

LAND 4 FIRE PREVENTION AND PROTECTION ADEQUACY EVALUATION

1.0 EXECUTIVE SUMMARY

This study reviewed current regulations and policies on fire prevention and protection that may apply to Southern California Edison's (SCE's) hydroelectric facilities in the Big Creek Area. These regulations and policies are outlined in the Public Resource Codes of the State of California, Health and Safety Code of the State of California, and the U.S Forest Service (USDA-FS) Manual (FSM). In order to comply with applicable regulations or policies, SCE prepares two planning documents that outline procedures and activities that are implemented for fire prevention and suppression. The SCE Northern Hydro Division prepares and maintains a Project Fire Plan for its Big Creek hydroelectric projects. This plan outlines responsibilities for fire prevention and suppression activities, and sets up reporting and attack procedures in the event of a fire within the area of a SCE hydroelectric project. The intent of the plan is to act consistent with the guidelines in the FSM. SCE reviews the plan annually and provides any revisions to the USDA-FS for their review and approval. In addition to the Project Fire Plan, SCE also prepares a Vegetation Management and Special Projects Memorandum. This is an internal planning memorandum that is prepared annually by the Northern Hydro Division to outline the proposed vegetation management and special projects program. The vegetation management activities described in the memorandum reflect recurring vegetation management work activities that are implemented to provide fire hazard reduction, improve dam safety, facilitate Project operation, and enhance personnel safety and efficiency around Project facilities.

This study also includes an evaluation of the potential fire hazard and risk at SCE Project facilities in the Big Creek area. Potential fire hazard was evaluated from fuels accumulation around Project-related facilities. Factors considered in evaluating fire hazard include vegetation community type, elevation range, and topography. Fire risk was evaluated as risk of fire ignition. Factors considered in evaluating risk of ignition include public access, recreational use, and seasonality. The evaluation of potential fire hazard and risk included a site visit to SCE Northern Hydro facilities and nearby recreation areas to document the physical characteristics (vegetation community, topography, elevation, access issue and fuels build up) at these locations. However, any documentation of fuels build up at the facilities visited represents only a snapshot of the condition at the time of the site visit. The field visit indicates that SCE does maintain a defensible zone (where ground fuels have been removed) around the Project facilities and that the greatest threat of fire to SCE facilities, or nearby Project-related recreation areas, is from fires that begin at other locations and potentially threaten SCE facilities.

Potential fire hazard and risk within the study area depend on the risk of fire ignition and on the intensity and speed by which fire spreads. Fire ignition risk tends to be greater near locations with unrestricted public access. In the study area, such areas are found around recreation areas such as Huntington and Shaver lakes. The intensity and speed by which a fire can spread (potential hazard) is influenced by a combination of

elevation, topography, vegetation community, and seasonality. At low elevations, vegetation and climate tends to be drier, topography steeper, which contributes to rapidly spreading fires. At high elevations, the climate is cooler, topography less steep, which decreases the potential of a rapidly spreading fire.

2.0 STUDY OBJECTIVES

Determine adequacy of existing SCE fire prevention and protection measures within Project boundaries and enhancement opportunities. Identify build up of fuels immediately adjacent to Project facilities and at Project-related recreation facilities and develop fire prevention and protection measures to reduce or eliminate fuel build up, if required.

3.0 STUDY IMPLEMENTATION

3.1 STUDY ELEMENTS COMPLETED

- Reviewed existing SCE fire prevention and protection measures.
- Visited SCE Project facilities and Project-related recreation facilities to identify areas of fuel build up, and potential areas of high fire risk.
- Determined if existing measures are adequate and identified opportunities for enhancement.

3.2 OUTSTANDING STUDY ELEMENTS

- Discuss proposed changes with the Land Management Working Group.
- Propose revisions to SCE to determine if revisions are feasible.
- If appropriate, revise SCE's fire prevention and protection measures.

4.0 STUDY METHODOLOGY

A review of the California Department of Forestry, USDA-FS, and Fresno and Madera County Fire Districts' current regulations and policies on fire prevention and protection was completed to determine if they are relevant to SCE hydroelectric facilities in the Big Creek area.

Existing SCE fire prevention and protection measures for the Northern Hydro facilities were reviewed. This review addressed various issues such as: regular maintenance measures or programs for vegetation cut-back at facility perimeters; and employee emergency fire response and evacuation plans, the placement of fire protection equipment and fire safety procedures.

This study also included an evaluation of the potential hazard or risk of fire at SCE project facilities in the Big Creek area based on a review of several factors including

vegetation community type, elevation range, topography, fuels accumulation, public access, recreation, and season.

5.0 STUDY RESULTS

5.1 FIRE PREVENTION AND PROTECTION PLANS

Laws and policies for fire protection, prevention, and suppression that are of value in determining the preparation of a fire plan for SCE's Big Creek hydroelectric projects are in the Public Resource Codes of the State of California (PRC 4291, 4423, 4427-4428, 4433, 4442, 4442.5, and 4448), Health and Safety Code of the State of California (13000, 13001, and 13005), and the U.S Forest Service Manual (5113)¹. Together, these laws and policies regulate activities that may cause fires, and require that fire prevention and suppression equipment be available. In addition to these laws and policies, the USDA-FS and the California Department of Forestry (CDF) prescribe a defensible space perimeter around structures in the forest. The USDA-FS provides guidance on defensible space for homeowners and commercial entities on their Firewise Internet-based information website which can be found at http://www.firewise.org/fw_index.htm. The USDA-FS current standard is to keep a clearing of at least 30 feet around structures as defensible space and for fire fighting equipment. The defensible space recommendation from the California of Forestry (CDF) is described in the Homeowner's Responsibility section of the California Public Resources Code Section 4291 (Pers. Comm. J. Wendt, USFS 2004). In 2004, a 30-foot defensible space or firebreak was required by CDF (Pers Comm. D. Hayes, CDF 2004). However, CDF has revised this perimeter in 2005 and now requires a 100-foot defensible space/firebreak around structures.

SCE Northern Hydro Division prepares two planning documents that outline procedures and activities that are implemented for fire prevention and suppression. These documents include the Project Fire Plan and an internal memorandum titled Vegetation Management and Special Projects Memorandum. Each are discussed in the following.

5.1.1 PROJECT FIRE PLAN

The SCE Northern Hydro Division prepares and maintains a Project Fire Plan for its Big Creek hydroelectric projects which outlines the responsibility for fire prevention and suppression activities, and sets up reporting and attack procedures in the event of a fire within the area of a SCE hydroelectric project. The intent of the plan is to act consistently with the guidelines in the FSM. SCE reviews the plan annually to determine if revisions are appropriate to address any regulatory changes that may have occurred, or to address any new project activities not already dealt with in the current

¹ Note that the Federal Power Act pre-empts state and local laws that would otherwise be applicable to SCE licensed hydropower facilities. These state and local laws are relevant in that they give important guidance for preparing a fire management plan.

plan. If revisions to the plan are made, then SCE submits the revised plan to the USDA-FS for review and approval.

SCE uses a single comprehensive Project Fire Plan for the Northern Hydro Region Projects which includes the seven FERC Projects in the Big Creek Hydroelectric system (FERC Project No. 67 (Big Creek Nos. 2A, 8 and Eastwood); FERC Project No. 120 (Big Creek No. 3); FERC Project No. 2017 (Big Creek No. 4); FERC Project No. 2085 (Mammoth Pool); FERC Project No. 2086 (Vermilion Valley); FERC Project No. 2174 (Portal); and FERC Project No. 2175 (Big Creek Nos. 1 and 2)). Overall, this plan addresses responsibilities for fire prevention, suppression, and reporting procedures in the event of a fire within the area of a SCE Hydroelectric Project. The Project area is defined as being in and adjacent to a defined work area on National Forest lands where activities related to the operation and maintenance of the hydroelectric project is undertaken and also includes all roads used in connection with the activity.

The Project Fire Plan also identifies "Activity Levels" that define the levels of fire preparedness and the type of work activities permitted in the Project area based upon a fire danger rating system maintained by the USDA-FS. The measures include the designation of a job-site administrator who is responsible for the implementation of the plan and directs all fire-related activities for the Project. The Project Fire Plan provides detailed information on existing SCE fire prevention and protection measures, placement of fire protection equipment, and fire safety procedures. A copy of SCE's 2004 Project Fire Plan is provided in Appendix A.

5.1.2 VEGETATION MANAGEMENT AND SPECIAL PROJECTS MEMORANDUM

SCE also annually prepares a Vegetation Management and Special Projects Memorandum (memorandum). This is an internal planning memorandum that outlines the proposed vegetation management and special projects to be implemented during a calendar year. The vegetation management activities described in the memorandum reflect recurring vegetation management work activities that are implemented to provide fire hazard reduction around Project facilities. These activities include vegetation control by removal of unwanted vegetation using hand tools or through the application of herbicides. This internal memorandum provides a scope of work for the work crews, that identifies for each project the locations (i.e., facilities or roads) where vegetation control measures will be implemented. Many of these activities consist of a recurring scope of work which ranges from field inspections to determine if vegetation removal is needed, to periodic or annual maintenance. The vegetation management activities identified in the memorandum represent a range of potential measures that have been approved and used for vegetation control in the Big Creek Hydroelectric system. The memorandum also provides work crews with a summary on the Program Implementation and Compliance Requirements, which includes but is not limited to completion of inspection reports, agency coordination requirements, agency reporting requirements, and record keeping needs.

In addition to vegetation management activities, the memorandum also identifies and describes special projects or programs which are not recurring projects. Special

projects are typically mandated by agency direction and may be the result of FERC inspections that identify items which may affect Project operations and therefore require attention. This annual memorandum consolidates the vegetation management and special Project activities into one planning document which aids SCE with their annual planning process, identifying new projects and prioritizing projects. A copy of SCE's 2004 Vegetation Management and Special Projects Memorandum is provided in Appendix B.

5.2 SCE FACILITIES AND NEARBY RECREATION AREAS SITE VISIT

This study included an evaluation of the potential fire hazard and risk at SCE project facilities in the Big Creek area. Several factors were considered in order to make an assessment of potential fire hazard and risk. These include vegetation community type, elevation range, and topography in the evaluation of fire hazard from fuels accumulation. Public access, recreational use, and seasonality, were considered in the evaluation of fire hazard (risk of ignition). The evaluation of fire hazard and risk included a site visit to SCE Northern Hydro facilities and nearby recreation areas to document the physical characteristics (vegetation community, topography, elevation, access issue and fuels build up) at these locations. However, any documentation of fuels build up at the locations visited represents only a snapshot of the condition at the location and time of the site visit. Therefore, the fuels build up conditions observed at these locations are only representative of a one time evaluation and do not represent long term conditions. However, field observations from the site visit indicates that SCE does maintain a defensible perimeter where ground fuels have been removed around the Project facilities.

A site visit to photo-document areas of fuel accumulation around Project facilities and nearby recreation areas was conducted on November 3, 2003 and included participants Mark Newquist (SCE), Carolyn Ballard (USDA-FS (SNF)), and Martin Ostendorf (ENTRIX). Prior to the site visit, SCE and the USDA-FS agreed to visit SCE facilities along Big Creek from the community of Big Creek downstream to the confluence with the San Joaquin River, and along the San Joaquin River from Mammoth Pool Powerhouse downstream to Powerhouse No. 3. The areas around Mammoth Pool Reservoir, Shaver Lake, Huntington Lake, and the Upper Basin East of Kaiser Pass (Florence Lake and Mono Diversion) were not included in this site visit. The USDA-FS representative indicated that they were familiar with these areas and that SCE should evaluate these areas independently for this study. Discussions of facilities not visited in November 2003 were developed by reviewing photographs of the Project facilities and nearby recreation facilities taken either during the 2002 recreation facility surveys (REC 9, Recreation Resources and Facility Inventory Assessment) or as part of the visual quality assessment (LAND 9, Visual Quality Assessment). On June 23, 2004, a site visit was conducted to photo-document conditions around Huntington Lake.

The following characteristics were noted around each of the Project facilities: volume of vegetation and woody debris, vegetation community type in the immediate area, surrounding topography, elevation and climate, and restricted or open public access to the immediate area. Fuel accumulation, vegetation community type, elevation range

and topography are considered when evaluating fire hazard. Fire hazard is greater at locations: (1) with dense fuels build-up (vegetation under brush or woody debris); (2) within dry vegetation communities types, such as oak woodlands and chaparral; (3) in lower elevation areas where the climate may be hotter and humidity lower; and (4) in areas of steep topography where fire can burn rapidly up-slope and fire suppression is difficult. The risk of fire ignition is greater in areas of open public access, such as public recreation areas. Photographs showing the Project facilities with adjacent vegetation communities are provided in Appendix C. The physical characteristics observed at the Project facilities are described in the following.

5.2.1 COMMUNITY OF BIG CREEK (SCE NORTHERN HYDRO FACILITIES AND POWERHOUSE No. 1)

The community of Big Creek is located in a conifer forest at an elevation of approximately 5,000 feet. The area within the community of Big Creek is well managed, with respect to fuels build-up and defensible zones. The ground brush vegetation has been removed or thinned, trees have been limbed near the ground surface, and only a few dense strands of trees are present. Most of the building structures in the community are roofed with non-flammable material and SCE maintains a 30-foot cleared defensible zone around the Project facilities. Photographs C-1 and C-2 show the open and cleared condition resulting from brushing and thinning performed within the community. After a fire in 1994, USDA-FS cleared accumulated fuel from around the perimeter of the community of Big Creek to provide more protection from fire (Carolyn Ballard, USDA-FS, pers. comm.).

SCE maintains approximately a 30-foot clearance zone around Powerhouse No. 1 and the adjacent switchyard. The powerhouse is a concrete structure providing good fire protection and low fire risk. Photographs C-3 and C-4 show the vegetation clearance along the side and behind the Powerhouse No. 1 building. Photographs C-5 and C-6 show that vegetation is properly cleared along the switchyard adjacent to Powerhouse No. 1.

5.2.2 UPPER CANYON ROAD (8S05) – APPROXIMATELY ONE MILE WEST OF THE HUNTINGTON LAKE ROAD.

This area is located along road 8S05, also referred to as the Upper Canyon Road. The vegetation in this area is a mixed conifer pine belt forest (Douglas Fir, Yellow/Jeffrey Pine, and Incense Cedar) that is composed of small diameter trees and thick understory as shown in Photographs C-7 and C-8. This area is located along the transition between the conifer forest above and the lower oak woodland/chaparral within a steep walled canyon at elevations from 3,000 to 4,500 feet. The small diameter of trees in this area suggests relatively recent logging. Large woody debris fuel has not accumulated. Harvesting has also allowed fire prone tree species, such as incense cedar, to encroach into stands of young and intermediate sized pines (Carolyn Ballard, USDA-FS, pers. comm.). Public access to this area of the Big Creek Canyon is restricted to foot or bicycle traffic. Vehicular traffic is limited to authorized SCE or emergency service vehicles. The FERC Project boundary extends 50 feet along either side of the road.

5.2.3 POWERHOUSE 2/2A

The Powerhouse 2 and 2A facilities are located within mixed chaparral and oak woodland. The Project facilities at this location are situated in a steep walled canyon at an elevation of approximately 3,000 feet (Photograph C-9). The low elevation results in hot, dry summers with increased fire hazard. Ground fuels in the area include grass and leaves that do not build up a fuel load. A good defensible zone exists around the powerhouse. The structure is made of concrete and is thus well protected from fire. The building walls, a rock wall, and a road immediately behind the powerhouse building (Photograph C-10) are cleared of vegetation and dry grass.

Mature vegetation on the opposite side of the canyon from the powerhouse was destroyed in a 1994 fire, and sufficient vegetation to sustain a fire on that side of the canyon may not exist for 10 more years (Carolyn Ballard, USDA-FS (SNF), pers. comm.). SCE clears vegetation for 30 feet around the main 220 kV switchyard, located on the opposite side of Big Creek canyon from the Powerhouse. In addition, much of the area within and around the switchyard is covered with gunite to prevent grass growth. Photographs C-11 and C-12 show the clearance zones and gunite covering at the switchyard. This switchyard is subject to removal from the ALP and subsequent operation under Special Use Authorization from the USFS when the Transmission Line Separation Project is completed.

5.2.4 POWERHOUSE NO. 8 FACILITIES

Powerhouse No. 8 and the associated Project facilities are located in mixed chaparral and oak woodland at the confluence of Big Creek and the San Joaquin River in a steep walled canyon at an elevation of approximately 2,200 feet (Photograph C-13). Dense brush covers the steep hillside above the powerhouse building. A good defensible zone exists around Powerhouse No. 8 because Dam No. 6 forebay borders three sides of the structure (Photograph C-14) and a steep rock wall borders the remaining structure wall (Photograph C-15). The structure is made of concrete and is thus well protected from fire.

5.2.5 MAMMOTH POOL POWERHOUSE

Mammoth Pool Powerhouse and the associated Project facilities are located in mixed chaparral and oak woodland along the San Joaquin River in a steep walled canyon at an approximate elevation of 2,200 feet (Photograph C-16). Dense brush covers the steep hillside above the north and west sides of the powerhouse building. The San Joaquin River borders the east side and a paved road and parking lot border the south side.

SCE maintains a 30-foot defensible width around the powerhouse (Photograph C-17). The structure is made of concrete and is thus well protected from fire.

5.2.6 BIG CREEK NO. 3 COMMUNITY AND POWERHOUSE

The Big Creek No. 3 community and powerhouse are located within mixed chaparral and oak woodland from 1,400 to 1,600 feet elevation (Photograph C-18). Ground fuels within the community have been brushed and thinned and only small pockets of brush remain. Photograph C-18 shows a portion of the community and Powerhouse No. 3 switchyard and depicts areas between the buildings and oak trees that are cleared of brush leaving open grass areas. Photograph C-18 shows the 30-foot vegetation clearance zone around the switch yard. Photograph C-19 shows the work yard in the powerhouse No. 3 community and depicts the defensible clearing of brush from open areas around the perimeter of the facility.

Powerhouse No. 3 is located at the base of a canyon with steep slopes covered with dense brush (Photograph C-20). Brush is currently encroaching behind the powerhouse building and could be cleared back to provide a better defensible space (Photograph C-21). However, the structure is made of concrete and is thus well protected from fire.

The vegetation in the adjacent Jose Basin (south of Big Creek No. 3 Project community and facilities) is much denser and more overgrown than in the Big Creek No. 3 area. Because public access in the Big Creek No. 3 community area is limited, risk of a fire ignition is relatively low. However, the probability of a fire starting in the Jose Basin is higher, and a fire starting at this location would typically burn uphill toward Shaver Lake and not threaten the Big Creek No. 3 area (Carolyn Ballard, USDA-FS, pers. comm.).

5.2.7 MAMMOTH POOL RESERVOIR AREA

The Mammoth Pool Reservoir area is located at an elevation of approximately 3,200 feet in the upper transition between the lower oak woodland/chaparral and the conifer forest vegetation communities above. The vegetation in this area is a mixed conifer forest with interspersed oaks and sparse understory (Photographs C-22 through C-24).

The developed recreation facilities in the area are the Mammoth Pool campground, Windy Point Day Use Area, boat ramp, and the Logan Meadow Trailhead. An evaluation of fuels accumulation at these locations indicates that a good defensible fuel profile zone exists at the recreation facilities because of brushing and thinning of ground fuels (vegetation and woody debris). Photographs C-22 and C-23 show the conditions at the Mammoth Pool Campground and Logan Meadow Trailhead, respectively, where ground vegetation and woody debris have been brushed and thinned, leaving only sparse fuel accumulation between the trees and in open areas. Photograph C-24 shows the Mammoth Pool Boat Launch parking area and the transition zone vegetation community from oak woodland to conifer forest.

5.2.8 SHAVER LAKE AREA

Shaver Lake is located at elevation 5,400 feet in a mixed conifer forest community. The understory of the bordering territory tends to be sparse and may include young trees and shrubs. Much of the land around Shaver Lake is owned by SCE and managed for

silviculture, wildlife habitat, and recreation. These forests have been logged extensively and most of the remaining trees are of varying sizes. Large diameter trees and woody debris fuel loading are relatively rare, and SCE practices controlled burning and mechanical thinning of underbrush, which keeps fuel buildup at a low level and simultaneously provides a variety of habitats for wildlife.

Recreation facilities at Shaver Lake include developed campgrounds at Camp Edison and Dorabelle, boat launches at Camp Edison and Sierra Marina, and day use areas at Camp Edison, North Shore, and Shaver Point. An evaluation of fuels build up at these facilities indicates that the areas along the margins of the lake have been brushed and cleared as shown in Photograph C-25 of the Shaver Point and Photograph C-26 of the Camp Edison Boat Launch. Set back from the lake in the forest are dense stands of small and intermediate sized trees. Within Camp Edison and Dorabelle Campground the ground vegetation has been brushed and thinned resulting in a sparse understory which may include young trees as well as shrubs. The trees in the campgrounds have been limbed to thin branches near the ground surface and dead branches have been removed. Photographs C-27 and C-28 show conditions within Camp Edison and Photographs C-29 and C-30 show conditions in Dorabelle Campground. The understory in both campgrounds is sparse.

5.2.9 HUNTINGTON LAKE AREA

The Huntington Lake area is located at an approximate elevation of 7,000 feet in a dense subalpine pine/fir forest of slender trees with sparse understory. Accumulated fuel includes pockets of woody debris and brushy ground fuels (primarily in forest openings). Photograph C-31 (taken on the north side of the lake near Huckleberry Tract) shows an example of the typical Huntington Lake stand of small and intermediate trees. Photographs C-32 and C-33 (taken near Cedar Crest and Dam 3A, respectively) show examples of woody debris and pockets of ground vegetation typical of forest openings around Huntington Lake.

The recreation facilities at Huntington Lake consist of campgrounds, day use areas, trailheads and boat launches. An evaluation of fuels build up at the recreation facilities indicates that the grounds have been brushed and cleared, removing the build up of vegetation and woody debris that contribute to ground fuels. Photographs C-34 and C-35 show the conditions at Deer Creek Campground and Photograph C-36 shows the conditions within Dowville Picnic area.

5.2.10 UPPER BASIN (FLORENCE LAKE, MONO DIVERSION, BEAR DIVERSION)

The Upper Basin area ranges in elevation from 7,000 to 9,000 feet and extends from Kaiser Pass east to Florence Lake and the Mono Diversion. The Kaiser Pass area is a pine and fir forest community in an alpine-boreal environment. The forest is tall and open with sparse brush understory (primarily in clearings).

The Upper Basin is dominated by granite domes and outcrops as depicted in Photograph C-37 which shows Florence Dam and the surrounding granitic landscape.

Facilities found in the Upper Basin consist of Project dams, reservoirs, diversions, gaging stations, and conduits, and Forest Service recreation facilities (campgrounds, day use areas and trailheads). Photograph C-38 depicts the Dutch Creek Trailhead at Florence Lake and shows the open forest, sparse understory, and granitic environment. Dense stands of trees exist at this high elevation in riparian areas such as depicted in Photograph C-39 of the Florence Lake Picnic Area. This photograph also shows that ground fuels in the picnic area have been cleared by brushing and thinning.

Photograph C-40 of the Mono Creek Campground and Photograph C-41 of the Mono Creek Trailhead show the open forest and sparse volume of ground vegetation and woody debris that are typically found at the Upper Basin facilities. Photograph C-42 shows the Bear Ridge Trailhead and depicts the open forest, sparse ground fuels and granitic landscape.

5.3 DISCUSSION ON POTENTIAL FIRE HAZARD AND RISK

The fire risk at each Project facility relates to the likelihood of ignition in the surrounding area. Variables that contribute to this risk include access to the area, types of recreation which takes place there, seasonality, and the vegetation community. Fire hazard at each Project facility pertains to the potential for a fire to spread. The speed by which a fire can spread depends on the vegetation community, the density of vegetation, the topography, the weather, and the continuity of fuel accumulation (Carolyn Ballard, USDA-FS (SNF), pers. comm.). For example, the risk for fire ignition is greater at some higher elevation locations with unrestricted public access and recreational activity (e.g., Huntington and Shaver Lakes) and where the frequency of lightning strikes from afternoon thunderstorms is higher, than in the lower elevation locations of Project facilities, where the public does not have vehicular access. However, once a fire in high-elevation areas is ignited, it usually spreads slowly because the high elevation summer weather is relatively cool and wet, the coniferous forest is less vulnerable to fire, and ground fuel is relatively scarce. Conversely, low elevation fires are comparatively less frequently ignited because of restricted public access. But when a low elevation fire is ignited, it tends to spread rapidly because summer weather is hot and dry, the characteristic cismontane woodland and chaparral vegetation is vulnerable to fire, the topography is difficult for fire fighting, and accumulated ground fuel is often abundant. Low elevation fire prevention and control in steep canyons (at Powerhouses Nos. 2/2A and 8, and at Mammoth Pool Powerhouse) are particularly troublesome because it is difficult to clear ground fuels for fire prevention, it is often undesirable to do so because of the potential for erosion, and it is difficult to respond to fires with conventional fire suppression equipment. The relative extent and severity of fires within particular vegetation communities also tends to increase as the interval between fires lengthens (Swetnam 1993; Husari and Hawk 1994; Skinner and Chang 1996). A description of each vegetation community type present within the study area and its associated fire potential and risk is provided in Appendix D.

Fires that spread from other locations toward SCE Project facilities pose a great hazard. These can be prevented or controlled only if land owners and stewards adopt fire prevention programs to maintain defensible space around structures by clearing accumulated ground fuels.

6.0 LITERATURE CITED

Ballard, Carolyn. USDA-FS, Sierra National Forest. Personal Communication.

Husari, S. J., and K. S. Hawk. 1994. The Role of Past and Present Disturbance in California Ecosystems. Draft Region 5 Ecosystem Management Guidebook, Vol. 2, Appendices I–C. San Francisco: U.S. Forest Service, Pacific Southwest Region.

Skinner, C. N., and C. Chang. 1996. Fire Regimes, Past and Present. In Sierra Nevada Ecosystem Project: Final report to Congress, Vol. II, Chap. 38. Davis: University of California, Centers for Water and Wildland Resources.

Swetnam, T.W. 1993. Fire history and climate change in giant sequoia groves. *Science*. 262:885-889

APPENDIX A
2004 Project Fire Plan

RECORD OF AMENDMENTS
TO
SIERRA NATIONAL FOREST
HIGH SIERRA AND BASS LAKE
RANGER DISTRICTS

PROJECT FIRE PLAN
February 2003 Revision

For

SOUTHERN CALIFORNIA EDISON COMPANY'S
NORTHERN HYDRO REGION
BIG CREEK, CALIFORNIA

<u>DATE</u>	<u>AMEND NO.</u>	<u>TITLE -</u>	<u>SECTION AND PAGE NO.</u>	
April 19, 2004	1	3 Yr. Av. Activity Level (2001-2003) up-date and the designation of <u>Minarets</u> as the weather reporting station for activities at or below <u>PH#1</u> at Big Creek and the <u>Dinkev Cr.</u> Station for activities <u>above PH#1</u> <u>including Shaver Lake.</u>	Exhibit B	13

SIERRA NATIONAL FOREST

HIGH SIERRA AND BASS LAKE
RANGER DISTRICTS

PROJECT FIRE PLAN
February 2003 Revision

For

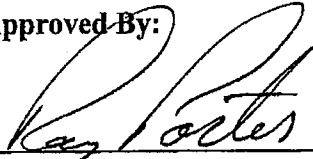
SOUTHERN CALIFORNIA EDISON COMPANY'S
NORTHERN HYDRO REGION
BIG CREEK, CALIFORNIA

FERC LICENSE NUMBERS:
67-120-2017-2085-2086-2174-2175

U. S. Forest Service
High Sierra Ranger District

Southern California Edison Company
Northern Hydro Region

Approved By:



Ray Porter
District Ranger

Date:

3.10.03

Approved By:



Randy Anthony
Region Manager

Date:

2/20/03

Bass Lake Ranger District

Approved By:



District Ranger

Date:

3-22-03

FIRE PLAN

I. PURPOSE

The purpose of this plan is to outline the responsibility for fire prevention and suppression activities and set up reporting and attack procedures in the event of a fire within a project area of a SCE hydroelectric project. A project area is defined as that area which is in and adjacent to a defined work area on National Forest lands where an activity related to the operation and maintenance of the hydroelectric project is undertaken and also all roads used in connection with the activity.

Additionally, this plan identifies "Activity Levels" which define the levels of fire preparedness and work activities permitted on projects areas based upon a fire danger rating system.

The intent of this plan is to comply with all applicable laws and guidelines included in Forest Service Manual (FSM) 5113, and Federal Energy Regulatory Commission License Articles.

II. OBJECTIVES

The objectives of this plan are to increase awareness of the potential for fires and establish guidelines for the prevention of project associated human caused fires. Additionally, the procedures that follow will provide for prompt and aggressive action in the event that a fire does occur.

III. RESPONSIBILITIES

A. Southern California Edison Company (SCE) or its Contractor(s)

- 1. Job-site Administrator**
(Maybe a SCE or a contractor's employee. However, SCE is responsible for the implementation and enforcement of the requirements of this Plan.)
 - a. Is responsible for and will direct all fire related activities for the project, including fire suppression, until relieved by the USFS District Ranger or his/her designated representative.**
 - b. Is responsible for the implementation of the requirements of this fire plan.**

- c. Will designate a Fire Guard who will act as the representative for the above responsibilities. The Fire Guard will also have the following duties:
- 1) Enforcement of permit and project regulations concerning burning, blasting and welding; controlled fires, spark arresters and fire suppression tool requirements.
 - 2) Monitor project activities to assure compliance with this plan and with full authority to "shut down" any activity in violation of this Plan's requirements.
 - 3) Make timely patrols, be aware of all ongoing activities and be prepared to take appropriate corrective action in accordance with this plan.
 - 4) Keep the USFS currently informed of progress and/or problems, and make periodic inspections of the project area with a designated agent of the USFS and correct any problems noted.
 - 5) Ensure that fire suppression tools and equipment are in compliance with this Fire Plan.
 - 6) Inspect all incoming equipment and vehicles for compliance with fire regulations, as identified in this plan.
 - 7) If an on-site weather station is installed, collects weather data, and calculates the actual on-site activity level and follows shut down directions in accordance with instructions as identified in Table I of this Fire Plan.
- d. Is responsible for establishing procedures to assure that everyone on the job site is cognizant of the Action Plan requirements (Exhibit C in the Appendix) in the event of a fire. The procedures should provide reminders and be continually updated to assure that specific assignments, contacts and phone numbers are current. Installation of a "bulletin board" at the project staging area should be considered as a means of communicating fire prevention messages.
- e. Will be responsible for notifying the Job-site Administrator in case of a fire. May make direct contact with the SCE dispatcher and/or the USFS dispatcher or office, if communications are available and time is of the essence. An emergency response notification list for both SCE and the USFS are included as Exhibit D and E in the Appendix.

- f. Is responsible for procurement of all fire-related permits from the District Ranger's Office having jurisdiction over the project area., i.e. High Sierra or Bass Lake Ranger Districts.

B. United States Forest Service (USFS)

1. District Ranger

- a. Is responsible for all fire activities in the Ranger District.
- b. The District Ranger or designated representative will assist in the preparation of this plan and will approve the plan in its final form.

IV. ACTIVITY LEVELS

A. Fire Danger Rating System

A fire danger rating system is the basis for determining activity levels. The Fire Danger Rating Area Map is included in the Appendix as Exhibit A and covers the Sierra National Forest. This map identifies contiguous areas of low-moderate-high fire danger rating areas and the weather stations where daily weather data is collected to determine the predicted activity levels for the following day. SCE shall be responsible for determining the fire danger rating area for a project area.

Based upon the predicted activity level, SCE shall curtail project area operations and implement fire preparedness levels to the extent identified in Table I by using the appropriate predicted Activity Level provided daily by the Forest Service Office(s) listed in Section B below.

**TABLE 1
ACTIVITY LEVELS**

Activity Level	Limitations or Requirements for next day based on Predicted Activity Level □	Immediate Limitations when Designated Activity Level Is Measured On-Site
1	Minimum required by State law.	Same as Predicted Activity Level
2a	Furnish fire patrol person	Same as Predicted Activity Level
2b	Furnish tank truck or trailer	Same as Predicted Activity Level
3	Stop all snag falling. Recently killed or dead trees (such as big trees) are not	Same as Predicted Activity Level

	<p>considered snags and the falling of these trees may continue as determined by the Forest Service.</p> <p>Welding shall be confined to cleared areas having a minimum radius of 10 feet measured from the place of welding.</p>	
4	<p>In addition to complying with the above, stop all falling, limbing, bucking, skidding, and other clearing and grubbing operations at 1:00 P.M. (local time). Welding, blasting, or open burning of any kind shall not be permitted at any time during the day. Work may resume when actual activity level, as determined by a project on-site weather station, returns to a minimum of activity level 3 or lower.</p>	Same as Predicted Activity Level
5	<p>In addition to complying with the above, shut down all operations except as specifically permitted by written order of the District Ranger or his designated representative. No welding, burning, or blasting of any kind shall be permitted.</p>	Same as Predicted Activity Level

The above requirements are cumulative and are tied directly to the activity level as predicted for each day. Lightning storm predictions will not be used as a basis for these requirements.

The predicted activity level shall govern operations for the following day.

A review of the activity level will be made by 1:00 P.M. the following day and SCE will be notified if the actual activity level exceeds the predicted activity level given the previous day. The actual activity level determined by the review will supersede the predicted activity level, which was given the previous day. In all cases, the actual weather elements shall govern over the predicted weather elements in determining activity levels.

B. Designated Weather Stations by Fuel Models

The designated Forest Service weather stations and fuel models for SCE project areas are: North Fork (B), Minarets (C), Mtn. Rest (B), Dinkey (G), Mt. Tom (H) and High Sierra (H), (Refer to Fire Danger Rating Map in Appendix A).

Each project area shall be assigned to one of the designed stations listed above for determination of predicted activity level.

ACTIVITY LEVELS CAN BE OBTAINED AFTER 4 PM BY CALLING NORTH FORK, BASS LAKE RANGER STATION (559) 877-2218 (MADERA COUNTY) OR PRATHER, HIGH SIERRA RANGER STATION (559) 855-5355 (FRESNO COUNTY)

OR

BY MONITORING CHANNEL 2 (FREQUENCY 171.475) OR CHANNEL 4 (FREQUENCY 162.225) USING A SCANNER

WHEN REQUESTING THE ACTIVITY LEVEL FOR A SPECIFIC PROJECT AREA, THE JOB-SITE ADMINISTRATOR OR THE DESIGNATED REPRESENTATIVE SHOULD STATE THE WEATHER STATION LOCATION AND/OR THE FUEL MODEL. FOR EXAMPLE: REQUESTING THE ACTIVITY LEVEL FOR HIGH SIERRA – FUEL MODEL “H”

C. Three-year Average Activity Level Table

The activity level table in Appendix B provides data on the three-year average for the predicted and actual activity levels for the period between 2000 and 2002 inclusive. These data can be used in the project planning effort to anticipate delays in activities due to high fire danger periods.

Opportunity exists to update these data by contacting the USFS Dispatcher. Generally the update occurs in January or February for the preceding year. The telephone number for the Dispatcher is included in the USFS – Key Personnel Contact List in Exhibit E in the Appendix.

The three-year average activity levels can also be used as a guide to schedule projects in high fire danger areas to minimize interruptions of work. Projects scheduled for high fire danger areas should, if possible, be scheduled during low fire hazard periods. This would reduce work interruptions, reduce agency coordination requirements and lower the risk of an escape fire and its attendant suppression costs.

A general caveat is “that nothing is as variable and unpredictable as the weather”, so discretion in the use of the average activity level is advised.

V. FIRE PREVENTION

A. Fire Prevention Requirements

It is understood and agreed to that SCE will take all steps reasonably in its power to prevent fires on or adjacent to the project area.

1. **Blasting and Welding**

The District Ranger or his designated representative will issue permits, as required, for these activities. Each permit will contain special stipulations pertinent to the particular job. Permits issued during the period May 1 to October 31 will be for individual operations and on a day-to-day basis. Permits issued outside the above period will be for the job, conditions permitting.

2. **Spark Arresters**

All diesel or gasoline operated engines, both stationary and mobile, used on the project area and flues used on construction camp buildings shall be equipped with a spark arrester that meets the State of California Public Resource Code Section 4442 and 4443 and USFS Regulations (FSM 5113). Power saws and other portable internal combustion engines are not exempt. (See Section 5 below for additional requirements for portable power tools).

Diesel engines with an integrated turbo-charger on the exhaust system are exempt from this requirement.

3. **Fire Extinguishers**

- a. Each fire extinguisher shall be inspected annually for serviceability by a qualified service and testing company. The inspection or certification tag shall not be removed or the seal broken. Missing certification tags or broken seals shall be cause to treat the extinguisher as an expended vessel.
- b. Expended fire extinguishers shall be replaced by a fully charged, like vessel prior to operation of the equipment that it was removed from.
- c. Extinguishers will be mounted so that immediate location and unobstructed access is possible.

4. **Controlled Fires**

- a. **Lunch and Warming Fires** - A permit issued by the District Ranger or his designated representative will be required and will contain stipulations regulating use of such fires when they are allowed.

- b. **Smoking Signs** stating smoking and fire rules will be posted on the bulletin board during the fire season. Supervisory personnel will oversee and require compliance with these rules. Smoking will be prohibited during fire season except in areas agreed upon by the SCE and the Forest Service. Under no circumstances will smoking be permitted while operating equipment, or while walking to and from the project area.

Each designated smoking area will be allowed only in cleared areas of at least three feet and places of habitations. All smokes will be crushed "dead out" when discarded.

5. **Power Saws and Other Portable Power Tools**

Spark arresters that meet State of California Public Resource Code Sections 4442 and 4443, and the United States Forest Service Regulations (FSM 5113), are required on all gasoline power saws and other portable power tools. An approved fire extinguisher and "O" round point shovel will be carried with each power saw and auger while operating. Fire extinguishers must be in accordance with California Public Resource Code, Section 4431, and California Administrative Code, Title 14, Section 1234, and appear on approved list as established by State Statute. Gas and oil will be carried only in metal safety cans.

Saw operators will check closely around the cuts of each tree felled and bucked, particularly old punk in vicinity of cuts, to make sure that no fire has started. After use, saws will be set firmly upright on a stump, rock or in areas cleared of inflammable debris so that the hot muffler cannot contact fuel. Keep muffler clean of sawdust, oil and litter. After fueling, saws or other portable tools shall be moved at least 10 feet from fueling area.

6. **Storage and Parking Areas**

Equipment service area(s), parking area(s), gas, diesel, and oil drum storage area(s) will be cleared of all flammable material for a radius distance of at least fifty (50) feet. The District Ranger must approve these areas in writing. Small stationary engine sites shall be cleared of flammable material for a radius distance of at least fifteen (15) feet.

7. **Oil Filters, Cartridges, Oil Rags**

Used and discarded oil filters oily rags, or waste will be hauled off-site and disposed of at approved disposal sites. Glass jugs or bottles shall not be used as containers of gas, oil or water.

VI. FIRE SUPPRESSION

A. Fire Suppression Responsibilities

- 1. It is understood and agreed that SCE will take all steps reasonably in its power to suppress fires on or adjacent to the project area.**
- 2. As part of this Plan, personnel will be supplied from project crews to fight fires caused by SCE or its contractors on the project area up to the total number of personnel in the project crew employed by SCE or its contractors as they are needed by the Incident Commander and based upon the knowledge, training, and ability of the project crew personnel.**
- 3. In the event of a fire within the project area, the Job-site Administrator or his/her designated representative will implement the Fire Suppression Action Plan. (Exhibit C in the Appendix).**
- 4. The following documents are sequestered in Appendices. They are an integral part of the Fire Plan. These documents provide information for initiating fire suppression activities, reporting procedures, key persons contact list and available forces and equipment list:**
 - SCE and or its contractor(s) - Fire Suppression Action Plan**
 - SCE and/or its contractor(s) – Key Personnel Contact List**
 - SCE and/or its contractor(s) Plan Regarding Personnel, Equipment and Organization**
 - USFS Emergency Notification and Key Personnel List**
 - Emergency Telephone Numbers**
- 5. The above documents contain titles, addresses and phone numbers and will be kept current. An annual review and update of the documents should be made, as needed.**
- 6. Copies of the Fire Suppression Action Plan and directories will be distributed to all concerned SCE, contractor(s) and USFS involved personnel and they will be posted in selected locations throughout the project area.**
- 7. All involved SCE personnel and/or /its contractor(s) personnel will be informed about item #6 and cautioned about the fire hazards immediately upon reporting to the project site.**

8. Emergency measures will be coordinated with the USFS for weekends, holidays, or outside working hours.

B. Fire Suppression Tool Cache(s) Requirements

A fire suppression tool cache(s) will be provided and maintained by SCE or its contractor(s) for emergency fire control use only, at each location when five or more people are working. Each cache shall be in a toolbox painted red and marked "Fire Tools." All tools shall be sharp and ready for use.

The fire cache(s) will be sealed by a strip seal and will be inspected regularly by the Job-site Administrator or his representative. The number of tool caches required will be determined by dividing the total number of project personnel by eight (8). Tool caches will be in place prior to the start of work. Exception: "When fewer than five employees are working on a project site, sufficient shovels and axes or Pulaski's must be available to outfit all personnel".

1. Each fire tool cache shall contain as a minimum requirement, the following tool complement:
 - Four shovels, size 0, LHRP
 - Two McLeod tools,
 - Two axes, double blade, (Pulaski tool may be substituted for axes)
 - One pump, back, 5 gallon filled with water

C. Equipment Fire Tool Requirements

Project equipment will have the complement of tools as specified below:

1. Each highway truck, personnel vehicle, tractor and other earth moving equipment will have (1) serviceable shovel, axe and a fully charged fire extinguisher, UL rated 4B:C or more.
2. Each fuel truck and/or lube type vehicle will have one (1) 20 pound B:C dry chemical fire extinguisher for each fuel dispensing device but shall not need more than two (2) 20 pound B:C dry chemical fire extinguishers per vehicle regardless of the number of dispensing devices.
3. Each straight lube type vehicle will have at least one (1) of the above type extinguishers.
4. Each welding unit, truck and mobile, will have one (1) serviceable shovel and a 5-gallon backpack pump, full of water, in good operating condition and one (1) 20 pound B:C dry chemical fire extinguisher.

5. All fire suppression tools and equipment required shall be in good condition and shall meet the following specifications:
- Shovels shall be size "O" or larger and be not less than 46 inches in length.
 - Axes shall have 2 1/2 pound or larger heads and be not less than 28 inches in overall length.
6. A mobile fire water tank will be located on a project, if required by the Fire Guard, and shall meet the following requirements:

(A determination as to the need for a Fire Water Tank will be made by SCE or its contractors in consultation with the USFS representative).

FIRE WATER TANK REQUIREMENTS

The tank shall contain at least 300 gallons of water available for fire suppression. A water sprinkling tank truck will meet this requirement if provision is made to insure that the minimum of 300 gallons is available for fire suppression at all times. Ample power shall be readily available for promptly and safely moving tank over roads serving project area. Tank truck or trailer shall be equipped with the following:

Pump, which at sea level can deliver 23 gallons per minute (GPM) at 175 pounds per square inch (PSI), measured at the pump outlet. Pump(s) shall be tested on the project area using a 5/16-inch orifice in the "Forester One Inch In-Line Gauge" test kit.

Pump shall meet or exceed the pressure value in the following table for nearest temperature and elevation:

Temp °F	3000' Elev.		4000' Elev.		5000' Elev.		6000' Elev.		7000' Elev.	
	PSI	GPM	PSI	GPM	PSI	GPM	PSI	GPM	PSI	GPM
55	165	22	161	22	157	22	153	22	150	21
70	162	22	158	22	154	22	150	21	147	21
85	159	22	155	22	151	21	147	21	144	21
100	155	22	152	22	148	21	144	21	141	21

The pump outlet shall be equipped with 1 1/2" National Standard fire hose thread. A bypass, or pressure relief valve, shall be provided for other than centrifugal pump.

300 feet of 3/4-inch inside diameter rubber-covered high-pressure hose mounted on live reel attached to pump with no segments longer than approximately 50 feet, when measured to the extreme ends of the couplings. Hose shall have reusable compression wedge type 1-inch brass or lightweight couplings (aluminum or plastic). One end of hose shall be equipped with a coupling female section and the other end with a coupling male section. The hose

shall, with the nozzle closed, be capable of withstanding 200-PSI pump pressure without leaking, distortions, slipping of couplings, or other failures.

A shut-off nozzle with a combination 3/16-inch straight stream orifice and fog spray rated at 6 to 20 gallons per minute.

Sufficient fuel will be available to run the pump for at least 2 hours; including the necessary accessories to facilitate efficient operation of the pump.

APPENDIX

- Exhibit A** **Map of Fire Danger Rating Areas And Weather Station Locations**
- Exhibit B** **Chart – Weather Stations Name/Number Including: Fuel Model Designations and Three-Year Average Activity Levels**
- Exhibit C** **SCE’s Fire Suppression Action Plan**
- Exhibit D** **SCE’s Emergency Notification and Key Personnel Contact List**
- Exhibit E** **USFS Emergency Notification and Key Personnel Contact List**
- Exhibit F** **SCE’s or Contractors Plan Regarding Organization, Personnel and Equipment**
- Exhibit G** **Excerpt from State of California Public Resource Code Relating to Fire Prevention**
- Exhibit H** **Excerpt from Federal Energy Regulatory Commission License Article 14, relating to fire prevention and suppression activities.**

Exhibit B

ACTIVITY LEVELS AVERAGE 2001-2003											
Station Name/Number	Level	June		July		August		Sept		October	
		Actual	Predicted	Actual	Predicted	Actual	Predicted	Actual	Predicted	Actual	Predicted
North Fork 044204	1	13	14	12	9	14	16	13	12	27	26
Fuel Model - B	2	1	2	2	2	1	1	1	1	1	1
	3	15	13	17	18	16	14	16	17	2	3
	4	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0
Mt. Rest 044505	1	2	2	4	2	0	1	2	2	8	8
Fuel Model - B	2	4	5	1	3	1	1	2	3	2	2
	3	14	12	16	16	20	18	17	14	9	9
	4	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	1	0	1	0	0
Minarets 0445203	1	11	10	8	8	8	8	10	9	15	15
Fuel Model - C	2	1	2	5	5	3	3	0	0	1	1
	3	6	6	6	4	15	15	17	17	2	2
	4	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	1	0	0	0	1	0	0
High Sierra 044520	1	8	7	7	7	0	0	3	3	3	4
Fuel Model - H	2	6	4	3	4	1	2	0	1	2	3
	3	6	7	10	9	18	16	16	13	14	13
	4	0	1	0	0	0	0	0	1	0	0
	5	0	0	0	0	2	3	1	2	1	1
Dinkey Ck 044521	1	13	13	17	19	13	14	12	12	17	16
Fuel Model - G	2	5	3	6	4	7	8	5	6	4	7
	3	2	3	4	3	11	8	11	10	4	3
	4	0	0	0	0	0	0	0	1	0	0
	5	0	0	0	0	0	0	0	0	0	0
Mt. Tom 044511	1	5	6	8	8	1	2	5	4	6	7
Fuel Model - H	2	4	4	2	3	1	2	2	3	3	2
	3	5	3	5	6	4	4	3	3	6	7
	4	4	4	3	3	6	8	4	7	2	3
	5	2	2	3	1	9	5	6	4	3	1

Assigned Weather Stations:

Effective in 2004 two weather reporting stations will be used for determining the Activity Levels within No. Hydro Region project areas as follows:

1. Minarets Recording Station for projects/activities at Big Creek PH#1 and below.
2. Dinkey Cr. Recording Station for projects/activities above Big Creek PH#1, including Shaver Lake.

Activity levels can be obtained at 4pm daily by monitoring Channel 2 (frequency 171.475) or Channel 4 (frequency 162.225), using a scanner.

Exhibit C

SOUTHERN CALIFORNIA EDISON COMPANY

FIRE SUPPRESSION PROCEDURE

ACTION PLAN

I. IN CASE OF A FIRE (SCE and/or its Contractors) will:

A. Attempt to contain the fire with on-site personnel, equipment and fire tools.

Generally the most fire knowledgeable person on-site shall assume responsibility for the initial attack on the fire. This person shall direct fire suppression activities until the fire is controlled or a Forest Service person relieves him/her.

If the initial attack fails and the fire becomes an escaped wildfire, project personnel shall only attempt fire suppression based upon their knowledge, training and ability to do so.

If possible, protect the point of origin of the fire.

B. Simultaneously, notify the SCE Dispatcher* by the most expeditious means available:

Telephone: (559)-855-2853 PAX: 8-78333

Mobile Radio (SCE), (Alpha Code): "Dispatch"

*Notify the Forest Service Dispatcher at (559) 487-1515 or Call 911, if the SCE Dispatcher cannot be contacted.

Provide the Dispatcher with information as to the location, size of the fire, if help is required and what action has been taken. Keep Dispatcher informed of changes in fire conditions and when the Forest Service assumes responsibility for fire suppression activities.

The SCE Dispatcher will take the following actions, immediately upon being informed of a fire:

- Notify the Forest Service Dispatcher of the fire by telephone at (559-348-1515).
- Provide as much detailed information as is available and continue coordinating activities between fire suppression forces and the Forest Service Dispatcher until relieved.
- Notify Northern Hydro Management or the Duty Supervisor of the fire by the most expeditious means available.

Exhibit D

SOUTHERN CALIFORNIA EDISON COMPANY

EMERGENCY NOTIFICATION

AND KEY PERSONNEL LIST

EMERGENCY CONTACT NUMBERS (24 HOURS):

	CONTACT	RADIO ID#	PHONE/PAGER	PAX	LOCATION
1.	SCE Dispatcher	73-0000	(559) 855-2853	78333	Big Creek 3
2.	Rector Substation		(559) 734-1786	72230	Visalia

KEY PERSONNEL CONTACT LIST, Northern Hydro Region

	CONTACT	RADIO ID#	PHONE/PAGER	PAX	LOCATION
1.	Region Manager	75-1054	(559)-893-3646 (559) 730-1900 (cell)	78146	Big Creek No. 1
2.	Duty Supervisor (After hours)	Various	(559) 730-1908	various	Big Creek No. 1
3.	Production Manager	75-1057	(559) 893-3675 (559) 730-1910 (cell)	78175	Big Creek No. 1
4.	Agency Coordination Manager	75-1099	(559) 893-3606	78106	Big Creek No. 1

Exhibit E

UNITED STATES FOREST SERVICE

EMERGENCY NOTIFICATIONS LIST

KEY PERSONNEL

EMERGENCY TELEPHONE NUMBERS (24 HOURS)

- | | | | |
|----|-----------------------------------|-----------------|------|
| 1. | USFS Dispatcher – In Case of Fire | 559-348-1515 or | 911 |
| 2. | California Highway Patrol | | 911* |
| 3. | Fresno County Sheriff's Office | | 911 |
| 4. | Ambulance | | 911 |

*Dial 911 and state your need, i.e., ambulance, fire, Sheriff, CHP

HIGH SIERRA RANGER DISTRICT

- | | | |
|----|----------------------------------|--------------------------|
| 1. | District Office – Prather | (559) 855-5355 |
| 2. | District Ranger | (559) 855-5355 Ext. 3340 |
| 3. | F.S. Representative | (559) 855-5355 Ext. 3338 |
| 4. | District Fire Mgmt. Officer | (559) 855-5355 Ext. 3342 |
| 5. | District Fire Prevention Officer | (559) 855-8321 Ext. 3414 |
| 6. | Big Creek Fire Station | (559) 893-3419 |
| 7. | High Sierra Ranger Station | (559) 877-3138 |

BASS LAKE RANGER DISTRICT

- | | | |
|----|----------------------------------|--------------------------|
| 1. | District Office – North Fork | (559) 877-2218 |
| 2. | District Ranger | (559) 877-2218 Ext. 3100 |
| 3. | F.S. Representative | (559) 877-2218 Ext. 3182 |
| 4. | District Fire Management Officer | (559) 877-2218 Ext. 3120 |
| 5. | District Fire Prevention Officer | (559) 877-2218 Ext. 3128 |
| 6. | Minarets Work Center | (559) 877-3142 |

Exhibit F

SUPPLEMENTAL FOREST SERVICE PROVISIONS

SCE or its Contractor's Plan Regarding Personnel, Equipment, and Organization:

SCE or its Contractor shall, prior to commencing work, furnish the following information relating to key personnel, tools and equipment available for the purpose of fighting wild fires within and adjacent to the project area:

Key Personnel: (In order of call preference)

Company:		Address:	
Name:		Phone (day):	
Title:		Phone (eve):	

Company:		Address:	
Name:		Phone (day):	
Title:		Phone (eve):	

Company:		Address:	
Name:		Phone (day):	
Title:		Phone (eve):	

Personnel and Equipment

Classification	Type	Number
Fire Fighters		
Fallers		
Power saws		
Equipment with operators		

APPENDIX B

2004 Vegetation Management and Special Projects Memorandum

MEMORANDUM
NORTHERN HYDRO REGION
PROJECT WORK PLANNING
VEGETATION MANAGEMENT AND SPECIAL PROJECTS
YEAR 2004

TO: Kathleen Dunkle

The following is the proposed vegetation management (IPM) and special projects program for the year 2004. These projects have been my “AOR” for several years. I have accomplished these projects using the California Conservation Corps and the Edison Forestry Mitigation Crew, in the past. I plan to continue using these crews in the year 2004.

In addition, I will investigate using a contractor with a “Qualified Applicators License” to apply herbicides at facilities such as, penstocks, flowlines, siphons and roads. This action will be in response to the anticipated approval of the amendment to the PG&E/SCE EA. that will include these facilities. These facilities represent a backlog for treatment and should be accomplished in 2004 to regain vegetative control. Some of these facilities have not an IPM treatment for up to four years, due to scheduling and authorization conflicts.

These projects are mandated by Agency requirements, such as compliance with fire hazard reduction around facilities, and the FERC and DSOD inspections that identify items requiring attention that affect dam safety and/or operational procedures. The projects also enhance personnel safety and efficiency.

The plan reflects a recurring scope of work. It also reflects additional work request that have been made during fiscal year 2003 that have been deferred until fiscal year 2004 including non-vegetation projects. These special projects are listed under a separate heading in this memorandum.

The scope of work at each facility will vary on an annual basis. It will range from a field review to determine need, to periodic or annual maintenance.

Projects are identified by location and facility. This method provides a “scope of work” for crews and a tracking document for accomplishment.

I. SCOPE OF WORK

PROJECT SITE ACTIVITY/FACILITY STATUS*

Big Creek 1

Vegetation Control - Using IPM Methods

1. Switchyard/Transformer Pad
2. Access Road to Powerhouse
3. Dam 4 Access/Groins, also debris removal at up-slope groins of the dam.
4. Wastewater treatment plant/access road
5. Water treatment plant
6. Pitman sub-station
7. Vehicle Storage and garage fence line sites
8. Fire boxes
9. Penstocks*
10. Oak trees at weather station
11. Initiate clearing a fifty-foot (50') fuel break below Spruce Road.
This is a multi-year project.

Big Creek 2/2A

Vegetation Control - Using IPM Methods

1. Switchyard
2. Powerhouse area
3. Parking area
4. Access Road
5. Access trail to intake structure
6. Fire boxes
7. 12kV substation- inside and perimeter fence..
8. Surge chamber adj. to R/R grade (West Portal).
9. Penstocks - spot treatment with herbicide
10. Access road to PH 2A gatehouse (Above R/R @ West Portal.
11. Penstocks 3&4 Venturi Bldg. below Canyon Road.
12. Dam 5 groins remove blackberry plants.
13. Trail to valve house above Canyon Road @ PH2A penstock crossing of road.

Drainage Structure Maintenance

1. Switchyard -
Check and remove sediment from drainage ditches as needed.

Big Creek 8

Vegetation Control - Using Hand Tools/ Herbicides

1. Access Road
2. Gas house/ fire boxes
3. Access trail to Dam 6
4. Gatehouse
5. Penstocks - spot treatment with herbicide
6. Communication bldg. at surge chamber
7. Access roads to penstocks and surge chamber

Big Creek 3

Vegetation Control - Using IPM Methods

1. Buildings: -garages, hazardous material, office
2. Access road to PH, switch yard, water treatment plant
3. Maintenance yard - perimeter fence, access road.
4. Fire boxes
5. Control noxious weeds at identified locations using herbicides. (goat head, tocalote thistle, broom sp. and tree of-heaven)
6. Storage garage near residences
7. Intake structure at top of PH#3 penstocks including trail to communication bldg
8. Trail to rock trap from intake structure
9. Penstocks - determine need for follow-up treatment. Spot treat as necessary.
10. Trail to Dam 7 gauging station. Erosion and vegetation control
11. Dam 7 Sub station

Big Creek 4

Vegetation Control Using IPM Methods

1. Haz Mat bldg
2. Parking lot
3. Access road
4. Substation
5. Switchyard/ substation (inside and along perimeter fence line; also control a small population of tocalote thistle (a noxious weed) at the end of switch yard fence on the east side, using herbicides.
6. Dam 7 groins north and south side

Maintenance of Drainage Structures

1. Inside of switchyard -clean-out drainage ditches, as needed
2. Remove soil covering over bed rock above switchyard for long term fire hazard reduction.

Mammoth Pool

Vegetation Control - Using IPM Methods

1. Back of PH
2. Penstock – Cut trees and shrubs. Basal treatment of cut stumps with Pathfinder II herbicide.
3. Mammoth Pool dam. Trees and shrubs cut in 1999 and 2000. Treated with herbicide in 2000 and 2002. Check to see, if follow-up treatment is needed to control regrowth. Spot treatment, as needed in out-years.

Maintenance of Drainage Structure

Install a permanent drainage behind the PH to drain the standing pool of water into the nearby stream channel. Backhoe maybe required.

Shaver Lake Dam

Vegetation Control - Using IPM Methods

1. Dam groins and leakage sites where riparian vegetation is established.
2. Trail to Stevenson Creek gauging station. Follow-up spot herbicide treatment using Garlon4/ Pathfinder II herbicide, if needed.

Eastwood PS

Vegetation Control - Using IPM Methods

1. Timberwine Substation (Use pre emergent herbicide)
2. Get-a-way structure inside and outside of fence line. Use pre-emergent herbicide.
3. Surge chamber.
4. Exhaust fan site. Cut and remove 4 small oak trees that are leaning into exhaust fan. Professional faller will be contracted to do the job.
5. Access roads to EPS (Perimeter Road) and Get-Away Structure. Pre-treat brush using “brush hog” to cut Encroaching vegetation, follow-up with herbicide treatment.

Huntington/ Shaver Lake Siphon Vegetation Control Using IPM Methods

1. Treat sprouting tree/shrub vegetation with a basal herbicide application in 2004. This project is a continuation of vegetation control activities begun in the fall of 2002 and 2003 .
2. Access roads to the Huntington Lake and Shaver Lake side of the siphon. Brush removed by hand cutting in 2002. Follow-up herbicide treatment needed.

Balsam Forebay Vegetation Control - Using IPM Methods

1. Dam groins. Treat noxious weed bull thistle also. (Use pre-emergent herbicide).
2. Weirs below dam (3) at stream flow release valve house
3. Spillway (flat area). Trees and shrubs only.
4. Inlet and outlet gatehouses.
5. Access roads to forebay. Treat resprouting vegetation with herbicides.

Rodent Control

Toe of dam, as needed. Use established bait stations.

Huntington Lake Vegetation Control - Using IPM Methods

1. Dams 1, 2, and 3 down face slopes. Continue vegetation control from previous years. Treat resprouting vegetation with Garlon4/ Pathfinder II herbicide.
2. BC#1 flow lines and gatehouse at top of penstock
3. Treat sprouting vegetation with Garlon4/Pathfinder II herbicide. Camp 10 and Line Creek substations. Treat Camp 10 substation with pre-emergent herbicide. Line Creek substation with Accord herbicide only.
4. Weir below dam 3 cut and remove encroaching vegetation and remove sediment from behind and below weir (check annually).

Portal Forebay Vegetation Control Using IPM Methods

Upslope and downslope dam faces and saddle dike. Monitor for tree/shrub establishment treat, as needed, with Garlon4/Pathfinder II herbicide.

Rodent Control

Dam faces and saddle dike. Spring/fall monitor for activity, treat as needed. Follow prescription.

Weir Maintenance

1. Toe of dam – Monitor drain and clean as iron bacteria accumulate and inhibit free flow of water through the “V” notch weir
2. Tunnel Leakage weir. Monitor sediment build-up. Drain and remove sediment as needed.

Vermilion Dam

Vegetation Control Using IPM Methods

1. Upslope/downslope dam faces - remove trees/shrubs by cutting with chain saws/ hand pruners. Hand grub small trees. Treat cut stumps of sprouting shrubs with basal application of Garlon4/ Pathfinder II herbicide. Control noxious weeds (mullien).
2. Emergency spillway - monitor for tree encroachment. Remove as needed.
3. Remove encroaching vegetation that is impacting flows thru “V” notch weirs (8). Keep flow channel from weirs 25 and 28 free of encroaching tree/shrub vegetation Major species are Mt. Alder, Lodge pole and Jeffery pines. Hand grub and/or cut vegetation. Treat cut stumps and sprouting shrubs with Accord herbicide only. Accord has an aquatic label.
4. Service spillway - maintain a bare ground area of 3 feet at interface of the top of the concrete spillway and bare ground for detection of undermining the spillway.

Florence Lake

Vegetation Control Using IPM Methods

Dam arches (58). Initial control of vegetation was by cutting in the fall of 2000. Basal application of Pathfinder II herbicide was applied to sprouting vegetation in the fall of 2001. Follow-up treatment completed in the fall of 2002. Follow-up in 2004, as needed.

Mono Bear Siphon

Vegetation Control Using IPM Methods

Remove selected trees and shrub encroaching on siphon.

Canyon and MSM Roads Vegetation Control Using IPM Methods

1. Control sprouting shrubs and trees that were treated using a mechanical “brush hog”. Use Garlon 4/Pathfinder II herbicide as a basal application.
2. Continue “brush hog” along Canyon Road to gate in 2003. Follow-up with herbicide treatment
3. Additional site distance clearing shall be required at certain location cut vegetation and treat cut stumps with Garlon4/Pathfinder II basal herbicide.
4. Control grasses and forbs that are growing on the inside ditch line and the outside berm using a foliar application of a accord/garlon 4 prescription or a pre-emergent herbicide. The selected treatment will be dependent upon soil conditions at the time of application.

Note: Prior to any brush cutting or herbicide application below 3000 ft. in elevation, elderberry plants must be identified and protected in accordance with Fish and Wildlife established guidelines.

II. SPECIAL PROJECTS FOR YEAR 2004

Big Creek 1 SY Sediment Removal

1. Remove sediment deposit to reestablish drainage that was caused by soil failure due to soil saturation. (Consider shotcrete application on slope within the switchyard, after correcting drainage problem). This problem was discussed with Rick Johnson. He shall take the lead as this is his AOR.

Big Creek 3 Site Modifications

1. Harden site with shotcrete or tunnel tailings behind machine shop (50x30 feet) to eliminate vegetative growth. Annual removal of this growth generates debris that is deposited within the adjacent oil cooling vats.

Balsam Meadow Project

1. Annually put-up and take down and maintain the six miles of the Dinkey Road fence line in compliance with the project CDF&G MOU.
2. Annually review, implement and document wildlife habitat maintenance projects in compliance with the project CDF&G MOU. Coordination with Steve Bryd of Edison Forestry for incorporating projects into Forestry’s timber harvesting program.

III. OTHER SPECIAL PROJECTS IN SUPPORT OF HYDRO'S OPERATIONS

Weir Maintenance

- 1. Establish a weir maintenance program using the DF&G MOU guidelines and USFS requirements. And schedule for completion. Complete the required vegetation removal plans in a timely manner to meet work schedule dates.**

Kaweah Hydro Projects

- 2. Kaweah hydro extensively uses the CCC's to do various maintenance project at their facilities provide technical assistance by preparing a "Scope of Work" and Agency coordination for each project. Jim Berner then directs the field work of the CCC crews. This has proven to be a effective means of accomplishing need work.**

Pitman Diversion Repair Project

- 3. Check erosion control on access road to Diversion structure. Notify CDF&G on status.**

IV. SUMMARY

This plan represents the accumulation of vegetation control activities that have been developed over several years as needs were identified during Hydro's planning process.

This plan, as presented, can be used to fulfill a "Plan of Work" and establish goals for calendar 2004 in my AOR. In addition, a long term goal is to have an established vegetation control program that over-time reduces effort, costs and fire , risk that meet Agencies requirements

Since this was my "AOR", the specific projects filter down to me and were incorporated into my annual program. However, the scope of work was not consolidated into one planning document, so this document is my effort to accomplish this task. Hopefully, the document can be incorporated in the planning process to develop annual plans of work, to prioritize projects and include new projects.

Most of the projects listed above have received an initial treatment to Control vegetation, so we are basically into a maintenance phase. This phase

Includes a wide range of activities from annual/periodic monitoring to spot treatments and annual treatments for fire hazard reduction compliance.

Implementation of the above program requires agencies approval and/or permits. The following is an listing of the major requirements. The listing also be used as an annual compliance check list.

V. PROGRAM IMPLEMENTATION COMPLIANCE REQUIREMENTS

- 1. Complete specific items identified in FERC/DSOD inspections reports prior to the next scheduled inspections.**
- 2. Provide the Forest Service with annual maintenance schedule.**
- 3. Review annually the Forest Service’s environmental documents to assure that authorization extends into the current year.**
- 4. Coordinate with the Forest Service for issuance of new authorization when current is due to expire. One to two year lead time may be required.**
- 5. Edison’s person in charge of herbicide application must have a “Qualified Applicators Certificate” (QAC) issued by the CA Dept. of Pesticide Regulation. Initial QAC is based on study package and testing. Subsequent Certificates are based upon continuing education credits (20 hours/2 years).**
- 6. A “Operators Identification Number” (OIN) must be obtained for application of herbicides.**
- 7. Monthly reporting of herbicides used must be submitted to Fresno County’s Dept. of Agriculture using their standardized form or by webmail at www.eworldag.com. Reporting requirement is only for months that herbicide is applied.**
- 8. A “Pest Control Advisor” recommendation is required for each herbicide that is to be applied. These recommendations are generally available for no charge from the supplier of the herbicide. Annual requirement.**
- 9. Annual training and formal documentation is required for applicators of herbicide. Usually the QAC can conduct the required training. Standardized training material is available from the County.**
- 10. Records must be maintained for varying time periods.**
- 11. Coordination with the Station Chiefs, including the assignment of a checker for applications around energized facilities is a requirement.**
- 12. Annually report pesticide use on National Forest lands to the District Ranger by 09/30. (This the end of the Agency’s fiscal year).**
- 13. Comply with the Implementation Plan that was prepared for the PG&E/SCE EA when applying any pesticide.**
- 14. Project located below 3000 ft. in elevation that may potentially have elderberry plants will need to receive an evaluation and if elderberry plants are identified within the project that may include a take, compliance with Fish & Wildlife Guidelines will be mandatory.**

**Joe Tanski
Project Coordinator**

MEMORANDUM

JULY 21, 2003

SUBJECT: Additional Projects - 2003/2004

The following projects have been proposed to be added to the Vegetation Management Program for the 2003/2004 period.

Project Number and Description

- | | |
|---|---|
| 1. Willow Creek Guaging Sta. | Remove riparian veg. from under cableway. hand clearing only. |
| 2. PH 2/2A- 12 kV Substation | Clean out sediment from substation and reinforce drainage ditch above substation to prevent sediment deposition in substation. |
| 3. PH 1 Gatehouse at top of Penstock | Fall 3 marked small trees to provide safer approach for helicopter landing at the site. |
| 4. Dam 6 | Remove on plant growing on face of downstream side of the dam. |
| 5. Mammoth Pool Dam | Remove one willow growing on upslope face of dam. |
| 6. Road Brushing at the following locations: | In conjunction with brush hog, followup treatment with herbicide to control sprouting. |
| a) Perimeter Road | |
| b) Eastwood Elevator Bldg. Access Road | |
| c) Balsam Forebay Access Road | |
| d) Canyon Road | |
| e) Camp 6 Road | No herbicide followup. Use not approved, Awaiting approval for herbicide use. |
| f) BC 1 Flowline | |
| g) Rock Creek Access Road | No herbicide followup. Use not approved. |
| h) Million Dollar Mile Road | Brushing prescription to be developed after Field review of elderberry plants. |

APPENDIX C

Photographs of Fuel Loads at Representative Project Facilities in the Study Area



Photo C-1 – Big Creek Lodge. The area within the community of Big Creek is identified a defensible fuel profile zone where the ground vegetation has been brushed and thinned. Ground fuels consisting of brush vegetation and woody debris have been removed or thinned from around the building and between the trees. The trees in the area have been limbed to reduce limb density near the ground surface and to remove dead branches. Many of the buildings in Big Creek are constructed using non-flammable roofing material.



Photo C-2 – Big Creek Community. This photograph shows that the brush and woody debris have been thinned or removed from between the trees and along the road margins reducing the accumulation of ground fuels.



Photo C-3 – Powerhouse No. 1. This photograph taken along the side of Powerhouse No. 1 shows that the hillside area immediately adjacent to the structure is cleared of brush and woody debris. Trees adjacent to the building have been limbed back to provide a defensible space. The building is of concrete construction providing very good fire protection.

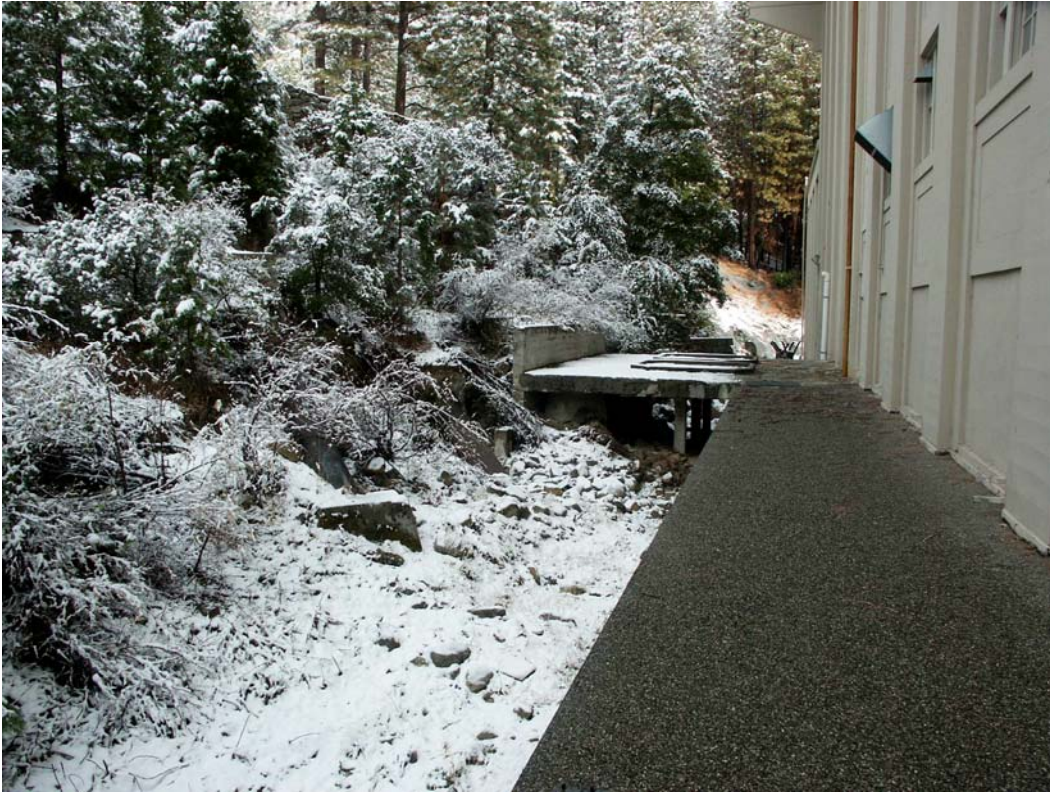


Photo C-4 – Powerhouse No. 1. This photograph taken behind the powerhouse shows the defensible space area immediately adjacent to the structure which is cleared of brush and woody debris. Trees adjacent to the building have been limbed back to provide a defensible space and the building is of concrete construction providing very good fire protection.



Photo C-5 – Powerhouse No. 1 Switchyard. This photograph shows the clearing of brush and woody debris around the perimeter of the facility.



Photo C-6 – Powerhouse No. 1 Switchyard. This photograph shows clearing of ground fuels along the perimeter of the facility. One tree is overhanging the perimeter fence and should be limbed.



Photo C-7 – Upper Canyon Road. This area is located along the road 8S05, also referred to as the Upper Canyon Road, approximately one mile west of the gate near the intersection with Huntington Lake Road. This photograph depicts the thick stands of young trees and dense understory of saplings and brush. Vegetation in this area is a mixed conifer pine belt forest (Douglas Fir, Yellow/Jeffrey Pine and Incense Cedar).



Photo C-8 – Upper Canyon Road. This area is also located along the road 8S05 approximately one mile west of the gate near the intersection with Huntington Lake Road. This photograph depicts the thick stands of young trees that are observed throughout this general area. Vegetation in this area is a mixed conifer pine belt forest (Douglas Fir, Yellow/Jeffrey Pine and Incense Cedar).

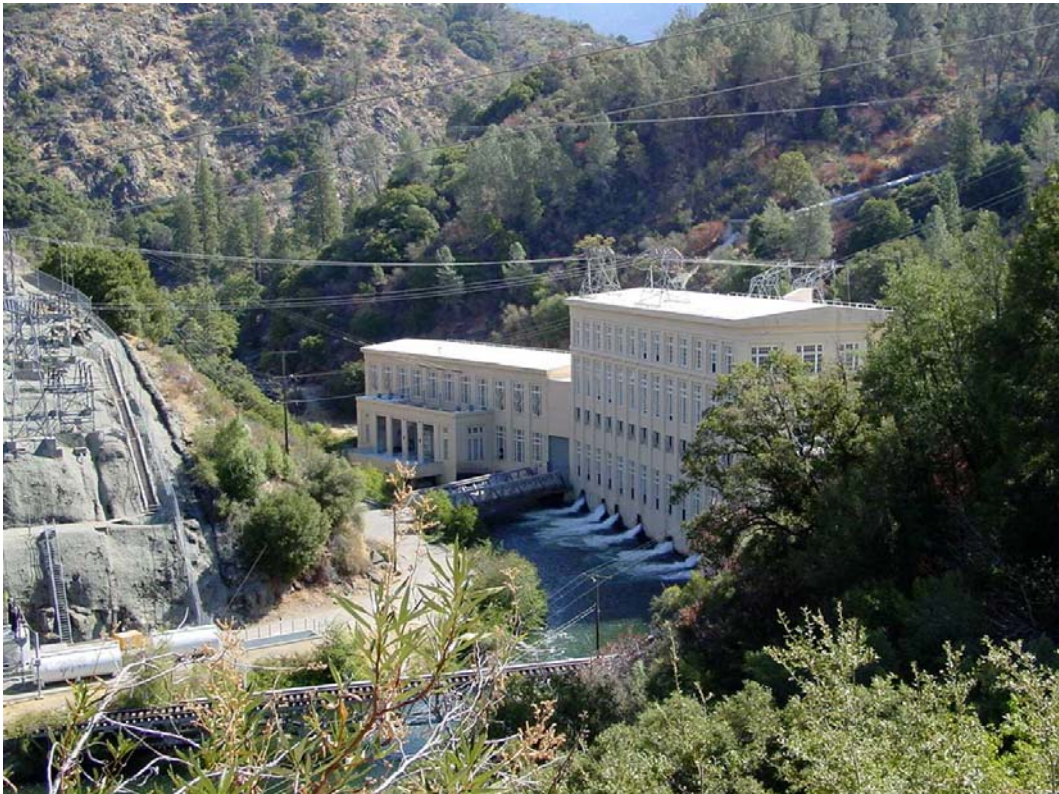


Photo C-9 – Powerhouse 2/2A Facilities. The Powerhouse 2 and 2A facilities and switchyard are located in a steep walled canyon at an elevation of approximately 3,000 feet within a vegetation community consisting of chaparral and oak woodland.



Photo C-10 – Powerhouse 2/2A. This photograph depicts the area immediately behind Powerhouse No. 2/2A. The road, rock wall and perimeter area that is clear of woody debris and brush provides defensible space. The building is of concrete wall construction which provides good fire protection.



Photo C-11 – Powerhouse 2/2A Switchyard. This photograph shows the cleared area around the perimeter of the switchyard to maintain a defensible space. In addition the ground surface within and around the switchyard is covered with gunite to provide additional fire protection.



Photo C-12 – Powerhouse 2/2A Switchyard. This photograph shows the clearance of ground fuels and gunite covering within and around the perimeter of switchyard.



Photo C-13 - Powerhouse No. 8. Powerhouse No. 8 and the associated facilities are located at the confluence of Big Creek and the San Joaquin River in a steep walled canyon at an approximate elevation of 2,200 feet. This location is within a vegetation community consisting of chaparral and oak woodland.



Photo C-14 – Powerhouse No. 8. This photograph shows the powerhouse surrounded along three sides by the Dam 6 forebay and therefore has a low fire risk or hazard.



Photo C-15 - Powerhouse No. 8. This photograph shows the steep rock hillside behind Powerhouse No. 8. This hillside has little vegetative cover and provides a defensible space around the structure.



Photo C-16 - Mammoth Pool Powerhouse. This photograph shows the powerhouse located along the San Joaquin River in a steep walled canyon at an approximate elevation of 2,200 feet. This location is within a vegetation community consisting of chaparral and oak woodland.



Photo C-17 – Mammoth Pool Powerhouse. This photograph shows the defensible space cleared of brush, grass and woody debris that is maintained around the perimeter of the Mammoth Pool Powerhouse.



Photo C-18 – Big Creek No.3 Community. The Big Creek No. 3 community, switchyard and powerhouse are located at elevations between 1,400 to 1,600 feet within a vegetation community consisting of chaparral and oak woodland. The area within the community is a defensible fuel profile zone where areas between the buildings and open areas are cleared of brush and woody debris. Ground fuels in the oak woodland setting consists predominately of grass and leaves.



Photo C-19 – Big Creek No. 3 Community. This photograph shows the workyard/corporation yard in the Big Creek No. 3 community and depicts the defensible clearing of brush from open areas and around the perimeter of the facility. Ground fuels in the oak woodland setting consists predominately of grass and leaves.



Photo C-20 – Powerhouse No. 3. This photograph shows the powerhouse located at the base of a steep canyon with the hillside above the powerhouse building covered with thick brush.



Photo C-21 – Powerhouse No. 3. This photograph shows brush encroaching behind the powerhouse building. The vegetation could be cleared back to provide a better defensible space. The building is of concrete construction which provides good fire protection.



Photo C-22 – Mammoth Pool Campground. This photograph shows the area within the campground clear of ground vegetation and fuels build up between the trees. Ground vegetation in the area has been brushed and thinned, and the tree limbs have been thinned. This area is located at an elevation of approximately 3,200 feet and is located at the transition zone between the lower oak woodland/chaparral and the conifer forest.



Photo C-23 - Logan Meadow Trailhead (near Mammoth Pool Reservoir). This photograph shows an area of sparse ground vegetation and fuels build up between the trees. This area is located at an elevation of approximately 3,200 feet and is located at the transition zone between the lower oak woodland/chaparral and the conifer forest.



Photo C-24 – Mammoth Pool Boat Launch Parking Area. This photograph shows the transition zone vegetation community from oak woodland to conifer forest. The vegetation and understory in the boat launch parking area has been thinned and cleared.



Photo C-25 – Shaver Point, Shaver Lake. This photograph shows the lake margin which is clear of fuel accumulation. Set back from the lake in the forest are stands of young and intermediate size trees with sparse understory that may include young trees and shrubs. The Shaver Lake area is located at about 5,400 feet elevation in a mixed conifer forest community.



Photo C-26 – Camp Edison Boat Launch. This photograph shows the lake margin which is clear of fuels build. Set back from the lake in the forest are stands of young and intermediate size trees with sparse understory.



Photo C-27 Camp Edison Campground. This photograph shows the grounds within Camp Edison brushed and cleared of ground vegetation and woody debris. The limbs on the trees have been thinned and dead branches have been removed.



Photo C-28 - Camp Edison Campground. This photograph shows the grounds within Camp Edison brushed and cleared of ground vegetation and woody debris. Ground vegetation when present is usually sparse. The limbs on the trees have been thinned and dead branches have been removed.



Photo C-29 – Dorabelle Campground, Shaver Lake. This photograph shows the grounds within Dorabelle Campground brushed and cleared of ground vegetation and woody debris. Ground vegetation when present is usually sparse. The limbs on the trees have been thinned and dead branches have been removed.



Photo C-30 - Dorabelle Campground, Shaver Lake. This photograph shows the grounds within Dorabelle Campground brushed and cleared of ground vegetation and woody debris. Ground vegetation when present is usually sparse. The limbs on the trees have been thinned and dead branches have been removed.



Photo C-31 – Huntington Lake Area. This photograph was taken on the north side of the Huntington Lake near Huckleberry Tract and shows an example of the typical stand of young and intermediate tree sizes that are observed in the area. The area is dominated with dense stands of young to intermediate size trees with occasional pockets of woody debris and brushy ground fuels.



Photo C-32 –Huntington Lake Area. This photograph was taken on near Cedar Crest at Huntington Lake and shows an example of woody debris and pockets of ground vegetation typical of forest clearings around Huntington Lake.



Photo C-33 –Huntington Lake Area. This photograph was taken along an access road near Dam 3A and shows an example of woody debris and pockets of ground vegetation typical of forest clearings around Huntington Lake



Photo C-34 - Deer Creek Campground, Huntington Lake. This photograph shows the grounds within Deer Creek Campground brushed and cleared of ground vegetation and woody debris. Ground vegetation is usually sparse or absent. The limbs on the trees have been thinned and dead branches have been removed.



Photo C-35 - Deer Creek Campground. This photograph shows the grounds within Deer Creek Campground brushed and cleared of ground vegetation and woody debris. Ground vegetation is usually sparse or absent. The limbs on the trees have been thinned and dead branches have been removed.



Photo C-36 - Dowville Picnic Area, Huntington Lake. This photograph shows the grounds within Dowville Picnic Area brushed and cleared of ground vegetation and woody debris. Ground vegetation is usually sparse or absent. The limbs on the trees have been thinned and dead branches have been removed.



Photo C-37 – Florence Lake Dam. This photograph shows an area that is dominated by granite domes and outcrops. The Florence lake area is at an elevation of approximately 7,000 feet. The forest is a tall open forest with sparse understory of chaparral and scrubs. Understory vegetation is sparse and occurs as low shrubs in forest openings.



Photo C-38 – Dutch Creek Trailhead. This photograph shows the open forest, sparse understory, and granitic environment. The forest is a tall open forest with sparse understory of chaparral and scrubs. Understory vegetation is sparse and occurs as low shrubs in forest openings.



Photo C-39 – Florence Lake Picnic Area. This photograph shows dense stands of trees which are found in riparian areas as can be observed at the Florence Lake Picnic Area. This photograph shows that ground fuels in the picnic area have been cleared by brushing and thinning, and that the lower branches of the trees have been thinned.



Photo C-40 – Mono Creek Campground. This photograph shows the grounds within the campground brushed and thinned to remove the build up of ground fuels. The forest in this area is generally an open forest with sparse ground fuels and granitic landscape.



Photo C-41 – Mono Creek Trailhead. This photograph shows the area around the trailhead brushed and thinned to remove the build up of ground fuels. The forest in this area is generally open with sparse ground fuels and granitic landscape.

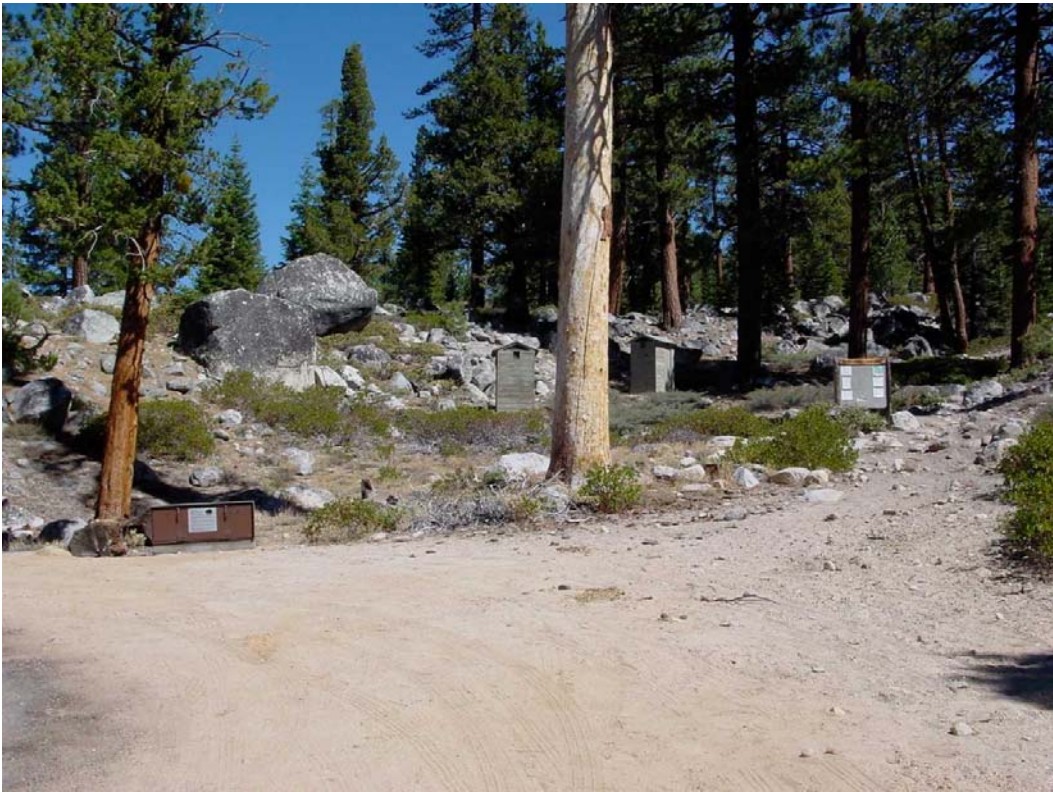


Photo C-42 – Bear Ridge Trailhead. This photograph shows the trailhead in the open forest, with sparse understory in a granitic landscape. Ground fuels in this area consist of the same woody debris and sparse ground vegetation.

APPENDIX D

**Fire Potential and Risk
Among Different Vegetation Communities
in the Study Area**

Fire Potential and Risk Among Different Vegetation Communities in the Study Area.

Fire potential and risk varies among different vegetation community types. The relative extent of fires within particular vegetation community types tend to increase as the interval between fires lengthens (Swetnam 1993; Husari and Hawk 1994; Skinner and Chang 1996). Following is a description of each vegetation community type present within the Project area and it's associated fire potential and risk.

Cismontane Woodlands

Cismontane woodland communities are highly adapted to hot summer fires. Mature oaks can survive low-intensity fires and usually can resprout after crown fires. Fires within these community types are usually fast-moving. Fuel accumulation tends to be light. Perennial plant species have transitioned into more annual species and promote an earlier burning season than previously (Skinner and Chang 1996). This community type usually has a high fire frequency that, keeps shrub height low (Skinner and Chang 1996). The fire frequency decrease during the last century may have increased the density of shrubs within these communities. The three community types designated as cismontane woodlands within the Project area include Blue Oak Woodland, Gray Pine-Chaparral Woodland, and Oak Woodland.

The Blue Oak Woodland Community is typically found in the Project area below 3,200 feet elevation. This woodland is dominated by blue oaks (*Quercus douglasii*) but usually includes several other oak species as well, along with gray pine (*Pinus sabiniana*). This community is found in the lower elevations of the Project area, it varies from open savannas with grassy understories to fairly dense woodlands with shrubby understories. Some common species of this vegetation community are California buckeye (*Aesculus californica*), Mariposa manzanita (*Arctostaphylos viscida* ssp. *mariposa*), Yerba Santa (*Eriodictyon californicum*), and black oak (*Quercus kelloggii*).

The Gray Pine-Chaparral Woodland Community typically occurs in the Project area between 1,800 and 5,000 feet elevation. This woodland is dominated by species such as Mariposa manzanita, ceanothus (*Ceanothus* spp.), and oaks (*Quercus* spp.), with scattered emergent gray pines (*Pinus sabiniana*). The shrub layer can vary from sparse to thick. Other common species of this vegetation community include California buckeye, California coffeeberry (*Rhamnus californica*), and foothill ash (*Fraxinus dipetala*).

The Oak Woodland Community is typically found in the Project area between 2,800 and 7,400 feet elevation. This woodland is dominated by interior live oak (*Quercus wislizenii*), canyon live oak (*Q. chrysolepis*), and black oak. California buckeye, Yerba Santa, and Mariposa manzanita are often present. Stands vary from open savannas with grassy understories (usually at lower elevations) to fairly dense woodlands with shrubby understories.

Chaparral

Vegetation in chaparral communities is adapted to periodic fires. In this community type fires tend to be severe and kill most of the herbaceous vegetation, which however produce long-lasting seeds which quickly sprout after a fire (Christenson 1985; Mayer and Laudenslayer 1988; Barro and Conrad 1991). The community designated as chaparral in the Project area is Mixed Montane Chaparral.

Mixed Montane Chaparral Community is generally found in the Project area between 2,800 and 9,400 feet in elevation. This chaparral often forms a dense thicket, although it is also found more sparsely distributed on rocky sites within the Project area. Sierra chinquapin (*Chrysolepis sempervirens*) and any of several species of manzanita (*Arctostaphylos* spp.) or ceanothus (*Ceanothus* spp.), particularly greenleaf manzanita, Mariposa manzanita, pinemat manzanita (*Arctostaphylos nevadensis*), mountain whitethorn, and deerbrush (*Ceanothus integerrimus*) dominate mixed montane chaparral. Herbaceous understory is usually sparse, except in the few years immediately following a fire.

Lower Montane Coniferous Forests

Fire provides for several functions in the conifer forest ecosystems of the Sierra Nevada including: seedbed preparation; nutrient cycles; successional pattern; favorable wildlife conditions; creation of a mosaic of age classes and vegetation types; numbers of trees susceptible to attack by insects and disease; and both reducing and creating fire hazards (Kilgore 1973). Fire intensity of lower montane coniferous forests can range from mild surface fires found in forests under natural conditions and intense fires found in logged forests with dense underbrush (Kilgore 1973). Generally, they tend to be low to moderate in severity (Skinner and Chang 1996), but fires in lower montane coniferous forests tend to be more hazardous than in upper montane coniferous forests (Leopold et al. 1963; Biswell et al. 1968; Kilgore 1973). Forests with lower fire frequency tend to develop dense stands of incense cedar or white fir. Ponderosa pine and black oak trees usually increase in size with decreasing stand density but incense cedar decreases (Warner 1980). More frequent, low-intensity fires would probably favor less shade-tolerant species such as ponderosa pine or black oaks, which is more desirable. The two lower montane coniferous forest types within the Project area include Westside Ponderosa Pine Forest and Sierran Mixed Conifer Forest.

Westside Ponderosa Pine Forest Community is a lower montane coniferous forest typically found in the Project area between 3,200 and 3,900 feet in elevation. This is an open forest dominated by ponderosa pine (*Pinus ponderosa*). The understory usually consists of scattered chaparral shrubs and young trees. Other species commonly found within this community are white fir (*Abies concolor*), incense cedar (*Calocedrus decurrens*), canyon live oak, California coffeeberry, and black oak.

The Sierran Mixed Conifer Forest Community is a lower montane coniferous forest type that occurs in the Project area between 3,400 and 7,800 feet elevation. Several species dominate this community, including ponderosa pine, fir (*Abies* spp.), and sugar pine

(*Pinus lambertiana*). Other typical species include incense cedar, black oak, Jeffrey pine, and Douglas fir (*Pseudotsuga menziesii*). The understory is usually sparse and may include young trees as well as shrub and herbaceous species found in Jeffrey pine forest.

Upper Montane Coniferous Forests

Lightning strike frequency is much higher in upper montane coniferous forests than in lower forest and woodland communities. Fires occur more frequently but they are less likely to spread rapidly (Skinner and Chang 1996). Fire intensity of upper montane coniferous forests can range from mild surface fires found in forests under natural conditions and intense fires found in logged forests with dense underbrush (Kilgore 1973). Less ground fuel accumulates in upper than in lower montane coniferous forests because of the shorter growing seasons, but decomposition rates can also be slower (Kilgore 1973). Fire hazard is lower in red fir forests than in other upper and lower montane forest communities in the Sierra Nevada (Kilgore 1971; Kilgore 1973). The two community types designated as upper montane coniferous forests in the Project area include Jeffrey Pine Forest and Jeffrey Pine/Fir Forest.

The Jeffrey Pine Forest Community is an upper montane coniferous forest type generally found in the Project area between 5,300 and 8,400 feet elevation. This is a tall, open forest dominated by Jeffrey pine (*Pinus jeffreyi*), with a sparse understory of chaparral or sagebrush scrub shrubs and young trees. The understory may include white fir, greenleaf manzanita (*Arctostaphylos patula*), mountain whitethorn (*Ceanothus cordulatus*), wax currant (*Ribes cereum*), and mountain sagebrush (*Artemisia tridentata* ssp. *vaseyana*). Lodgepole pine (*Pinus contorta* ssp. *murrayana*) can be found in moist areas.

Jeffrey Pine/Fir Forest Community occurs on drier slopes and flats and on coarse soils typically found in the Project area between 5,600 and 9,400 feet elevation. Jeffrey pine and white fir dominate the tree layer, but lodgepole pine, western juniper (*Juniperus occidentalis*), and red fir (*Abies magnifica*) are also common. Lodgepole pine co-dominates in some moist areas along the reservoirs and creeks. Western juniper is common on many of the drier slopes in the Project area and red fir occurs in some of the higher elevation Jeffrey pine/fir forest, such as the northern side of Huntington Lake. The understory is dominated by shrub species including greenleaf manzanita, mountain whitethorn, Sierra gooseberry (*Ribes roezlii*), wax currant, and mountain sagebrush. The herbaceous layer is generally sparse in forested areas, but typical herbaceous species include spreading dogbane (*Apocynum androsaemifolium*), diffuse gayophytum (*Gayophytum diffusum* ssp. *parviflorum*), and naked buckwheat (*Eriogonum nudum* ssp. *deductum*).

Subalpine Coniferous Forests (Lodgepole Pine Forest)

Fires tend to be infrequent and of low severity in subalpine coniferous forests (Kilgore 1981). When lodgepole pine stands are mature they tend to have sparse fuel

accumulation (Parker 1986). Therefore, ignition promotion and fire spread is low (Van Wagendonk 1991).

Lodgepole Pine Forest Community is a subalpine coniferous forest type found in the Project area between 6,800 and 8,400 feet in elevation. This forest is typically a dense forest of slender trees, often consisting of nearly pure stands of lodgepole pines. Understory vegetation is sparse in dense forest, but low shrubs and herbs are abundant in forest openings.

Meadows

Meadows in the Sierra Nevada have fairly low fuel loads and a low fire frequency. However, fires can spread rapidly in grasses (Anderson and Smith 1997). The two types of communities designated as meadows in the Project area include Dry Montane Meadow and Wet Montane Meadow.

Dry Montane Meadow Community is generally found in the Project area between 6,600 and 7,600 feet in elevation in this part of the Sierra Nevada. These meadows are vegetated by a dense growth of perennial herbs and grasses, including horkelias (*Horkelia* spp.), bluegrasses (*Poa* spp.), and mat muhly (*Muhlenbergia richardsonis*).

Wet Montane Meadow Community is typically found in the Project area between 3,800 and 9,400 feet in elevation. These meadows are vegetated densely with sedges and other perennial herbs, including rushes (*Juncus* spp.), California corn lily (*Veratrum californicum* var. *californicum*), wandering daisy (*Erigeron peregrinus*), great red paintbrush (*Castilleja minyata*), and white-flowered bog orchid (*Platanthera leucostachys*). Wet montane meadows have soils that remain saturated throughout the year. The wettest portions of these wet meadows tend to be dominated by inflated sedge (*Carex vesicaria*) or small-fruited bulrush (*Scirpus microcarpus*). Diversity increases in transitional areas that are moist in the summer but not permanently saturated. Common species in this zone include Jeffrey's shooting star (*Dodecatheon jeffreyi*), slender cinquefoil (*Potentilla gracilis* var. *fastigiata*), Sierra rush (*Juncus nevadensis*), and Torrey's lotus (*Lotus oblongifolius*).

Riparian

Fire frequency in riparian areas is more variable than in upland vegetation communities (Skinner and Chang 1996). Riparian fires tend to be localized but to burn severely (Skinner and Chang 1996).

Riparian Communities are found throughout the Project area and are composed of several vegetation types including montane riparian scrub, aspen riparian forest, montane black cottonwood riparian forest, and montane freshwater marsh. Riparian vegetation is generally found in narrow bands along streams, and is often separated by rocky, unvegetated reaches. Where the terrain is level and open, the riparian zone is usually wider, and may merge into montane meadows. The most extensive riparian vegetation is Montane Riparian Scrub, generally dominated by alder (*Alnus rhombifolia*, *A. incana* ssp. *tenuifolia*). Willow (*Salix lucida* ssp. *lasiandra*, *S. lemmonii*, *S.*

scouleriana) may be interspersed with alder, or may occasionally form mono-specific stands. Aspen (*Populus tremuloides*) groves (intermingled with lodgepole pine and white fir) are fairly extensive in the level areas immediately downstream of Florence Lake and are scattered elsewhere in the system. Black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) occurs in small, scattered stands from Florence Lake to Redinger Lake. Riparian communities occur both on relatively fine-textured alluvia on the smaller, shallower-gradient streams and also along the larger, faster flowing streams. Alders form dense thickets that tend to preclude development of an herb layer. However, openings in the canopy may support a diversity of wetland herbs such as scouring rush (*Equisetum arvense*), arrow-leaf groundsel (*Senecio triangularis*), fireweed (*Epilobium angustifolium*), cow parsnip (*Heracleum lanatum*), and streamside bluebells (*Mertensia ciliata*).

Ruderal vegetation has been delineated primarily along roads and other disturbed areas where the vegetation is subject to routine maintenance or disturbance. Introduced exotic species and some native species may be found in these areas.

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