 of 23 random counts of campground occupancy during the summer found the campground at or above capacity. Current recreation use in the project area is consistent with the FS Recreation Opportunity Spectrum (ROS) Class objectives set for the area. Increased use could conflict with current management strategy to maintain the predominantly natural appearing environment with a low to moderate concentration of users. The impacts of additional campsites upon the FS ROS Class objectives and current management strategy should be incorporated into the decision process to determine if additional campsites are necessary. Additonal sites should be designed to best meet FS ROS Class objectives and maintain the predominately natural appearing environment.

Items needed to protect soils, vegetation and water quality (e.g., items 1 and 13, above) and improvements to make campsites and campground toilets accessible to people with disabilities (such as item 10, accessible restrooms) should also be implemented as soon as possible after license issuance. SCE, in consultation with FS and other interested parties, should determine the number of campsites to be modified and make this part of the recreation plan.

FS indicates relocation of the Portal power line where it crosses the forebay (item 14) is needed because anglers cast over this line and there is a risk of entanglement. SCE's alternative 4(e) condition suggests removal of this requirement, FS condition 14(d)14 and 16(b), because their angler use and satisfaction surveys did not identify recreation user interaction with the power line as a problem, nor was this problem raised as an issue during the relicensing consultation process or during scoping meetings. However, we note that the survey did not include specific questions about the power line. Therefore, we conclude that additional information is needed about angler interactions with the power line. We recommend SCE include specific questions about the location

and safety issue of the power line in the recreation visitor surveys mentioned above. The results of the surveys would be included in the Recreation Reports required every six years. The information from the surveys would be useful to SCE and FS in evaluating whether a problem exists and identifying any measures needed to reduce risks to visitors. We further conclude that, until the information is available to determine the need to relocate the power line, signs warning the public to avoid casting fishing lines over the power line should be installed at the forebay. We are also recommending bald eagle surveys, to evaluate whether this line may pose a risk of avian collision, if bald eagle use of the area increases.

As noted above, FS and SCE disagree about the need for and benefit of a water supply system. We found that SCE's surveys did not clearly demonstrate a current need for a water supply system at the Portal site. However, with predictions of a rapidly expanding and aging population (California Department of Aging, 2004), we anticipate that user needs may change in the future. Such changes, if any occur, could be appropriately addressed during consultation with FS as part of the recreation plan. If it is decided that a water supply system is needed, specific concerns about water contamination and safe storage of chemicals could be addressed through consultation and by including SWRCB and the California Department of Health Services as consulting agencies.

We estimate the annual costs of recreation facility improvements would be about $90,000, including annualized capital costs and barrier-free accessibility improvements (two sites included purely for cost-estimating purposes), but excluding the relocation of the Portal distribution line (item 14) and funding of specific FS operation and maintenance activities (condition no. 14 (c)). The potential environmental benefits associated with this measure are worth the additional costs. The cost of adding more campsites when occupancy reaches 75 percent on summer weekends for three consecutive years (item 16) is not included.

We note that while our independent analysis leads us to different conclusions than the FS regarding recreational improvements at the project, we recognize that, because of their mandatory nature, 4(e) conditions for recreation may be included by the Commission in any license issued for the project.

### 6. Land Management

#### Project Boundary Adjustments

We recommend that Camp 61 Creek from Portal forebay dam outlet works downstream to the confluence with the SFSJR be excluded from the FERC project boundary, because it is not a project feature and is not necessary to the operation of the project. We agree that the diversion of flows from Camp 61 Creek represents an ongoing project effect, but we anticipate that implementation of our recommended flow releases

will improve habitat conditions downstream of the Portal forebay. In addition to minimum instream flows and flushing flows, we are recommending that SCE consult with FS in developing a monitoring program to measure the effects of the new flow regime on channel condition and riparian vegetation. We are not recommending that SCE construct any new project facilities or access for maintenance or recreation associated with the flow regime or the monitoring, and we assume FS management would not conflict with improvements that may result from SCE's release of minimum instream flows and channel and riparian maintenance flows.

We recommend that the 1,000-foot-long reach of Rancheria Creek, from the Portal powerhouse outfall to Huntington Lake, be removed from the Portal Project boundary and made a component of FERC Project No. 67, of which the Ward tunnel is a primary component. Although Rancheria Creek flows through the Portal powerhouse, flows are controlled primarily by Project No. 67.

We recommend that the Eastwood Overflow Campground area be removed from the Portal Project and incorporated into the boundary of SCE Project No. 2175. The campground is used primarily to accommodate visitors to Huntington Lake, a primary feature of Project No. 2175.

We recommend the addition to the Portal Project of the 0.02-acre gaging station site on the East Fork of Camp 61 Creek and the 0.02-acre gaging station site on the West Fork of Camp 61 Creek to the Portal Project boundary. Both of these features are important to SCE's ability to monitor inflow to the project. Staff also supports SCE's proposed addition to the Portal Project boundary of the Adit 2 Notch Weir. SCE requires unrestricted access to all three sites for monitoring and maintenance.

We do not concur with the FS recommendation that the entire length of Adit 2 Creek should be included in the project boundary, although we agree that the Portal Project affects the creek; some seepage occurs through the Portal forebay saddle dike that contributes to flows in the creek, and materials used in constructing the saddle dike may be causing high levels of iron in the seepage. However, the creek developed as a result of leakage from the Ward tunnel, a feature of FERC Project No. 67. Adit 2 Creek is not necessary for the operation of the Portal Project, and would continue to exist in the absence of the project. Therefore, it is not necessary to include the creek in the project boundary.

**Land Management Plan**

SCE adopted FS 4(e) condition nos. 15 and 16 in its December 16, 2004 letter responding to FS preliminary 4(e) conditions. These conditions address the development of land and resource management plans associated with the use and protection of federal lands by the licensee. FS specified plans include a transportation system plan, a fire management plan, a sign plan, a hazardous substance plan, and a visual management

plan. We concur with the development of these plans and recommend that the plans be consolidated into a single land management plan due to the common objective of addressing the use and protection of federal lands. The development of a single plan for these resource areas would make consultation and reporting with FS more efficient. SCE's consultation with FS would occur during the annual consultation meeting as set forth in FS 4(e) condition no. 1.

The transportation and access management portion of this plan should identify roads within the project boundary for which SCE is solely responsible for protection and maintenance. It should also identify the need for FS roads outside of the project boundary for project operations and project-related recreation access, to determine if they should be included in the project boundary. The plan should also identify road condition, construction and closure needs, public safety, and parties responsible for maintenance.

The fire management and response portion of this plan should address the prevention of fires on project lands and the protection of public safety. It should also be consistent with the fire prevention guidelines put forth in the Sierra Nevada National Forest Plan Amendment (FS, 2003) and specific to project lands and project-related facilities.

The signage portion of this plan should ensure that public safety and information about project facilities is posted in a manner consistent with FS standards. The plan should address the need for signage associated with fire prevention, regulations and safety warnings, information and education, and directions. This portion of the land management plan could also be developed in concert with the recreation plan.

The hazardous substance portion of this plan should address the storage, use, and disposal of hazardous substances used by SCE at the project facilities. It should be developed in a manner that complies with 40 CFR § 112, *Oil Pollution Prevention*.

The development of this plan would have an initial capital cost of $60,000. We estimate the annual cost of this measure over a 30-year license term would be about $17,000. The potential environmental benefits associated with this measure are worth the additional costs.

### 7. Cultural Resources

#### Historic Properties Management Plan

As previously mentioned, the Portal Project is one of seven projects within SCE's Big Creek Hydropower System. To provide an integrated approach to cultural and historic resource protection, SCE proposes to develop an HPMP that would apply to all seven projects, rather than to develop separate HPMPs for each project. Some of the costs of developing an overall HPMP would be attributable to the Portal Project.

Although SCE estimated these would total approximately $153,000 in capital costs and $27,500 in annual costs, we have adjusted the costs somewhat to reflect the small size and limited occurrence of cultural resources in the Portal Project area. We estimate the capital cost of developing an HPMP that should be attributed to the Portal Project as $40,000, reflecting a total annualized cost of $9,500 when O&M is included. The potential environmental benefits associated with this measure are worth the additional costs.

## VIII. RECOMMENDATIONS OF FISH AND WILDLIFE AGENCIES

Under provisions of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project. However, no agency submitted Section 10(j) recommendations for the Portal Project.

## IX. CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA requires the Commission to consider the extent to which a project is consistent with federal and state comprehensive plans for improving, developing, and conserving waterways affected by the project. We reviewed 14 plans under Section 10(a)(2) that address various resources in California to determine whether

the Portal Project would be consistent with their provisions.[30] No conflicts were found with the plans.

## X. FINDING OF NO SIGNIFICANT IMPACT

Continuing to operate the Portal Project with our recommended measures involves little or no land-disturbing or land-clearing activities. Our recommendations would require SCE to implement protection and enhancement measures to improve water quality, sediment transport, habitat for fish and benthic macroinvertebrates, and potential habitat for mountain yellow-legged frogs in Camp 61 Creek. We also recommend measures to improve management of vegetation (including non-native invasive weeds and special status plants), wildlife, and recreation resources. As part of managing fish and wildlife, we recommend SCE develop a plan to monitor bald eagle use of the project area. We recommend a specific measure for cultural resources, as well as supporting SCE's completion and implementation of the HPMP that is being developed as part of the Big Creek ALP. We also include, in our recommendations, that SCE implement FS standard administrative conditions and measures pertaining to transportation, signage, fire response, and visual resources.

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[30] (1) California Department of Parks and Recreation. 1997. Public Opinions and Attitudes on Outdoor Recreation in California. 1997. Sacramento, California. March 1998; (2) California Department of Parks and Recreation. 1993. California Outdoor Recreation Plan. Sacramento, California. April 1994; (3) California Department of Parks and Recreation. 1980. Recreation Outlook in Planning District 2. Sacramento, California. April 1980; (4) California Department of Water Resources. 1983. The California water plan: projected use and available water supplies to 2010. Bulletin 160-83. Sacramento, California. December 1983; (5) California Department of Water Resources. 1994. California water plan update. Bulletin 160-93. Sacramento, California. October 1994; (6) California State Water Resources Control Board. 1975. Water quality control plan report. Sacramento, California; (7) California- the Resources Agency. Department of Parks and Recreation. 1983. Recreation needs in California. Sacramento, California. March 1983; (8) Fish and Wildlife Service. California Department of Fish and Game. California Waterfowl Association. Ducks Unlimited. 1990. Central Valley habitat joint venture implementation plan: a component of the North American waterfowl management plan. U.S. Department of the Interior, Portland, Oregon. February 1990; (9) Forest Service. 1992. Sierra National Forest land and resource management plan. Department of Agriculture, Clovis, California. March 1992; (10) State Water Resources Control Board. 1999. Water Quality Control Plans and Policies Adopted as Part of the State Comprehensive Plan. April 1999; (11) Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior; (12) Fish and Wildlife Service. Undated. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.; (13) National Park Service. 1982. The nationwide rivers inventory. Department of the Interior, Washington, D.C. January 1982; (14) Forest Service. 2001. Sierra Nevada National Forest plan amendment, including final environmental impact statement and Record of Decision. Department of Agriculture, Clovis, California. January 2001.

We concur with SCE's proposals to adjust the Portal Project boundaries by removing Camp 61 Creek between the spillway and the creek's confluence with the SFSJR; Eastwood Overflow Campground; and Rancheria Creek below the energy dissipater. We also support SCE's proposals to include gaging stations on East Fork and West Fork Camp 61 Creek, and the Adit 2 notch weir, within the Portal Project boundary.

Based on our independent analysis, issuance of a new license for the Portal Project, with our recommended measures, would not be a major federal action significantly affecting the quality of the human environment.

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# APPENDIX A

# RESPONSES TO COMMENTS ON AUGUST 4, 2005 DRAFT ENVIRONMENTAL ASSESSMENT

## Purpose and Need for Action

**Comment:** SCE responds to our statement in section II.B, *Need for Power*, of the draft EA where we state that data on the water year types in the San Joaquin River Basin for years 2000 through 2003 were not available by providing a link to the data at the California Department of Water Resources, Division of Flood Management website at http://cdec.water.ca.gov/cgi-progs/iodir/WSIHIST.

**Response:** We accessed the data and modified footnote 2, section II.B, *Need for Power*, of the final EA to reflect that water year 2000 was above normal, 2001 and 2002 were both dry water years, and water year 2003 was below normal.

## Water Resources

**Comment:** FS states that the draft EA ignores the FS objective of providing cold water refugia for native aquatic species in the lower reaches of Camp 61 Creek, and notes that using water from Ward Tunnel to provide its recommended minimum instream flows would provide cold water refugia for trout from the South Fork San Joaquin River.

**Response:** The draft EA did not ignore the FS objective of providing cold water refugia for native aquatic species in the lower reaches of Camp 61 Creek. As discussed on page 83 of the draft EA, SCE and staff recommended minimum instream flows would provide increased habitat quantity and quality. Based on continuous seasonal temperature data presented in the draft EA and this final EA (table 6), lower Camp 61 Creek summer temperatures typically do not currently exceed the optimum ranges for trout residing in the area. We also considered that higher instream flows, such as those recommended by FS, had the potential to raise water temperatures in lower Camp 61 Creek, by diluting colder inflow from Adit 2 Creek. We acknowledge that maintaining the cool summer water temperatures in lower Camp 61 Creek and increasing the physical habitat available would enhance cold water refugia for trout from the South Fork San Joaquin River, as discussed in the final EA on page 84.

**Comment:** USGS indicates that consideration could be given to implementing innovative treatment technologies used for acid mine drainage, and intercepting the iron-contaminated dam seepage followed by providing physical/chemical treatment of it before discharging it into the tailrace. It also states that referencing documents that outline potential environmental effects and past success of such physical removal of iron and manganese precipitates below dams would be useful in evaluating the feasibility of the proposed action.

**Response:** We have revised section V.C.1.b, *Iron in Waters Downstream of Portal Forebay*, in the final EA to include a discussion of additional potential treatment methods as noted by the USGS. Based on the quality of the water collected at the base of Portal

dam, we determined that wetlands may be effective at removing elevated concentrations of iron and manganese from the seepage, and recommend that SCE develop and implement an adaptive approach to removing the iron deposits from the catchment basin.

**Aquatic Resources**

**Comment:** FS states that while the objectives of its 4(e) conditions are presented correctly in the draft EA, it does not appear that we understand the ecological benefits of these 4(e) conditions, in particular how they relate to improving hydrologic and aquatic habitat conditions within the South Fork San Joaquin River (South Fork) basin.

**Response:** We understand the potential ecological benefits associated with the FS minimum flow 4(e) conditions and are familiar with the premise of the IHA/RVA (i.e., that the natural biotic composition, structure, and function of the aquatic ecosystem will be provided by protecting or restoring a natural hydrological regime on a river) (see section V.C.2.b, *Aquatic Resources*). Based on our analysis, the staff recommended flow regimes, including channel and riparian maintenance flows, would provide additional habitat area for all life stages of brown trout (and possibly rainbow trout) in Camp 61 Creek, improve water quality downstream of Portal forebay dam, and provide improved habitat connectivity throughout Camp 61 Creek. The increased volume of cooler water and increased habitat area in Camp 61 Creek during the summer and fall would also provide cold-water refugia for native aquatic species residing in the SFSJR and provide a source of cold water to contribute toward cooling temperatures in the SFSJR near the Portal project area.

**Comment:** FS comments that the draft EA has not appropriately characterized the condition of the fishery in Camp 61 Creek below Portal dam, or the amount of habitat that would be available under the FS-specified condition. FS notes that no criteria were identified in the draft EA related to the characterization that the brown trout population in Camp 61 Creek below Adit 2 Creek were "relatively healthy", and recommends that we use a three-tiered approach to evaluate the condition of the fishery. FS also contends that its minimum instream flow regime would provide more square feet of habitat than that provided by our recommended flow regime.

**Response:** We characterized the condition of the fishery in Camp 61 Creek using information provided in SCE's license application and responses to AIRs and subsequent agency and applicant filings with the Commission, including FS and SWRCB analyses and comments. Most of this information was derived from studies that were recommended by and developed in consultation with the FS and SWRCB. This is the best available information, and provides the most appropriate characterization of existing conditions.

In discussing the amount of fish habitat that would be available under FS flow regime, we

noted that the mean monthly flows released into Camp 61 Creek would more closely mimic the timing and duration of the natural hydrograph and would be substantially higher than those proposed by SCE. We also noted that these higher flows would likely increase the amount of available aquatic habitat in Camp 61 Creek compared to SCE's proposal and would further improve passage conditions for trout, especially during the spring and early summer (see section V.C.2.b, *Aquatic Resources*).

**Comment:** FS comments that the draft EA states that SCE's synthetic flow data overestimate the flow in Camp 61 Creek by 1.3 and 1.7 when compared to the estimated flow data set provided by SCE. In reality, FS states, the synthetic data underestimates low flows on average by 50 percent in June through November and may overestimate the flow the remainder of the year.

**Response:** We analyzed the synthetic flow data to help determine its potential value in our analysis of instream flow requirements. Because of the magnitude of the differences in estimated flow values, as noted by FS, we did not use any of the synthetic flow data (see section V.C.1.a, *Water Resources*). Despite its misgivings, we note the FS has based its flow regime on a combination of "available hydrology data, synthetic hydrology data, and conceptual geomorphic concepts."

**Comment:** FS comments that the draft EA misunderstands the nature of channel and riparian maintenance flows for Camp 61 Creek, as proposed by the FS, which is to fill the thalweg in most years, provide overbank flows in half of the years, and move sediment. It states that since there has been no flow in the channel for over 80 years, bankfull indicators are not readily apparent. FS notes that relying on the hydrologic record, which may not include accurate values for peak flows, also makes it difficult to determine appropriate flows.

**Response:** While the existing hydrologic record for East and West Fork Camp 61 Creek is relatively short, it is the most reliable source of hydrologic data for Camp 61 Creek. Our analysis of channel and riparian maintenance flows needed in Camp 61 Creek was based on daily discharge records for East and West Fork Camp 61 Creek, the predicted flows required to initiate sediment movement using Shield's Criterion, estimated bankfull flows using Manning's Equation, and the bedload transport model described in Andrews and Nankervis (1995) (see section V.C.2.b, *Channel and Riparian Maintenance Flows*). We concluded that SCE's recommended channel and riparian maintenance flows would be adequate to meet FS objectives for sediment transport, and would support a balance between channel maintenance needs and power production.

**Comment:** FS comments that the wetted perimeter and fish passage study completed by SCE shows that flows in the range of 0.7 cfs to 2 cfs are needed to assure fish passage and also to provide minimum flow for aquatic life such as macroinvertebrates. Choosing the minimum or even median value measured is not appropriate since the values are

associated with various channel features that require the specific flow determined at that site. Thus the choice of 0.5 cfs would not allow for fish passage or sufficient flow for macroinvertebrates along the entire channel. The FS instream flow requirement of 1.25 cfs in Critical and Dry Water Years would provide sufficient flow for aquatic life and assure passage along the entire channel.

**Response:** We agree that a 0.5 cfs flow release in August and September would not allow fish access along the entire Camp 61 Creek channel upstream of the Adit 2 Creek confluence due to the presence of natural impassable barriers. However, the 0.5 cfs flow release, plus leakage from the dam (up to 0.12cfs), would provide perennial flow throughout Camp 61 Creek during the natural summer low flow period, and according to SCE's fish passage analysis; it would substantially improve brown trout passage compared to existing conditions. In addition, our recommended flow of 0.5 cfs in August and September would be equal to the combined 50 percent exceedence flows for the East and West forks in September (0.5 cfs), and just 0.1 cfs lower than the combined 50 percent exceedence flows for the East and West forks in September (0.6 cfs). Our recommended 1.0-cfs flow release from October 1 through December 15 would further improve fish passage for brown trout during their critical spawning fall period. The 1.0-cfs recommended flow release during the spring and early summer (March 1 through July 31), would improve fish passage for brown trout, increase the amount of juvenile and adult brown trout rearing habitat, and may facilitate rainbow trout colonization of lower Camp 61 Creek (see section V.C.2.b, *Minimum Instream Flows*).

It is our understanding that a natural fish passage barrier located approximately 7,040 feet upstream from the Camp 61 Creek confluence is a complete barrier at all flows (SCE, 2003). This barrier would limit fish movement into upper Camp 61 Creek even under the FS flow regime.

**Comment:** FS states that it is not aware of literature that supports riparian flows as short as 8 days as proposed by the draft EA and SCE. The 16 days proposed by the FS meets both the Andrews and Nankervis duration and also the 2 week minimum suggested by Hill and others for riparian maintenance. The Nature Conservancy's Indicators of Hydrologic Alteration (IHA) analysis (Version 7, 2005) showed that unimpaired flows in the range proposed for the FS channel riparian maintenance flows would have had durations lasting on average three months.

**Response:** Although Andrews and Nankervis (1995) have found that bankfull flow persisted for an average of 16 days in Colorado, we agree with SCE and do not believe that this should be the default flow duration for Camp 61 Creek. Camp 61 Creek has a relatively low sediment load due to the presence of Portal forebay dam. Camp 61 Creek is also predominantly a steep-gradient, boulder-dominated channel type. Fine sediment transport over this stable, coarse-bed matrix will be the dominant mode of sediment transport and channel maintenance, rather than re-working bar deposits and transporting

gravels and coarser bed material. Our recommendation for 8 days of channel and riparian maintenance flows in wet and above normal year types should be adequate to transport fine sediments. The 16-day release period specified by FS would likely exceed the amount of time needed to reduce the sediment load and increase the sediment transport capacity of Camp 61 Creek.

**Comment:** FS comments that Camp 61 Creek downstream of Portal forebay has experienced extreme low flows for the past 80 years since the completion of the Ward tunnel. FS states that an IHA analysis (IHA Version 7, 2005) of the flow record combining the SCE new data and the synthetic data shows that the extreme low flows include all flows less than 0.2 cfs. The median small flood (which represents 2 year to 10 year event flows) was 67 cfs with a median duration of 94 days. The median high flow pulse was 4.5 cfs with a duration of 5 days and ranged from 2.5 cfs to 17.5 cfs with durations of 2 to 33 days. Large floods are rare but have a median peak of 364 cfs, a median duration of 138 days and a range of peak flows from 174 cfs to 485 cfs. These data further substantiate the FS choice of flows for this stream.

**Response:** We believe an IHA analysis of the flow record "combining the SCE new data and the synthetic data" is inappropriate, because the synthetic data used in the analysis is of questionable quality. For this reason, we compared the average annual flows calculated from the synthetic data for both forks of Camp 61 Creek to the average annual flows diverted into Ward tunnel (West Fork Camp 61 Creek and East Fork Camp 61 Creek) for the period 1967 through 1997 (excluding 1973–75). We found that using the synthetic data appears to substantially overestimate the average annual and monthly flows in Camp 61 Creek. We note that the FS has also acknowledged that the synthetic record may be too short to accurately reflect the flow variation in the watershed.

**Comment:** FS comments that recognition of the needs of native species is inherent to its minimum stream flow 4(e) condition. Focusing a recommendation on brown trout excludes the needs of other species that evolved under a flow regime that would be included with an unimpaired snowmelt hydrograph.

**Response:** Our analysis focused on brown trout because it was the only trout species captured in Camp 61 Creek below Portal forebay dam (FS considers brown trout to be a management indicator species). We acknowledge that our recommended flow regime might also lead to rainbow trout colonization of Camp 61 Creek. Neither species is native to the project area. Although FS indicates that recognition of the needs of native species is inherent to their minimum instream flow recommendation, we note that allowing any trout to remain in Camp 61 Creek at all discounts the needs of native amphibians, macroinvertebrates, and other species that have evolved at high elevations, in the absence of trout. With 4(e) conditions that specify much higher flows, but do not specify removal of trout, we assume that FS is seeking a balance between ecological benefits and recreational benefits. Likewise, staff's recommended flow regime seeks a

balance of resource values. Our recommended increase in instream flows over existing conditions would likely increase the distribution and abundance of brown trout, expand the abundance and diversity of important benthic macroinvertebrate species, and provide cold-water refugia for native aquatic species residing in the SFSJR. The increase in flow may also facilitate rainbow trout colonization of lower Camp 61 Creek.

**Comment:** While the draft EA acknowledges the effect the lack of a minimum stream flow has had on the fishery, it does not discuss how the timing of instream flows and the lack of spring peak flows favors brown trout over native species.

**Response:** We have added text to section V.C.2.b, *Aquatic Resources,* of the final EA describing how the existing instream flows and the lack of spring peak flows may favor brown trout over rainbow trout, a species that is native to California but not historically present in the Portal Project area. Based on our analysis, both our recommended and the FS specified flow regimes, including channel and riparian maintenance flows, would provide for the needs of brown trout and may serve to increase the distribution of rainbow trout. We note that our recommended flow regime and channel and riparian maintenance flows meet four of the five instream flow objectives identified by the FS (i.e. they would provide improved fish passage, provide habitat for all life stages of brown trout, improve water quality downstream of Portal forebay, and provide improved habitat connectivity), although they would not closely mimic the natural hydrograph.

**Comment:** FS notes that the draft EA (p. 177) characterizes the brown trout population in Camp 61 Creek below Adit 2 as "relatively healthy." No criteria were identified to establish this determination, although it apparently relates to the estimated number of brown trout in Camp 61 Creek being higher than other project streams, and similar to or greater than brown trout densities that in were found Vermilion Project reference streams (draft EA pp. 177-178). Table 3 summarizes fish sampling conducted in support of both the Portal and Vermilion relicensings. While brown trout densities in Camp 61 Creek are greater than several streams sampled, they are lower than most streams sampled and trout density (all species) is also lower than most streams sampled.

**Response:** The criterion we used to determine the condition of the existing brown trout population in Camp 61 Creek was our comparison to the estimated number of brown trout that were found in Vermilion Project reference streams. Based on the FS comment, we have modified the text in section V.C.2.b to clarify that brown trout population densities in Camp 61 Creek were similar to brown trout population densities found in the Vermilion Project reference streams. We have also deleted the phrase "relatively healthy" from text in section VII.B.2 (*Instream Flows in Camp 61 Creek*) and note instead that the existing density of brown trout in Camp 61 Creek (downstream of Adit 2 Creek) appears to be similar to the density of brown trout observed in Boggy Meadow Creek, Lower Mono Creek, and Cold Creek (Vermillion Project reference streams).

**Comment:** FS comments on the FERC recommended flow regime, with the draft EA stating that it would "substantially" improve aquatic habitat conditions in Camp 61 Creek for both brown trout and benthic macroinvertebrates, improve fish passage conditions, and improve water quality downstream of the forebay. While the draft EA identified problems with water quality, sediment transport, gravel embeddedness, and fish passage related to lack of a minimum stream flow, FS comments that there is no evaluation provided to quantify how providing 0.5 cfs more than the SCE proposal from October 1 through December 15 would provide "substantial" improvement (over SCE's proposal). Additionally, the draft EA (p. 84) describes the FS specified flow regime as "while the flow may provide an additional benefit to brown trout, the incremental benefit is relatively small compared to what would be realized under the staff recommended flow regime." Again, FS finds no basis to quantify the determination of "relatively small."

**Response:** Our basis for quantifying the degree of habitat improvement at the various flow regimes was based on SCE's wetted perimeter analysis, fish passage evaluation, and our analysis of water quality data to help determine what flows were needed to improve aquatic habitat conditions in Camp 61 Creek. According to SCE's wetted perimeter analysis, more square feet of habitat would be available under both SCE's and staff's recommended flow regimes than what is available under existing conditions (our baseline), especially upstream from the Adit 2 confluence. From October 1 through December 15, our recommended 1.0-cfs flow regime would provide even more square feet of habitat than would be realized under SCE's proposal. We continue to characterize this increase in habitat as "substantial" in the final EA. We agree that FS's variable flow regime would provide still more habitat, but we maintain the incremental benefit would be relatively small. We concluded that the FS recommended flow regime would provide more flow than is reasonably needed to protect aquatic resources in Camp 61 Creek.

**Comment:** SCE comments that the justification for monitoring of fish populations must be tied to a potential management decision and consequent action for it to be worthwhile. While the draft EA mentions the use of the data in developing adaptive strategies (page 93), it neither includes such nor identifies any management decisions that could result from the collection of the data. In fact, SCE notes no adaptive management is proposed for this area nor is adaptive management necessary.

SCE states the only reasonable management decision for fisheries would relate to assessing the potential impacts of geomorphic flows on recruitment of brown trout. SCE believes this fish monitoring could be done five years after the initiation of the new minimum instream flows for the reach, and that additional monitoring should not be necessary beyond addressing this specific objective.

**Response:** We recommended fish population monitoring to determine short-term and long-term response to both the channel and riparian maintenance flows and the modified instream flow releases. By monitoring in years 5 and 10, the immediate response to

changes in project operations would be characterized. Subsequent monitoring in year 20 would adequately characterize the long-term population trends. It is anticipated that the channel and riparian maintenance flows and increased minimum instream flows will benefit aquatic resources; however, if the modified flows result in adverse effects on aquatic resources, the Commission would have the authority to reopen any new license and consider the need for corrective actions. Such actions could include modifying flow releases at Portal diversion dam or modifying the magnitude, timing, or duration of the channel and riparian maintenance flows. We consider this to be a form of adaptive management. Finally, we note that SCE itself suggested a fish population monitoring program in years 5, 10, and 20 of a new project license in thier comments on FS preliminary 4(e) condition no. 12(d)1.

**Comment:** SCE notes that golden trout are not found in Portal Project streams, including Camp 61 Creek or its tributaries, or Rancheria Creek, and that golden trout was not included in SCE's list of species known to occur in the Portal Project area and should be removed from table 18 in the draft EA.

**Response:** SCE reports that a single golden trout-rainbow trout hybrid was captured in East Fork Camp 61 Creek during fish populations sample in fall 2001 and summer 2002 (SCE, 2003). We have modified table 18 and have clarified the text in V.C.2.a, *Aquatic Resources*, to indicate this single golden trout-rainbow trout hybrid documentation.

**Comment:** SCE notes that the use of *Smith, C.L. 1985. The inland fishes of New York State. New York State Department of Environmental Conservation, Albany, NY*, is not an appropriate choice for discussion of the life histories of California fish, and suggests instead the use of *Moyle, P.B. 2002. Inland fishes of California. University of California Press, Berkeley and Los Angeles. CA*, as a more appropriate source of information.

**Response:** We have replaced our reference to Smith, 1985 with the reference to Moyle, 2002.

**Comment:** SCE notes that in Table 19, it is stated that the preferred temperature range for rainbow trout is between 7.3 and 14.6ºC. SCE believes this is an underestimate of both the preferred and optimum temperatures for resident rainbow trout. It states the temperature preference data presented in Table 11 is for steelhead in the Pacific Northwest, which are a different genetic strain associated with a much different temperature regime than resident rainbow trout in the southern Sierra Nevada mountains and is inappropriate for use in this context.

**Response:** We agree that resident rainbow in California have likely developed preferred temperature requirements in direct response to local environmental conditions and have modified the text in section V.C.2.a of the final EA accordingly, using the information found in Moyle, 2002.

**Comment:** SCE observes that extremely cold water temperatures that occur at the altitude of Project streams result in considerably longer hatching and emergence times in the Portal Project waters than suggested by the draft EA. Emergence of young of the year brown trout at similar elevations in the Mokelumne River drainage has been observed to occur during June (Piotrowski et al. 1989). SCE notes that this later emergence in higher elevation streams has significant implications for the timing of potential geomorphic and riparian flow releases.

**Response:** We agree that water temperature has a profound effect on the hatching and emergence timing of trout (i.e. colder temperatures and delay hatching and emergence). We also agree that water temperatures in the project area are extremely cold for a relatively long period of time. In the draft EA, we restated the brown trout life history information presented in Section 2.4.1.1 of SCE's license application. We relied on this relatively general information, because no site-specific data describing hatching and emergence timing for trout in project area streams were provided. In the draft EA, we noted that brown trout and brook trout eggs hatch in 11 to 16 weeks, depending on water temperature, and fry emerge from the gravel several weeks later. We also noted that rainbow trout eggs hatch in 11 to 15 weeks, depending on water temperature, and fry emerge from the gravel 2 or 3 weeks after hatching.

We agree that emergence timing has significant implications for the timing of geomorphic and riparian flow releases; therefore, we are recommending SCE provide its channel and riparian maintenance flows during a 10-day period between June 1 and July 31 (ideally following the emergence of trout in Camp 61 Creek).

**Comment:** SCE comments that there may be a number of factors that contribute to the relatively low numbers of age 0+ brown trout at sampling sites in Camp 61 Creek besides a potential lack of spawning success, including emigration of young of the year and cannibalism, which is common among brown trout. In addition, the substrate observed in the vicinity of the sampling site was composed of sand, boulders and fine silt. Based on the results of the habitat mapping effort, however, other downstream areas contained more suitable spawning gravels and these areas are where age 0+ brown trout are likely to be more abundant. Age 0+ were present during both years of sampling, representing near 10% of the trout caught. However, the age 1+ age class during both years of sampling was very abundant clearly showing the recruitment of age 0+ fish during each of the previous years. SCE believes that this shows that not only was successful spawning taking place, but that fish were surviving to be recruited to the next age class. The age structure of the population clearly indicates that brown trout are recruiting and surviving to reasonable ages.

**Response:** We agree that a number of factors may contribute to the relatively low numbers of age 0+ brown trout at sampling sites in Camp 61 Creek. However, based on

our review of aquatic habitat conditions in Camp 61 Creek, it is most likely that a lack of suitable spawning habitat (due to sedimentation and low flows) is a major limiting factor that may be at least partially responsible for the low number of age 0+ brown trout. The presence of large numbers of age 1+ brown trout in the sampling site may be due to emigration into the sampling area from downstream river reaches.

**Comment:** SCE comments regarding the draft EA characterization of the results of SCE's macroinvertebrate studies and specifically identifies Camp 61 Creek Site 1 as having metrics showing the most disturbance as compared to other sites in the stream. SCE notes the draft EA did not identify the location of this site as being immediately downstream of Portal forebay in Camp 61 Creek. SCE believes this is an area of currently intermittent flows and most affected by temperature and water quality issues associated with those low flows, which will be addressed by its proposed instream flows.

**Response:** We have clarified the location of the site in section V.C.2.a of the final EA and note that intermittent flows as a result of hydroelectric project operation likely caused these metrics to be some of the lowest in the project area. Our recommended flow regime would likely improve these values compared to existing conditions.

**Comment:** SCE believes that the draft EA makes a misleading comparison between East and West Forks of Camp 61 Creek and Camp 61 Creek downstream of Adit 2 Creek in terms of species composition and trout densities. SCE believes direct comparisons of densities of brook trout in the East and West Forks of Camp 61 Creek with brown trout in Camp 61 Creek are inappropriate due to the differences between these species, including differences in size and age of fish.

**Response:** We disagree that direct comparisons are inappropriate. Differences in species composition (brown trout vs. brook trout), relative abundance, and age structure within a relatively small project-affected stream system provide important insight into how project operations affect aquatic resources and ecological processes.

**Comment:** SCE states that the text on page 85 of the draft EA that characterizes its channel and riparian maintenance flow should be revised as follows: 'SCE's proposed channel and riparian maintenance flows could commence any day during the April 1 to July 31 period during above normal and wet water years, but once started, the flow schedule would be followed to completion.'

**Response:** We have modified the text in section V.C.2.b, *Aquatic Resources*, of the final EA in response to SCE's comment.

**Comment:** SCE agrees with the draft EA's proposal to develop a plan to monitor sediment accumulation and spawning gravel volume and quality in Camp 61 Creek. However, SCE does not agree with the FS 4(e) condition that 4 monitoring events are

needed, or that the sediment monitoring should be timed to coincide with the fish monitoring program.

Therefore, SCE proposes to conduct the baseline sediment monitoring prior to the first channel and riparian maintenance flow release. One additional sediment monitoring event should be implemented shortly after the first channel and riparian maintenance flow release, whenever that may occur during the license period. No other monitoring should be necessary over longer time frames in order to detect the effect of the channel and riparian maintenance flow on sediment conditions. SCE does not believe there is a technical reason to conduct the sediment monitoring on the same schedule as the fish monitoring. Sediment responses to the channel and riparian maintenance flow release should be immediate after the release and, therefore, monitoring should be conducted immediately after the first channel and riparian maintenance flow release occurs to accurately document the effects.

**Response:** We disagree with SCE's sediment monitoring schedule as reflected in its comment. Monitoring sediment accumulation and spawning gravel volume and quality in Camp 61 Creek in years baseline, 5, 10, and 20 (as recommended in the final EA) would allow SCE and the resource agencies to determine both short-term and long-term changes in sediment quantity and quality as the channel slowly adjusts to the prescribed flows. A single survey, completed immediately after the first channel and riparian maintenance flow release, would not adequately capture long-term changes in gravel recruitment and other factors influencing sediment conditions. We agree there is no technical reason to conduct sediment monitoring in combination fish population monitoring. We recommended this approach based on the assumption that conducting the surveys at the same time would be more cost-effective than conducting separate surveys.

**Comment:** SCE provided additional information regarding entrainment at the project powerhouse.

**Response:** We have added the August and September 2003 entrainment information to section V.C.2.b of the final EA. While we agree that entrainment was relatively low during the sampling in 2001, 2002 and 2003, there is inadequate information available to determine the total number of fish being entrained and the effects of this entrainment on fish populations residing in Portal forebay and its tributaries. It is also impossible to know if the fish collected during tailrace sampling originated from the Portal Project area or from other diverted waterbodies located upstream of the Portal Project (entering the Portal powerhouse via Ward tunnel).

**Comment:** SCE agrees that the requirement to release channel and riparian maintenance flows between April 1 to the end of July allows for greater operational flexibility than the

timing of the channel and riparian maintenance flows specified by FS (between May 1 and May 16). In addition, SCE notes that during most years the natural runoff pattern would not have provided the channel and riparian maintenance flows on the schedule specified by FS. SCE reviewed the gaging records for East and West Forks of Camp 61 Creek (Table 1 below) and found that in 12 out of 14 years, channel and riparian maintenance flows would not be available beginning on May 1 because runoff occurs later in the year at this elevation range. Therefore, SCE believes that the channel and riparian maintenance flow should be based on conditions that are similar to the natural runoff magnitude and pattern, which is the FS stated rationale. We note however, that SCE included in its alternative 4(e) conditions, a shift in the timing of the release period from between April 1 and July 31 to between June 1 and July 31.

In addition, the comparatively high compositional and structural diversities characteristic of riparian communities depend on an inter-annually variable flow regime. As the timing of runoff naturally varies from year to year, different individuals and species are able to successfully germinate and survive, thereby increasing the species and genetic diversity of the community over the long-term. SCE's alternative 4(e) condition would provide this variability, allow more flexibility in SCE's operations, and minimize impacts on juvenile brown trout recruitment.

**Response:** In the draft EA we agreed with SCE regarding the need for greater flexibility in the timing of channel and riparian maintenance flows. For this reason, we recommended that SCE release channel and riparian maintenance flows between April 1 and July 31 of above normal and wet water year types. The start of flow releases during these years should be determined in consultation with the FS and other interested resource agencies. However, in the final EA, we recommend SCE release channel and riparian maintenance flows between June 1 and July 31 consistent with SCE's alternative 4(e) condition. This modified release period would also provide some operational flexibility while minimizing potential impacts on brown trout recruitment.

**Comment:** FWS does not agree that our recommended measures for water and aquatic resources would adequately protect, mitigate, and enhance the fish and wildlife resources affected by the proposed project. The proposed instream flows and pulse flows are too low and too short in duration to adequately meet the needs of fish and wildlife. The proposed instream flow releases do not adequately match the pattern of the natural hydrograph of the Big Creek System nor do they account for a variety of different water year types. FWS recommends that the instream flow releases to Camp 61 Creek be increased across all months of the year and that the release of these instream flows be shaped to characterize the natural hydrograph within the watershed. In addition, the magnitude and duration of the proposed Camp 61 Creek channel and riparian maintenance instream pulse flows need to be increased to adequately protect, mitigate and enhance the physical and biological riverine processes that have been affected by the project.

**Response:** Our recommended instream flows and channel and riparian maintenance flows for Camp 61 Creek were based on the results of the SCE's wetted perimeter analysis, the fish passage study, the flows required to initiate sediment movement using Shield's Criterion, estimated bankfull flows in East Fork Camp 61 Creek, West Fork Camp 61 Creek, and Camp 61 Creek using Manning's Equation, and a review of historical daily discharge records. Based on our analysis of this information, our recommended flows would adequately meet the needs of fish and wildlife, while allowing for a reasonable level of power production.

**Terrestrial Resources**

**Comment:** Based on SCE's Properly Functioning Condition (PFC) analysis, FS notes that the riparian vegetation along the Camp 61 Creek channel exhibited signs of stress through leaf drop. FS concludes that this finding supports their assessment of minimum streamflow requirements.

**Response:** The results of the PFC assessment presented in Section 2.6 of SCE's license application show that all of the reaches surveyed were determined to be in "Proper Functioning Condition", and the riparian vegetation was noted as healthy and vigorous with the exception of localized areas where some premature leaf drop and tip burn was observed. Because the assessment indicated that the overall riparian area was functioning properly, and the areas of premature leaf drop were in localized areas, we conclude that premature leaf drop is not indicative of the overall riparian condition, and does not support a need for flows of the magnitude FS is specifying.

**Comment:** SCE believes that the riparian monitoring scheduled for years 2, 4, 10, 15, 20, and 30 is excessive and poorly timed.

**Response:** As described in section VII.B.3 (*Riparian Vegetation Monitoring*), we recognize the value of the broad-level monitoring to collect data on species composition, to monitor the width of the riparian zone, and to assess bank stability in Camp 61 Creek by the state of the riparian vegetation. In SCE's comments on the draft EA, it proposed to evaluate the baseline state of the riparian community in conjunction with the first sediment monitoring event, then conduct qualitative observations again in years 10, 20, and 30. We agree with SCE's riparian vegetation monitoring proposal as this schedule would provide the baseline information that would facilitate identification of broad-level changes in plant communities and bank surface protection over time in relation to the new flow regime.

**Comment:** SCE agrees that proposed channel maintenance and riparian flows may decrease encroachment of vegetation into the channel of Camp 61 Creek over time as the existing vegetation matures and dies and is not replaced by new seedlings. In addition to

reproduction from seed, however, SCE notes that the species present along Camp 61 Creek readily reproduce vegetatively. SCE agrees with the draft EA that vegetation response to flows would depend on the sequence of water year types that occur during any new license period. SCE points out that the long-term frequency of wet and above normal water year types is approximately half the total years counted, and believes this should be adequate to maintain an appropriate balance between scouring and riparian encroachment.

**Response:** The effect of channel maintenance flows on vegetative sprouts would be similar to the effect on seedlings in that they would not likely mature. While seedlings may be uprooted during channel scouring, vegetative sprouts would be abraded to a degree that the sprouts may not successfully mature. As noted in our analysis these effects would depend to a great extent on the pattern of water year types that occur through any new license period.

Over the long-term we expect that the distribution of the riparian vegetation community and its encroachment upon Camp 61 Creek will reach an equilibrium with the new stream flow regime and there will be a balance between scouring and riparian encroachment. However, compared to the existing conditions in which no channel and riparian maintenance flows are provided, we expect that some riparian vegetation would be lost as encroachment is reduced.

**Comment:** SCE disagrees that annual monitoring of special-status amphibians, specifically Yosemite toad and mountain yellow-legged frog, should be conducted, because none were identified during surveys and existing habitat in Camp 61 Creek is limited. SCE states their proposals would increase habitat quality for these species with no apparent adverse effects on habitat quality.

**Response:** SCE's previous surveys did not cover all suitable habitat. Surveys for mountain yellow-legged frog were limited to one 500-meter segment of Camp 61 Creek, although SCE classified habitat suitability throughout the creek as being moderate, with segments of poor and good habitat. Surveys for Yosemite toad covered only the upper wetland along Adit 2 Creek, although the lower 0.9 miles of Adit 2 Creek contains suitable habitat Yosemite toad, and for mountain yellow-legged frog, as well.

Implementation of higher base flows and channel and riparian maintenance flows may improve habitat for the mountain yellow-legged frog in Camp 61 Creek over time, but reducing flows in Adit 2 Creek may reduce habitat suitability for both species in lower Adit 2 Creek. In light of the special status of both species, we conclude it is reasonable for SCE to conduct surveys in Camp 61 and Adit 2 creeks to monitor the consequences, whether beneficial or adverse, of the proposed actions.

**Comment:** SCE disagrees with the draft EA recommendation to conduct annual

monitoring for noxious weeds, because SCE will have a Vegetation Management Plan that has been agreed upon by the regulatory agencies. SCE will monitor treated noxious weed populations for one year to determine the effectiveness of treatment and determine if additional treatment is necessary, and will monitor project facilities, roads, trails, and recreation features every 10 years.

**Response:** We agree SCE should treat weed infestations, and should monitor the effectiveness of treatments to determine whether additional control measures are needed. However, the most cost-effective approach to weed control is prevention of establishment and spread (Bossard, et al., 2000). Because prevention requires early detection, frequent monitoring is a key element of any weed management plan.

To date, the primary weed species of concern is cheatgrass. Cheatgrass is considered a species of the greatest ecological concern in California, because it degrades native habitats, spreads rapidly, and is difficult to control. Cheatgrass has been mapped along the Portal forebay shoreline, at the dam, and in the parking area at the powerhouse. Seven invasive weed species (including cheatgrass) were identified during surveys of the Big Creek ALP study area (TERR-2, 2003 Technical Study Reports). SCE's license application lists a total of 21 weeds that could occur in the project area.

We conclude that the characteristics of many weed species (including cheatgrass, in particular) warrant a longer period of monitoring after treatment and at sites of ground disturbance than one year, as SCE proposes. We concur with FS 4(e) condition no. 17 that SCE should monitor annually for three years following treatment or disturbance, and have modified the text in section VII.B.3 (*Vegetation Management Plan*) to explain the basis for this recommendation.

We conclude that the risk of establishment and spread of weeds warrants more intensive coverage of the project area than 10-year survey intervals would allow but that annual monitoring may be unnecessary, in light of the relatively low levels of maintenance and recreation activity in the project area. We have modified the text in section VII.B.3 (*Vegetation Management Plan*) to clarify that SCE should monitor project-related facilities and high-probability areas for weed occurrence (e.g., roadsides, disturbed soils, riparian habitats immediately downstream of project facilities) at five-year intervals. We have also modified the text to indicate that monitoring at 10-year intervals should be adequate to address aquatic weeds.

**Comment:** SCE disagrees with the draft EA recommendation that annual monitoring of the special-status plant population under the distribution line would be necessary to evaluate the effectiveness of protective measures. Vegetation maintenance on the distribution line corridor occurs as needed following annual inspections.

**Response:** We agree with SCE. By "monitoring the effectiveness of protective

measures," we intend that SCE should check whether boulder or pylons placed to prevent accidental trampling of subalpine fireweed are having their intended effect or whether an alternative would be needed (e.g., larger boulders). We assume this annual check could be accomplished at the same time SCE is inspecting the distribution line.

**Comment:** SCE disagrees with the draft EA recommendation to conduct regular bald eagle monitoring in the project area, because the project does not represent appropriate nesting habitat and is too high in elevation to represent potential wintering habitat, and proposed mitigation measures will maintain current levels of recreation and potential foraging habitat.

**Response:** As mentioned in section in section V.C.4.b (*Threatened and Endangered Species*), bald eagle populations in California are increasing. About 30 breeding pairs were documented in 1977, while surveys in 1999 indicated the number had increased to over 150 (CDFG, 2001). In addition to increasing in numbers, bald eagles are recolonizing their range in California. In 1977, bald eagles were known to nest in eight of the 58 counties in the state, and as of 1999, bald eagle nests were documented in 28 counties. As bald eagles fill suitable habitat, they begin to use marginal habitat (Jackman and Jenkins, 2004), and it is possible that bald eagles may nest in the project area within any new license period. Monitoring for new nests and monitoring bald eagle use of foraging areas would be consistent with guidelines recently prepared for FWS in California (Jackman and Jenkins, 2004), which suggest that even if nesting is unlikely, "eagles may still hunt in project areas and nest elsewhere, so an assessment of foraging activity may be necessary in foraging habitats potentially affected by project construction or operation."

**Comment:** SCE disagrees with the draft EA statement that monitoring of bald eagle populations would provide an indication of whether to relocate the segment of the distribution line that crosses the Portal forebay. SCE believes its Avian Protection Program would be best in determining whether to relocate the line.

**Response:** SCE's Avian Protection Program depends on documenting mortality as the criteria for determining whether remedial action is needed. The program also includes measures that should be implemented in raptor concentration areas, and measures to protect nests on power poles. We agree that SCE's program is valuable as a system-wide application, but it does not address the somewhat unique conditions at Portal. As mentioned above, bald eagle populations in the project vicinity (including Huntington Lake) may increase, and foraging may occur more frequently in the Portal forebay than it does under current conditions, and that as a result, the risk of collision with the distribution line may increase. Our recommendation is for SCE to take a proactive approach and conduct surveys at 5 to 10-year intervals through any new license period to evaluate changes in bald eagle use of the project area, and associated risk of collision with the distribution line. Using this information, SCE would be able to determine

whether there is a need to relocate the line.

**Recreation Resources**

**Comment:** FS comments that it does not require accessibility improvements at every campsite, but that there are currently accepted guidelines that describe an acceptable level of accessibility.

**Response:** We understand that the FS does not require accessibility at every site. The final EA recommends that SCE consult with the FS and other interested parties to determine the number of camp sites to be modified and make this part of the recreation plan(see section VII.B.5).

**Comment:** FS comments that SCE's proposal to support road repairs induced only by its operation and maintenance activities is unreasonable because, while SCE operations occur within the Portal Forebay Campground, the Campground exists because SCE built the forebay and provided the setting for camping.

**Response:** As indicated in section VII.B.5 of the final EA we recommend that SCE should consult with the FS to schedule the improvements within the context of the recreation plan. SCE should maintain the road because it is within the project boundary and needed for project purposes. We expect that SCE would determine the appropriate level and scheduling of improvements for visitor satisfaction in consultation with FS, as they develop the recreation plan.

**Comment:** FS comments that the Portal Forebay Campground, while semi-primitive, must be managed to health and cleanliness standards. Reconstruction of the entire facility during the term of the license will be needed to efficiently and effectively provide adequate facilities through the entire term of the license.

**Response:** We agree that, while most of the FS specified improvements are likely to be needed at some point during the new license period, studies indicate that not all of them are warranted at this time. We have recommended that SCE consult with the FS to schedule the improvements within the context of the recreation plan whereby improvements can be identified and prioritized over the length of any new license period.

**Comment:** FS notes that any construction of a new channel and other supporting features between Adit 2 Creek and Camp 61 Creek within the Ansel Adams Wilderness would need to comply with the FS policy on the use of mechanized equipment within wilderness areas.

**Response:** We do not concur with SCE's proposal to construct a new channel between Adit 2 Creek and Camp 61 Creek. As discussed in sections V.C.1.b (*Water Resources*),

V.C.2.b (*Aquatic Resources*) and V.C.5.b (*Recreation Resources*), the reasons for not recommending this measure include: the risk of unintended adverse effects on water quality and fish habitat in lower Adit 2 Creek; the potential adverse effects on wetlands, native amphibians, California spotted owl, aesthetics, and cultural resources; and the possible hindrance to hikers on the Rattlesnake-Mono Crossing trail. We recommend that SCE consult with FS and SWRCB to develop a plan to stabilize the eroding segment of Adit 2 Creek. Development of this plan would provide an opportunity for FS to address concerns about constructing a new channel in a designated wilderness.

**Comment:** FS comments that the distribution line across the Portal forebay is a concern for the health and safety of recreation visitors, particularly anglers at Portal forebay. The FS indicates that the current location of the distribution line is a potential safety hazard because anglers may cast fishing lines over it. FS comments indicate that there has been previous discussion with SCE about moving this distribution line.

**Response:** The segment of the distribution line that crosses the Portal forebay was not identified in the relicensing record as a concern until FS specified relocation of the distribution line in its preliminary 4(e) conditions no. 14(d) [Construction Responsibilities] and 16(b) [Visual Management Plan], and we are not aware of any SCE commitment or proposal to move the line. As no information has been presented to assist in determining the scope of the issue, or in analyzing alternatives, we are recommending that SCE collect this information through their visitor surveys and include results in the Recreation Reports, required every 6 years. This information would be useful in evaluating the scope of the problem and identifying any needed modifications to the line. We are further recommending that SCE install signs at the forebay warning anglers of the danger of casting over the power line. A potential risk of avian collision with this distribution line could also be a concern if bald eagle use of the area increases and is addressed in section VII.B.4 (*Bald Eagle Management*).

**Comment:** FS comments that FERC's assumption that the FS can charge fees to help defray the cost of operating and maintaining recreation facilities is not entirely correct. A concessionaire can collect fees for the daily operation and maintenance, yet there is no mechanism for the FS to collect and retain money for the administration of the concessionaire.

**Response:** We have removed this assumption from our analysis.

**Comment:** SCE comments that the current results of user surveys do not warrant that all of the FS specified improvements be conducted immediately. SCE does not agree with item 15 requiring the installation of a water system at Portal Forebay Campground. SCE believes the installation of a water supply system at Portal Campground is unreasonable due to excessive cost for installation, maintenance and monitoring of a well, water distribution piping and a filtration system for only 14 campsites in a semi-primitive

location. SCE estimates that the capital cost to install and then operate a water supply system at the Portal Campground is $306,500.

**Response:** We agree that a water supply system is not needed at this time. In the final EA we recommend that SCE consult with the FS to schedule the water supply improvements within the context of the recreation plan. The number of users who responded to a survey reflected an even split between those who thought that drinking water, developed restrooms, and showers were important or very important and those who thought such amenities were not important or somewhat important. With an expanding and aging population, we anticipate that user needs may change in the future. Consultation with FS during development of the recreation plan and completion of recreation Form 80 at six-year intervals should provide the information SCE will need to determine when a water supply system should be constructed, and how to ensure it will be consistent with designation of the campground as a semi-primitive facility. At that point, we recommend that SCE consult with SWRCB and the California Department of Health Services regarding methods to minimize the risk of water contamination and the risk of adverse ecological effects associated with storage and use of chlorine.

Costs shown in table 42 assume a water supply system would be constructed in year 15 of any new license. Costs have been revised, based on SCE's comments on the draft EA.

**Developmental Resources**

**Comment:** FS is concerned that the draft EA vastly overstates the impacts of requiring instream flows in Camp 61 Creek on power generation at the Portal Powerhouse as Camp 61 Creek flows are incidental to power production at the Portal Project.

**Response:** As we described under *Project Operation* in section III (*Proposed Action and Action Alternatives*), the Portal powerhouse is located at the downstream end of Ward tunnel and adjacent to Rancheria Creek immediately upstream of Huntington Lake (figure 2). Ward tunnel (FERC Project No. 67) transports water from upper SFSJR diversions and reservoirs (FERC Project Nos. 67 and 2086) to Huntington Lake for power production in the lower BCHS. Water diverted into Camp 61 Creek is diverted around these projects and hence energy losses are not strictly limited to the Portal Project, but to the flow-line below Portal as well. Based on the combined Portal energy losses and downstream energy losses, we conclude that 7,136 MWh, or $334,200 annualized cost, is a reasonable estimate for the effect of the FS environmental flow proposal.

We also note that FS estimated environmental flows would range from an average of 905 acre-feet for critical years to 3,265 acre-feet per year for wet years. Staff estimated the annual volume of instream flow as 2,287 acre-feet per year, which falls within this range.

# APPENDIX B

# U.S. FOREST SERVICE FINAL TERMS AND CONDITIONS SEPTEMBER 30, 2005

**Portal Project, FERC No. 2174**
**Final 4(e) Terms and Conditions**

To clarify modifications between the Preliminary 4(e) Conditions and the enclosed Final 4(e) Conditions, we have included this crosswalk table.

| # | Preliminary 4(e) Title | Final 4(e) Title | Remarks |
|---|---|---|---|
| 1 | Consultation | Consultation | Clarified per Licensee request |
| 2 | Approval of Changes After Initial Construction | Approval of Changes After Initial Construction | Clarified per Licensee request |
| 3 | Maintenance of Improvements | Maintenance of Improvements on or Affecting NFSL | Clarified per Licensee request |
| 4 | Existing Claims | Existing Claims | No Change |
| 5 | Compliance with Regulations | Compliance with Regulations | reworded for consistency with FS Policy |
| 6 | Protection of United States Property | Protection of United States Property | No Change |
| 7 | Surrender of License or Transfer of Ownership | Surrender of License or Transfer of Ownership | reworded for consistency with FS Policy |
| 8 | Indemnification | Indemnification | reworded for consistency with FS Policy |
| 9 | Damage - High Hazard | Damage to Land, Property and Interests of the United States | Title Change for clarity – reworded for consistency with FS Policy |
| 10 | Risks and Hazards | Risks and Hazards on National Forest System Lands | Title Change for clarity – reworded for consistency with FS Policy |
| 11 | Pesticide-Use Restrictions | Pesticide-Use Restrictions on NFSL | Title Change for clarity |
| 12 | Flow Management | Flow Management | Uses Revised Condition Filed on March 30, 2005 – modified monitoring schedule per FERC DEA suggestion |

| # | Preliminary 4(e) Title | Final 4(e) Title | Remarks |
|---|---|---|---|
| 13 | Protection of Forest Service Special Status Species | Protection of Forest Service Special Status Species | No change |
| 14 | Recreation Resource Management | Recreation Resource Management | No change |
| 15 | Transportation System | Transportation System | Minor reword for clarity in Part C |
| 16 | Land Resource Plans for Mitigating Project Effects to NFS Resources | Land Resource Plans for Mitigating Project Effects to NFS Resources | Reword of Fire Plan for consistency with Forest Service Policy |
| 17 | Vegetation And Invasive Weed Management Plan | Vegetation And Invasive Weed Management Plan | No Change |
| 18 | Cultural Resources Management Plan | Cultural Resources Management Plan | No Change |
| 19 | Coordination With Projects In The Big Creek System | Coordination With Projects In The Big Creek System | No Change |
| 20 | Forest Service Reserves the Right to Revise Section 4(e) Conditions in Response to Other Agencies Requirements | Forest Service Reserves the Right to Revise Section 4(e) Conditions in Response to Other Agencies Requirements | No Change |

# ENCLOSURE 1

FINAL LICENSE TERMS AND CONDITIONS
NECESSARY FOR THE PROTECTION AND UTILIZATION
OF THE SIERRA NATIONAL FOREST
IN CONNECTION WITH
THE APPLICATION FOR FERC LICENSE, NO. 2174,
PORTAL HYDROELECTRIC PROJECT
SOUTHERN CALIFORNIA EDISON COMPANY

## I. GENERAL

The Forest Service (FS) provides the following Final Section 4(e) conditions for the Portal Hydroelectric Project, FERC No. 2174 in accordance with 19 CFR 4.34(b)(1)(i). Section 4(e) of the Federal Power Act (FPA) states the Commission may issue a license for a project within a reservation only if it finds that the license will not interfere or be inconsistent with the purpose for which such reservation was created or acquired. This is an independent threshold determination made by FERC, with the purpose of the reservation defined by the authorizing legislation or proclamation (see Rainsong v. FERC, 106 F.3d 269 (9th Cir. 1977). The FS, for its protection and utilization determination under Section 4(e) of the FPA may rely on broader purposes than those contained in the original authorizing statutes and proclamations in prescribing conditions (see Southern California Edison v. FERC, 116F.3d 507 (D.C. Cir. 1997)).

The following terms and conditions are based on those resource and management requirements enumerated in the Organic Administration Act of 1897 (30 Stat. 11), the Multiple-Use Sustained Yield Act of 1960 (74 Stat. 215), the National Forest Management Act of 1976 (90 Stat. 2949), and any other law specifically establishing a unit of the National Forest System or prescribing the management thereof (such as the Wilderness Act or the Wild and Scenic Rivers Act), as such laws may be amended from time to time, and as implemented by regulations and approved Land and Resource Management Plans prepared in accordance with the National Forest Management Act. Specifically, the 4(e) conditions in this document are based on the Land and Resource Management Plan (as amended) for the Sierra National Forest, as approved by the Regional Forester of the Pacific Southwest Region.

Pursuant to Section 4(e) of the Federal Power Act, the Secretary of Agriculture, acting by and through the Forest Service, considers the following conditions necessary for the adequate protection and utilization of the land and resources of the Sierra National Forest. License articles contained in the Federal Energy Regulatory Commission's (Commission) Standard Form L-1 (revised October 1975) issued by Order No. 540, dated October 31, 1975, cover general requirements. Section II of this document includes administrative conditions deemed necessary

for the administration of National Forest System lands. Section III covers specific resource requirements for protection and utilization of National Forest System lands.

## II. ADMINISTRATIVE FOREST SERVICE PROVISIONS

### Condition No. 1- CONSULTATION

Each year, the Licensee shall consult with the Forest Service with regard to measures needed to ensure protection and utilization of the National Forest resources affected by the project. The date of the consultation meeting will be mutually agreed to by the Licensee and the Forest Service but in general will be held 60 days prior to the beginning of the recreation season to facilitate implementation of flow management requirements and recreational management activities. Representatives from the U.S. Fish and Wildlife Service, California Department of Fish and Game, or other interested agency representatives concerned with operation of the project may request to attend the meeting.

Consultation shall include, but not be limited to:

- A status report regarding implementation of license conditions;
- Results of any monitoring studies performed over the previous year in formats agreed to by the Forest Service and the Licensee during development of study plans;
- Review of any non-routine maintenance;
- Discussion of any foreseeable changes to project facilities or features;
- Discussion of any necessary revisions or modifications to plans approved as part of this license;
- Discussion of needed protection measures for species newly listed as threatened, endangered, or sensitive or, changes to existing management plans that may no longer be warranted due to delisting of species or, to incorporate new knowledge about a species requiring protection; and
- Discussion of elements of current year maintenance plans, e.g. road maintenance.

A record of the meeting shall be kept by the Licensee and shall include any recommendations made by the Forest Service for the protection of National Forest System lands (NFSL) and resources. The Licensee shall file the meeting record, if requested, with the Commission no later than 60 days following the meeting.

A copy of the certified record for the previous water year regarding instream flow, monitoring reports, and other pertinent records shall be provided to the Forest Service at least 10 days prior to the meeting date, unless otherwise agreed.

Copies of other reports related to project safety and non-compliance shall be submitted to the Forest Service concurrently with submittal to the FERC. These include, but are not limited to: any non-compliance report filed by the licensee, geologic or seismic reports, and structural safety reports for facilities located on or affecting NFSL.

The Forest Service reserves the right, after notice and opportunity for comment, to require changes in the project and its operation through revision of the 4(e) conditions to accomplish protection and utilization of National Forest lands and resources.

**Condition No. 2- APPROVAL OF CHANGES AFTER INITIAL CONSTRUCTION**

Notwithstanding any license authorization to make changes to the project, the Licensee shall obtain written approval from the Forest Service prior to making changes on or affecting National Forest System lands:

- to any constructed project features or facilities,
- in the uses of project lands and waters,
- or any departure from the requirements of any approved exhibits filed with the Commission.

Following receipt of such approval from the Forest Service, and a minimum of 60-days prior to initiating any such changes, the Licensee shall file a report with the Commission describing the changes, the reasons for the changes, and showing the approval of the Forest Service for such changes. The Licensee shall file an exact copy of this report with the Forest Service at the same time it is filed with the Commission. This article does not relieve the Licensee from the requirement for license amendment or other requirements of Article 2 or Article 3 of this license. Any changes to the license made for any reason pursuant to Article 2 or Article 3 shall be made subject to any new terms and conditions the Secretary of Agriculture may make pursuant to section 4(e) of the Federal Power Act.

**Condition No. 3- MAINTENANCE OF IMPROVEMENTS ON OR AFFECTING NFSL**

The Licensee shall maintain all its improvements and premises on National Forest System (NFS) lands to standards of repair, orderliness, neatness, sanitation, and safety acceptable to the Forest Service. Disposal will be at an approved existing location, except as otherwise agreed by the Forest Service.

**Condition No. 4- EXISTING CLAIMS**

The license shall be subject to all valid claims and existing rights of third parties. The United States is not liable to the Licensee for the exercise of any such right or claim.

## Condition No. 5- COMPLIANCE WITH REGULATIONS

The Licensee shall comply with the regulations of the Department of Agriculture for activities on NFS lands, and all applicable Federal, State, county, and municipal laws, ordinances, or regulations in regard to the area or operations on or affecting NFS lands covered by this license, to the extent federal law does not preempt ordinances or regulations.

## Condition No. 6- PROTECTION OF UNITED STATES PROPERTY

The Licensee, including any agents or employees of the Licensee acting within the scope of their employment, shall protect from damage the land and property of the United States covered by and used in connection with this license.

## Condition No. 7– SURRENDER OF LICENSE OR TRANSFER OF OWNERSHIP

Prior to any surrender of this license, the Licensee shall provide assurance acceptable to the Forest Service that Licensee shall restore National Forest System resources to a condition satisfactory to the Forest Service upon or after surrender of the license, as appropriate. The restoration plan shall identify the measures to be taken to restore National Forest System resources and shall include adequate financial assurances such as a bond or letter of credit, to ensure performance of the restoration measures.

In the event of any transfer of the license or sale of the Project, the Licensee shall guarantee or assure that, in a manner satisfactory to the Forest Service, that the Licensee or transferee will provide for the costs of surrender and restoration. If deemed necessary by the Forest Service to assist it in evaluating the Licensee's proposal, the Licensee shall conduct an analysis, using experts approved by the Forest Service, to estimate the potential costs associated with surrender and restoration of the Project area on or affecting NFS lands to Forest Service specifications. In addition, the Forest Service may require the Licensee to pay for an independent audit of the transferee to assist the Forest Service in determining whether the transferee has the financial ability to fund the surrender and restoration work on or affecting NFS lands specified in the analysis.

## Condition No. 8- INDEMNIFICATON

The Licensee shall indemnify, defend, and hold the United States harmless for any violations incurred under any such laws and regulations or for judgments, claims, or demands assessed against the United States in connection with the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license. The licensee’s indemnification of the United States shall include any loss by personal injury, loss of life or damage to property in connection with the construction, maintenance, or operation of the project

works or of the works appurtenant or accessory thereto under the license. Indemnification shall include, but is not limited to, the value of resources damaged or destroyed; the costs of restoration, cleanup, or other mitigation; fire suppression or other types of abatement costs; third party claims and judgments; and all administrative, interest, and other legal costs. Upon surrender, transfer, or termination of the license, the Licensee's obligation to indemnify the United States shall survive all valid claims for actions that occurred prior to such surrender, transfer or termination.

Indemnification shall include, but not be limited to, the value of resources damaged and destroyed; the costs of restoration, cleanup, and other mitigation; fire suppression and other types of abatement costs; third party claims and judgments; and all administrative costs, interest, and other legal expenses. This paragraph shall survive the termination of this license, regardless of cause.

**Condition No. 9—DAMAGE TO LAND, PROPERTY, AND INTERESTS OF THE UNITED STATES**

The Licensee has an affirmative duty to protect the land, property and interests of the United States from damage arising from the Licensee's construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license.

In addition to the general requirements of the Commission Form L Articles, the Licensee is liable for and shall pay, after being afforded an opportunity to review Forest Service claimed costs, all damages, costs and expenses associated with damage to the land, property and interests of the United States occasioned by the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license, including but not limited to damages, costs and expenses resulting from fire. Such damages, costs and expenses shall include, but not be limited to:

1. Fire suppression costs
2. Rehabilitation and restoration costs
3. Value of lost resources
4. Abatement costs
5. Investigative and administrative expenses
6. Attorneys' fees

The Licensee's liability under this condition shall not extend to acts or omissions of third parties outside of the Licensee's control. Licensee's contractors or employees of contractors are not considered third parties. Damages will be determined by the value of the resources lost or impaired, as determined by the Forest Service. The basis for damages will be provided to the Licensee. The licensee shall accept transaction registers certified by the appropriate Forest Service official as evidence of costs and expenses. The Licensee shall have an opportunity to

review the basis for the Forest Service's damages, costs and expenses, and to meet and confer with the Forest Service to resolve any questions or disputes regarding such damages, costs and expenses. After the opportunity for review, the Licensee shall promptly pay to the United States such damages, costs and expenses upon written demand by the United States.

**Condition No. 10 - RISKS AND HAZARDS ON NATIONAL FOREST SYSTEM LANDS**

As part of the occupancy and use of the license area, the Licensee has a continuing responsibility to identify and report all known or observed hazardous conditions on or affecting NFS lands within the project boundary that would affect the improvements, resources, or pose a risk of injury to individuals. Licensee will abate those conditions, except those caused by third parties not related to the occupancy and use authorized by the License. Any non-emergency actions to abate such hazards on National Forest System lands shall be performed after consultation with the Forest Service. In emergency situations, the Licensee shall notify the Forest Service of its actions as soon as possible, but not more than 48 hours, after such actions have been taken. Whether or not the Forest Service is notified or provides consultation; the Licensee shall remain solely responsible for all abatement measures performed. Other hazards should be reported to the appropriate agency as soon as possible.

**Condition No. 11- PESTICIDE-USE RESTRICTIONS ON NATIONAL FOREST SYSTEM LANDS**

Pesticides may not be used on NFS lands or in areas affecting NFS lands to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, trash fish, etc., without the prior written approval of the Forest Service. During the Annual Consultation meeting described in Condition 1, the Licensee shall submit a request for approval of planned uses of pesticides for the upcoming year. The Licensee shall provide information essential for review including specific locations and timeframes for application. Exceptions to this schedule may be allowed only when unexpected outbreaks of pests require control measures that were not anticipated at the time the report was submitted. In such an instance, an emergency request and approval may be made.

The Licensee may also provide an Integrated Pest Management plan that describes planned pesticide use on a regular basis for the term of the license. Submission of this plan will not relieve the Licensee of the responsibility of annual notification and review.

The Licensee shall use on National Forest System land only those materials registered by the U.S. Environmental Protection Agency for the specific purpose planned. The Licensee must strictly follow label instructions in the preparation and application of

pesticides and disposal of excess materials and containers.

## III. ADDITIONAL FOREST SERVICE PROVISIONS

### Condition No. 12 – FLOW MANAGEMENT

Written consent from the Forest Service will allow the flow management requirements listed in this condition to be temporarily modified, during and to the extent required for performance of required maintenance of the dam, outlet facilities, and minimum flow release facilities. The Licensee shall notify the Forest Supervisor at least five working days prior to any such departure.

The Licensee shall notify the Forest Supervisor within two business days of any modification of the flow management requirements due to operational emergencies beyond the control of the Licensee or in the interest of public safety.

### A. Minimum Streamflow Requirement

During the operation of the facilities authorized by the license, the Licensee shall maintain the following minimum flows as measured as set forth in Condition 12 B. Minimum flow shall be measured in two ways: as the seven-day average of the flow and as a minimum instantaneous flow. Instantaneous flow is defined to be the flow value used to construct the average daily flow value such as the 15 minute flow. Water Year Type shall be based on the April 1st forecast for the San Joaquin Four Rivers Index or its successor. By March 15th of each year, the licensee shall use the March 1 preliminary Water Year forecast to inform the FS which category of instream flows will be implemented on April 1.

### 1. Camp 61 Creek below Portal Dam – (gage to be installed)

**Below Average, Above Average and Wet Water Year Types:**

| | |
|---|---|
| September 1 – Feb 28/29: | 7 day average of 2 cfs, instantaneous floor of 1 cfs |
| March 1 – 31: | 7 day average of 3 cfs, instantaneous floor of 2 cfs |
| April 1 – April 15: | 7 day average of 5 cfs, instantaneous floor of 4 cfs |
| April 16 - 30: | 7 day average of 10 cfs, instantaneous floor of 8 cfs |
| May 1 – 16: | CRMF as defined in part C below |
| May 17- 31: | 7 day average of 10 cfs, instantaneous floor of 8 cfs |
| June 1 – 30: | 7 day average of 5 cfs, instantaneous floor of 4 cfs |
| July 1 – August 31: | 7 day average of 3 cfs, instantaneous floor of 2 cfs |

**Dry Water Year Type:**

| | |
|---|---|
| May 16 – June 30: | 7 day average of 5 cfs, instantaneous floor of 4 cfs |
| remainder of year: | 7 day average of 1.25 cfs, instantaneous floor of .75 cfs |

**Critically Dry Water Year Types:**

| | |
|---|---|
| year long: | 7 day average of 1.25 cfs, instantaneous floor of .75cfs |

**B. Instream Flow Measurement:**

The Licensee shall measure and document all instream flow releases in publicly available and readily accessible formats. For the purposes of measuring and documenting compliance with the required minimum instream flows in the Camp 61 Creek bypass reach, the Licensee shall prepare and file with the Commission an Instream Flow Measurement Plan (Plan) that is approved by the Forest Service. A year-round gage shall be installed to ensure CRMF and minimum instream flows conditions are met in Camp 61 Creek immediately below Portal Forebay.

The Plan shall include a description of existing or proposed instream flow measurement gages or devices, including flow gages, spillway or reservoir outlet discharge measurement devices, etc., and a detailed proposal for measuring instream flow in each of the Project reaches with existing or proposed devices. The Plan must describe existing or proposed provisions for making mean daily flow data available to the public, and for making 15 minute or hourly gage data available to the Forest Service.

The Plan shall include evidence of gage calibration and historical and recent cross-section data, if applicable. The Licensee shall submit the Plan to the Forest Service for approval as soon as practicable and no later than one year after license issuance and shall not begin construction of flow measurement devices or implementation of Plan elements until the Plan has been formally approved in writing from the Forest Service and filed with the Commission.

**C. Channel and Riparian Maintenance Flow for Camp 61 Creek:**

The Licensee shall release channel - riparian maintenance flows (CRMF) into Camp 61 Creek as shown in the Table below. Water year types are those developed by California Department of Water Resources based upon April 1 projected flow at the "San Joaquin Four Rivers" index or its successor.

| Table 1: Below Average, Above Average and Wet Water Year Types CRMF Schedule | | |
|---|---|---|
| | Below Average | Above Average/Wet |
| May 1-2 | 10 | 20 |
| May 3-4 | 20 | 30 |
| May 5-8 | 30 | 45 |
| May 9-12 | 20 | 30 |
| May 13-16 | 10 | 20 |

## D. Monitoring

### 1. Fish Monitoring

The Licensee shall conduct quantitative fish population monitoring within Camp 61 Creek (downstream of the dam) after years 2, 5, 10, 15, and 20 of license implementation. The objectives of the fish population monitoring are to determine the fish species composition in the bypass reach and to estimate, for each species present, the abundance by life stage, the size distribution, total biomass, and condition. The monitoring results from Years 5 and 10 will also provide insight to possible affects on brown trout recruitment from Channel and Riparian Maintenance Flows.

In conjunction with the sediment monitoring described below, the licensee shall also monitor the effects of the Channel and Riparian flow releases on spawning gravel volumes. The CRMF prescribed in section C of this condition may have a positive or negative effect on the amount and quality of spawning gravels in Camp 61 Creek. The monitoring plan would be designed to assess the impacts of CRMF on the quality and quantity of spawning gravels, recruitment, gravel additions, and other factors influencing gravel conditions as agreed upon between the Licensee and Forest Service.

A draft technical report providing the results of the fish population survey will be prepared each year that monitoring occurred and provided to the Forest Service and other interested agencies at least 2 months prior to the annual consultation meeting specified in Condition 1. The report will include a map showing the locations of the monitoring stations. The report will also provide tabular results will give numbers captured and average length and weight for each species at each station. The table will also provide computed abundance and biomass estimates, with 95 percent confidence limits for each species. The report will also provide a graph of the combined length-frequency distribution from all monitoring stations.

In addition to describing the results, the report will compare the results with results of previous fish population surveys from each monitoring sites and will discuss implications regarding trends in fish abundances. A Report will be provided after 11 years to evaluate possible affects on brown trout recruitment from Channel and Riparian Maintenance Flows. This report should consider the effectiveness of the Channel and Riparian Maintenance Flow in reducing the levels of fines within pools (V*), in addition to evaluating the condition of the fishery over the 10-year period. The Licensee shall consult with the Forest Service; the California Department of Fish and Game; the U.S. Fish and Wildlife Service; and the State Water Quality Control Board regarding the results of these studies and establish whether there is a need to modify Channel and Riparian Maintenance Flows.

**2. Sediment Monitoring in Camp 61 Creek.**

Within one year of the date of acceptance of this license, the Licensee shall file with the FERC, a plan approved by the Forest Service for sediment monitoring within Camp 61 Creek. Licensee will develop a plan to monitor project related sediment accumulation in Camp 61 Creek above and below the confluence with the Adit 2 channel. The Licensee shall develop the plan in consultation with the Forest Service and other appropriate federal and state resource agencies. The plan will include at a minimum the following components:

The Licensee shall conduct no less than four surveys of sediment conditions in Camp 61 Creek above and below its confluence with Adit 2 Creek during the license term. This should include baseline monitoring plus three additional surveys in conjunction with the Fish Monitoring in Years 5, 10, and 20. Monitoring would consist of a combination of methods which may include V*, substrate embeddedness, Wolman pebble counts, monumented cross sections, or other quantitative methods agreed upon and approved by the Forest Service. The section of Camp 61Creek above its confluence with Adit 2 would be used as a reference with which to compare downstream sediment conditions.

A draft technical report will be provided to the Forest Service and other appropriate federal and state resource at least two months prior to the consultation meeting between the licensee and the Forest Service specified in Condition 1. The report will include a map showing monitoring locations, results, and interpretation of quantitative sediment data, and comparison to previous sediment condition data. Sediment Management Plan results would be discussed during the annual consultation meeting with the Forest Service.

### 3. Camp 61 Creek Riparian Community Monitoring

The Licensee shall conduct quantitative riparian monitoring every ten years in the Camp 61 Creek bypass reach at sites comparable to where data was collected for the 2003 relicensing. Data collected will be similar to that collected for the Big Creek Alternative Licensing Process and include plant species composition, percent cover, height and canopy structure, relative density, size classes present, evidence of unusual mortality, structural diversity, and width of the riparian zone. Incidental wildlife observation, presence of diagnostic sign (e.g. tracks, scat, feathers, etc) and habitat suitability will also be collected.

A draft technical report will be provided to the Forest Service and other appropriate federal and state resource agencies at least two months prior to the Consultation Meeting specified in Condition 1. The report will include a map showing monitoring locations, results, and interpretation of quantitative riparian data, and comparison to previous data. Results would be discussed during the annual consultation meeting with the Forest Service.

### 4. Stabilization of Adit 2 Creek

Within two years of acceptance of the license, the Licensee in coordination with the Forest Service shall determine whether there are structural methods that can be implemented to reduce sediment delivery from Adit 2 Creek to Camp 61 Creek. If the licensee and Forest Service jointly determine that such measures can be implemented and maintained over the life of the license, the licensee shall develop and implement the stabilization measures, including maintenance over the term of the license. The licensee shall also develop a monitoring plan, approved by the Forest Service, to document the effectiveness of the stabilization measures.

## Condition No. 13 – PROTECTION OF FOREST SERVICE SPECIAL STATUS SPECIES

Before taking actions to construct new project features on NFSL that may affect Forest Service special status species (i.e. Forest Service sensitive and/or management indicator species) or their critical habitat, the Licensee shall prepare and submit a biological evaluation (BE) for Forest Service approval. The BE shall evaluate the potential impact of the action on the species or its habitat. In coordination with the Commission, the Forest Service may require mitigation measures for the protection of the affected species.

The biological evaluation shall

- Include procedures to minimize adverse effects to special status species.
- Ensure project-related activities shall meet restrictions included in site management plans for special status species.
- Develop implementation and effectiveness monitoring of measures taken or employed to reduce effects to special status species.

**Condition No. 14: RECREATION RESOURCE MANAGEMENT**

**A. Report on Recreational Resources**

Licensee shall prepare a Report on Recreational Resources once every six years from license issuance. The Report on Recreational resources shall comply with the FERC's regulations at 18 CFR section 4.51(f) (1996), and shall be provided to the Forest Service for review and comment prior to being filed with the Commission. The report shall be based on a recreational survey that shall include but not be limited to changes in kinds of use and use patterns, user survey as to preferences in recreation activities, kinds and sizes of recreation vehicles, preference for day use versus overnight use and recreation user trends within the project area. A copy of the survey and survey results will be provided to the Forest Service. The Forest Service reserves the right, after notice and opportunity for comment, to require changes in the project and its operation through revision of the 4(e) conditions that require measures necessary to accomplish protection and utilization of National Forest resources identified as a result of these surveys.

**B. Recreation Plan- Facilities and Interpretive Services**

The Licensee shall file a Recreation Plan with the Commission within one year following the issuance of a new project license. This plan will be submitted to the Forest Service for approval prior to filing the plan with the Commission. The plan will address development and management of project related recreation opportunities. Project specific construction or implementation plans will be developed by the Licensee for required facilities, and will be submitted to the Forest Service for approval prior to construction. Approved construction plans will be incorporated into the Recreation Plan and filed with the Commission.

Unless otherwise agreed upon by the Forest Service, the Licensee shall be responsible for maintenance, repair and major rehabilitation of project recreation facilities, which are defined to include any Licensee owned or Forest Service owned facilities that are included in the Recreation Plan.

## C. Operation and Maintenance Responsibilities

The Licensee shall contribute annually by October 1, $3,405 per year (year 2004 cost basis) to the Forest Service for recreation operation and maintenance responsibilities as described below:

The licensee shall contribute annually by October 1, $1,915 per year (year 2004 cost basis) to the Forest Service for monitoring and permit compliance assurance for the campground concessionaire Special Use Permit. The Special Use Permit currently covers licensee responsibilities for the site policing, maintenance, monitoring, and law enforcement at recreation facilities, including: Portal Campground. The costs shall be escalated based on the U.S. Gross Domestic Product – Implicit Price Deflator (GPD-IPD).

The Licensee shall contribute annually by October 1, $1,490 (year 2004 cost basis) to the Forest Service for site policing, maintenance, monitoring, and enforcement of dispersed public use sites (overnight camping and day use) within the Project area around Portal Forebay. The costs shall be escalated based on the GDP-IPD.

After facility reconstruction, project related recreation facilities are to be included within the FERC Project boundary.

## D. Construction Responsibilities

The licensee shall be responsible for funding and performing construction and future rehabilitation of all project-related recreation facilities located within the Project boundary. Rehabilitation is normally needed every 15-25 years and is defined as work that is necessary to keep existing facilities (currently: Portal Campground and the dispersed camping around Portal Forebay.)

All recreation facilities installed shall be designed and constructed according to applicable Forest Service specifications and standards in place at the time of construction. This includes compliance with Forest Service Manual Direction concerning Forest Service Outdoor Recreation Accessibility Guidelines and the Forest Service Trails Accessibility Guidelines.

In all Licensee responsible construction, the licensee shall meet applicable Americans with Disabilities Act (ADA) guidelines to maximize accessibility as Forest Service policy directs at the time of facility design and as determined feasible by the Forest Service. The Forest Service may approve modifications to this condition depending on topography, vegetation, feasibility, practicality, and the design standards current during project design and construction.

The licensee in consultation with the Forest Service will develop a schedule for the construction of all proposed recreation improvements in this license. The following recreation facilities are to be constructed by the Licensee at the existing recreation sites listed below. The Licensee in consultation with the Forest Service will develop the campground construction designs for Forest Service approval. This schedule will consider the timing and construction needs of other licenses within the Big Creek basin.

The Licensee shall conduct the following activities at the existing campground. There are currently 14 camping spaces including two adjacent to Kaiser Pass Road across the reservoir from the main campground:

1. In consultation with the Forest Service, the licensee shall develop and implement a plan to convert the two campsites adjacent to Kaiser Pass Road to either walk-in camping or day use and limit direct vehicle access to the reservoir.

2. Improve the leveling at all existing campsites. The campsite upgrades shall consist of leveling an area of approximately 30 by 35 feet (1,050 square feet) at each campsite by removing or covering obstacles (such as small rocks and roots), compacting the native surface, and constructing a minimum 26 inch wide and maximum 5-foot-wide compacted native surfaced pathway from the parking spur to the campsite. Running slope of pathways shall in general not exceed 14 percent per 50 feet. Lengths of pathways will vary from 5 to 100 feet.

3. At all campsites install a fire ring and replace the existing tables. Provide and replace bear proof food storage containers.

4. Improve the parking spurs at all campsites and surfacing the native material with 4 inches of compacted aggregate base rock. The length of the spurs will vary depending on topography and vegetation.

5. Improve the delineation of the interior road, turnouts, and parking spurs by installing rock or post barriers for vehicle control, as determined feasible by the Forest Service. Construct a parking turnout (approximately 8 feet wide by 40 feet long) adjacent to the roadway at each new toilet location.

6. Reconstruct the existing interior roadway within the campground by repairing damaged areas, reconstructing the drainage ditches, replacing existing corrugated metal pipes with new, larger pipes.

7. Install campsite markers and provide appropriate directional signs (“one way”) as approved by the Forest Service.

8. Provide erosion control on the campground access road and interior pathways as needed.

9. Install four new information station sign panels according to Forest Service design. Surface the viewing area in front of the signs with compacted aggregate base rock.

10. Remove and replace all of the existing pit toilets with two single-unit prefabricated concrete accessible vault toilets at each existing toilet location.

11. Provide a compacted 5-foot-wide access pathway down the slope between the campground roadway and Portal Forebay. The pathway shall extend to the high water line.

12. Replace toilets in the dispersed area on the south shore of Portal Forebay with "Sweet Smelling Toilets".

13. Licensee shall relocate site(s) that are within 50 feet of the high water mark to locations that will prevent erosion into Portal Forebay.

14. Licensee shall reroute the electrical line that crosses directly over Portal Forebay to a location where anglers will not be able to cast fishing lines over that electrical line.

15. Licensee shall provide water to the campground, as part of the campground reconstruction. This will at a minimum include a water well, a water holding tank, a water distribution system, water distribution lines, spigots and drain basis as appropriate for the level of recreation use at the campground.

16. The Licensee shall construct additional campsites as agreed by the Forest Service, when the seasonal occupancy rate on weekends from Memorial Day weekend through Labor Day weekend (inclusive) reaches 75 percent for 3 consecutive years, or as otherwise indicated by information provided in the Recreation survey and plan described elsewhere in this condition.

## Condition No. 15:- TRANSPORTATION SYSTEM

### A. Transportation System Management Plan

Licensee shall file with the Commission, within one year following the issuance of a new project license, a Transportation System Management Plan, approved by the Forest Service, for protection and maintenance of roads associated with this license. At a minimum the Plan should include a map showing all roads associated with this project, identify the uses (i.e. recreation, facility access) of the roads, condition surveys, construction/reconstruction needs, road closure, safety, jurisdiction (i.e., county, state), and identify roads with respect to the project boundary and maintenance responsibilities.

The Licensee shall, in consultation with the Forest Service, take appropriate measure to rehabilitate existing erosion damage and minimize further erosion of the Project access roads on National Forest System lands. Gates or other vehicle control measures will be installed where necessary to achieve erosion protection.

### B. Project Access Roads

When construction is in progress adjacent to or on Forest Service controlled roads open to public travel, Licensee shall furnish, install, and maintain, temporary traffic controls to provide the public with adequate warning and protection from hazardous or potentially hazardous conditions associated with the Licensee's operations. Device must be appropriate to current conditions and must be covered or removed when not needed. Except as otherwise agreed, flagmen and devices must be as specified in the "Manual on Uniform Traffic Control Devices for Streets and Highways."

As part of transportation system management, the Licensee shall provide the following public safety and erosion control projects:

- Reconstruct access road to Portal Campground 7S080. Provide a hardened surface, as well as a smooth obstruction free template.

- Provide delineated road surfaces.

- Continue to cooperate with FS in Kaiser Pass Road snow removal.

- Repair or replace gate at 8S303 to ensure facility security at the powerhouse.

- Repair existing damage at the surge chamber. Continue to provide locked gate on road 5S80P.

- Provide a gate near the 7S05/5S80 intersection. This will help to provide Facility security during spring road opening, as well as facilitate snow removal. Repair Gate on 5S80.

- Licensee shall pay the Forest Service for its share of maintenance cost or perform maintenance or other agreed to services, as determined by the Forest Service for all use of roads related to project operations or related activities. The maintenance obligation of the Licensee shall be proportionate to total use and commensurate with its use. Any maintenance to be performed by the Licensee shall be authorized by and shall be performed in accordance with an approved maintenance plan. In the event a road requires maintenance, restoration, or reconstruction work to accommodate the Licensee's needs, the licensee shall perform such work at its own expense after securing Forest Service authorization.

**C. Area Access**

The United States shall have unrestricted use of any road, over which the Licensee has control, constructed within the project area, for all purposes deemed necessary or desirable in connection with the protection, administration, management, and utilization of Federal lands or resources. The United States shall have the right to extend rights and privileges for use of the right-of-way and road thereon to States and local subdivisions thereof, as well as to other users, including members of the public, except contractors, agents and employees of the Licensee. The agency having jurisdiction shall control such use so as not to unreasonably interfere with the safety or security uses, or cause the Licensee to bear a share of the costs of maintenance disproportionate to the Licensee’s use in comparison to the use of the road by others.

**D. Road Use**

The Licensee shall confine all project vehicles, including but not limited to administrative and transportation vehicles and construction and inspection equipment, to roads or specifically designed access routes. The Forest Service reserves the right to close any and all such routes where damage is occurring to the soil or vegetation, or if requested by Licensee, to require reconstruction/construction by the Licensee to the extent needed to accommodate the Licensee's use. The Forest Service agrees to provide notice to the Licensee and the FERC prior to road closures, except in an emergency, in which case notice will be provided as soon as practicable.

## Condition No. 16 – LAND RESOURCE PLANS FOR MITIGATING PROJECT EFFECTS TO NFS RESOURCES

Within the timeframes described below, and in consultation with applicable Federal and State agencies, the Licensee shall file with the Commission Land Resource Plans that are approved by the Forest Service, as they relate to resource management on the National Forest. The plans shall include:

A. Fire Management And Response Plan
B. Visual Management Plan
C. Sign Plan
D. Hazardous Substance Plan

### A. Fire Management and Response Plan

Within one year of license issuance the Licensee shall file with the Commission a Fire Prevention and Response Plan that is approved by the Forest Service, and developed in consultation with appropriate State and local fire agencies. The plan shall set forth in detail the Licensee's responsibility for the prevention, reporting, control, and extinguishing of fires in the vicinity of the Project.

At a minimum the plan shall address the following categories:

1. Fuels Treatment/Vegetation Management
    - Identification of fire hazard reduction measures to prevent the escape of project-induced fires.

2. Prevention
    - Availability of fire access roads, community road escape routes, helispots to allow aerial firefighting assistance in the steep canyon, water drafting sites and other fire suppression strategies.
    - Address fire danger and public safety associated with project induced recreation, including fire danger associated with dispersed camping, existing and proposed developed recreation sites, trails, and vehicle access.
3. Emergency Response Preparedness
    - Analyze fire prevention needs including equipment and personnel availability.
4. Reporting
    - Licensee shall report any project related fires to the Forest Service within 24 hours.

5. Fire Control/Extinguishing
    - Provide the Forest Service with a list of the locations of available fire suppression equipment and the location and availability of fire suppression personnel.

Assure fire prevention measures will conform to water quality protection practices as enumerated in USDA, Forest Service, Pacific Southwest Region, Water Quality Management for National Forest System Lands in California-Best Management Practices.

**Investigation of Project Related Fires**

The Licensee agrees to fully cooperate with the Forest Service on all fire investigations. The Licensee shall produce upon request all material and witnesses, not subject to attorney client or attorney work product privilege, over which the Licensee has control, related to the fire and its investigation including:

- All investigation reports
- All witness statements
- All photographs
- All drawings
- All analysis of cause and origin
- All other, similar materials and documents regardless of how collected or maintained

The Licensee shall preserve all physical evidence, and give custody to the Forest Service of all physical evidence requested. The Forest Service shall provide the Licensee with reasonable access to the physical evidence and documents the Licensee requires in order to defend any and all claims, which may arise from a fire within the Project boundaries, to the extent such access is not precluded by ongoing criminal or civil litigation.

**B. Visual Management Plan:**

Within 1 year of license issuance, the Licensee shall file with the Commission a Visual Management Plan that is approved by the Forest Service for any NFS lands visually affected by the Project based on applicable FS visual standards and guidelines. As a minimum the Plan shall address:

- Replacement of Power Line crossing Portal Forebay
- Clearings, spoil piles, and project facilities, such as diversion structures, ditches, powerhouses, other buildings, transmission lines, corridors, and access roads.

- Facility configurations, alignments, building materials, colors, landscaping, and screening.
- Mitigation measures that shall include, but are not limited to:
    - Surface treatments with colors and materials that are in harmony with the surrounding landscape.
    - Use of native plant species to screen facilities from view, where appropriate.
    - Reshaping and revegetating disturbed areas to blend with surrounding scenic characteristics.
    - Removal of project induced debris piles that detract from the visual quality.
    - General maintenance and upkeep of facilities.

The plan shall also include an "Implementation Schedule" outlining the timeline to bring the project facilities into compliance with applicable National Forest Land and Resource Management Plan direction. Upon Commission approval, the Licensee shall implement the plan.

**C. Sign Plan**

The Licensee shall prepare in consultation with the Forest Service, California Department of Transportation, Fresno County, and other interested parties, within one year of license issuance, a Sign Plan that shall conform to the Manual of Uniform Traffic Control Devices, Forest Service sign handbook, and other applicable standards. As a minimum the Plan is to include the location, design, size, color, and message for the following types of signs:

- Information and education signs
- Fire Prevention signs
- Regulatory and warning signs
- Project license signs
- Road signs
- Recreation signs
- Directional signs to assist non-local visitors
- Safety signs
- Sign format/consistency throughout project

The Plan shall also address maintenance standards so that all signs are maintained in a neat and presentable condition. Signs which are to be placed on National Forest System lands shall be approved by the Forest Service. The Licensee shall not be required to consult or obtain the prior approval of the Forest Service for signs on

Licensee owned land that are not visible from National Forest System lands.

Upon Commission approval, the Licensee shall implement the plan.

**D. Hazardous Substance Plan**

Within one year following the date of acceptance of this license and at least 60 days before starting any activities the Forest Service determines to be of a land-disturbing nature on National Forest System land, the Licensee shall file with the Commission, a plan approved by the Forest Service for oil and hazardous substances storage and spill prevention and cleanup.

At a minimum, the plan must require the Licensee to: (1) maintain in the project area, a cache of spill cleanup equipment suitable to contain any spill from the project; (2) to periodically inform the Forest Service of the location of the spill cleanup equipment on National Forest System land and of the location, type, and quantity of oil and hazardous substances stored in the project area; and (3) to inform the Forest Service immediately of the nature, time, date, location, and action taken for any spill on or affecting National Forest System lands.

**Condition No. 17 - VEGETATION AND INVASIVE WEED MANAGEMENT PLAN**

Within two years of license issuance, the Licensee shall file with the Commission vegetation and noxious weed management plan developed in consultation with the Fresno County Agricultural Commissioner and California Department of Food and Agriculture. At a minimum, the plan should include two components: a Noxious Weed Plan and a Vegetation Management Plan. Noxious weeds will be those weeds defined in the California Food and Agriculture code, and other species identified by the Forest Service.

1) The Noxious Weed Plan will include and address the following elements:

- Noxious weed treatment (aquatic and terrestrial) within the project boundary and adjacent to project features including recreation facilities, roads, and distribution and transmission lines.
- Inventory and mapping of new populations of noxious weeds within the area affected by project related operations or activities using a Forest Service compatible database and GIS software. The Noxious weed GIS data layer will be updated periodically and shared with resource agencies.

- Action and/or strategies to prevent and control spread of known populations or introductions of new populations within the area affected by project related operations or activities, such as vehicle/equipment wash stations.
- Develop a schedule for eradication of all A, B, Q and selected other rated invasive weed species within the area affected by project related operations or activities, designated by resource agencies.
- New infestations of A& B rated weeds shall be eradicated within 12 months of detection. (A, B, C, & Q ratings refer to the California Department of Food & Agriculture Action Oriented Pest Rating System).
- At specific sites where other objectives need to be met (e.g. recreational use) all classes of noxious weeds may be required to be treated.
- On-going annual monitoring of known populations of noxious weeds for the life of the license in locations tied to Project actions or effects, such as road maintenance, project facilities, O&M activities, recreational areas, new construction sites, etc. to evaluate the effectiveness of re-vegetation and noxious weed control measures.
- Monitoring should be done in conjunction with other project maintenance and resource surveys, so as not to require separate travel and personnel. Monitoring information, in database and GIS formats, will be provided to the Forest Service as part of the annual consultation on affected National Forest resources (Condition No. 1). To assist with this monitoring requirement, training in invasive plant identification will be provided to Project employees and contractors by the Forest Service.
- Licensee shall restore/revegetate areas where treatment has eliminated noxious weeds in an effort to eliminate the reintroduction of noxious weed species.
- Project-induced ground disturbing activities shall be monitored annually for the first 3 years after disturbance to detect and map new populations of noxious weeds.
- The plan will include an adaptive management element to implement methods for prevention of aquatic noxious weeds, as necessary. These actions may include, but may not be limited to: 1) public education and signing of public boat access, 2) preparation of an Aquatic Plant Management Plan approved by the Forest Service, and in consultation with other agencies, and 3) boat cleaning stations at boat ramps for the removal of aquatic noxious weeds.

2) The Vegetation Management plan shall include and/or address the following elements:

- Hazard tree removal and trimming;
- Vegetation management for habitat improvement
- Revegetation of disturbed sites;

- Soil protection and erosion control, including use of certified weed free straw; and
- Establishment of and/or revegetation with culturally important plant populations.
- Use clean, weed free seed with a preference for locally collected seed.

Upon Commission approval, the Licensee shall implement the plan.

**Condition No. 18- CULTURAL RESOURCES MANAGEMENT PLAN**

The Licensee shall develop and implement the Cultural Resources Management Plan attached to the Project Memorandum of Agreement submitted to the Advisory Council on Historic Preservation.

**Condition No. 19–COORDINATION WITH PROJECTS IN THE BIG CREEK SYSTEM**

The Forest Service reserves the right, after notice and opportunity for comment, to require changes in the project and its operation through revision of the 4(e) conditions base on the results of the Basin Wide Big Creek Analysis and the relicensing efforts for Big Creek Hydropower Projects Nos. 67, 120, 2017, 2085, 2086, and 2175.

**Condition No. 20 - FOREST SERVICE RESERVES THE RIGHT TO REVISE SECTION 4(e) CONDITIONS IN RESPONSE TO OTHER AGENCIES REQUIREMENTS**

The Forest Service reserves the right to modify these conditions, if necessary, to respond to modifications required by 1) the U.S. Fish and Wildlife Service biological opinion issued for the relicensing of the Portal Hydroelectric Project; and 2) the water quality certification issued by the State of California Department of Water Resources Control Board.