BIOLOGICAL ASSESSMENT/ BIOLOGICAL EVALUATION FOR SOUTHERN CALIFORNIA EDISON'S BIG CREEK HYDROELECTRIC PROJECTS

MAMMOTH POOL (FERC PROJECT NO. 2085)
BIG CREEK NOS. 1 & 2 (FERC PROJECT NO. 2175)
BIG CREEK NOS. 2A, 8 & EASTWOOD (FERC PROJECT NO. 67)
BIG CREEK NO. 3 (FERC PROJECT NO. 120)

Prepared by:

SOUTHERN CALIFORNIA EDISON
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February 2007

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BIG CREEK NO. 3

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Location:

Upper San Joaquin River Watershed, Fresno, and Madera Counties, California

USGS Quadrangles: Squaw Dome, Mammoth Pool Dam, Kaiser Peak, Mount Givens, Florence Lake, Ward Mountain, Huntington Lake, Musick Mountain, Shaver Lake, and Cascadel Point

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TABLE OF CONTENTS

List of Tables

List of Tables (continued)

List of Figures

List of Appendices

1.0 INTRODUCTION

The purpose of this Biological Assessment/Biological Evaluation (BA/BE) is to evaluate four of Southern California Edison's (SCE) Big Creek hydroelectric Projects to determine the effect of the Project relicensing (proposed actions) on federally listed threatened, endangered, candidate, and proposed species; or on any trend toward a Forest Service Sensitive (FSS) species becoming federally listed. This BA/BE is prepared in accordance with legal requirements set forth under Section 7 of the Federal Endangered Species Act (ESA) (16 U.S.C. 1536 c) and with the standards established in the Forest Service Manual (FSM) (FSM 2672.42 and 2672.43). This document also follows other guidance from the U.S. Forest Service (USDA-FS) (USDA-FS 1996) and the Federal Energy Regulatory Commission (FERC or Commission) (FERC 2001).

SCE's Big Creek Hydroelectric System, located in the Upper San Joaquin River watershed, consists of nine powerhouses, 23 generating units, and six major reservoirs, and has a combined dependable operating capacity of about 1,000 megawatts (MW). The Big Creek Hydroelectric System is comprised of seven FERC licenses: Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67), Big Creek No. 3 (FERC Project No. 120), Big Creek No. 4 (FERC Project No. 2017), Mammoth Pool (FERC Project No. 2085), Vermilion Valley (FERC Project No. 2086), Portal Power Plant (FERC Project No. 2174), and Big Creek Nos. 1 and 2 (FERC Project No. 2175). Three of SCE's seven Big Creek Projects (Big Creek No. 4, Portal Power Plant, and Vermilion Valley) are not evaluated in this document. FERC completed ESA Section 7 consultation for Big Creek No. 4 on October 16, 2003 and issued a new license on December 4, 2003. FERC completed an Environmental Assessment for the Portal Power Plant Project in August 2005, and for the Vermilion Valley Project in May 2004, which will serve as the BA/BE for future consultation with the U.S. Fish and Wildlife Service (USFWS) and USDA-FS associated with relicensing of the Projects (FERC 2004).

In 1999, SCE was designated as the non-federal representative for the purpose of conducting Section 7 consultation, pursuant to the ESA, with the USFWS for the remaining four FERC hydroelectric Projects in the Upper San Joaquin Watershed. These Projects—Mammoth Pool, Big Creek Nos. 1 and 2, Big Creek Nos. 2A, 8 and Eastwood, and Big Creek No. 3—are being relicensed using the FERC's Alternative Licensing Process (ALP).

The four Big Creek hydroelectric Projects that are addressed in this BA/BE are located within the following 7.5-minute U.S. Geological Survey (USGS) quadrangles: Squaw Dome, Mammoth Pool Dam, Kaiser Peak, Mount Givens, Florence Lake, Ward Mountain, Huntington Lake, Musick Mountain, Cascadel Point, and Shaver Lake. The Projects are located almost entirely on USDA-FS property in the Sierra National Forest (SNF). A portion of The Big Creek Nos. 2A, 8 and Eastwood Project is located on property owned by SCE around Shaver Lake.

This assessment of sensitive resources is based on a review of existing information relevant to the Project facilities, extensive agency and other stakeholder consultation, and field surveys. Detailed descriptions of the methods and results are located in the

Final Technical Study Plan Package for the Big Creek Alternative Licensing Process (SCE 2001), *2002 Final Technical Study Report Package for the Big Creek Hydroelectric System Alternative Licensing Process* (SCE 2003), *2003 Final Technical Study Report Package for the Big Creek Hydroelectric System Alternative Licensing Process* (SCE 2004a), and the *2004 Final Technical Study Reports for the Big Creek Hydroelectric System Alternative Licensing Process* (SCE 2004b). Those documents are incorporated by reference into this BA/BE.

Appendix A is a table of the special-status species identified by resource agencies as occurring or potentially occurring in the study area. This information is based on the following documents: USFWS *Species List* (USFWS 2007; Appendix B), USDA-FS Regional Forester's *List of Sensitive Plant and Animal Species for Region 5* (USDA-FS 1998), SNF's Sensitive Plant List, April 2002 (USDA-FS 2002), and the *California Natural Diversity Database* (CNDDB) (CDFG 2007). A special-status species is defined for this BA/BE as any species that is granted status by USFWS as a Federally threatened (FT), endangered (FE), candidate (FC), or proposed (FP) species; or by USDA-FS as a FSS species. USDA-FS Management Indicator Species for the SNF (SNF MIS) are also included in this document, as required by the Sierra Nevada Forest Plan Amendment. SNF MIS are analyzed as target species to represent the effects of management on fish and wildlife resources.

Federally listed species included in Appendix A that are known to occur or could potentially occur in the study area for the four Big Creek ALP Projects considered in this BA/BE (study area) based on habitat and elevational and geographic range are discussed in this document. Wildlife species that are identified as potentially occurring in the study area are species that have the potential to nest, winter, forage, den, or roost in the study area. Those species that are unlikely to occur in the study area due to lack of suitable habitat, or whose elevational or geographic range does not fall within the study area are not discussed further in this document.

Nine federally listed species (designated as endangered, threatened, candidate, or proposed) were identified as known or potentially occurring in the vicinity of the study area. These species are listed below. Refer to Appendix A for species occurrences or the potential for occurrence within the four Big Creek ALP Projects. Appendix C provides the known occurrences of special-status species by Project facility, bypass stream reach, road, trail, or recreation facility.

<u>Federally Listed Plants (2 Species)</u>

- Mariposa pussypaws (*Calyptridium pulchellum*) – FT, CNPS 1B.1
- Keck's checkerbloom (*Sidalcea keckii*) – FE, CNPS 1B.1

<u>Federally Listed Invertebrates (1 Species)</u>

- Valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*) – FT, FPD

Federally Listed Amphibians (3 Species)

- California red-legged frog (CRLF) (*Rana aurora draytonii*)[1] – FT, CSC
- Mountain yellow-legged frog (MYLF) (*Rana muscosa*) – FC, FSS, CSC
- Yosemite toad (YT) (*Bufo canorus*) – FC, FSS, CSC

Federally Listed Birds (2 Species)

- Bald eagle (*Haliaeetus leucocephalus*) – FT, FPD (Proposed delisting on 7/6/99; nesting and wintering), CE, CFP, SNF MIS
- American peregrine falcon (*Falco peregrinus anatum*) – Former FE (Delisted on 8/20/99; nesting), FSS, CE, CFP, SNF MIS

Federally Listed Mammals (1 Species)

- Pacific fisher (*Martes pennanti pacifica*) – FC, FSS, CSC, SNF MIS

There are no designated or proposed critical habitat units for these species within or adjacent to the study area. The study area is within *Recovery Unit 1: Sierra Nevada Foothills and Central Valley Recovery Unit* for the California red-legged frog, but is not within a core recovery area for the species (USFWS 2002a). The study area is not within the recovery area for any other species.

1.1 FOREST SERVICE SENSITIVE AND MANAGEMENT INDICATOR SPECIES

Forty-two FSS species were identified as potentially occurring in the study area. These species are listed below. Refer to Appendix A for a list of species occurrences, or the potential for occurrence, in the vicinity of the four Big Creek ALP Projects. Appendix C provides the known occurrences of special-status species by Project facility.

Forest Service Sensitive Plants (29 Species)

- Yosemite onion (*Allium yosemitense*) – FSS, CNPS 1B.3
- Scalloped moonwort (*Botrychium crenulatum*) – FSS, CNPS 2.2
- Bolander's candle moss (*Bruchia bolanderi*) – FSS, CNPS 2.2
- Mono Hot Springs evening primrose (*Camissonia sierrae* ssp. *alticola*) – FSS, CNPS 1B.2
- Muir's tarplant (*Carlquistia muirii*) – FSS, CNPS 1B.3
- Tree-anemone (*Carpenteria californica*) – FSS, CT, CNPS 1B.2
- Mariposa clarkia (*Clarkia biloba* ssp. *australis*) – FSS, CNPS 1B.2

[1]Unlikely to occur within the Project vicinity. However, study area is part of the USFWS-designated recovery area for CRLF.

- Merced clarkia (*Clarkia lingulata*) – FSS, CE, CNPS 1B.1
- Flaming trumpet (*Collomia rawsoniana*) – FSS, CNPS 1B.2
- Mountain lady's slipper (*Cypripedium montanum*) – FSS, CNPS 4.2
- Unexpected larkspur (*Delphinium inopinum*) – FSS, CNPS 4.3
- Tulare County bleeding heart (*Dicentra nevadensis*) – FSS, CNPS 4.3
- Subalpine fireweed (*Epilobium howellii*) – FSS, CNPS 1B.3
- Hall's daisy (*Erigeron aequifolius*) – FSS, CNPS 1B.3
- Kettle Dome buckwheat (*Eriogonum prattenianum* var. *avium*) – FSS, CNPS 4.2
- Congdon's woolly sunflower (*Eriophyllum condonii*) – FSS, CR, CNPS 1B.2
- Shuteye Peak fawn lily (*Erythronium pluriflorum)* – FSS, CNPS 1B.3
- Short-leaved hulsea (*Hulsea brevifloria*) – FSS, CNPS 1B.2
- Veined water lichen (*Hydrothyria venosa*) – FSS
- Yosemite lewisia (Lewisia disepala) – FSS, CNPS 1B.2
- Orange lupine (*Lupinus citrinus* var. *citrinus*) – FSS, CNPS 1B.2
- Three-ranked hump moss (*Meesia triquetra*) – FSS, CNPS 4.2
- Broad-nerved hump moss (*Meesia uliginosa*) – FSS, CNPS 2.2
- Slender-stemmed monkeyflower (*Mimulus filicaulis*) – FSS, CNPS 1B.2
- Slender-stalked monkeyflower (*Mimulus gracilipes*) – FSS, CNPS 1B.2
- Pansy monkeyflower (*Mimulus pulchellus*) – FSS, CNPS 1B.2
- Tehipite Valley jewel-flower (*Streptanthus fenestratus*) – FSS, CNPS 1B.3
- Bolander's clover (*Trifolium bolanderi*) – FSS, CNPS 1B.2
- Grey-leaved violet (*Viola pinetorum* ssp. *grisea*) – FSS, CNPS 1B.3

<u>Forest Service Sensitive Fish (1 Species)</u>

- Hardhead (*Mylopharodon conocephalus*) – FSS

<u>Forest Service Sensitive Amphibians and Reptiles (2 Species)</u>

- Foothill yellow-legged frog (FYLF) (*Rana boylii*) – FSS, CSC
- Western pond turtle (WPT) (*Actinemys marmorata*) – FSS, CSC

Forest Service Sensitive Birds (4 Species)

- Northern goshawk (*Accipiter gentilis*) – FSS, CSC (nesting), SNF MIS
- Great gray owl (*Strix nebulosa*) – FSS, CE (nesting)
- California spotted owl (*Strix occidentalis occidentalis*) – FSS, CSC, SNF MIS
- Willow flycatcher (*Empidonax traillii brewsteri*) – FSS, CE (nesting), SNF MIS

Forest Service Sensitive Mammals (6 Species)

- Western red bat (*Lasiurus blossevilli*) – FSS
- Townsend's western big-eared bat (*Corynorhinus townsendii*) – FSS, CSC
- Pallid bat (*Antrozous pallidus*) – FSS, CSC
- Sierra Nevada red fox *(Vulpes vulpes necator)* – FSS, CT
- American (=pine) marten (*Martes americana*) – FSS, SNF MIS
- California wolverine (*Gulo gulo luteus*) – FSS, CT, CFP

Ten SNF MIS, as well as four avian guilds associated with particular habitat types, were identified as potentially occurring in the study area. These species are listed below. Refer to Appendix A for a list of species occurrences, or the potential for occurrence, near the four Big Creek ALP Projects. Appendix C provides a description of the known occurrences of special-status species by Project facility.

Sierra National Forest Management Indicator Species (10 Species)

- Threatened and Endangered Species

  Bald eagle

- Forest Service Sensitive Species

  American peregrine falcon

- Species Associated with Early Successional Seral Stages

  Mule deer (also a harvest species)

- Species Associated with Riparian Zones

  Willow flycatcher
  Resident trout (eastern brook trout, brown trout, and rainbow trout)
  Osprey (require large water bodies)

- Species Associated with Late Successional Forest (old growth)

  California spotted owl
  Northern goshawk
  American marten
  Pacific fisher

- Avian Guilds in the Following Habitats

  Riparian habitat
  Oak woodland habitat
  Meadow edge habitat
  Mature mixed-conifer habitat

1.2 DOCUMENT ORGANIZATION

The organization of this BA/BE is as follows:

- Section 2.0 provides a consultation history and summary
- Section 3.0 provides current regulatory management in the study area
- Section 4.0 provides a description of the Proposed Action
- Section 5.0 provides a description of the existing environment
- Section 6.0 provides the effects of proposed actions and management recommendations
- Section 7.0 summarizes cumulative effects
- Section 8.0 provides conclusions and determinations
- Section 9.0 presents the literature cited
- Section 10.0 provides a list of preparers

There are several supporting tables, figures, and appendices attached to this BA/BE. Appendices include tables presenting the known occurrences, or the potential for occurrence, of special-status species by Project facility, bypass stream reach, road, trail, or recreation facility; consultation documentation, and a report providing the results of a site assessment conducted for CRLF, as well as other appendices.

2.0 CONSULTATION HISTORY AND SUMMARY

The following provides an overview of consultation conducted as part of the Big Creek ALP, and consultation and associated activities conducted specifically with USFWS.

2.1 BIG CREEK ALP CONSULTATION

For the past six years, SCE has engaged in a consultation process associated with the relicensing of the four Big Creek ALP Projects. As part of this process, representatives from USFWS and USDA-FS have participated as stakeholders in the Big Creek Collaborative (BCC), which consists of a Plenary Group, and several smaller Working Groups. Descriptions of the BCC consultation for the four Big Creek ALP projects are provided in the FTSPP (SCE 2001), the 2002 FTSRP (SCE 2003), the 2003 FTSRP (SCE 2004a), and the 2004 FTSR (SCE 2004b). SCE has also filed progress reports with FERC every six months summarizing the ALP activities, including all agendas, meeting minutes, lists of attendees, final documents, newsletters, and formal correspondence between participants. These progress reports, which represent the complete consultation record for the Big Creek ALP, are available on SCE's website, and on the FERC eLibrary, at the following locations:

- http:/www.sce.com/PowerandEnvironment/PowerGeneration/BigCreekHydro
- http://www.ferc.gov/docs-filing/elibrary.asp

In addition to participating as members of the Plenary Group, USFWS and USDA-FS representatives have participated in the Combined Aquatics Working Group (CAWG) and Terrestrial Working Group (TERR) that developed a total of 58 CAWG and TERR Technical Study Reports (TSRs) that, in whole or in part, address federally listed, FSS, and SNF MIS plant, fish, and wildlife species that are considered in this BA/BE. Refer to Table 2-1 for specific USFWS and USDA-FS consultation conducted to date for the Projects discussed in this document. Appendix D contains copies of correspondence between SCE and USFWS for these Projects.

2.2 USFWS CONSULTATION

USFWS, pursuant to the federal ESA, must be consulted with regard to projects that may affect the continued existence of a federally listed species. Species are defined as threatened or endangered by USFWS if they are listed in Title 50 of the Code of Federal Regulations (50 CFR §§17.11 or 17.12). The following is a brief summary of key consultation conducted.

- SCE requested to be designated as the non-federal representative, for the purpose of conducting Section 7 consultation, pursuant to ESA, with the USFWS for the four Big Creek ALP Projects on December 7, 2000. On December 21, 2000, USFWS granted SCE's request to be designated as the non-federal designee.

- In addition to meetings conducted as part of the Plenary and Working Groups discussed above, several additional meetings and conference calls were convened

between SCE and USFWS. A total of 19 meetings were held between February 2001 and October 6, 2005. When USFWS was unable to attend meetings, their comments and correspondence were received via e-mail.

- On October 25, 2004, SCE submitted the Preliminary Administrative Draft BA/BE (PAD BA/BE) to the USFWS for review and comment. USFWS provided comments on the PAD BA/BE via e-mail on November 3, 2004.

- On November 21, 2005, SCE submitted a revised BA/BE for the four Big Creek ALP Projects.

- On January 18, 2006, SCE met with USFWS to discuss the Big Creek ALP BA/BE.

- On March 30, 2006, USFWS provided SCE with approval (via e-mail) to implement the Big Creek ALP Valley Elderberry Longhorn Beetle (VELB) Management Plan (Appendix E). On October 24, 2006, SCE met with USFWS and USDA-FS to select a VELB mitigation site in the Project area. USFWS concurred that the elderberry seedlings should be planted at mitigation Site No. 2.

- In February 2007, SCE submitted a letter to USFWS providing additional information regarding the implementation of VELB mitigation.

3.0 CURRENT REGULATORY MANAGEMENT

This section summarizes current regulatory management in the study area, as described in various documents published by federal, state, and local agencies, including USDA-FS, State Water Resources Control Board (State Water Board), Madera and Fresno counties, USFWS, and FERC.

3.1 CURRENT USDA-FS MANAGEMENT

Current USDA-FS policy regarding special-status species, as described in the FSM (FSM 2672.4, Exhibit 1), is to conduct a pre-field review of available information, and, in instances where there is evidence of species or habitat, conduct a field reconnaissance, if necessary, to determine whether the Project poses a threat to FSS species. The results of the surveys are documented in a BE. Additionally, pursuant to the Code of Federal Regulations (50 CFR 402.12), consultation with USFWS is required if threatened; endangered, or proposed species are potentially affected by the proposed action.

National Forest Management Act

The National Forest Management Act (NFMA) of 1976 reorganized, expanded, and otherwise amended the Forest and Rangeland Renewable Resources Planning Act of 1974, which called for the management of renewable resources on national forest lands. The NFMA is the primary statute governing the administration of national forests. The NFMA requires the Secretary of Agriculture to develop and implement resource management plans for each unit of the National Forest System. The Secretary must specify procedures to ensure management plans are in accordance with the National Environmental Policy Act (NEPA) and ensure consideration of both economic and environmental factors; provide for wildlife and fish; provide for the diversity of plant and animal communities; ensure timber harvesting will occur only where water quality and fish habitat are adequately protected from serious detriment; ensure clearcutting and other harvesting will occur only where it may be done in a manner consistent with the protection of soil, watersheds, fish, wildlife, recreation, aesthetic resources and regeneration of the timber resource. Plans must be updated every 15 years.

Sierra National Forest Land and Resource Management Plan

The Forest Land and Resource Management Plan (LRMP) was developed by the USDA-FS to direct the management of the SNF (USDA-FS 1991). The goal of this plan is to provide a management program that reflects a variety of activities, allows use and protection of Forest resources, and fulfills legislative requirements while addressing local, regional, and national issues. The LRMP describes the desired future state of the SNF, forestwide management direction, and prescriptions for individual management areas, management standards and guidelines, location maps, schedules of proposed and possible outputs and activities, monitoring and evaluation requirements, and how issues were resolved. The LRMP applies to all National Forest Land administered by the SNF. The LRMP states that USDA-FS will manage sensitive species to avoid future

listings of those species as threatened or endangered and will ensure maintenance of genetic and geographic diversity and viable populations for sensitive species. The LRMP recognizes hydropower and recreation as two very important beneficial uses of the Forest.

Final Environmental Impact Statement and Record of Decision, Sierra Nevada Forest Plan Amendment

The Sierra Nevada Forest Plan Amendment (Framework) is an amendment to the Pacific Southwest Regional Guide, the Intermountain Regional Guide, and LRMPs for national forests in the Sierra Nevada and Modoc Plateau, including the SNF (USDA-FS 2001a). The Framework addresses five problem areas, including old forest ecosystems and associated species and aquatic, riparian, and meadow ecosystems and associated species, which were considered by USDA-FS to need urgent attention at the Sierra range-wide scale. Management recommendations in the Framework strive to protect, increase, and perpetuate desired conditions of old forest ecosystems and conserve their associated species (e.g., California spotted owl, Pacific fisher, and American marten) and to protect and restore desired conditions of aquatic, riparian, and meadow ecosystems. The Framework addresses the stated needs of: 1) sustaining desired conditions of old forest ecosystems; 2) protecting and restoring riparian, aquatic, and meadow ecosystems; 3) combating noxious weeds; 4) improving fire and fuels management; and, 5) sustaining desired conditions of lower west side hardwood ecosystems in the affected national forests. The Record of Decision (ROD) was submitted with the Final Environmental Impact Statement (FEIS) and rationale for the decision of selected alternative. The preferred alternative applies a cautious approach for vegetation and fuels management in habitats for sensitive wildlife species, particularly those associated with old forest ecosystems, while recognizing the need to reduce fire threat to human communities.

3.2 WATER QUALITY CONTROL PLAN (BASIN PLAN) – CENTRAL VALLEY REGION, THE SACRAMENTO RIVER BASIN AND THE SAN JOAQUIN RIVER BASIN

The objectives presented in the Central Valley Region, Water Quality Control Plan (Basin Plan) for the San Joaquin River Basin are designed to ensure the protection of the beneficial uses of water within the basin. These beneficial uses include:

- **Municipal and Domestic Supply (MUN)** – Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

- **Irrigation and Stock Watering-Agricultural Supply (AGR)** – Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation (including leaching of salts), stock watering, or support of vegetation for range grazing.

- **Hydropower Generation (POW)** – Uses of water for hydropower generation.

- **Water Contact Recreation (REC-1)** – Uses of water for recreational activities involving body contact with water, where the ingestion of water is reasonably

possible. These uses include, but are not limited to, swimming, wading, water-skiing, whitewater activities, fishing, or use of natural hot springs.

- **Non-Contact Water Recreation (REC-2)** – Uses of water for recreational activities involving proximity to water, but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

- **Warm Freshwater Habitat (WARM)** – Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

- **Cold Freshwater Habitat (COLD)** – Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

- **Wildlife Habitat (WILD)** – Uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation or enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

The Basin Plan also provides a list of water quality objectives that sets the limits or levels of water quality constituents or characteristics that are established for the protection of the beneficial uses of the river. The achievement of these objectives, where not already demonstrated as being met through testing, depends on consideration of controllable water quality factors. The applicant is responsible for identifying the water quality impact caused by controllable factors due to operations of the Project and recommending measures that may be reasonably applied to control impacts to beneficial uses (including water quality).

3.3 COUNTY GENERAL PLANS

Madera County General Plan

The Madera County General Plan was published in October 1995 and includes guidance on forest resources, water resources, wetland and riparian areas, fish and wildlife habitat, vegetation, and open space for preservation of natural resources (Madera County 1995). Appendix F provides a summary of the applicable general plan goals and policies.

Fresno County General Plan Update

The Fresno County General Plan Update was developed on October 3, 2000 and includes guidance on productive resources, water resources, forest resources, natural resources, wetland and riparian areas, fish and wildlife habitat, and vegetation (Fresno County 2000). Appendix G provides a summary of the applicable goals and policies.

3.4 ENDANGERED SPECIES ACT

There are no federally listed anadromous fish species potentially occurring or currently known to occur in the study area. However, National Oceanic and Atmospheric Administration (NOAA) Fisheries (formerly National Marine Fisheries Service) determined that operation of these FERC licensed Projects have the potential to impact Central Valley Steelhead and their critical habitat, as well as the potential for species recovery (NOAA 2000), and expressed a desire to consult with FERC. As part of the Big Creek No. 4 Project, FERC responded to this request stating that the Big Creek ALP Projects as a whole may cause relatively minor shifts in the timing and magnitude of releases to downstream locations. However, the overriding capacity of Millerton Reservoir to store large volumes of water and the commitment of nearly all releases to irrigation and other consumptive uses would make any possible shifts in operation of the Big Creek ALP Projects irrelevant downstream of Friant Dam (FERC 2002). In addition, FERC identified that substantial portions of the San Joaquin River downstream of Friant Dam are de-watered each year. Therefore, FERC concluded that relicensing of the Big Creek No. 4 Project would not have an effect on Central Valley steelhead. SCE is treating FERC's determination on the Big Creek No. 4 Project as being applicable to all Big Creek ALP Projects being analyzed in this BA/BE.

Pursuant to the federal ESA, the USFWS must be consulted with regard to Projects that may affect the continued existence of a federally listed species. Species are defined as threatened or endangered by USFWS if they are listed in Title 50 of the Code of Federal Regulations (50 CFR §§17.11 or 17.12). Section 9 of ESA and federal regulations prohibit the "take" of federally listed species; take is defined under ESA, in part, as killing, harming, or harassment of such species. Under federal regulations, take is further defined to include habitat modification or degradation where it actually results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. An incidental "take" permit under Section 10(a), or federal consultation under Section 7, is required if the Project might affect a federally listed species.

For Projects where federal action is not involved and take of a listed species may occur, the Project proponent must secure an incidental take permit under Section 10(a) of the federal ESA. Because the Big Creek hydroelectric Projects require a federal action, this process does not apply and is not discussed further.

Take of a federally listed species may be approved through Section 7 consultation between USFWS and another federal agency, if the proposed Project is sponsored by or under another federal agency's jurisdiction. For this Project, Section 7 is applicable because SCE will file applications with the FERC to obtain new licenses for the Big Creek ALP system facilities. As part of the process, SCE is the non-federal designee for Section 7 consultation and initiates informal consultation with USFWS on behalf of the FERC. Prior to completion of a BA, USFWS determines whether the proposed Project would have "no effect" on listed threatened or endangered species or "may affect" these species. Should USFWS render a "may affect" determination, formal consultation would be initiated between USFWS and the FERC via submittal of the BA

to USFWS. A BA provides an evaluation of the effects of a Project on listed and proposed threatened and endangered species. USFWS then prepares a Biological Opinion (BO) regarding whether the Project would jeopardize the continued existence of a species. This document is a BA/BE to aid in this determination by the USFWS Endangered Species Division.

3.5 FEDERAL POWER ACT

Under the Federal Power Act (FPA), FERC has the authority and responsibility for regulating non-federally owned hydroelectric power Projects on federal lands. The majority of FERC regulations governing the process of licensing major constructed hydroelectric Projects are contained in Title 18 of the Code of Federal Regulations, Part 16 (18 CFR Part 16). Other applicable FERC regulations can be found in other parts of Title 18 of the Code of Federal Regulations.

The four Big Creek ALP Projects are located in the upper San Joaquin River Watershed and are operated and maintained in accordance with terms and conditions specified in individual licenses previously issued by FERC for each of the hydroelectric Projects. Each Project license specifies the Project description and boundaries, the constraints and limits of Project operations, and describes the engineering, safety, and environmental protection requirements specific to the Project. The licensee must comply with all terms and conditions in the license to generate hydroelectric power. Each Project license issued by the FERC has a specified term, generally 30 to 50 years, during which the licensee can operate the hydroelectric Project. The license for each of the four Projects expires in 2009 or earlier. The FERC is responsible for regularly inspecting and enforcing compliance by the licensee with the terms and conditions of the license.

A minimum of five years prior to the expiration of a Project license, a licensee that wishes to obtain a new license is required to formally initiate a consultation process for the preparation, filing, and processing of a new license application for an existing hydroelectric Project. This process, referred to as relicensing, has specific regulatory deadlines and requirements, which must be met by the licensee. These requirements include: filing of notifications at key milestones; submittal of required documents; consultation with state and federal resource agencies and Native American tribes; obtaining comments from the public; and filing a license application with FERC two years prior to the expiration of the Project license. The licensee also is responsible for complying with all laws, statutes, and regulations that may apply to the Project on a federal or state level. Among the laws that must be complied with during the relicensing process are ESA, National Historic Preservation Act (NHPA), Wild and Scenic Rivers Act (WSRA), Clean Water Act (CWA), Fish and Wildlife Coordination Act (FWCA), and Americans with Disabilities Act (ADA). In addition, special rules apply when a Project includes lands that are part of a federal reservation. Federal reservations can include National Forests, Defense Department bases, and Native American reservations, among others. These rules allow the federal agency responsible for managing the reservation to set conditions for the FERC license for the protection and utilization of the federal reservation. The rules also allow the SWRCB to set conditions for the FERC

license as part of its process for certification, under section 401 of the federal Clean Water Act, that the Project will be in compliance with the appropriate Basin Plan.

The FERC staff's role in the relicensing process is to conduct an independent analysis of license applications to determine if a new license should be issued, and what terms and conditions will be included as part of any new license. The FERC staff is responsible for conducting the analyses in accordance with FERC regulations and consistent with the National Environmental Policy Act of 1969 (NEPA). The new license issued by FERC describes the terms and conditions that the licensee must adhere to over the life of the new license.

The FPA requires FERC to evaluate license applications based on an equal consideration of both power and non-power values associated with a Project. Non-power values include: environmental, cultural, recreation, fish, and wildlife values affected by the Project. The FPA also requires FERC to consider whether a Project is consistent with federal and state comprehensive plans applicable to the study area. Further, the impact analysis and mitigation must focus on the ongoing impacts of the Project as it currently exists.

4.0 PROPOSED ACTION AND ALTERNATIVES

4.1 PROPOSED ACTION

The following is a description of the Proposed Action for relicensing four Big Creek ALP Projects owned and operated by SCE. This includes the requested license term, existing Project facilities, proposed Project boundaries, water management, and Project maintenance activities. Additionally, the Proposed Action includes a description of existing environmental measures, which would be continued for the protection and enhancement of resources in the vicinity of the four Projects, as well as proposed new environmental measures to further enhance resources in the Upper San Joaquin River Basin (Basin).

License Term

For the Big Creek No. 4 Project, the Commission has the authority to extend that license term another 14 years to reach a 50-year license term. Upon receipt of the requested license terms for the four ALP Projects, SCE will file an amendment request for the Big Creek No. 4 license to extend the license term to be co-terminus with the ALP Projects. SCE requests that the Commission issue the new licenses for the Portal and Vermilion Projects at the same time as the Big Creek ALP Project licenses are issued.

Commission policy is to allow for the issuance of 50-year license terms for projects with extensive mitigation and enhancement measures, and other activities, including significant new infrastructure improvements. The Proposed Action includes an extensive suite of mitigation and enhancement measures, e.g., significant increases in instream and channel riparian maintenance flows, as well as substantial recreation and transportation system enhancements. The Proposed Action also includes significant construction of new and modified water release facilities on diversion dams, new stream gages, and installation of new equipment to monitor instream flows. This amount of mitigation and enhancement justifies the Commission's issuance of a 50-year license. However, SCE is requesting 44-year license terms for the four Big Creek ALP Projects so that the Commission may coordinate the license terms with the other BCS licenses.

The requested license terms would allow time for SCE to recover the significant costs associated with this relicensing proceeding and the new license conditions. The annualized cost (2006$) of implementing new environmental measures for the four Big Creek ALP Projects over the recommended term of new licenses is $5,247,251 (Section 7.1.2). Additionally, the mitigation measures proposed by SCE would result in an overall annual loss of generation of approximately 1.87 GWh, with an estimated annual replacement energy cost (2006$) of $9,924,000 (Table 7.1-1). A total annual cost of about $15,171,251 justifies the requested license expiration date of 2053.

A coordinated expiration date will simplify future licensing efforts by allowing all stakeholders to participate in one process, instead of many different license proceedings. Many of the same stakeholders that were involved in the Big Creek ALP

were also involved in the Big Creek No. 4, Vermilion, and Portal relicensing processes. Developing all the license applications at once would be an efficient and cost effective undertaking, because all seven Big Creek System Projects are located within the same watershed and are owned and operated by SCE.

Therefore, SCE proposes that the Commission issue new licenses for Mammoth Pool (FERC Project No. 2085); Big Creek Nos. 1 and 2 (FERC Project No. 2175); Big Creek Nos. 2A, 8, and Eastwood (FERC Project No. 67); and Big Creek No. 3 (FERC Project No. 120) projects with license expirations of 2053.

Existing Project Facilities

The major components of the four Big Creek ALP Projects are powerhouses; dams and diversions; reservoirs, forebays, water conveyance systems; and transmission lines. A brief description of the major components of each Project is provided in the following section. A complete list of Project components including Project roads and trails and ancillary Project facilities is provided in Tables 4-1 through 4-3.

Detailed descriptions of the Project components (including dam construction and dimensions; flow capacities of spillways, diversions and water conveyance systems; storage capacities of reservoirs, lakes, and forebays; and characteristics of outlets works, penstocks, gate valves, and generation units) are provided in the Initial Information Package (IIP) for the Big Creek Hydroelectric System, Alternative Licensing Process, May 2000 (SCE 2001), and in the Exhibits A, F and G for the Applications for New License. A summary of the physical hydraulic capacities of flow release and diversion structures at Project dams and diversions is provided in Table 4-4. Refer to the Transportation System Management Plan for a detailed list and description of Project roads and trails (SCE 2007b).

<u>Mammoth Pool (FERC Project No. 2085)</u>

The Mammoth Pool Project operates under a FERC license as Project No. 2085, originally issued on December 30, 1957, which expires on November 30, 2007. The Project has a dependable operating capacity of approximately 187 megawatts (MW). The existing major Project components consist of:

- One powerhouse and one fishwater generator including:
  - Mammoth Pool Powerhouse, with two turbine generator units, has a total dependable operating capacity of approximately 187 MW.
  - The Fishwater Generator at the base of Mammoth Pool Dam has a generation capacity of 937 kilowatts (kW).
- One large dam:

  - Mammoth Pool Dam, forming Mammoth Pool Reservoir, with a usable storage capacity of approximately 119,940 acre-feet (ac-ft), at an elevation of approximately 3,330 feet (ft) above mean sea level (msl).

- Two water conveyance systems:

  - Mammoth Pool power tunnel is used to convey water from Mammoth Pool Reservoir to Mammoth Pool Powerhouse. The water conveyance system is approximately 7.5 miles long and begins at its intake in Mammoth Pool Reservoir.

  - Mammoth Pool diversion tunnel is used to convey water from Mammoth Pool Reservoir to the Fishwater generator, Howell-Bunger (HB) Valve, and minimum instream flow (MIF) release at Mammoth Pool Dam. This water conveyance system is approximately 2,092 ft long and begins at its intake in the Mammoth Pool Reservoir.

- Two small diversions including:

  - Rock Creek Diversion, with a usable storage capacity of less than 1 ac-ft, at an elevation of approximately 3,336 ft above msl.

  - Ross Creek Diversion, with a usable storage capacity of less than 1 ac-ft, at an elevation of approximately 3,359 ft above msl.

- One transmission line:

  - The Mammoth Pool Powerhouse–Big Creek 3 Transmission Line is approximately 6.7 miles long and connects the Mammoth Pool Powerhouse to the Big Creek No. 3 Switchyard. The line is a 230 kW/V, 3-phase single circuit line.

Big Creek Nos. 1 and 2 (FERC Project No. 2175)

The Big Creek Nos. 1 and 2 Project operates under a FERC license as Project No. 2175 issued on March 27, 1959, which expires on February 28, 2009. The Project has a dependable operating capacity of approximately 150 MW. The existing major Project components consist of:

- Two powerhouses (total combined dependable operating capacity approximately 150 MW) including:

  - Powerhouse No. 1, with four turbine/generator units and a total dependable operating capacity of approximately 82.9 MW.

  - Powerhouse No. 2, with four turbine/generator units and a total dependable operating capacity of approximately 67.1 MW.

- Four dams that impound one reservoir:
  - Dams 1, 2, 3, and 3a, which form Huntington Lake, with a capacity of approximately 89,166 ac-ft, at an elevation of approximately 6,950 ft above msl.
- One moderate-sized dam:
  - Dam 4, which forms Dam 4 Forebay, with a capacity of approximately 60 ac-ft, at an elevation of approximately 4,810 ft above msl.
- Three small diversions, including:
  - Balsam Creek Diversion, with a usable storage capacity of less than 1 ac-ft, at an elevation of approximately 4,880 ft above msl.
  - Ely Creek Diversion, with a usable storage capacity of less than 1 ac-ft, at an elevation of approximately 4,844 ft above msl.
  - Adit 8 Diversion, with a usable storage capacity of less than 1 ac-ft, at an elevation of approximately 4,825 ft above msl.
- Three water conveyance systems including:
  - Tunnel No. 1, which is used to convey water from Huntington Lake to Big Creek Powerhouse No. 1. Water is conveyed through Tunnel No. 1 and an 84-inch diameter pipe approximately 2 miles, to the top of the penstocks leading into Big Creek Powerhouse No. 1.
  - Tunnel No. 2, which is used to convey water from Dam 4 Forebay to Big Creek Powerhouse No. 2. Tunnel No. 2 is approximately 4.1 miles long. Ely and Balsam Creek diversions also enter into Tunnel No. 2 between the forebay and powerhouse.
  - Shoo Fly Complex, which was formerly used to convey water from Shaver Lake through Tunnel 5 and into Tunnel 2 leading to Powerhouse No. 2. The conveyance system consists of a bulkhead in Tunnel No. 5 with a pipe leading downhill to a valve and energy dissipation structure just above Adit 8 Diversion. The Shoo Fly Complex was used during the construction of Shaver Lake Dam and Powerhouse No. 2A, to keep water off the dam. Upon completion of Shaver Dam and Powerhouse No. 2A, the Shoo Fly Complex was no longer used. Although not currently in use, the Shoo Fly Complex gives SCE the flexibility to divert water from Shaver Lake to Powerhouse No. 2 if required.

<u>Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67)</u>

The Big Creek Nos. 2A, 8 and Eastwood Project operates under a FERC license as Project No. 67, issued on August 9, 1978, which expires on February 28, 2009. The

Project has a dependable operating capacity of approximately 370 MW. The existing major Project components consist of:

- Two powerhouses and a power station (total combined dependable operating capacity of approximately 370 MW), including:
  - Big Creek Powerhouse No. 2A, with two turbine/generator units and a total dependable operating capacity of approximately 98.5 MW.
  - Powerhouse No. 8, with two turbine/generator units and a dependable operating capacity of approximately 64.5 MW.
  - Eastwood Power Station, with one turbine/pump/generator unit and a dependable operating capacity of approximately 207 MW.
- Two major dams and reservoirs including:
  - Shaver Dam, that forms Shaver Lake with a usable storage capacity of approximately 135,568 ac-ft, at an elevation of approximately 5,370 ft above msl.
  - Florence Dam, that forms Florence Lake with a usable storage capacity of approximately 64,406 ac-ft, at an elevation of approximately 7,327 ft above msl.
- Five moderate-sized dams, forming two forebays and three small diversion pools including:
  - Balsam Forebay, with a usable storage capacity of approximately 1,547 ac-ft, at an elevation of approximately 6,670 ft above msl.
  - Dam 5 Forebay, with a usable storage capacity of 49 ac-ft, at an elevation of approximately 4,000 ft above msl.
  - Pitman Diversion Pool, with a usable storage capacity of approximately 1 ac-ft, at an elevation of approximately 6,900 ft above msl.
  - Bear Diversion Pool with a usable storage capacity of approximately 103 ac-ft, at an elevation of approximately 7,350 ft above msl.
  - Mono Diversion Pool, with a usable storage capacity of approximately 47 ac-ft, at an elevation of approximately 7,350 ft above msl.
- Eight small diversions including:
  - Hooper Creek Diversion, with a usable storage capacity of approximately 3 ac-ft, at an elevation of approximately 7,505 ft above msl.
  - North Slide Creek Diversion, with a prior storage capacity of less than 1 ac-ft, at an elevation of approximately 7,501 ft above msl.

- South Slide Creek Diversion, with a prior storage capacity of less than 1 ac-ft, at an elevation of approximately 7,501 ft above msl.

- Tombstone Creek Diversion, with a prior storage capacity of less than 1 ac-ft, at an elevation of approximately 7,673 ft above msl.

- Crater Creek Diversion, with a usable storage capacity of less than 1 ac-ft, at an elevation of approximately 8,747 ft above msl.

- Bolsillo Creek Diversion, with a usable storage capacity of less than 1 ac-ft, at an elevation of approximately 7,538 ft above msl.

- Chinquapin Creek Diversion, with a usable storage capacity of less than 1 ac-ft, at an elevation of approximately 7,274 ft above msl.

- Camp 62 Creek Diversion, with a usable storage capacity of less than 1 ac-ft, at an elevation of approximately 7,258 ft above msl.

Under the Proposed Action, four small diversions and associated ancillary features are recommended for decommissioning, including North Slide Creek Diversion, South Slide Creek Diversion, Tombstone Creek Diversion, and Crater Creek Diversion. The North Slide Creek, South Slide Creek, and Tombstone Creek diversions are currently out of service.

- Six water conveyance systems, including:

  - Ward Tunnel, which conveys water from Florence Lake to Huntington Lake (a component of Big Creek Nos. 1 and 2, FERC Project No. 2175) and has a conveyance capacity of approximately 1,760 cubic feet per second (cfs). The tunnel is approximately 12.8 miles long and receives water from Florence Lake, Mono Creek, Bear Creek, the eight small tributaries discussed above, and the East and West Forks of Camp 61 Creek (a component of the Portal Project, FERC Project No. 2174).

  - Mono-Bear Siphon, which conveys water from the Mono and Bear diversions to the Ward Tunnel. Water is conveyed from the Mono Diversion, through approximately 1.6 miles of flowline and from the Bear Creek Diversion through approximately 1.4 miles of combined tunnel and flowline to the location where the two tunnels are connected, known as the Mono-Bear Wye. From this connection, water is conveyed 2.6 miles through a combined flowline siphon to the Ward Tunnel. The Mono Tunnel and Bear Tunnel have conveyance capacities of 450 cfs each. The combined flowline siphon has a conveyance capacity of approximately 650 cfs.

  - Huntington-Pitman-Siphon, also known as Tunnel No. 7, or Huntington-Pitman-Shaver conduit, conveys water from Huntington Lake and the Pitman Creek Diversion to Shaver Lake, through either North Fork Stevenson Creek or through Balsam Forebay and the Eastwood Power Station. Tunnel No. 7 is

approximately 5.4 miles long and is used to convey water from Huntington Lake and the Pitman Creek Diversion bore hole to Gate No. 2 tunnel outlet located on North Fork Stevenson Creek upstream of Shaver Lake. The Balsam Diversion Tunnel is approximately 1.1 miles long, and branches off Tunnel No. 7 approximately 1,200 ft upstream of the Gate No. 2 outlet. The Balsam Diversion Tunnel connects Tunnel No. 7 to Balsam Forebay. Water is normally routed to Balsam Forebay from Tunnel No. 7 through the Balsam Diversion Tunnel and the Gate No. 2 outlet on North Fork Stevenson Creek is closed (except for MIF releases to North Fork Stevenson Creek).

- Eastwood Power Station and Tailrace Tunnels convey water from Balsam Forebay through the Eastwood Power Station to Shaver Lake. The Eastwood Power Station Tunnel is about 1 mile long. The Tailrace Tunnel is about 1.4 miles long. The conveyance capacity of the tunnels is approximately 2,500 cfs. The Eastwood Power Station, power tunnels and the tailrace also are used to convey water back from Shaver Lake to Balsam Forebay during pump-storage operations.

- Tunnel No. 5 conveys water from Shaver Lake to Big Creek Powerhouse No. 2A and has a conveyance capacity of approximately 650 cfs. The tunnel is about 2.6 miles long.

- Tunnel No. 8 conveys water from the Dam No. 5 Forebay to Big Creek Powerhouse No. 8 with a conveyance capacity of approximately 1,173 cfs. The tunnel is about 1 mile long.

- One transmission line:

  - Eastwood Power Station–Big Creek 1 Transmission Line connects Eastwood Power Station to a non-Project switchyard at Big Creek Powerhouse No. 1. This transmission line is approximately 4.7 miles long, and is a 220kV line (elevation range 4,780 - 6,160 ft msl).

<u>Big Creek No. 3 (FERC Project No. 120)</u>

The Big Creek No. 3 Project operates under a FERC license as Project No. 120, issued on September 7, 1977, which expires on February 28, 2009. The Project has a dependable operating capacity of approximately 182 MW. The major existing Project components consist of:

- One powerhouse:

  - Big Creek Powerhouse No. 3, with five turbine generator units and a total dependable operating capacity of approximately 182 MW.

- One moderate-sized dam and forebay:
  - Dam 6 impounds Dam 6 Forebay, with a capacity of approximately 993 ac-ft, at an elevation of approximately 2,230 ft above msl.
- One water conveyance system:
  - Powerhouse No. 3 water conveyance system is used to convey water from Dam No. 6 Forebay to Big Creek Powerhouse No. 3. The conveyance system is approximately 5.3 miles long with a capacity of approximately 2,431 cfs.

Project Boundaries

SCE is proposing several modifications to the existing Project boundaries at all four Big Creek ALP Projects as described in the following sections.

Mammoth Pool (FERC Project No. 2085)

Areas Proposed for Inclusion in the Project Boundary

- Shakeflat Creek Trail, access to San Joaquin River gaging station upstream of Shakeflat Creek

  The Shakeflat Creek Trail is proposed to be added to the Project Boundary. SCE uses this trail to access and maintain the gaging station located on the San Joaquin River upstream of the Shakeflat Creek confluence. The trail originates at the crossing of U.S. Department of Agriculture Forest Service (USDA-FS) Road No. 7S20 over Shakeflat Creek and follows the left bank of Shakeflat Creek to the confluence with the San Joaquin River where the trail then continues upstream to the river gaging station. The length of the trail is 3,112 ft and the Project Boundary should include a 10 ft right-of-way (ROW) from the centerline (5 ft from the centerline on each side of the trail). This Project Boundary modification will result in the addition of approximately 0.7 acre of federal land.

- Helicopter landing site adjacent to the San Joaquin River above Shakeflat Creek

  The helicopter landing site adjacent to the San Joaquin River above Shakeflat Creek is proposed to be added to the Project Boundary. SCE uses this landing site to access a trail leading to the stream gage (SCE gage No. 157) located on the San Joaquin River. The landing site provides access to the gage and is needed for the operation and maintenance of the Project. The landing site is located within a circular area 400 feet in diameter. This Project Boundary modification will result in the addition of approximately 2.90 acre of federal land.

Big Creek Nos. 1 and 2 (FERC Project No. 2175)

Areas Proposed for Removal from the Existing Project Boundary

- Rancheria Creek downstream of Portal Powerhouse (Portal Tailrace) to the high water line of Huntington Lake

  Rancheria Creek from Portal Powerhouse to the high water line of Huntington Lake is proposed to be removed from the Project Boundary. This reach is primarily affected by flow through the Ward Tunnel and is currently included in the Project boundaries of two other FERC licensed projects (Big Creek Nos. 2A, 8, and Eastwood, FERC Project No. 67; and Portal Project, FERC Project No. 2174). Commission staff were consulted and concur with SCE's recommendation that this reach be removed from the Portal Project (FERC 2005). Removal of this reach from the Big Creek Nos. 1 and 2 Project (FERC Project No. 2175) would be consistent with the action proposed for the Portal Project. The reach does not need to be included within more than one FERC license, but should still be included as part of the Big Creek Nos. 2A, 8, and Eastwood Project, as it is the primary conveyance for water from the back-country diversions, which are largely part of Project No. 67, into the Big Creek System. This Project Boundary modification will result in the removal of approximately 2.51 acres of federal land from the Project Boundary.

- A portion of the ROW along the access road to the gaging station located on Big Creek below Huntington Lake (USDA-FS Road Nos. 8S66 and 8S66A)

  The Project Boundary is proposed to be modified to align with the road and reduce the ROW width from 100 ft to 50 ft along the access route to the gaging station located on Big Creek below Huntington Lake. The access route is along two road segments as follows: (1) USDA-FS Road No. 8S66 from near the east end of Dam 2 to the intersection with USDA-FS Road No. 8S66A, and (2) USDA-FS Road No. 8S66A from USDA-FS Road No. 8S66 to the gaging station. The existing Project Boundary along these routes is a 100 ft wide ROW. The ROW should be reduced in width to 50 ft (25 ft from the centerline along both sides of the road). The additional land included in the 100 ft ROW is excessive and is not necessary for the safe and efficient operation of the Project. This Project Boundary modification will result in the removal of approximately 1.58 acres of federal land.

- A communication line ROW from the dispatchers office near Big Creek Powerhouse No. 3 to Big Creek Powerhouse No. 2 and the Northern Hydro offices near Big Creek Powerhouse No. 1

  The Project Boundary is proposed to be modified to remove this ROW along the former communication line that provided service from the dispatcher's office near Big Creek Powerhouse No. 3 to Big Creek Powerhouse No. 2 and the Northern Hydro offices near Big Creek Powerhouse No. 1. The communication line and associated equipment have been removed, after consultation with the USDA-FS, and the land is not necessary for the safe and efficient operation of the Project. Communication

between the Project facilities is currently conducted via microwave transmission or by fiber optic cable. This Project Boundary modification will result in the removal of approximately 68.83acres of federal land.

- Former company housing area near Big Creek Powerhouse No. 2 and 2A

  The former company housing area located across the creek from Big Creek Powerhouse No. 2 is proposed to be removed from the Project Boundary. The housing has been removed and the land restored after consultation with the USDA-FS. SCE does not require any access to these lands for the operation of the Project. This Project Boundary modification will result in the removal of approximately 10.52 acres of federal land.

- USDA-FS Road No. 8S13 from the gate located near the top of Big Creek Powerhouse No. 2 penstocks to USDA-FS Road No. 8S08.

  The segment of USDA-FS Road No. 8S13 located between the gate near the top of the penstocks for Big Creek Powerhouse No. 2/2A to USDA-FS Road No. S8S08 (Railroad Grade Road) is proposed to be removed from the existing Project Boundary. SCE does not need or use this road segment for the operation and maintenance of the Project. Access to Project facilities at this location is now provided by the Canyon Road (USDA-FS Road No. 8S05). This Project Boundary modification will result in the removal of approximately 28.23 acres of federal land.

- Excess land located southwest of Big Creek Powerhouse No. 2/2A

  Unused lands located southwest of Big Creek Powerhouse No. 2/2A is proposed to be removed from the current Project Boundary. This area of land was formerly occupied by SCE for company housing. The housing has been removed and the land restored after consultation with the USDA-FS. SCE does not require any access to these lands, and they are not necessary for the safe and efficient operation and maintenance of the Project, or for other Project purposes. This Project Boundary modification will result in the removal of approximately 15.67 acres of federal land.

Areas Proposed for Inclusion in the Project Boundary

- Eastwood Overflow Campground

  The overflow camping area is proposed to be included in the Project Boundary for Big Creek Nos. 1 and 2 Project (FERC Project No. 2175) and removed from the Big Creek Nos. 2A, 8, and Eastwood Project (FERC Project No. 67). The overflow campground is used as a designated USDA-FS dispersed camping area when the developed campgrounds at nearby Huntington Lake are full. The Eastwood Overflow Campground does not need to be included in more than one FERC license, and is more closely associated with recreational use at Huntington Lake, a primary feature of the Big Creek Nos. 1 and 2 Project (FERC Project No. 2175).

This Project Boundary modification will result in the addition of approximately 5.63 acres of federal land to the Project Boundary.

- Eastwood Overlook

  The Eastwood Overlook is proposed to be included in the Project Boundary for Big Creek Nos. 1 and 2 Project (FERC Project No. 2175). The overlook is located along Rancheria Creek upstream of the confluence with Huntington Lake, and is more closely associated with recreational use at Huntington Lake. This Project Boundary modification will result in the addition of approximately 0.48 acre of federal land.

- USDA-FS Road No. 8S66, from the gate to the west end of Dam 2

  The access road from the gate at the terminus of Fresno County Road 3380 (Huntington Lodge Road) to the west end of Dam 2 is proposed to be added to the FERC Project Boundary. This road is used by SCE to access Project facilities at Dam 1 and Dam 2. This Project Boundary modification will not increase Federal use land fees because the lands are owned by SCE.

- Segment of USDA-FS Road No. 8S83

  A short segment of USDA-FS Road No. 8S83 from the junction with USDA-FS Road No. 8S83A is located outside of the Project Boundary on USDA-FS lands and is proposed to be added to the FERC Project Boundary, with a total width of ROW of 50 ft. This road is used by SCE to access the Project facilities in the vicinity of Dam 1 and Dam 2. This Project Boundary modification will result in the addition of approximately 2.6acres of federal land.

<u>Big Creek Nos. 2A, 8, and Eastwood (FERC Project No. 67)</u>

Areas Proposed for Removal from the Existing Project Boundary

- Excess land located southwest of Big Creek Powerhouse No. 2 and 2A

  Unused lands located southwest of Big Creek Powerhouse No. 2/2A are proposed to be removed from the Project Boundary. These lands were formerly occupied by SCE company housing, which has been removed and the land restored after consultation with the USDA-FS. SCE does not require any access to these lands, and it is not necessary that these lands be included in the Project Boundary for the safe and efficient operation and maintenance of the Project, nor for other specified Project purposes. This Project Boundary modification will result in the removal of approximately 16.48 acres of federal land.

- Excess land located along the southern side of Rancheria Creek from approximately 500 ft upstream of Portal Powerhouse downstream to Huntington Lake

  Unused lands along the south side of Rancheria Creek from approximately 500 ft upstream of Portal Powerhouse downstream to Huntington Lake are proposed to be

removed from the Project Boundary. The lands proposed for removal from the Project Boundary are not necessary for the safe and efficient operation and maintenance of the Project, or for other specified Project purposes. SCE does not require any access to these lands for the operation of the Project. This Project Boundary modification will result in the removal of approximately 12.53 acres of federal land.

- Eastwood Overflow Campground

  The Eastwood Overflow Campground is proposed to be removed from the Project Boundary of the Big Creek Nos. 2A, 8, and Eastwood Project (FERC Project No. 67). The overflow campground is a designated USDA-FS dispersed camping area. This USDA-FS facility is not related to FERC Project No. 67 in any fashion. This Project Boundary modification will result in the removal of approximately 7.72 acres of federal land from the FERC No. 67 Project Boundary.

- Eastwood Overlook

  The Eastwood Overlook is proposed to be removed from the Project Boundary for Big Creek Nos. 2A, 8, and Eastwood Project (FERC Project No. 67). The overlook is located along Rancheria Creek, upstream of the confluence with Huntington Lake. This Project Boundary modification will result in the removal of approximately 0.48 acres of federal land.

- USDA-FS Road No 5580H Access road to Bolsillo Creek Diversion, from USDA-FS Road No. 5S80

  The access road to the Bolsillo Creek Diversion is proposed to be removed from the FERC Project Boundary. This public open-access USDA-FS Road No. 5S80 also provides access to the USDA-FS Bolsillo Campground, a USDA-FS horse corral, and to the Corbett Lake Trailhead. This road is not used exclusively by SCE for the operation and maintenance of the Project and should not be considered a Project road. This Project Boundary modification will result in the removal of approximately 1.41 acres of federal land.

- Chinquapin Diversion piping near Camp 62 along co-aligned segment of USDA-FS Road No. 7S01

  The Chinquapin Diversion Piping and co-aligned segment of USDA-FS Road No. 7S01 is proposed to be removed from the Project Boundary. The Chinquapin Diversion was relocated in 2002 and the associated steel diversion piping alongside of USDA-FS Road No. 7S01 was removed at that time. The lands associated with the former diversion piping are not necessary for the operation of the Project, nor other specified Project purposes. This Project Boundary modification will result in the removal of approximately 11.36 acres of federal land.

- Segment of USDA-FS Road No. 9S311, access road to Eastwood Power Station Switchyard

  USDA-FS Road No. 9S311 from Highway 168 to the Eastwood Power Station Switchyard is proposed to be removed from the Project Boundary. This road segment is not necessary for maintenance and operation of the Project, nor any other Project purpose. Access to the Eastwood Power Station Switchyard is provided by another road, USDA-FS Road No. 9S312. This Project Boundary modification will result in the removal of approximately 0.69 acres of federal land.

- Florence Lake Day-Use Area

  The Florence Lake Day-Use area is proposed to be removed from the FERC Project Boundary. The day-use area is located near the Crater Creek Diversion Channel that flows into the northwest corner of Florence Lake. This land is used exclusively for public recreation and is not needed for the operation of the Project. This Project Boundary modification will result in the removal of approximately 13.66 acres of Federal land.

Areas Proposed for Inclusion in the Project Boundary

- USDA-FS Road No. 8S08A, access road to the upper penstock valves for Tunnel 5 from USDA-FS Road No. 8S08 (Railroad Grade Road)

  The portion of the access road leading to the upper penstock valves for Tunnel 5 (USDA-FS Road No. 8S08A) from the Railroad Grade Road (USDA-FS Road No. 8S08) is proposed to be added to the Project Boundary. SCE uses this road to access the area at the top of the penstocks for Big Creek Powerhouse No. 2 and 2A. SCE's use of this road segment is currently authorized under a Special Use Authorization (SUA) issued by the USDA-FS. The road should be considered a Project road that is needed for the operation and maintenance of the Project. The road is closed to public vehicular access by an SCE locked gate. This Project Boundary modification will result in the addition of approximately 0.5 acres of federal land.

- Bolsillo Creek Diversion and Stream Gage Trail

  The Bolsillo Creek Diversion and Stream Gage Trail is proposed to be added to the Project Boundary. SCE uses this trail to access and maintain the small diversion and gaging station on Bolsillo Creek. The trail originates from the Bolsillo Creek Diversion Access Road, USDA-FS Road No. 5S80H, which is a spur road off Kaiser Pass Road and terminates at the Bolsillo Creek Diversion. SCE maintains the trail and is the primary user. The length of the trail is approximately 275 ft and the Project Boundary should include a 10 ft ROW (5 ft from the centerline on each side of the trail). This Project Boundary modification will result in the addition of approximately 0.09 acre of federal land.

- Chinquapin Creek Diversion and Stream Gage Trail

  The Chinquapin Creek Diversion and Stream Gage Trail is proposed to be added to the Project Boundary. SCE uses this trail to access and maintain the small diversion and gaging station on Chinquapin Creek. The trail originates off the Florence Lake Road (USDA-FS Road No. 7S01) approximately a quarter mile beyond the intersection with Kaiser Pass Road (USDA-FS Road No. 5S80) and terminates at the Chinquapin Creek Diversion. SCE maintains the trail and is the primary user. The length of the trail is 3,854 ft and the Project Boundary will include a 10 ft ROW (5 ft from the centerline on each side of the trail). This Project Boundary modification will result in the addition of approximately 0.87 acre of federal land.

- USDA-FS Road No. 9S17 access road to Eastwood Power Station-Big Creek 1 Transmission Line tower M0 T3

  This access road, originally used during construction of the Eastwood Power Station-Big Creek No. 1 Transmission Line tower No. M0-T3, will be re-constructed and is proposed to be added to the Project Boundary. The road will be approximately 350 ft long and begins on State Highway 168 and terminates at tower No. MO-T3, with a 50 ft ROW (25 ft from the centerline along both sides of the road). This road is necessary for SCE to operate and maintain the transmission line tower. Portions of this access road are within the current Project Boundary around the transmission line. The proposed boundary modifications will only add those portions of the road not already in the existing FERC Boundary. This Project Boundary modification will result in the addition of approximately 0.23 acre of land.

- USDA-FS Road No. 9S312, access road to Eastwood Power Station Switchyard

  The access road to Eastwood Power Station Switchyard (USDA-FS Road No. 9S312) is proposed to be added to the Project Boundary. USDA-FS Road No. 9S312 provides SCE access to the Eastwood Power Station Switchyard from Highway 168. The road is closed to public vehicular traffic by an SCE locked gate. SCE uses the road to access the switchyard. SCE needs this road for operation and maintenance of the Project. This Project Boundary modification will include a 50 ft ROW (25 ft from the centerline along both sides of the road), and will result in the addition of approximately 0.76 acre of federal land.

- Gaging station on South Fork San Joaquin River above Hooper Creek confluence (SCE gage No. 128S)

  The gaging station and ancillary equipment (cable way and housing structure) on the South Fork San Joaquin River above the Hooper Creek confluence is proposed to be added to the Project Boundary. SCE's use of the land surrounding this gage is currently authorized under a SUA issued by the USDA-FS. This stream gage is used to measure flow in the South Fork San Joaquin River above the confluence with Hooper Creek. This gage should be added to the Project Boundary, with a 300

foot wide square around the gage and ancillary equipment. This Project Boundary modification will result in the addition of approximately 2.07 acre of federal land.

- Segment of USDA-FS Road No. 8S83 from the current FERC Project Boundary for Project No. 2175 to the Huntington-Pitman-Shaver Siphon

  The segment of USDA-FS Road No. 8S83, which is used by SCE to access the Huntington-Pitman-Shaver Siphon from the junction of USDA-FS Road No. 8S83A, is proposed to be added to the Project Boundary. The road is necessary for the operation and maintenance of the Project. The road is closed to public vehicular access by an SCE locked gate. This road is proposed to be added to the Project Boundary with a 50 ft ROW (25 ft from the centerline along both sides of the road). This Project Boundary modification will result in the addition of approximately 4.11 acres of federal land.

- USDA-FS Road No. 8S94, Pitman Creek Diversion access road

  The Pitman Creek Diversion access road, USDA-FS Road No. 8S94, is proposed to be added to the Project Boundary. The road is necessary for the operation and maintenance of the Project. The road is closed to public vehicular access by an SCE locked gate. This road should be added to the Project Boundary with a 50 ft ROW (25 ft from the centerline along both sides of the road). This Project Boundary modification will result in the addition of approximately 1.76 acres of federal land.

- USDA-FS Road No. 9S32C, access road to the Eastwood Power Station-Big Creek No. 1 Transmission Line

  The Project Boundary is proposed to be modified by adding USDA-FS Road No. 9S32C and associated spur roads that provide access to the Eastwood Power Station-Big Creek No. 1 Transmission Line towers (Nos. M1-T2, M1-T3, M1-T4, M1-T5, M1-T6, M2-T1 and M2-T2). The total length of road and associated spurs to be added to the Project Boundary is 2.19 miles. The area to be included in the Project Boundary along the road and associated spurs includes a 50 ft ROW (25 ft from the centerline along both sides of the road) at locations where the road is not already within the FERC Boundary around the existing transmission line. SCE needs this road and associated spurs for maintenance and inspection of the Eastwood Power Station-Big Creek No. 1 Transmission Line. This Project Boundary modification will not increase Federal use land fees because the lands are owned by SCE.

- USDA-FS Road No. 8S47, access to the Eastwood Power Station-Big Creek 1 Transmission Line

  The Project Boundary is proposed to be modified to cover re-constructing 0.62 miles of road from the terminus of USDA-FS Road No. 8S47, which will provide access to the Eastwood Power Station-Big Creek No. 1 Transmission Line tower Nos. M3-T1, and M2-T5. This road segment was used during the original construction of the Transmission Line and was subsequently decommissioned. The area to be added

to the Project Boundary includes a 50 ft ROW (25 ft from the centerline along both sides of the road). SCE needs this road for maintenance and inspection of the transmission line. This Project Boundary modification will result in the addition of approximately 3.11acres of federal land.

- USDA-FS Road Nos. 8S02 and 8S02B, access road to the Huntington-Pitman-Shaver Tunnel Adit

  The access roads to the Huntington-Pitman-Shaver Tunnel Adit, USDA-FS Road Nos. 8S02 and 8S02B, are proposed to be added to the Project Boundary. USDA-FS Road No. 8S02 is approximately 3.41 miles long and provides access from State Highway 168 to the Huntington-Pitman-Shaver Tunnel Adit. The road is closed to public vehicular traffic by a gate at Highway 168 that is controlled by SCE. The road is used exclusively by SCE to access the tunnel adit. USDA-FS Road No. 8S02B is a short road spur from USDA-FS Road No. 8S02 that leads to the tunnel adit entrance. SCE needs both roads for operation and maintenance of the Project. This Project Boundary modification should include a 50 ft ROW (25 ft from the centerline along both sides of the road). This Project Boundary modification will result in the addition of approximately 14.34 acres of federal land.

- USDA-FS Road No. 9S58, access road to Eastwood Power Station and the North Fork Stevenson Creek gage

  The access road to the North Fork Stevenson Creek gage (USDA-FS Road No. 9S58) is proposed to be added to the Project Boundary. This road provides access from the SCE controlled gate at Sierra Marina to the stream gage located on North Fork Stevenson Creek. This road also provides access to the Eastwood Power Station facilities located along the northeastern side of Shaver Lake. The 0.75 mile of the road is open for public recreation up to a second access gate controlled by SCE. Beyond the second gate, the road is closed to public vehicular traffic and is used exclusively by SCE to access the Eastwood Power Station and the North Fork Stevenson Creek Stream Gage. This Project Boundary modification will include a 50 ft ROW (25 ft from the centerline along both sides of the road). SCE needs this road for operation and maintenance of the Project. This Project Boundary modification will not increase Federal use land fees because the lands are owned by SCE.

- USDA-FS Road No. 9S58K, access road to Eastwood Power Station Entrance Tunnel

  The access road to the Eastwood Power Station entrance tunnel (USDA-FS Road No. 9S58K) is proposed to be added to the Project Boundary. This road provides access from USDA-FS Road 9S58 to the entrance tunnel leading to the Eastwood Power Station. This Project Boundary modification should include a 50 ft ROW (25 ft from the centerline along both sides of the road). SCE needs this road for operation and maintenance of the Project. This Project Boundary modification will not increase the Federal land use fees because the lands are owned by SCE.

- Access road to Eagle Point Boat Only Day-Use Area

  The access road to the Eagle Point Boat Only Day-Use Area is proposed to be added to the Project Boundary. The Eagle Point Boat Only Day-Use Area is located on the east side of Shaver Lake. Public access to this recreation facility is only via boat. SCE does maintain an access road to the boat-only day-use area. This access branches off USDA-FS Road No. 9S58 (discussed above). The access road to the boat-only day-use area is closed to public vehicular traffic. SCE uses this road exclusively to access the facility. SCE needs this road for operation and maintenance of the Project. This Project Boundary modification will include a 50 ft ROW (25 ft from the centerline along both sides of the road). This Project Boundary modification will not increase the Federal land use fees because the lands are owned by SCE.

- Trail to Big Creek stream gage below Dam 5

  The trail to the stream gage on Big Creek below Dam 5 is proposed to be added to the Project Boundary. SCE uses this trail to access and maintain the gaging station, SCE gage No. 105. The trail originates at the Canyon Road (USDA-FS Road No. 8S05) about a quarter mile from Big Creek Powerhouse No. 8 and terminates at the stream gage on Big Creek. SCE maintains the trail and is the primary user. The length of the trail is approximately 1,050 ft and the Project Boundary will include a 10 ft ROW (5 ft from the centerline on each side of the trail). This Project Boundary modification will result in the addition of approximately 0.19 acre of federal land.

- Bear Creek Stream Gage Trail

  The Bear Creek Stream Gage Trail is proposed to be added to the Project Boundary. SCE uses this trail to access and maintain the stream gage located on Bear Creek upstream of the Bear Creek Diversion. The trail originates at the Bear Creek Diversion Pool and travels along the west side of the forebay, and terminates at the stream gage located upstream on Bear Creek. SCE maintains the trail and uses it to access the stream gage. The length of the trail is approximately 500 ft and the Project Boundary should include a 10 ft ROW (5 ft from the centerline on each side of the trail). This Project Boundary modification will result in the addition of approximately 0.29 acre of federal land.

- Gaging station on South Fork San Joaquin River below Hooper Creek confluence (SCE gage No. 129)

  The diameter of the Project Boundary around the gaging station on the South Fork San Joaquin River below the Hooper Creek confluence (SCE Gage No. 129) is proposed to be increased to 100 ft from the current 20 ft diameter. This stream gage is used to measure flow in the South Fork San Joaquin River below the confluence with Hooper Creek and the increased lands are necessary for safe and efficient maintenance and operation of the Project. This Project Boundary modification will result in the addition of approximately 0.18 acres of Federal land.

- Land surrounding the gaging station on Hooper Creek below Hooper Creek Diversion (SCE Gage No. 114) and the Hooper Creek Diversion helicopter landing site.

  The diameter of the Project Boundary around the gaging station, located on Hooper Creek below the Hooper Creek Diversion is proposed to be increased to 100 ft from the current 20 ft diameter. The Hooper Creek Diversion helicopter landing site should also be added to the Project Boundary. The Project boundary revision for the gaging station and the helicopter-landing site overlap each other. These additional lands are necessary for the safe and efficient operation and maintenance of the Project. This Project Boundary modification to include the stream gage and landing site will result in the addition of approximately 0.68 acre of federal land.

- Helicopter landing site at South Fork San Joaquin River at Florence Spill Station

  The helicopter landing site at the South Fork San Joaquin River Florence Spill Station above the Hooper Creek confluence is proposed to be added to the Project Boundary. SCE uses this landing site to access the stream gaging station (SCE Gage No. 128S) that is used to measure flows on the South Fork San Joaquin river below Florence lake. The landing site provides access during spill at Florence Lake and during the winter months, when vehicular access is not possible due to road closure from snow accumulation or high flow events. The landing site is located within a circular area 200 feet in diameter. This Project Boundary modification will result in the addition of approximately 0.72 acres of federal land.

- Helicopter landing site at Summit at Shaver Hill

  The helicopter landing site at the Summit (Shaver Hill) is proposed to be added to the FERC Project Boundary. This landing site is used as an alternative landing location when the Big Creek heliport is closed due to inclement weather. This landing site is necessary for the operation and maintenance of the Project. The landing site is located within a circular area 200 feet in diameter. This Project Boundary modification will not increase the Federal land use fees because the lands are owned by SCE.

- Helicopter landing site at Tiffany Pines at Camp Edison

  The helicopter landing site at Tiffany Pines (Camp Edison) is proposed to be added to the FERC Project Boundary. SCE uses this landing site to access Shaver Lake. This landing site is used as an alternative landing location when the Big Creek heliport is closed due to inclement weather. This landing site is necessary for the safe and efficient operation and maintenance of the Project. The landing site is located within a circular area 400 feet in diameter. This Project Boundary modification will not increase Federal use land fees because the lands are owned by SCE.

- Helicopter landing site at Bear Creek Diversion

  The helicopter landing site at Bear Creek Diversion is proposed to be added to the Project Boundary. SCE uses this landing site to access the Bear Creek Diversion and stream gage. The helicopter-landing site is necessary for the safe and efficient operation and maintenance of the Project. The landing site provides access during the winter months, when vehicular access is not possible due to road closure from snow accumulation. The landing site is located within a circular area 400 feet in diameter. This Project Boundary modification will result in the addition of approximately 0.69 acre of federal land.

- Helicopter landing site at the South Fork San Joaquin River below Hooper Creek

  The helicopter landing site at the South Fork San Joaquin River below Hooper Creek is proposed to be added to the Project Boundary. SCE uses this landing site to access a stream gage (SCE gage No. 129) that is needed for the operation and maintenance of the Project. The landing site is located within a circular area 400 feet in diameter. This Project Boundary modification will result in the addition of approximately 2.9 acre of federal land.

- Helicopter landing site at Mount Givens Telecom Site

  The helicopter landing site at Mount Givens is proposed to be added to the Project Boundary. SCE uses this landing site to access a communication tower that is necessary for the safe and efficient operation and maintenance of the Project. The landing site provides access during the winter months, when vehicular access is not possible due to road closure from snow accumulation. The landing site is located within a circular area 70 feet in diameter. This Project Boundary modification will result in the addition of approximately 0.09 acre of land.

- Helicopter landing site at Florence Lake Dam

  The helicopter landing site at Florence Lake Dam is proposed to be added to the Project Boundary. SCE uses this landing site to access the dam. The landing site is necessary for the safe and efficient operation and maintenance of the Project. The landing site provides access during the winter months, when vehicular access is not possible due to road closure from snow accumulation. The landing site is located within a circular area 400 feet in diameter. This Project Boundary modification will result in the addition of approximately 0.16 acre of federal land.

- Helicopter landing site at the Mono Creek Diversion

  The helicopter landing site at the Mono Diversion is proposed to be added to the FERC Project Boundary. SCE uses this landing site to access the Mono Diversion and Forebay, which are necessary for the safe and efficient operation and maintenance of the Project. The landing site is located within a circular area 400

feet in diameter. This Project Boundary modification will result in the addition of approximately 2.9 acre of land.

- Helicopter landing site at the Mono Creek below Lake Edison

  The helicopter landing site at the Mono Creek below Lake Edison is proposed to be added to the FERC Project Boundary. SCE uses this landing site to access a stream gage (SCE gage No. 119) that is necessary for the safe and efficient operation and maintenance of the Project. The landing site is located within a circular area 400 feet in diameter. This Project Boundary modification will result in the addition of approximately 2.9 acre of federal land.

Big Creek No. 3 (FERC Project No. 120)

Areas Proposed for Removal from the Existing FERC Project Boundary

- Excess lands around Dam No. 6 Forebay that are above the high water line

  The Project Boundary is proposed to be modified by removing excess Project lands from above the high water line around Dam 6 Forebay. SCE does not require any special access to the forebay shoreline. SCE does not need these lands to be included in the Project Boundary for the operation and maintenance of the Project, nor for other specified Project purposes. This Project Boundary modification will result in the removal of approximately 44.17 acres of federal land.

Project Operations

Operation of SCE's seven FERC-Licensed Projects in the Big Creek System (BCS) is managed from a watershed-wide perspective and on an individual project-by-project basis. The Big Creek Hydroelectric System consists of six major reservoirs (Thomas A. Edison, Florence, Huntington, Redinger, Shaver, and Mammoth Pool,) and nine powerhouses (Portal; Eastwood; Mammoth Pool; and Big Creek Powerhouse Nos. 1, 2, 2A, 3, 4, and 8). The operation of the BCS and the individual Projects is dependent on natural run-off during periods of snowmelt and wet weather and the operation of other components in the system, the amount of generation required for SCE's customers, and the dispatching of energy in accordance with the California Independent System Operator requirements.

SCE operates the four Big Creek ALP projects within the BCS in accordance with the FERC-license conditions, which includes MIF release requirements that are made by SCE from diversions and impoundments. Bypass and flow augmented stream reaches associated with each of the four Big Creek ALP Projects are listed in Table 3.1.4-1.

The management of water through the BCS and specifically the four Big Creek ALP Projects routes water between Projects in a manner that best meets the operational constraints that are imposed either by contractual operating agreements (i.e., licenses, permits, etc.) or by physical limitations of the Project infrastructure. The BCS is subject to several operating constraints including the following: (1) available water supply;

(2) electrical system requirements; (3) both planned and unplanned maintenance outages; (4) storage limits (including both recreation minimums and year-end carryover maximums); (5) both minimum and maximum release limits (from storage); (6) various provisions contained in water rights agreements; and (7) California Independent System Operator requirements.

Water Rights and Contractual Obligations

Each of SCE's Big Creek Hydroelectric Projects either has separate water rights or shares one or more water rights with other projects for the diversion, use, and storage of water. The majority of the water rights are for non-consumptive uses associated with the generation of power. A few locations, such as the SCE's administrative offices and company housing near Big Creek No. 1 Powerhouse have minor consumptive water rights. SCE does not hold water rights for the consumptive use of water by any party other than SCE, nor does SCE sell any water rights associated with the hydropower projects to other parties.

SCE's water rights were obtained pursuant to state law and a majority of the water rights are documented by licenses and permits issued to SCE, or its predecessors, by the State Water Resources Control Board (State Water Board). Additional water rights were obtained through appropriation of water prior to the implementation of the Water Commission Act of 1914, and by prescriptive use against other parties. SCE also holds other water rights as a riparian land owner, which authorizes SCE to divert and use water on land owned by SCE. Table 3.1.4-2 summarizes the water right licenses and permits for the four Big Creek ALP Projects analyzed in this APDEA.

The water rights agreements contain stipulations that stem from the senior status of certain downstream water rights holders. Generally, any water right holder with senior rights began diverting water for consumptive purposes prior to SCE or its predecessors. To protect the rights of the downstream water rights holders, SCE entered into agreements that restrict the use of water within the BCS to non-consumptive purposes, i.e., hydroelectric generation. Certain agreements limit the length of time and amount of water that SCE can store in its Project reservoirs. In a few instances, SCE's non-consumptive water use is a senior water right, and other water users hold junior water rights.

SCE operates its reservoirs consistent with the Mammoth Pool Operating Agreement (MPOA), which specifies cumulative reservoir storage constraints based on the computed natural run-off for the water year at Friant Dam. The MPOA between SCE and the U.S. Bureau of Reclamation (Bureau) specifies water storage and release requirements for the BCS reservoirs, which are upstream of Friant Dam (Millerton Reservoir) and the associated Central Valley Project water distribution system operated by the Bureau on behalf of the downstream irrigators. Millerton Reservoir is a major irrigation storage facility serving the central San Joaquin Valley agricultural community. Meetings between SCE, the Bureau, and the downstream irrigators are held following the March 1 run-off forecast each year, and periodically as needed, to coordinate and optimize hydropower production consistent with irrigation needs of the downstream

agricultural users holding senior water rights and emergency flood control operations of Millerton Reservoir. The MPOA includes constraints on the annual and seasonal timing and volume of releases from SCE's reservoirs, maximum year-end storage allowed, and minimum seasonal flow from Dam No. 7 (release and diversion). Table 3.1.4-3 summarizes the storage constraints specified in the MPOA.

Water Management

This section provides a general overview of the existing water management of the seven Projects in the BCS followed by a description of water management specific to the four Big Creek ALP Projects analyzed in this APDEA.

BCS Water Management

A key component of the annual water management plan for the BCS is the development of an annual run-off forecast. The annual run-off forecast is developed based on snow pack and precipitation data collected in the vicinity of the Project. This information is used along with assumptions about future median precipitation and air temperatures to produce a run-off forecast through the end of the water year (September 30). The forecast includes an estimate of both the timing and the quantity of water that will enter Project reservoirs during that run-off season. Snow pack and precipitation data are shared with the California Department of Water Resources (DWR) and the USBR, who use it to develop individual forecasts of run-off volumes and declare water year types (critical, dry, below normal, above normal, or wet). The run-off forecast is a valuable tool for planning and ensuring compliance with the constraints of the MPOA (described above) and for planning purposes. A majority of the MPOA and other constraints are based on actual run-off volumes. The forecast also is used for directing future operational plans for: 1) instream flow release requirements; 2) reservoir recreational storage requirements; and 3) hydroelectric generation operations for the entire BCS.

The operation of the BCS is similar in all water year types in that water diverted from Project reservoirs and diversions is utilized to generate power. There are subtle differences, however, in the way that the Project is operated during different water year types and during different conditions of state energy requirements.

Some of the BCS reservoirs generally spill in wet and above normal water years and are filled to maximum capacity when spill ceases. When the BCS reservoirs stop spilling, SCE is able to manage the system with available inflows and begin managing the water to meet electric supply requirements by providing both base load and peak cycling energy. In the upper basin area, water from the upper South Fork San Joaquin River drainage is stored in Florence Lake and water from Mono Creek drainage is stored in Lake Thomas A. Edison. Water is diverted from these two lakes and various other small backcountry diversions into Huntington Lake via the Ward Tunnel and the Mono-Bear Siphon. The volumes of water that can pass through Ward Tunnel and the siphon are limited by the physical size and layout of these conduits. Water deliveries to Huntington Lake are prioritized as follows: first priority is given to water from Florence Lake; second priority is given to water from Bear Diversion and Lake Thomas A. Edison;

and third priority is given to water diverted from the small diversions at Camp 61 Creek, Camp 62 Creek, Chinquapin Creek and Bolsillo Creek. The water delivered to Huntington Lake may also pass through Portal Powerhouse at the exit of the Ward Tunnel depending upon the amount of water being transported.

BCS Power Generation

The BCS has three interlinked water chains or pathways through which water may be transported and used to produce power. The three water chains are:

- Huntington Water Chain: This chain consists of Portal Powerhouse, Powerhouse No. 1, Powerhouse No. 2, Powerhouse No. 8, Powerhouse No.3, and Powerhouse No. 4.

- Shaver Water Chain: This chain consists of Portal Powerhouse, Eastwood Power Station, Powerhouse No. 2A, Powerhouse No. 8, Powerhouse No. 3, and Powerhouse No. 4.

- Mammoth Water Chain: This chain consists of Mammoth Pool Powerhouse, Powerhouse No. 3, and Powerhouse No. 4.

After passing through or bypassing the Portal Powerhouse, water entering Huntington Lake is directed to either the Huntington Chain, or the Shaver Chain. If the generation from the powerhouses of either chain is increased or decreased proportionally, the changes in load will have no effect on the MIF, or total levels of the storage reservoirs and forebays within the BCS. Changes in total loading conditions of the two chains can, however, affect Florence Lake and Lake Thomas A. Edison and can affect the amount of water leaving the project at Powerhouse No. 4. If generation from the powerhouses of either chain is changed disproportionately, the levels of Huntington Lake, Shaver Lake, and Redinger Lake can be increased or decreased.

Water from Big Creek Powerhouse Nos. 1 and 2 in the Huntington Chain joins water from the Shaver Chain, which has already passed through Eastwood Power Station and Big Creek Powerhouse No. 2A, at the Big Creek Powerhouse No. 2 and 2A Tailrace (Dam 5). Water from these two chains is then diverted through Big Creek Powerhouse No. 8, after which it joins the waters of the San Joaquin River coming from the Mammoth Chain at the Big Creek No. 8 Tailrace (Dam 6 Impoundment). Water from all three chains then continues through Big Creek Powerhouse Nos. 3 and 4.

Waters from the Middle Fork and North Fork San Joaquin River (SJR) drainages, and the South Fork SJR flows not diverted at Florence Lake, Lake Thomas A. Edison, Bear Creek Forebay, and the small backcountry diversions, are collected in Mammoth Pool Reservoir and become part of the Mammoth Chain. Mammoth Pool Powerhouse is usually run at maximum during the high flow or run-off period to prevent or delay spill at Mammoth Pool Reservoir.

For the most part, Portal Powerhouse, Eastwood Power Station, and Big Creek No. 4 Powerhouse operate independently of the other powerhouses in the BCS. Portal Powerhouse opportunistically uses water passing through the Ward Tunnel for power generation, but only operates efficiently at moderate flows through Ward Tunnel. Ward Tunnel flows outside the efficient flow range of Portal Powerhouse bypass Portal Powerhouse through a Howell-Bunger (HB) valve into Huntington Lake. Eastwood Power Station generation normally occurs during the peak demand period of the day, unless water is being moved continuously from Huntington Lake to Shaver Lake to avoid spill at Huntington Lake or to increase storage at Shaver Lake for use during peak periods. Maintaining storage (water surface levels) to maintain recreational needs at Huntington Lake and above pump-back minimum water surface level in Shaver Lake are important considerations when planning operations at Eastwood Power Station. Big Creek Powerhouse No. 4 is the last power generation opportunity in the Big Creek System and therefore adjustments in the operation of the Powerhouse No. 4 will not affect other upstream powerhouses in the BCS.

Generally, the three water chains of the BCS are operated around the clock in the spring run-off period, except in dry water years. Operational flexibility is limited during normal run-off because the amount of water run-off available exceeds the combined generation and storage capacity of the project, resulting in water flowing over spillways or “spill.”

After the end of the spill period, daily unit plant load schedules are established to maximize hydro resources during system peak load periods. When spring run-off is finished, if a powerhouse does not need to operate for water management, it is run preferentially during on-peak hours. Due to the nature of the energy market and SCE’s resources, it is generally beneficial for the Big Creek Projects to provide power during on-peak hours, once the spring run-off has finished. Since the BCS powerhouses discharge to reservoirs or forebays, the peaking operations generally do not cause varying flows in bypass reaches. Energy load changes on these power generation chains will not affect the WSE’s or instream flows, as long as adjustments are made to match reservoir inflows and outflows. A proprietary computer model used for predicting inflow is also used to plan monthly flow of water through the Project to meet the operating constraints on the system while maximizing generation during the peak load periods. In addition, computer programming of load schedules to use the most efficient units first, further enhances these operating activities and improves system integrity and efficiency. These activities can ensure the efficient use and availability of hydroelectric generation resources from these reservoir storage plants.

Market constraints and pricing, as well as transmission constraints and weather, will affect generation and operations at the Big Creek Projects. Often during the spring run-off season there is a financial disadvantage for SCE to generate energy even though to avoid generation would cause spill to occur. A simplified description of the California energy market describes the Independent System Operator (ISO) as having the role of balancing energy demand and supply in the state. The ISO takes the energy demand forecast, the transmission system constraints, and the energy that is bid into the day-ahead market to determine the acceptable energy supply. The ISO then adjusts the

supply load on a real-time basis to account for changing conditions. If the ISO believes that there is a surplus of energy available beyond that necessary to supply the grid, prices in the California energy market for additional energy could be negative. This situation would require SCE to pay for contributing additional energy.

BCS Reservoir Water Storage

The following characterizes water storage in reservoirs associated with the BCS. New environmental measures are proposed to support reservoir-based recreation and to maintain reservoir water surface elevations for reservoirs associated with the four Big Creek ALP Projects, including Huntington Lake, Florence Lake, Shaver Lake, and Mammoth Pool Reservoir. Refer to Section 3.1.7.3 for a summary of these measures.

Thomas A. Edison Lake

Lake Thomas A. Edison (Edison Lake), a component of the Vermilion Project (FERC Project No. 2086), is among the highest elevation reservoirs in the BCS. Edison Lake is located on, and stores water from, Mono Creek along with various other tributaries, including Warm Creek. Water released from storage at Edison Lake is diverted approximately 1 mile downstream at Mono Creek Diversion (part of FERC Project No. 67) into the Mono-Bear Siphon. Water also can be diverted from the Bear Creek Diversion into the Mono-Bear Siphon. Water diverted into the Mono-Bear Siphon flows into Ward Tunnel. Edison Lake has a relatively large storage capacity compared to drainage area. Thus, during the spring run-off period in non-spill years, the majority of inflow into Edison Lake is stored and not released until late summer. In spill years, however, the inflow into Edison Lake is stored until the threat of spill at Florence Lake and Bear Creek Diversion has passed, then releases from Edison Lake are commenced, to avoid using the emergency spillway at Edison Lake. Peak storage at Edison Lake normally occurs sometime during July and August.

Florence Lake

Florence Lake, a component of the Big Creek No. 2A, 8 and Eastwood Project (FERC No. 67), is a high elevation reservoir that stores water from the South Fork San Joaquin River and other small tributaries including Hooper creek. Water stored at Florence Lake is diverted into Ward Tunnel, as is water from Bolsillo, Chinquapin, Camp 62, and Camp 61 creeks. Priority is given to water being diverted from Florence Lake if spill is imminent at that location. Water being diverted from Edison Lake is given last priority because it is the least likely to spill due to its large storage capacity. Water diverted into Ward Tunnel passes under and is hydrologically connected to Portal Forebay. The water eventually exits Ward Tunnel through Portal Powerhouse or the HB valve, and is stored in Huntington Lake.

Florence Lake storage is kept near its minimum level (1,000 ac-ft) during the winter months to avoid damage on the dam face from freezing water. The storage of water usually begins to increase in late April. After the peak storage level is reached in late

spring/early summer, the reservoir elevation gradually declines until it again reaches its minimum storage level in the late fall.

Huntington Lake

Huntington Lake, a component of the Big Creek Nos. 1 & 2 Project (FERC No. 2175), is also a relatively high elevation reservoir that stores water from the backcountry lakes and diversions via the Ward Tunnel. Water from Huntington Lake may be sent to either Big Creek Powerhouse No. 1 or Shaver Lake via Balsam Forebay or North Fork Stevenson Creek. A good faith effort is made by SCE to keep Huntington Lake as full as practicable with minimum fluctuation from Memorial Day through Labor Day weekend, for recreational uses. However, during wet years it becomes necessary to keep the storage lower until after local uncontrolled peak inflows have passed. Spill could occur if local uncontrolled inflows exceed Huntington Lake water diversion capacities. Due to downstream safety issues and domestic water issues for the town of Big Creek, spill is avoided at Huntington Lake, if possible.

Shaver Lake

Shaver Lake, a component of the Big Creek No. 2A, 8 and Eastwood Project (FERC No. 67), is a moderate elevation reservoir that stores water from Huntington Lake via Eastwood Power Station or Tunnel 7 (through Gate 2) and local inflows from North Fork Stevenson Creek and other small tributaries. Water storage at Shaver Lake is not noticeably altered on a daily basis by pump-back operations at Eastwood Power Station, which usually occur during the late-night/early-morning hours from spring through fall, depending on water availability. During this period, the reservoir is generally kept at a high water surface elevation to enable the use of the pump-back capability. In pump-back mode, the Eastwood Power Station pumps water from Shaver Lake and returns it to Balsam Forebay. This water is used again the following day, for generation through Eastwood Power Station, and returned to Shaver Lake. In order for pump-back generation to occur, Shaver Lake has to be above a minimum elevation of 5,342 ft, or 78,426 ac-ft of storage. During Wet Water Years, Shaver Lake storage will be drawn down below this pump-back minimum elevation in the spring/early summer to create storage space for the upcoming run-off and to minimize the potential for spilling Shaver Dam. Water from Shaver Lake is diverted to Powerhouse No. 2A through Tunnel 2, and is also released to Stevenson Creek, which is a tributary to the San Joaquin River downstream of Dam 6.

Mammoth Pool

Mammoth Pool Reservoir, a component of the Mammoth Pool Project (FERC No. 2085), is a moderate elevation reservoir that stores water from the San Joaquin River and other small tributaries. The drainage area of Mammoth Pool Reservoir is by far the largest of all the Project reservoirs, relative to the reservoir size. As a result, Mammoth Pool Reservoir spills more often than the other Project reservoirs. In most cases, spill at Mammoth Pool Dam will also result in spill below Dam 6 and Redinger Lake. Ideally, minimum storage at Mammoth Pool Reservoir will occur just prior to the beginning of

spring run-off to maximize storage space availability. After the threat of spill has passed, storage at Mammoth Pool Reservoir declines at a rate necessary to ensure compliance with the September 30th storage requirement in the MPOA. Consideration is given to flood control issues when determining the optimal storage level at Mammoth Pool Reservoir during the winter months.

Redinger Lake

Redinger Lake, a component of the Big Creek No. 4 Project (FERC No. 2017), is a lower elevation reservoir that stores water from local inflows and water from Powerhouse No. 3. Water storage at Redinger Lake is normally kept near capacity throughout the year, except during annual maintenance. The California Division of Safety of Dams requires annual maintenance on the spillway gates at Redinger Lake. This requirement makes it necessary to reduce the storage at Redinger Lake to below 13,000 ac-ft, which affects the Water Surface Elevation (WSE) for approximately three weeks out of the year. This maintenance is usually performed in late October.

Big Creek ALP Projects Water Management

Mammoth Pool (FERC Project No. 2085)

The Mammoth Pool Powerhouse, located on the San Joaquin River, can be operated locally from the Mammoth Pool Powerhouse control room or remotely from Big Creek Powerhouse No. 3 (FERC Project No. 120) which serves as the main control center for the entire SCE BCS. The flow of water through the Mammoth Pool Project is dependent on natural run-off during periods of snowmelt and wet weather and the operation of other components of the BCS that are located at higher elevations within the watershed. Mammoth Pool Reservoir receives flow from a large watershed that includes Chiquito, Jackass, Dalton, and Granite Creeks, and the North, Middle, and South Forks of the San Joaquin River. Mammoth Pool Powerhouse is the first generating opportunity in the Mammoth Chain and moves water from Mammoth Pool Reservoir to the Dam 6 impoundment.

Under existing operations, water for the Mammoth Pool Project is diverted at the Mammoth Pool Reservoir on the San Joaquin River and from Rock Creek and Ross Creek (tributary streams to the San Joaquin River downstream of Mammoth Pool Reservoir). Water passing through the powerhouse enters the San Joaquin River just upstream of Dam 6 Impoundment, also known as Big Creek No. 3 Forebay (a component of the Big Creek No. 3 Project, FERC Project No. 120).

In Wet Water Years, the Mammoth Pool Project generally runs at full capacity beginning in April and can continue at full capacity well into the summer months. Wet Water Year operations usually provide a surplus of water and Mammoth Pool Powerhouse operates as much as possible during the spring run-off period. Mammoth Pool will usually begin to spill earlier than the upstream reservoirs due to its lower elevation and large watershed area relative to its reservoir capacity. In a typical Wet Year, Mammoth Pool Powerhouse will operate at full capacity until SCE gains control of inflows. At that time,

SCE will manage powerhouse operations to meet base load requirements and/or peak cycling energy needs.

In Above Normal Water Years, the Project generally runs at full capacity beginning in April or May, providing base load power until the end of peak run-off, which typically occurs in June. Mammoth Pool Reservoir generally spills in an Above Normal Water Year. When SCE has the ability to control inflows, SCE will manage powerhouse operation to match reservoir inflows, to meet base load requirements, and/or meet peak cycling energy needs. As inflows decrease during the summer, less flow is available for generation. Water is then used during peak generation periods to maximize the value of the energy. In the fall months, the reservoir begins to be lowered in anticipation of the winter and in accordance with the terms of the MPOA between SCE and the BOR. The months with the lowest generation are October through December, when the Mammoth Pool Reservoir inflows decrease.

During drier water years, the Project may run at full capacity for a shorter duration in May and June, based on inflows. If both reservoir storage and Project inflows are low, then the powerhouse will not be operated at full capacity in order to fill the reservoir to maximum capacity for the summer recreational season. Project generation is lower at the Mammoth Pool Powerhouse and very little or no water spills at Mammoth Pool Dam in drier water years.

Under the Proposed Action, water management goals and operations would remain generally the same as under the existing operations.

Big Creek Nos. 1 and 2 Project (FERC Project No. 2175)

The Big Creek Nos. 1 and 2 powerhouses, located on Big Creek, can be operated locally from the control rooms at Powerhouse No. 1 or Powerhouse No. 2, or remotely from Big Creek Powerhouse No. 3 (FERC Project No. 120), which serves as the main control center for the entire BCS. The water used by the Project is stored in Huntington Lake, which includes local run-off and water conveyed through Ward Tunnel from Florence Lake (FERC License No. 67), Lake Thomas A. Edison (FERC No. 2086), and from various small and intermediate size stream diversions. Powerhouse No. 1 utilizes water from Huntington Lake and discharges into the Dam 4 impoundment on Big Creek. Powerhouse No. 2 receives water from the Dam 4 impoundment and discharges to the Dam 5 impoundment on Big Creek.

The Big Creek Nos. 1 and 2 Project operates in conjunction with the rest of the BCS in a parallel and stair step sequence of water chains. Big Creek Powerhouses No. 1 and 2 represent the second and third generating opportunities in the Huntington water chain, respectively. The flow of water through the Powerhouse Nos. 1 and 2 Project is dependent on natural run-off during periods of snowmelt and wet weather and the operation of reservoirs in the BCS that are located at higher elevations within the drainage.

The operation of the Powerhouse Nos. 1 and 2 Project is similar in all water year types in that water diverted into the Project from remote impoundments and diversions is utilized to generate power when the water is available. In Wet Water Years, the Project usually runs at full capacity beginning in mid-April to May until the end of peak run-off, which typically occurs in late July and SCE gains control of inflows. Then, SCE will manage powerhouse operations to meet base load requirements and/or peak cycling energy needs. Project generation is greater during Wet Water Years and spills can occur at Dam 4.

In Above Normal Water Years, the Project is generally run at full capacity beginning in May until the end of peak run-off, which typically occurs in July. Some of the BCS reservoirs generally spill in Above Normal water years and are filled to maximum capacity until spill ceases. At that time, SCE gains control of inflows and begins managing the water to meet grid requirements by providing both base load and peak cycling energy.

During Dry Water Years, the Project may run at full capacity for a short duration in May and June. In some dry water years, the Project does not run at full capacity in order to fill the reservoirs to maximum capacity. Project generation is lower in Dry Water Years and very little water, other than required dam seepage and MIF releases, bypasses the powerhouses.

Under the Proposed Action, water management would remain generally the same as the existing operations. However, under the Proposed Action, MIF's would be released from Dam 4, Balsam Creek Diversion, and Ely Creek Diversion.

Big Creek Nos. 2A, 8, and Eastwood Project (FERC Project No. 67)

The Big Creek Nos. 2A, 8 and Eastwood Project covers the largest geographical area of all seven projects in the BCS. The Project includes (1) Florence Lake, and a number of small diversions in the high elevation backcountry or upper basin area; (2) Shaver Lake, located on Stevenson Creek; (3) Eastwood Power Station (EPS), which discharges to Shaver Lake; (4) Powerhouses 2A and 8, located along Big Creek. Powerhouses 2A and 8, and the Eastwood Power Station may be operated locally from the control rooms at each powerhouse or remotely from Big Creek Powerhouse No. 3 (FERC Project No. 120), which serves as the main control center for the entire BCS.

The flow of water through the Powerhouse Nos. 2A, 8 and EPS Project is dependent on natural run-off during periods of snowmelt and wet weather and the operation of other components of the BCS that are located at a higher elevation within the drainage. The Powerhouse Nos. 2A, 8 and EPS Project operate in tandem with the rest of the BCS in a parallel and stair step sequence of water chains. The EPS and Powerhouse No. 2A are in the Shaver Lake Water Chain and Powerhouse No. 8 is in both the Shaver Lake Water Chain and the Huntington Water Chain. The EPS receives water from Balsam Meadow Forebay, which is filled via the Huntington-Pitman-Shaver Conduit from Huntington Lake or through water pumped back from Shaver Lake, and discharges to Shaver Lake. The EPS may operate as a pump storage project in all water year types

after the run-off period has ended and SCE gains control of reservoir inflows in the BCS. Powerhouse No. 2A receives water from Shaver Lake and discharges to the Dam 5 impoundment on Big Creek. Powerhouse No. 8 utilizes water from the Dam 5 impoundment and discharges to the Dam 6 impoundment on the San Joaquin River.

The operation of all three powerhouses of Big Creek Nos. 2A and 8 and EPS are similar in all water year types, in that water diverted into the Project from remote impoundments and diversions is utilized to generate power when the water is available. In Wet Water Years, the Project runs at full capacity beginning in mid-April to May until the end of peak run-off, which typically occurs in late July. At that time, SCE gains control of inflows and begins managing powerhouse operations to meet grid requirements by providing both base load and peak cycling energy. Project generation is greater during Wet Water Years and water may be also bypassed around Project powerhouses at Project reservoirs and impoundments, if necessary.

In Above Normal water years, the Project is generally run at full capacity beginning in May until the end of peak run-off, which typically occurs in July. Some of the BCS reservoirs generally spill in Above Normal water years and are filled to maximum capacity until spill ceases. At that point, SCE gains control of inflows and begins powerhouse operations to meet grid requirements by providing both base load and peak cycling energy.

During Dry Water Years, the Project may run at full capacity for a short duration in May and June. In some dry water years, the Project does not run at full capacity in order to fill the reservoirs to maximum capacity. Project generation is lower in Dry Water Years and very little water, other than dam seepage and required MIF releases, bypasses the powerhouses.

Under the Proposed Action, water management would remain generally the same as existing operations with the exception of the decommissioning of four back-country small diversions including: North Slide Creek Diversion, South Slide Creek Diversion, Tombstone Creek Diversion, and Crater Creek Diversion.

Big Creek No. 3 Project (FERC Project No. 120)

The Big Creek No. 3 Project Powerhouse, located on the San Joaquin River, is operated locally from the Big Creek No. 3 Powerhouse control room or remotely from the Big Creek dispatch center, which serves as the main control center for the entire SCE Big Creek Hydroelectric System. The flow of water through the Big Creek No. 3 Project is dependent on natural run-off during periods of snowmelt and wet weather, and the operation of other components of the Big Creek Hydroelectric System that are located at higher elevations within the drainage. Big Creek Powerhouse No. 3 is one of the last generating opportunities in each of the water chains listed above, as water is moved from Florence Lake, Edison Lake, Huntington Lake, Shaver Lake, Mammoth Pool, and various tributaries through the water chains. The Project receives water from the Dam 6 impoundment and discharges into Redinger Lake. The Powerhouse No. 3

Project operates in conjunction with the rest of the BCS in a stair step sequence of water chains.

The operation of the Powerhouse No. 3 Project is similar in all water year types in that water diverted into the Project from remote impoundments and diversions is utilized to generate power when the water is available. In wet years, the Project is generally run at full capacity beginning in May until the end of peak run-off, which typically occurs in late July. Once SCE gains control of inflows, powerhouse operation is managed to meet grid requirements by providing both base load and/or peak cycling energy. Project generation is greater during Wet Water Years and the Dam 6 outlet works and spillway may be used to also bypass water around the powerhouse, if necessary.

In Above Normal water years, the Project is generally run at full capacity beginning in May until the end of peak run-off, which typically occurs in July. Some of the BCS reservoirs generally spill in Above Normal water years and are filled to maximum capacity until spill ceases. At that time, SCE gains control of inflows and begins managing powerhouse operations to meet grid requirements by providing both base load and/or peak cycling energy. The water flow through the Big Creek No. 3 Powerhouse is generally matched to the flow entering Dam 6.

During Dry Water Years, the Project may run at full capacity for a short duration in May and June. In some dry water years, the Project does not run at full capacity in order to fill the reservoirs to maximum capacity. Project generation is lower in Dry Water Years and very little water, other than dam seepage and required MIF releases, bypasses the powerhouses.

Under the Proposed Action, water management would remain generally the same as existing operations.

Project Maintenance

Maintenance activities for the Projects are largely conducted at and within Project buildings and structures. Some maintenance activities are also conducted on lands adjacent to these structures, which could potentially have environmental effects. These maintenance activities include vegetation management, rodent control, road maintenance, and sediment management. Each of these activities is described below.

Vegetation

Vegetation management, including measures to prevent the establishment of noxious weeds, occurs at several locations adjacent to the four Big Creek ALP Project structures (i.e., Project recreation facilities, helicopter landing sites, roads, and trails). Vegetation management includes trimming of vegetation by hand or with equipment as well as the use of herbicides. Refer to Table 3.1.5-1 for a list of vegetation management activities that occur at each Project facility. Table 3.1.5-1 also provides the frequency that the management activity typically occurs at each location. In general, vegetation management activities occur during the spring and early summer to avoid work during high fire danger periods.

Vegetation management is limited to the area necessary to reduce fire hazard, protect the integrity of dams, and provide worker/public health and safety. In general, vegetation management typically occurs within a 150 ft radius around Project facilities (dams, small and moderate diversions, gaging stations, powerhouses, and transmission lines) and recreation facilities. Vegetation management occurs within 10 ft of Project roads and within 2 ft of trails. These areas will be reduced, as required by the Valley Elderberry Longhorn Beetle (VELB) Management Plan, approved by the United States Fish and Wildlife Service (USFWS) to protect habitat potentially supporting the VELB.

SCE implements a combination of manual, mechanical, and chemical methods to control vegetation in the vicinity of the four Big Creek ALP Projects. Selection of appropriate control methods is based on an evaluation of worker/public health and safety, potential environmental effects, effectiveness of methods based on vegetation and site characteristics, and economics.

The methods used for general vegetation management are also useful for noxious weed control, when timed correctly and applied appropriately. The goal of noxious weed control efforts is to physically remove noxious weed plants and to prevent seed set for several consecutive years until there are no viable seeds remaining in the soil. The following is a summary of manual and mechanical vegetation management methods and chemical control (i.e., herbicides) used in the vicinity of the four Big Creek ALP Projects.

Vegetation Trimming by Hand (Manual)

One of the methods used to trim vegetation in the vicinity of the four Big Creek ALP Projects is with hand tools. This includes trimming of grasses and forbs with a string trimmer as well as removing or trimming of overhanging limbs of shrubs and trees with a chain saw or other hand-held saw. This management activity is implemented on an as-needed basis in conjunction with facility inspections.

Vegetation Trimming with Equipment (Mechanical)

Vegetation in the vicinity of the Projects is also trimmed using mechanical equipment, including a flail-type mower. A flail mower is a cutting device attached to a tractor that is used to cut brush along roadsides. As with trimming of vegetation by hand, this activity is implemented on an as-needed basis.

Herbicide Use (Chemical)

Herbicides are necessary, in addition to manual and mechanical methods, to effectively control weeds when the terrain in the vicinity of the four Big Creek ALP Projects is steep and difficult to walk, and hand-pulling or mowing are impractical and less safe. Application of herbicides requires that far less time be spent walking steep slopes, resulting in less risk to workers, and less soil disturbance. Less soil disturbance can minimize erosion and sedimentation. A description of herbicide use is provided below.

After vegetation has been reduced by manual or mechanical methods, herbicides are sometimes applied to further control vegetation, including noxious weeds, at some locations. Two methods of herbicide application, basal and foliar application techniques, are utilized. Basal application is used for shrub species and includes cutting of a shrub and applying an oil-based herbicide directly to the stump. Foliar application techniques include hand spraying of herbicides with an additive or other agent to control overspray. The application of all herbicides is performed or supervised by a certified pesticide applicator, in compliance with the specified herbicide application prescription.

The herbicides and other agents used in the vicinity of the four Big Creek ALP Projects are listed in Table 3.1.5-2. A complete description for each herbicide or other agent is provided in the Vegetation and Integrated Pest Management Plan (SCE 2007b). If different herbicides become available or required in the future, SCE will contact the USDA-FS and USFWS to obtain permission to substitute or add them to the herbicides listed in Table 3.1.5-2.

Herbicides and other chemical agents used in the vicinity of the four Projects are as follows:

- Garlon 4® and Hasten® (a vegetable oil-based additive) are combined and applied using a basal bark application technique.
- Garlon 4® and Accord® are combined and applied using a foliar application technique.
- Accord® is used by itself, or combined with either R-11® or In-Place®, and applied using basal bark and foliar techniques.
- Pathfinder® is used as a spot treatment to treat individual plants.
- Velpar® is used as a pre-emergent and is applied directly to moist soil to treat grasses and broad-leaved plants.

Rodent Control

SCE currently implements rodent control in the vicinity of the four Big Creek ALP Projects under a 1993 Memorandum (Rodent Control on Earth Filled Dams—Northern Hydro Region—Environmental Compliance (SCE 1993)) and a Fresno County Agricultural Commissioner Operator Identification Number. Regulations and requirements are strictly followed by SCE while using rodenticides, including toxicants, anticoagulants and fumigants, for vertebrate pest control. Rodenticide use at the four Big Creek ALP Projects is restricted to earthen dams and the interior of Project facilities, as described below.

Earthen Dams

Rodent control is necessary on Project earthen dams, where rodent burrowing activity is considered a threat to dam integrity. Rodent control is currently implemented at the following locations:

- Mammoth Pool Spillway (Mammoth Pool, FERC Project No. 2085)
- Balsam Dam (Big Creek Nos. 2A, 8, and Eastwood, FERC Project No. 67)

Rodent control at these locations involves using habitat modification (vegetation control) in combination with rodenticide treatments including fumigants (e.g., gas cartridges) and anticoagulant-treated oats and grains, specifically 0.005% Diphacinone. Specimen labels or Material Safety Data Sheets (MSDS) for both rodenticides are provided in the Vegetation and Integrated Pest Management Plan (SCE 2007b).

Facility Interiors

Rodent populations inside Project facilities can pose a human health risk and may damage interior Project components (e.g., control panels, wiring). Therefore, rodent control is currently implemented in powerhouses, gaging stations, and other facilities of the four Big Creek ALP Projects. SCE implements rodent control in facility interiors using non-restricted rodenticides and trapping (e.g., snap traps).

Road Maintenance

SCE conducts routine road maintenance activities including grading/graveling of unpaved roads; paving or patching of existing paved roads; cleaning of culverts and ditches; vegetation trimming along road margins by hand or mechanical means; snow removal, and sanding. These activities are conducted on an as-needed basis. Vegetation control along Project roads is conducted consistent with the measures provided in the vegetation and Integrated Pest Management Plan and the USFWS approved Valley Elderberry Longhorn Beetle Management Plan (Appendix E). This latter plan was developed to protect habitat potentially supporting the VELB. Table 3.1.5-3 provides information on the type and frequency of SCE's maintenance activities on Project roads. Information on vegetation management along Project roads is provided in Table 3.1.5-1. SCE also maintains signage, fencing, and gates along several of the Project roads.

Sediment Management

Sediment management activities occur at many of the dams and diversions in the four Big Creek ALP Projects. Refer to Table 3.1.5-4 for a list of the sediment management activities that occur at various dams and diversions and the frequency and time of year that the management activity typically occurs at each location. In general, the sediment management activities occur throughout the year.

SCE conducts sediment management activities at certain facilities to ensure the operational capability to efficiently divert water and ensure the safety of dams. Sediment deposition, sometimes including large woody debris, can interfere with operation of diversion intakes and low level drain gates in dams. Sediment maintenance is not intended to completely remove all the sediment and debris from the impoundments or to maintain water storage capacity. The maintenance is primarily intended to reduce sediment entrainment into the diversions or blockage of drain gates. Regular sediment management activities can reduce the volume of the sediment load that may accumulate within the impoundments.

Sediment Control

SCE implements a combination of methods to control sediment, including physical removal by hand and equipment, sediment trap or sand box, and sediment pass-through. Each method is summarized below.

Physical Removal by Hand

One of the methods used to control sediment at small diversions is by hand removal. Sediment containment structures (e.g., hay bales, geofabric and rock, and sand bags) are placed in the channel immediately downstream of the low-level outlet during maintenance, and trapped sediments are removed from the containment structure. Physical removal by hand typically occurs annually or one or more times in a 5-year period. This management activity is implemented on an as-needed basis.

Physical Removal with Equipment

Sediment at certain Big Creek ALP Project facilities is removed using mechanical equipment, such as backhoes, mobile cranes with clamshells, excavators, or other earth-moving equipment. The equipment is used to excavate sediment and debris from behind the dam to keep the intake and drainage structures clear and operational. Sediment is loaded into a dump truck and moved off-site away from the channel and drainage pathways. This management activity is implemented on an annual basis at:

- Mono Creek Diversion, Hooper Creek Diversion, and Bear Creek Diversion (components of FERC Project No. 67)

Physical removal is implemented infrequently (typically occurs during a 20-year period but less than once every 5 years) at the following facilities:

- Mono Creek Diversion, Hooper Creek Diversion, Pitman Creek Diversion Forebay, Dam 5 and Dam 6 (components of FERC Project Nos. 67, 120, 2175)

- Rock Creek and Ross Creek diversions (FERC Project No. 2085)

- Ely Creek Diversion (FERC Project No. 2175)

Hydraulic Sluicing

Sediment is hydraulically sluiced, in addition to mechanical removal, at the Dam 6 impoundment (FERC Project No. 120) on an infrequent basis.

Facility Testing

Certain activities associated with inspections and testing of facilities may cause the release of sediments. Specifically, these activities include tunnel inspections and gate and valve testing, as summarized below.

Tunnel Inspection

Tunnel inspections that occur at Tunnel 2 (FERC Project No. 2175), Tunnel 8(FERC Project No. 67) and Tunnel 3 (FERC Project 120) require draining the impoundments at the head of those tunnels, which may cause the release of accumulated sediment through the drain gates. These tunnel inspections are mandated by FERC and occur periodically (approximately once every seven years). The inspections typically last less than one week and currently occur during the summer or fall.

Gate and Valve Testing

Valve and gate testing is performed annually under FERC requirements at all the Project reservoirs and diversions. Typically, the valves and gates are not fully opened and are only opened for a few minutes. The potential to release sediments during these tests is considered to be limited and inconsequential, with no likely effects downstream to geomorphic or aquatic habitat resources.

Project Operations

High Flow Release

Sediment may be released downstream when the HB valves are opened at Mammoth Pool Reservoir (FERC Project No. 2085) or Shaver Lake (FERC Project No. 67) to make releases prior to a spill. This may cause temporary increases in turbidity. The HB valves are the only sizable controlled point of release to the downstream channels. SCE typically controls Shaver Lake to avoid spilling the dam and can release up to 600 cfs through the HB valve for this purpose, commonly in two out of three years. The maximum capacity of the HB valve (1,800 cfs) at Mammoth Pool Reservoir is insufficient to prevent spills in wet and above normal water years. Over the long-term, Mammoth Pool Reservoir spills about 50% of the time.

Channel Riparian Maintenance Flows (CRMF)

SCE does not currently release CRMF, other than spills, which frequently occur at certain locations under existing operations. These flows are designed to transport sediments, in part, and thereby maintain channel morphology and support riparian habitat. CRMF are recommended at Mono Diversion and at Florence Lake in the

Proposed Action (see Section 3.1.7.1). Frequent spills occurring at Mammoth Pool Dam and Dam 6 will function as CRMF.

Large Woody Debris Management

SCE conducts large woody debris (LWD) management at large and moderate size dams and small diversions.

SCE periodically, as needed, removes LWD that accumulates behind dams and diversion structures after spring run-off or large flow events. SCE conducts visual inspections of the dams and diversions annually following spring run-off or other peak flow events. If more than sparse LWD is observed behind the dams and diversions, then it is collected and removed. Any LWD that is too large to transport is cut into manageable size using chainsaws. At Mammoth Pool Dam and Florence Dam, LWD is transported and stockpiled at the mouth of the spillway and left in place pending the next spill event that will flush the LWD into the river downstream of the dam. At Shaver Lake Dam, LWD is transported from the reservoirs and either disposed of or burned. At moderate and small size diversions, LWD is placed in the stream channel downstream of the diversion structure.

LWD removal is prevalent at the diversions in high flow water years and occurs less intensively during years with less run-off and less delivery of LWD to the diversions.

Existing Environmental Measures

The following section summarizes existing programs, measures and facilities maintained by SCE for the protection and enhancement of the Basin resources by major resource category. These existing environmental measures would continue under the Proposed Action at each of the four Big Creek ALP Projects, unless otherwise indicated.

Water and Aquatic Resources

- Continue implementation of MIF measures.

  SCE currently provides MIFs for aquatic habitat and protection of beneficial uses in accordance with existing FERC license conditions. Implementation of MIFs would continue, but at different levels in most bypass and augmented stream reaches.

- Continue to maintain gaging stations located in the vicinity of the Projects.

  SCE currently maintains an extensive network of stream and lake gaging stations in the Basin to monitor and record the storage and flow of water. This network consists of 17 USGS stations that measure flow in rivers and creeks, six USGS stations that measure reservoir elevation and storage on SCE's reservoirs, and nine USGS gaging stations that measure flow through the tailraces of SCE's nine hydroelectric powerhouses.

Terrestrial Resources

- Continue to implement Environmental Training Program

  SCE employees attend environmental training sessions on a regular basis, as well as on an as-needed basis. These training sessions include a review of background material, permit conditions, and instructions on how to avoid impacts on biological or cultural resources. Project-specific meetings also may be conducted in the field on a job-specific or activity-specific basis to review appropriate management protocols (avoidance and protection (AP) measures) in environmentally or culturally sensitive areas.

- Continue to implement the Endangered Species Alert Program (ESAP)

  The ESAP provides SCE personnel with a means for identifying when they may be working in areas with the potential occurrence of legally protected plant and animal species within SCE Service Territory. Annual training is a component of the program. For each of these species within the SCE Service Territory, the ESAP Manual (SCE 2006b) includes a photograph, description, natural history information, and map showing the species' distribution in relation to SCE facilities. Should a proposed activity have the potential to conflict with a known sensitive species population, SCE's Northern Hydro Division Environmental Manager or Safety and Environmental Specialist are notified to evaluate the situation and, if needed, to coordinate with and obtain appropriate permits from regulatory agencies.

- Continue to implement the Avian Protection Program (APP)

SCE employees are informed about the SCE Avian Protection Program (APP) through posters, written literature, wallet-sized cards, and formal training. The training discusses pertinent environmental regulations, general raptor identification, reporting procedures for the discovery of a dead raptor, protocols for how to deal with avian nests, and modifications that can be made to powerline structures to lower the risk of avian electrocutions. The SCE Animal/Bird Mortality Reporting Form is used to record instances of avian mortalities in the Project vicinity. This training is conducted annually in coordination with the ESAP described above.

- Continue to implement measures to protect mule deer migration

  Measures to protect migrating mule deer in the vicinity of the Mammoth Pool Reservoir (FERC Project No. 2085) and the Eastwood Power Station (FERC Project No. 67) are currently implemented. These measures include the maintenance of fences around the Mammoth Pool Dam Spillway, the Daulton Creek Bridge, the barrel line across the Mammoth Pool Reservoir, and the implementation of road closures in the vicinity of the Eastwood Power Station (Balsam Meadows).

- Continue to implement wildlife habitat enhancement

  SCE piles or windrows brush cleared from roads, firebreaks, or under transmission lines on Project lands, within or adjacent to cleared areas. These activities provide cover and improve the habitat for quail, rabbit and other wildlife.

- Continue to protect special-status species

  SCE is required to prepare a Biological Assessment/Biological Evaluation (BA/BE) and obtain all appropriate permits or approvals prior to the construction of new Project features that may affect special-status species.

Recreational Resources

- Continue to maintain certain recreation facilities

  SCE currently maintains several recreation facilities in the vicinity of the four Big Creek ALP Projects. SCE would continue to maintain these facilities under the Proposed Action. The following describes each existing recreation facility by Project.

  Big Creek Nos. 2A, 8, and Eastwood (FERC Project No. 67)

  - Camp Edison, maintained and operated by SCE for public use, located along the western shore of Shaver Lake, provides 252 overnight camping facilities, picnic facilities for 75 families, hot and cold running water, showers, toilet and laundry facilities, disposal stations, electricity, and boat launching facilities. The Camp Edison Information Center has interpretive displays on Native Americans, native fish and wildlife, and timber programs in the Basin.

  - The Day use areas at Shaver Lake, along North Shore Roads 1 and 2, at Shaver Point off State Highway 168, and Eagle Point Boat-in Day-Use Area provide picnic tables and restroom facilities.

  - The trailhead, paved parking area (20- to 30-car capacity), and vault toilets located just off State Highway Route 168 at the entrance road to the Balsam Forebay, support year-round day-use activities.

  - The walk-in day-use area at the Balsam Forebay contains five picnic sites and vault toilets.

  - The Eastwood Overlook is located on two acres of land near Portal Powerhouse at the north end of Huntington Lake. The overlook provides an interpretive display containing signs, maps, and Project area information. The facility features several information signs about the BCS. Under the Proposed Action, SCE is recommending that Eastwood Overlook be removed from the FERC Project No. 67 Boundary and included in the FERC Project No. 2175 Boundary.

Big Creek No. 3 (FERC Project No. 120)

- The Angler Stairway provides access to the San Joaquin River and Dam 6 Forebay near Mammoth Pool Powerhouse.

Land Management

- Continue to implement the Fire Plan

  SCE maintains a Basin-Wide Fire Plan that is developed and reviewed annually in consultation with the USDA-FS. The Plan outlines the responsibilities for fire prevention and suppression during planned field activities for the duration of each declared fire season, or when ground litter and vegetation will sustain combustion, causing the spread of fire. The Plan also includes initial attack and reporting procedures that must be followed in the event of a fire in the vicinity of the Projects, or resulting from any SCE operations in the Forest. SCE will continue to implement the Fire Plan, as annually revised, during the term of the new license.

- Continue to implement the Spill Prevention Control and Countermeasure Plans

  SCE currently prepares Spill Prevention Control and Countermeasure Plans (SPCCs) to address and minimize the potential for oil spills. These plans are revised every three years, and describe procedures and available equipment for mitigating any oil spills that might occur. SCE also has specific provisions for periodic inspection of all oil-containing equipment and devices that prevent spilled oil from escaping Project buildings or grounds. In addition, all oil transfer operations follow applicable U.S. Department of Transportation (US-DOT) regulations.

  All SCE Northern Hydro Division operation and maintenance personnel receive annual training on spill prevention, control, and containment procedures. The training includes instruction in the location, operation and maintenance of equipment applicable to spill prevention and pollution control laws, rules and regulations.

Cultural Resources

- Continue to implement environmental training sessions

  SCE personnel attend environmental training sessions on a regular, and an as-needed basis. These training sessions include a review of background material, permit conditions, and instructions on how to avoid impacts on resources, including cultural resources. Project-specific meetings may also be conducted in the field on a job-specific or activity-specific basis to review appropriate management protocols (AP measures) in environmentally or culturally sensitive areas.

Existing Measures that Apply to Multiple Resource Categories

In addition to those measures that are identified above by resource category, the following measure applies to several resource categories.

- Continue to schedule and attend an annual planning meeting with the USDA-FS

  An annual meeting is held each spring between the USDA-FS and SCE to discuss and coordinate operations and maintenance projects planned for the coming year. These meetings allow the two organizations to be aware of upcoming activities and to make sure that proper contacts and preparations are made to avoid or mitigate potential adverse effects on environmental and cultural resources.

New Environmental Measures

The following describes new programs, measures or facilities under the Proposed Action to enhance environmental and cultural resources in the vicinity of the four Big Creek ALP Projects. The following section provides a description of each environmental enhancement by major resource category.

Water and Aquatic Resources

- Implement new MIF and CRMF. Refer to Tables 3.1.7-1 and 3.1.7-2 for proposed flows.

  SCE will implement MIFs for aquatic habitat protection and temperature control and CRMF for maintaining and enhancing aquatic and riparian habitat.

  Infrastructure changes at 12 Project facilities are necessary to provide the new MIFs and CRMFs recommended in the Proposed Action. The location of the facilities and type of infrastructure changes include:

  - Dam 5 (FERC Project No. 67) - install a release structure and a flow measurement device;
  - Mono Creek Diversion (FERC Project No. 67) - install a release structure and a flow measurement device;
  - Mammoth Pool Dam (FERC Project No. 2085) - install a pipe, valve and a flow measurement device as part of a new release structure;
  - Bolsillo Creek Diversion (FERC Project No. 67) –install piping and a flow measurement device;
  - Camp 62 Creek Diversion (FERC Project No. 67) –install piping and a flow measurement device;
  - Chinquapin Diversion (FERC Project No. 67) –install piping and a flow measurement device;
  - Ross Creek Diversion (FERC Project No. 2085) –install a flow measurement device;

  - Rock Creek Diversion (FERC Project No. 2085) –install a flow measurement device;
  - Ely Creek Diversion (FERC Project No. 2175) –install a flow measurement device;
  - Balsam Creek Diversion (FERC Project No. 2175) –install a flow measurement device; and
  - Dam 4 (FERC Project No. 2175) - install a release structure and a flow measurement device.
  - Dam 6 (FERC Project No. 120) - install piping and a flow measurement device.

- Decommission four small backcountry diversions and two domestic water diversions.

  SCE proposes to decommission four backcountry diversions (North and South Slide Creek diversions, Tombstone Diversion, and Crater Creek Diversion) and two domestic water diversions (Snowslide Creek Domestic Diversion and Pitman Creek Domestic Diversion). SCE has developed a Small Diversions Decommissioning Plan that describes the general approach for decommissioning the six small diversions (SCE 2007b). The Plan provides a description of: (1) the physical characteristics and location of each of the small diversions; (2) the decommissioning activities, staging areas and equipment to be used; (3) the permitting requirements; and (4) the proposed schedule. The objective of the Plan is to provide the information and preliminary details necessary for approval and issuance of required permits by the Commission and other appropriate regulatory agencies. Because the Tombstone Diversion and the Crater Creek Diversion are located within the John Muir Wilderness, SCE will need to obtain approval from USDA-FS to use power equipment and helicopter support.

- Implement the Fish Monitoring Plan

  The Fish Monitoring Plan presents an approach to long-term fish population trend monitoring in selected locations in Project bypass reaches and the four major ALP Project reservoirs. Monitoring of silver bioaccumulation will be conducted concurrently with reservoir monitoring in Mammoth Pool Reservoir and Huntington Lake. The Plan includes specifics regarding monitoring schedules and locations, survey and analytical methods, reporting, and agency consultation (SCE 2007b).

- Implement the Temperature Monitoring and Management Plan

  The Temperature Monitoring and Management Plan includes methods to assess the effectiveness of new instream flows in selected reaches associated with the four Big Creek ALP Projects to meet stream temperature targets and thus enhance coldwater fish (trout) habitat. The Plan describes the temperature objectives for the bypass reaches, approaches for monitoring temperatures, meteorology, and instream flows, and a monitoring schedule. In specific reaches, the Plan provides for real-time monitoring and adjustment of flows to meet temperature targets, when temperature is a Project controllable factor. The Plan defines the process for assessing whether the temperature objectives for habitat enhancement have been met. The Plan identifies the potential conflict between summer water temperature objectives for hardhead and resident trout in the Stevenson Reach of the San Joaquin River and an approach to determining if those objectives should change to avoid adverse effects to hardhead. The Plan also addresses approaches to protecting beneficial uses by alterations in releases, if temperature criteria are not initially met (SCE 2007b).

- Implement the Flow Monitoring and Reservoir Water Level Management Plan

  The Flow Monitoring Plan includes methods to monitor flow conditions in specified bypass reaches of the four Big Creek ALP Projects for compliance with License requirements, as well as monitoring of reservoir levels. The Plan includes locations of existing equipment, types of equipment to be installed, locations where additional gages will be installed, and monitoring and reporting methods and preliminary schedules for installation. The Plan also details the type and frequency of maintenance activities, as well as equipment calibration methods and frequency. Reporting of information is addressed in this Plan (SCE 2007b).

- Implement Large Woody Debris Measures

  Large Woody Debris Measures address the management of large woody debris at the Bear Creek Diversion (FERC Project No. 67). These measures ensure that large woody debris trapped by the diversion is available for downstream mobilization during high flows. It also specifies the minimum dimensions of large woody debris, and procedures and schedule for its collection, placement, and distribution, as well as agency consultation. The language of the measure is provided in the proposed License Article, Large Wood Debris Management (SCE 2007b).

- Implement the Sediment Management Prescriptions

  Refer to Table 3.1.7-3 for the locations where sediment management will occur. The sediment management prescriptions describe diversion operations and maintenance activities to address sediment management issues. The sediment management prescriptions outline the operational procedure including timing and duration for sediment pass through activities, physical removal of sediment from behind diversion structures, and coordination of flow releases to transport sediments from

downstream stream reaches after removal activities. Monitoring of turbidity during sediment removal activities and of sediment accumulation in pools downstream of the dams or diversion structures following sediment removal activities are also described.

- Implement the Mono Creek Channel Riparian Maintenance Flow Plan

  The objective of the Mono Creek Channel Riparian Maintenance Plan is to implement appropriate CRMF releases in Wet and Above Normal Water Years to maintain reduced accumulations of fine sediment in Mono Creek between Mono Diversion and the confluence with the South Fork San Joaquin River. The criteria in the Plan shall be used to determine which of two Wet Water Year CRMF schedules will be released for sediment control in Wet Water Years (SCE 2007b).

- Implement the Channel and Riparian Maintenance (CRM) Flows for the South Fork San Joaquin River below Florence Lake

  The objective of the CRMF Plan is to implement appropriate releases in Wet and Above Normal Water Years at Florence Lake to provide inundation of riparian habitats in the Jackass Meadow complex to enhance the riparian community. Areal extent of inundation will be used to assess appropriate CRMFs. Other objectives of these CRMFs are to provide whitewater boating opportunities and benefit sediment transport.

- Implement the Riparian Monitoring Plan

  The Riparian Monitoring Plan includes methods to monitor the effectiveness of various CRM flow measures in enhancing riparian resources along specified stream reaches in the vicinity of the Jackass Meadow Complex along the SFSJR and Mono Creek downstream of Mono Diversion for the Big Creek Nos. 2A, 8, and Eastwood Project (FERC Project No. 67). It details the monitoring approach, methods, and schedules for each reach (SCE 2007b).

Terrestrial Resources

- Continue to Protect Special-Status Species.

  SCE will continue to protect special-status species through implementation of the Special-Status Species Measure, which requires that SCE prepare a BA/BE and obtain all appropriate permits or approvals prior to the construction of new Project features that may affect special-status species. The language of the proposed measure is provided in the proposed Special-status Species License Article (SCE 2007b).

- Implement the Bear/Human Interaction Measure

  SCE will install and maintain bear proof dumpsters at SCE's administrative offices and company housing near Big Creek Powerhouse No. 1, and at other Project

facilities where food waste may be disposed or stored, as required by the proposed Bear/Human Interaction License Article (SCE 2007b). CDFG and USDA-FS will review and approve dumpster design prior to installation. The Licensee will also implement a program to educate SCE personnel about proper food storage and garbage disposal to reduce bear/human incidents.

- Implement the Noxious Weed Training Program

  SCE personnel will receive training on noxious weed control in the vicinity of the four Big Creek ALP Projects. Specifically, the Sierra-San Joaquin Noxious Weed Alliance Field Guide to Invasive Non-Native Weeds of Mariposa, Madera, and Fresno Counties will be reviewed and provided to SCE personnel. This field guide is focused on prominent weed species in the vicinity of the Projects and provides photographs, visual characteristics, a description of each species, mechanism of spread, impacts of infestation, and important control measures.

- Implement the Northern Hydro Special-Status Species Information Program

  SCE's Northern Hydro Division will implement a Northern Hydro Special-Status Species Information Program (NHSSIP) to provide SCE personnel with a means of identifying when they may be working within an area that could support a special-status species (2006c). This Program will require the use of the Environmental Compliance Program described below and will supplement the ESAP described under existing environmental measures above. This program will include a photograph or line drawing of the species, a description, natural history information, and map showing the species' distribution in relation to SCE facilities.

- Implement the Environmental Compliance Program

  SCE will develop a compliance program that includes a process to implement specific Operations and Maintenance activities. This program will be designed to track Operations and Maintenance activities implemented, update resource information, and guide personnel in implementation of Operations and Maintenance activities in compliance with A/P measures developed for the Project. The compliance program is envisioned to consist of three components the Northern Hydroelectric Environmental Compliance Database, GIS Database, and the Compliance Process.

  Northern Hydroelectric Environmental Compliance Database

  The Northern Hydroelectric Environmental Compliance Database (Compliance Database) will be developed and integrated with SCE's existing databases. A component of the database will be designed for tracking the training records of SCE personnel and O/M activities that have been planned and completed. The database will also include all associated A/P measures that are required for the Big Creek Hydroelectric Project. This database will be queried prior to implementation of specified O/M activities.

Geographic Information System Database

Several studies have been conducted for the Project. The results of these studies, data obtained from the USDA-FS Special-status Species Database, the CNDDB, and other biological studies were incorporated into a GIS database. This information includes the locations of special-status species and their habitats in the vicinity of the Project. Because of the sensitive nature of the locations of some special-status species, some GIS data layers are confidential. Therefore, access to these layers will be limited to SCE employees who are trained in the sensitivity and proper use of the information.

The GIS database will be evaluated annually during the term of the license to determine if updates are needed. Prior to updating the database, SCE will contact USDA-FS for the current version of its Special-status Species Database. SCE will also contact the USFWS for the current list of Threatened and Endangered Species and obtain any new versions of the CNDDB when they become available. Any new data on the location of resources in the vicinity of the Project that is obtained during implementation of O/M activities or required species monitoring will also be incorporated into the database on a regular basis. SCE will contact the agencies and request approval to use the newest available data sources if they become available.

Compliance Process

SCE will review all O/M work activity requests that are determined to be subject to environmental regulation. They will use the Database to determine which A/P measures are appropriate, given the timing and nature of the work to be conducted, and the proximity of special-status biological resources to the work location.

- Implement the Bald Eagle Management Plan

  The Bald Eagle Management Plan was developed to address management of the bald eagle during ongoing maintenance and operation of the four Big Creek ALP Projects. The Plan includes monitoring the location of bald eagles and their habitat within the Project vicinities; potential effects/enhancements of ongoing operations and maintenance activities; bald eagle AP measures to be implemented for the term of the license; resource monitoring and reporting; and agency consultation. The Bald Eagle Management Plan is provided in Appendix H.

- Implement the Valley Elderberry Longhorn Beetle (VELB) Management Plan

  The VELB Management Plan was developed to address VELB management during ongoing operations and maintenance of Project facilities, roads, trails and recreation facilities in the vicinity of the four Big Creek ALP Projects. The Plan includes the location of VELB and their habitat within Project vicinities; a summary of management activities that could potentially impact VELB or their habitat (e.g.,

vegetation control and road maintenance); measures for the AP of VELB and their habitat; a description of impacts to VELB habitat during the term of the license; proposed mitigation measures (i.e., planting of seedlings); and mitigation monitoring and reporting requirements. The Plan also includes a description of a VELB training program for SCE personnel conducting maintenance and operation activities in the vicinity of VELB or their habitat. The Valley Elderberry Longhorn Beetle Management Plan is provided in Appendix E.

- Implement the Vegetation and Integrated Pest Management Plan

  The Vegetation and Integrated Pest Management Plan was developed to address the management of vegetation, including noxious weeds, and pesticides (i.e., herbicides and pesticides) as part of ongoing maintenance and operation of the four Big Creek ALP Projects. The Plan describes vegetation management and pesticide use that occurs in Project vicinities; the location of sensitive biological resources, noxious weeds and invasive ornamentals potentially affected or introduced during vegetation management; appropriate AP measures for biological resources; measures to prevent the spread or introduction of noxious weeds and invasive ornamentals; erosion control and re-vegetation measures; and resource monitoring and reporting requirements.

- Implement the Special-Status Bat Species Measure

  The Special-Status Bat Species Measure requires that SCE consult with CDFG and USDA-FS prior to conducting any non-routine maintenance activities in areas known to support maternal or roosting bat species and to implement, if necessary, appropriate AP measures to minimize the disturbance of these populations. The rationale for and specific language for this measure is provided in the proposed Special-Status Bat Species License Article (SCE 2007b).

- Implement Mule Deer Measures

  SCE will continue to implement measures to protect mule deer in the vicinity of the Mammoth Pool Reservoir and Eastwood Power Station. These include measures that SCE currently implements and new measures such as monitoring debris build-up at Mammoth Pool Reservoir. The rationale and specific language for this measure is provided in the proposed Mule Deer License Article (SCE 2007b).

- Implement Measures for New Project Facilities

  SCE will complete focused special-status plant surveys, Native American plant species of special concern, VELB surveys, and noxious weeds and invasive plant species surveys in the vicinity of the newly identified Project facilities including roads, and trails. Surveys will follow agency and stakeholder approved survey methods implemented for the four Big Creek ALP projects as described in the Technical Study Plan Reports. If special-status resources, noxious weeds, or invasive ornamental plant species are identified at or adjacent to these Project

facilities, roads, and trails, SCE will implement AP measures as defined in the Vegetation and Integrated Pest Management Plan, Historic Properties Management Plan, and Valley Elderberry Longhorn Beetle Management Plan (Appendix E).

- Protection of Special-status Species at New Helicopter Landing Sites

  SCE proposes to develop five new helicopter landing sites. Two sites are located in the Mammoth Pool Project vicinity (SJR above Shakeflat Creek and Mammoth Pool Dam) and three sites are in the Big Creek Nos. 2A, 8 and Eastwood Project vicinity (South Fork San Joaquin River below Hooper, Mono Creek at diversion, and Mono Creek below Lake T. A. Edison). The development of these site will require removal of several trees and shrubs. Prior to development of these sites, SCE will: (1) complete focused surveys for special-status plants, noxious weeds, and invasive plant species; and (2) conduct clearance surveys for bald eagle nests and/or other active raptor nests. SCE will locate the landing pads to avoid effects to any nest trees, and site development activities (i.e., tree removal) will be scheduled to avoid disturbance of any active raptor nests identified during surveys.

Recreational Resources

- Implement the Recreation Management Plan

  The Recreation Management Plan addresses the management of developed recreation opportunities in the vicinity of the four Big Creek ALP Projects (SCE 2007b). The Plan describes recreation facility operation and maintenance responsibilities, rehabilitation of recreation facilities, recreation enhancements, interpretation programs, reservoir recreation, fish stocking, and whitewater boating. Each of the Recreation Management Plan components are summarized below.

  Periodic Review and Reporting: At least once every six years, SCE shall complete a recreational use and facilities condition survey at the sites listed in the Plan. The survey will be designed to determine trends of use, the number of days parking capacity is met or exceeded, and whether resource damage is occurring. SCE will use Forest Service data when available. When the data indicate a need for increased campground facilities, SCE and the Forest Service will address the need through this periodic Plan review process.

  The report will also provide graphs and exceedence tables summarizing water surface elevations at Huntington Lake, whitewater boating opportunity days provided by SCE through pre-spill release flows below Mammoth Pool Reservoir (Tied-for-First Reach) and CRMF releases below Florence Lake (Florence Run), and dates when Kaiser Pass Road opened to provide public vehicular traffic access into the backcountry for non-winter recreational use.

  Operation and Maintenance of Recreation Facilities. SCE will be responsible for the operation and maintenance of their Camp Edison facilities and Day-Use areas at Shaver Lake and the Day-Use area near Balsam Forebay. The USDA-FS will be

responsible for the maintenance of recreation facilities that they currently operate in the vicinity of the four Big Creek ALP Projects.

Recreation Facility Rehabilitation. SCE will be responsible for the full cost for major rehabilitation of existing recreation facilities listed in Table 3-1.7-4. SCE will be responsible for performing all needed rehabilitation activities through the provision of necessary personnel, equipment, materials, and management. SCE will be responsible to replace/rehabilitate recreation features currently existing at the recreation facilities. A list of these recreation facilities, associated features and the rehabilitation schedule is provided in the Recreation Management Plan.

Recreation Enhancements. SCE will be responsible for the full cost of developing the recreational enhancements identified below. SCE will be responsible for scheduling and/or performing all needed activities including the provision of necessary personnel, equipment requirements, materials purchase and management oversight. These recreational enhancement projects include:

- Big Creek Nos. 1 and 2 (FERC Project No. 2175)
    - Develop a day-use area adjacent to Dam No. 3 at Huntington Lake. This will include a parking area, a trail from the parking area to Dam 3, a toilet, three picnic tables, and a new gate to prevent parking on Dam 3. Two disabled parking spots will be designated at the north end of the dam.
    - Develop a handicapped accessible fishing location at Huntington Lake.
- Big Creek Nos. 2A, 8, and Eastwood (FERC Project No. 67)
    - Develop a handicapped accessible fishing location at South Fork San Joaquin River near Jackass Meadows Campground.
    - Develop a handicapped loading facility at the Florence Lake Boat Ramp.

Interpretive. SCE will design and install up to thirteen interpretative display exhibits (kiosks) at various locations in the vicinity of the Big Creek ALP Projects. The kiosks will contain two display panels approximately 24” by 36” in size presenting media to educate the public on cultural, historical, pre-historic, biological and recreation resources in the Big Creek area. SCE will consult with the USDA-FS and the Big Creek Heritage Advisory Committee (as defined in the Historic Properties Management Plan (HPMP)) regarding the design, content, and placement of the interpretative display panels/kiosks.

Reservoir Recreation. SCE manages its reservoir WSE to be consistent with the primary purpose of the reservoirs for hydro generation, existing water rights, contracts, and/or licenses associated with the reservoirs. SCE will provide year-round daily average reservoir elevation information for reservoir surface elevations to the public via the Internet or other appropriate technology. SCE will make a good

faith effort to support reservoir-based recreation through the maintenance of reservoir WSE at the following:

- Huntington Lake (FERC Project No. 2175)
- Florence Lake and Shaver Lake (FERC Project No. 67)
- Mammoth Pool Reservoir (FERC Project No. 2085)

Fish Stocking. In order to enhance angling opportunities on Project reservoirs and stream reaches in the vicinity of the Project, SCE will match equally the California Department of Fish and Game (CDFG) stocking of Project-related reservoirs and bypass stream reaches below Project diversions and upstream of Redinger Lake, up to the following amounts:

- Rainbow Trout:
  - Fingerlings – up to 20,000 per year
  - Catchables – up to 60,000 per year
  - Subcatchables – up to 40,000 per year
- Kokanee:
  - Fingerlings – up to 30,000 per year

Streamflow Information. SCE will provide streamflow information to the public via the Internet in a machine-readable format or other appropriate publicly accessible technology. SCE will provide year-round hourly flow data for the following stream reaches:

- South Fork San Joaquin River below Florence Dam (FERC Project No. 2175)
- San Joaquin River below Mammoth Pool Reservoir (FERC Project No. 2175)
- San Joaquin River below Dam 6 (FERC Project No. 2175)
- Stevenson Creek below Shaver Dam (FERC Project No. 2175)
- Mono Creek between Vermilion Valley Dam and Mono Diversion (FERC Project No. 2085)

Whitewater Recreation. Whitewater boating opportunities in the Project vicinities will be enhanced by the dissemination of real-time flow information and of pre-spill flow releases in wet years, and above normal years at Mammoth Pool Reservoir.

SCE will provide pre-spill whitewater flow releases below Mammoth Pool in Wet and Above Normal Years. Upon request of the American Whitewater Association or

regional whitewater boating representatives after March 15th, SCE will discuss the anticipated water run-off conditions in relation to pre-spill releases below Mammoth Pool Dam. If the water-year type is determined to be a wet or above normal water year, pre-spill releases will be proposed.

In addition, SCE will attempt to provide flows sufficient in timing and magnitude for whitewater boating opportunities in the South Fork San Joaquin River in wet and Above Normal Water Years. SCE will attempt to provide such flows during the descending portion of the channel and riparian maintenance flow (CRMF) release to the extent within their control and consistent with the requirements of the Channel and Riparian Maintenance (CRM) Flows for the South Fork San Joaquin River below Florence Reservoir (SCE 2007b).

These enhancements will enable whitewater boaters to take better advantage of existing whitewater boating opportunity days, as well as provide for an increase in the number of annual whitewater boating opportunity days.

Land Resources

- Implement the Visual Resources Plan

  The Visual Resources Plan includes measures to reduce the visual contrast of Mammoth Pool Penstocks (FERC Project No. 2085), Big Creek No.1 Penstock (FERC Project 2175), Big Creek No. 3 Penstock (FERC Project No. 120), Mono-Bear Siphon Combined Flow Line (FERC Project No. 67) and Big Creek No. 1 Switchyard (FERC Project No. 2175). The visual contrast of penstocks will be reduced by painting them with a color that blends in with the surrounding landscape, consistent with the historical nature of the facilities. This color will be selected in consultation with the USDA-FS using a testing and evaluation process described in the Visual Resources Plan (SCE 2007b). Penstocks will be painted during the routine painting cycle.

  The Visual Resources Plan also describes measures that will be implemented to reduce the visual contrast of the Big Creek No. 1 Switchyard as viewed along Huntington Lake Road. This includes a management prescription to promote the growth of existing trees along the road, to more effectively screen the view of the switchyard.

- Implement the Transportation System Management Plan

  The Transportation System Management Plan provides a description of the transportation system management issues and requirements. The Plan describes the transportation system used by SCE to access the four Big Creek ALP Projects, and identifies resource issues associated with road and trail access and maintenance activities. The Plan also includes appropriate measures to address these issues, including rehabilitation, road use/traffic control measures, measures to

protect environmental and cultural resources, and annual consultation with appropriate regulatory agencies (SCE 2007b).

Cultural Resources

- Implement a Cultural Resources Awareness Program

  A Cultural Resources Awareness Program will be conducted on an annual basis in conjunction with the ESAP described in Section 3.1.6.2. The training will be provided to SCE personnel working in the vicinity of the four Big Creek ALP Projects. The cultural resources component will include procedures for implementation of the HPMP and a section on awareness of Native American traditional cultural values.

- Implement the Historical Properties Management Plan (HPMP)

  The HPMP describes a program to preserve and manage Historic Properties and other important cultural resources—sites, places and resources identified by Native Americans and other stakeholders as having important historic or heritage values that do not otherwise meet the National Register criteria for Historic Properties—in the Area of Potential Effects (APE) for the four Big Creek ALP Projects. The Plan describes the regulatory context for the Plan development; defines Big Creek ALP historic preservation goals and management objectives; identifies historic properties in the Project vicinities and potential Project impacts on these properties; provides guidelines for the management of these properties and important cultural resources; and outlines the implementation and resource monitoring schedule for the Plan (SCE 2005).

- Schedule and attend an annual meeting with interested Native Americans

  SCE will schedule and attend an annual consultation meeting with interested Native Americans. The focus of this meeting will be to inform the Native Americans of proposed vegetation management (e.g., herbicide use), recreation rehabilitation, and road maintenance activities, including the location and time of year the activities are to be implemented.

Non-FERC Settlement Agreement Measures

As part of the Big Creek ALP stakeholder settlement negotiations, the signatories to the Settlement Agreement have agreed upon a number of terms in Appendix B to the Settlement Agreement. These “Non-FERC Settlement Terms” are not to be included as license conditions in Commission-issued licenses for the Projects. Instead, the signatories prefer that the terms be enforced as a contract among the signatories for a number of reasons, including that some of the terms are unrelated to any Project impacts and are inconsistent with the Commission’s guidance regarding settlement agreements in hydroelectric licensing proceedings (Policy Statement on Hydropower Licensing Settlements, issued September 21, 2006). Although the non-FERC settlement terms are not related to the operation and maintenance of the Project, the

terms will provide a cumulative benefit to environmental and cultural resources in the vicinity of the ALP Projects and are therefore discussed in Section 5.3 Cumulative Effects of this APDEA. The non-FERC settlement terms are described in detail in the Big Creek ALP Settlement Agreement, Appendix B (SCE 2007c). The Non-FERC Settlement terms are listed by resource area as follows:

- Water and Aquatic Resources
  - Gravel Augmentation - below Mammoth Pool Dam
- Cultural Resources
  - Additions to the Cultural and Environmental Awareness Program for SCE Northern Hydro Employees
  - Annotated Bibliography of cultural resource reports from SCE Projects within Big Creek Area
  - Access to SCE Lands for Plant Gathering Purposes
  - Lands for Reburial
  - Improve Pedestrian Access and Protection of Cultural Resource at Mono Hot Springs
  - Jackass Meadow Sedge Bed Restoration
  - Native American Advisory Group
  - Native American Use Area near Shaver Lake
  - Native American Scholarship Fund
  - Plant Gathering and Tending Garden
  - Support to Sierra Mono Museum
  - Training of Native American Monitors
- Land Management Resources
  - Provide commensurate share funding to the Forest Service for SCE use of non-Project roads
  - Road Rehabilitation on select Non-Project Forest Service Roads
  - SCE maintenance of select Forest Service Non- Project roads
  - Transportation Signage Fund

- Recreation Resources
  - Provide annual funding to the Forest Service for asset management and maintenance of concentrated use areas.
  - Provide a boat and trailer to the Forest Service for the management of the dispersed concentrated use recreation areas
  - Provide annual funding to the Forest Service for minor rehabilitation activities at the Forest Service owned and operated recreation facilities
  - Provide annual funding to the Forest Service for the administration of interpretive programs
  - Share costs for a Portal Campground water system
  - Provide funding to the Fresno County Sheriffs Department for the purchase of a Snow CAT.
  - Providing funding to the Huntington Lake Association for repairs to the Billy Creek Museum.
  - Provide assistance to the Huntington Lake Association to support boat dock improvements.
  - Provide permanent outdoor housing to the Huntington Lake Big Creek Historical Conservancy for housing of a Bull Mack Truck, and a section of Ward Tunnel Pipe
  - Provide funding to the Huntington Lake Big Creek Historical Conservancy for educational and interpretive programs.
  - Provide funding to the Huntington Lake Volunteer Fire Department to support the purchase of a fire tender truck.
  - Provide a one time donation to the San Joaquin River Trail Council to support the San Joaquin River Trail.
  - Provide a one time donation to the Shaver Crossing Railroad Group to support the Shaver Crossing Railroad Station Museum

4.2 CALIFORNIA DEPARTMENT OF FISH AND GAME ALTERNATIVE

On October 17, 2005 the California Department of Fish and Game (CDFG) filed a letter (CDFG 2005) with the Commission that provided recommended measures for the protection of the fish and wildlife resources encompassed within and downstream of the four Big Creek ALP Projects. The CDFG Alternative provides recommendations for both aquatic and terrestrial resources as comments to the Settlement Agreement

proposal developed by the Big Creek Collaborative. A copy of the CDFG letter is provided in Attachment A. SCE met with CDFG on June 15, 2006 to discuss and clarify portions of CDFG's letter (SCE 2006a). Where appropriate, those clarifications are incorporated into the CDFG Alternative described in this APDEA. The recommendations contained in the CDFG Alternative for aquatic and terrestrial resources are briefly summarized as follows:

- Condition the new licenses for the four Big Creek ALP Projects to require a study of how the Big Creek ALP Projects may affect future anadromous fish resources in the San Joaquin River downstream of Friant Dam and how they may be managed to contribute to the benefit of anadromous fish restoration efforts. Include a license re-opener condition that would allow consideration and adoption of additional or revised license conditions or articles to support anadromous fish restoration in the San Joaquin River downstream of Friant Dam.

- Development of NEPA documentation that relies on US Bureau of Reclamation modeling and other studies that can be used to address the direct, indirect, and cumulative impacts of the continued operation of the Project reservoirs upon future downstream anadromous fish populations.

- Implement recommended instream flows for 23 stream reaches that are under the Project's operational control. These instream flow recommendations are summarized in Table 3.1.7-1.

- Conduct a monitoring program, designed to identify trends in the levels and source(s) of silver accumulation in fish tissue as well as organisms regularly consumed by fish (crayfish or macroinvertebrates) in the Mammoth Pool area and other Project reservoirs. As discussed with CDFG (SCE 2006a), these studies would be carried out in conjunction with reservoir fish monitoring.

- Balance releases from Project reservoirs with the need to maintain reservoir levels for recreation. Concern is expressed for the timing and nature of minimum pool conditions.

- Develop a reservoir fish monitoring program to monitor fish population trends and to determine if changes in reservoir operation under the new Project licenses result in impacts to aquatic resources in reservoirs.

- Installation of fish screens to exclude fish and wildlife from the drop tube intakes on Project diversions, primarily the diversions that supply water to the Ward Tunnel. Provide compensation for entrainment losses.

- Use more current estimates, using more recent information, of reference fish densities for comparison to those in the Project area as a basis for environmental documentation or evaluation.

- Reimburse the CDFG for the ongoing cost of fish stocking, along with efforts for fish production and monitoring. CDFG estimates this cost to be in the range of $300,000 per year.

- Update the 1600 Stream Alteration Maintenance Agreement for Sediment Maintenance to ensure that adequate fish and wildlife protection is implemented during sediment management activities at Project facilities. Sediment management plans or measures approved by the ALP Collaborative may be attached.

- Continue to implement Mammoth Pool Deer Protection measures included in the present FERC License, with the exception of the construction of deer access ramps near the Mammoth Pool Spillway. Measures to be continued include annual photo documentation of Mammoth Pool to identify the presence of debris and ensure any debris is removed in a timely manner to protect deer migration across the reservoir.

- Implement a Wildlife Mortality Mitigation Program to offset ongoing wildlife mortality associated as a result of Project reservoir operations and Project associated traffic (wildlife loss on Project roads due to increases in recreational use). CDFG recommends that SCE provide funding to support the Wildlife Mortality Mitigation Program on an ongoing basis during the term of the Project license.

- Install and maintain bear proof dumpsters within the town of Big Creek and at all facilities in and adjacent to the FERC Project Area for which SCE is responsible for the term of the new licenses.

- Continued cooperation by the Licensee in granting access of CDFG personnel to restricted areas with in the Project

4.3 NO ACTION ALTERNATIVE

Under the No Action Alternative, the four Big Creek ALP Projects would continue to be operated and maintained under the terms and conditions in the existing licenses. Changes in Project facilities, Project boundaries, and new environmental measures described under the Proposed Action would not be implemented. In the APDEA, the No Action Alternative is used to establish baseline environmental conditions for comparison with other alternatives.

5.0 EXISTING ENVIRONMENT

This section summarizes the methods and results of the studies completed to characterize existing conditions in the study area. All of the studies described in this section address one or more of the species covered in this BA/BE.

5.1 METHODS

This assessment of sensitive resources was based on a review of existing information relevant to the four Big Creek ALP Projects considered in this BA/BE, extensive agency and other stakeholder consultation, and field surveys. The consultation description is provided in Section 2.0. Detailed descriptions of the methods involved as well as maps and lists of specific areas surveyed are located in the FTSPP (SCE 2001); 2002 FTSRP (SCE 2003); 2003 FTSRP (SCE 2004a) and 2004 FTSR (SCE 2004b). These documents are incorporated by reference into this BA/BE. A combined total of 173 TSRs have been approved by the Technical Working Group and the Plenary. Following is a brief review of the assessment methods described in TSRs that apply to species included in this document.

Review of Existing Information

Existing information was reviewed for all four of the Projects considered in this BA/BE. A literature review was conducted to determine the available biological information, including survey data in the study area. This included a review of the following resources: (1) California Department of Fish and Game's (CDFG) *California Natural Diversity Database* (CNDDB) (CDFG 2007); (2) USDA-FS *Special-status Terrestrial and Aquatic Wildlife Species Electronic Database* (USDA-FS 2001b); (3) USDA-FS Regional Forester's *List of Sensitive Plant and Animal Species for Region 5* (USDA-FS 1998); (4) the *Sierra Nevada Forest Plan Amendment* (USDA-FS 2001a); (5) USFWS *Species List* (USFWS 2007; Appendix B); (6) data on wintering bald eagles in the study area from the Santa Cruz Predatory Bird Research Group (Janet Linthicum, pers. comm., 2003); (7) the California Native Plant Society's (CNPS) *Electronic Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2007); (8) *Threatened, Endangered, and Sensitive Plants of the SNF Electronic Database* (USDA-FS 2001b); (9) USDA-FS *High Sierra Ranger District Sensitive Plant Coverage* (USDA-FS 2004); (10) *High Sierra Area California Soil Survey* (USDA-FS 1995); (11) *SNF Area California Soil Survey* (USDA-FS 1993a); (12) *Sierra Nevada Forest Plan Amendment* (USDA-FS 2001a); and other pertinent information that is referenced, as appropriate.

Vegetation Community/Wildlife Habitat Mapping

Vegetation community/wildlife habitat mapping was conducted for all four of the Projects. Vegetation communities and wildlife habitats within ¼ mile of Project facilities, roads, transmission lines, bypass and flow-augmented reaches, and recreational facilities in the study area were mapped through aerial photograph interpretation and ground-truthing. False color infrared aerials were flown in 2001 in 1-m pixel resolution in NAD83, Zone 11, Universal Transverse Mercator (UTM) Projection within ½ mile of

streams in the study area. Black-and-white aerials at a 1-m pixel resolution, NAD83, Zone 11, UTM Projection, from 1993 were obtained for the reservoirs within the study area. Vegetation polygons were delineated on mylar transparencies overlaid on large prints of the aerials and transferred into a GIS database. Ground-truthing was conducted by land and air surveys. A random selection of 25% of the polygons for each vegetation community type was ground-truthed, along with vegetation community boundaries and other questionable areas. Questionable areas were those areas where it was difficult to determine the vegetation type or vegetation community boundary from the aerial photographs. Corrections to vegetation polygons were made, as necessary, and incorporated into the GIS database. Revisions to vegetation polygons in the GIS database were also based upon information gathered during the special-status plant surveys performed in 2002, 2003, and 2004, and subsequent ground-truthing. Vegetation polygons were a minimum of one acre in size with the exception of sensitive habitats, such as wetland and riparian areas. Sensitive habitats encountered that were too small to represent as polygon features have been represented as line or point features in the GIS database. The line and point features are not indicative of the size or extent of the sensitive habitats, but provide only the approximate location and type of these habitats.

Vegetation community classification was based primarily on the *Preliminary Descriptions of Terrestrial Natural Communities of California* (Holland 1986) and cross-referenced to *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995). Habitat for common and special-status wildlife species within these vegetation communities was determined, based on a review of *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988).

Table 5-1 provides a summary of the vegetation communities that occur within each of the four Big Creek ALP Project. Refer to TERR-1, Vegetation Communities (SCE 2003; SCE 2004a) for detailed information and mapping of vegetation communities in the Project vicinity.

Reconnaissance Survey

A reconnaissance survey was conducted for all four of the Projects considered in this BA/BE. Reconnaissance-level wildlife surveys were conducted in September and October of 2001, September of 2003, and July of 2004. Species were recorded as present if they were observed, if species-specific vocalizations were heard, or if diagnostic field signs (e.g., scat, tracks, and pellets) were found. Some species that are known to occur in the study area and/or for which appropriate habitat is present within the study area were recorded as potentially occurring, but not observed. These surveys involved traversing habitats by walking and driving on roads in representative portions of the wildlife habitat types. General observations of the suitability of cover types for various special-status species were also recorded. If special-status species were observed during the reconnaissance survey, their location was identified, mapped onto a 7.5-minute USGS quadrangle map, and incorporated into a GIS database.

Portions of representative habitats within and near Project facilities, bypass and flow-augmented reaches, and recreational facilities in the study area, were surveyed. Vegetation communities and wildlife habitats were further refined following the reconnaissance-level wildlife survey. Therefore, not all of the wildlife habitat types present in the study area were visited as part of the reconnaissance survey. The survey area consisted of a 150-foot area around the following Project facilities: dams, reservoirs, moderate diversions, forebays, large and moderate diverted and augmented streams, powerhouses, transmission lines, and recreational facilities in the study area. A 50-foot area was surveyed around small diversions and small augmented and diverted streams, a 30-foot area was surveyed around roads, and the area visible from the trail but not less than 5 feet on either side was surveyed around trails. The areas around each Project facility were driven, walked, or examined on topographical maps and aerial photographs. Areas for sampling were selected in order to have a representative subset for each type of facility, each elevational range, and each wildlife habitat type that was identified at the time of the survey.

Special-status Plant Survey

A special-status plant survey was conducted for all four of the Projects considered in this BA/BE. Timing of the field surveys was determined from agency consultation, monitoring of reference sites, and evaluation of known blooming periods. A list of species and known blooming periods was formed through agency consultation with the SNF Botanist, Joanna Clines. To ensure that surveys were conducted within the blooming periods of these species, the study area was divided into three elevational ranges: elevations less than 4,500 feet, elevations 4,500 to 6,600 feet, and elevations higher than 6,600 feet. Surveys were conducted during the early and late blooming period in each elevation range from April through August 2002, May through August 2003, and April through August 2004.

Depending on the survey area and terrain, a variety of survey methods were utilized that allowed visual surveillance of the entire area, such as zig-zag patterns, random meandering, linear walking, and/or driving. The survey area included 200 feet around the following facilities: dams, reservoirs, moderate diversions, forebays, powerhouses, transmission lines, and recreational facilities in the study area. A 300-foot area was surveyed around Project-related campgrounds. A 50-foot area was surveyed around small diversions, and a 30-foot area was surveyed around roads. An area visible, but not less than 5 feet on either side, was surveyed around trails.

Plant species observed within sampling sites selected for the quantitative riparian study were keyed to species. Specimens of bryophytes were collected and identified to species using *Contributions Toward a Bryoflora of California: A Specimen-based Catalogue of Mosses* (Norris and Shevock 2004a) and *Contributions Toward a Bryoflora of California: A Key to the Mosses* (Norris and Shevock 2004b). Voucher specimens of all bryophyte species encountered during the riparian study have been preserved and provided to the USDA-FS. USDA-FS and other bryophyte experts recommended by the USDA-FS are currently confirming the identification of these species.

Surveys were conducted in accordance with the *Guidelines for Assessing Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities* (CDFG 2000). Surveys were floristic in nature, and nomenclature was based on the *Jepson Manual* (Hickman 1993). Floristic survey methods involve identifying all species to the level necessary to determine if they are a special-status plant, or whether they are a plant species with unusual or significant range extensions. For each special-status plant species or population observed, photographs and GPS coordinates were recorded (if possible), and an estimate of the number of individuals present, their phenology, and the associated vegetation was recorded. A CNDDB California native species field survey form was completed for each special-status plant population identified. The locations were mapped on 7.5-minute USGS quadrangles and incorporated into a confidential GIS database.

Valley Elderberry Longhorn Beetle Habitat Survey

VELB habitat surveys were conducted for all of the four Projects considered in this BA/BE in which VELB potentially occurs. During the spring and summer of 2002, 2003, and 2004, VELB habitat (i.e., elderberry shrubs located below 3,000 feet in elevation) was mapped on 7.5-minute USGS quadrangles and incorporated into a GIS database in conjunction with the special-status plant species surveys. Where accessible, elderberry shrubs were inspected for beetle exit holes. The survey area included a 150-foot area around the following Project facilities: dams, reservoirs, moderate diversions, gaging stations, forebays, powerhouses, transmission lines, and recreational facilities in the study area. A 100-foot area was surveyed around small diversions, roads, and trails.

During VELB habitat surveys, it was determined that elderberry shrubs could potentially be affected in the future during Project operations or maintenance activities. Therefore, a protocol-level survey according to USFWS's *Conservation Guidelines for Valley Elderberry Longhorn Beetle* (USFWS 1999c) was completed on all 567 shrubs identified in the study area in 2002. No additional shrubs were detected in the study area in 2003. Five additional shrubs were identified in the study area in 2004. Protocol-level surveys were completed on these additional shrubs. On October 7 and 8, 2002, April 20 and 21, 2004, and July 6, 2004, protocol-level surveys were conducted within the study area. The protocol-level survey included examining elderberry shrubs within the study area for beetle exit holes and counting the number of stems greater than or equal to 1 inch in diameter and less than or equal to three inches (≥ 1 and ≤ 3), stems greater than three and less than five inches in diameter (>3 and <5), and stems greater than or equal to five inches (≤ 5) in diameter (USFWS 1999c). VELB occupancy was assumed, based upon the presence of exit holes (external evidence of prior beetle presence).

Fish Survey

Fish surveys were conducted for all four of the Projects considered in this BA/BE, in addition to surveys conducted for three other non-ALP BCS projects. Hardhead (*Mylopharodon conocephalus*) is currently the only FSS fish species occurring within the ALP Projects and is associated with FERC Project No. 120. Hardhead also are found in the Big Creek 4 Project (FERC Project No. 2017), which is not part of the ALP.

Extensive studies were conducted to study fish populations and habitats in streams and reservoirs located within the BCS ALP study area. This included studies on hardhead and its habitat. Electrofishing, netting, and snorkeling surveys were conducted in 2001 and 2002 as part of CAWG-7, Characterize Fish Populations Study Plan, to characterize the abundance, distribution, and structure of fish populations in Project streams and reservoirs. Refer to the 2002 FTSRP (SCE 2003) and the draft reports for the 2003 study plan implementation for a more detailed description of methodology for these studies.

Amphibian Survey

Amphibian surveys were conducted within segments of bypass or flow-augmented streams associated with all four of the Projects considered in this BA/BE. There were several approaches to the methods for the amphibians potentially occurring in the study area. Focused surveys were conducted for FYLF, YT, MYLF, and WPT, and a protocol-level site assessment was conducted for CRLF. These methods are discussed below.

California Red-legged Frog Site Assessment

A CRLF site assessment was conducted for all of the four Projects considered in this BA/BE within the recovery area of the species. The site assessment for CRLF was completed in accordance with USFWS's *Guidelines on Site Assessment and Field Surveys for the California Red-legged Frog* (USFWS 1997). This included completion of a literature review, agency and expert consultation, review of CRLF historic and current distribution, determination of known locations of CRLF within the study area and within five miles of the Project boundaries, and identification of upland and aquatic habitats within the study area and within one mile of the Project boundaries. The site assessment was conducted between May and August in 2002.

Foothill Yellow-legged Frog, Yosemite Toad, Mountain Yellow-legged Frog, and Western Pond Turtle

Potential habitat for special-status amphibians and reptiles was obtained from aerial photographs, ground surveys, and helicopter reconnaissance surveys. Detailed information on streams in the study area was collected as part of the Aquatic Habitat Survey completed in the summer and fall of 2001 and 2002 (CAWG-1 TSRs in FTSRP 2002 (SCE 2003) and FTSRP 2003 (SCE 2004a)). A habitat inventory was used to identify and characterize individual habitat units (mesohabitats) within each stream, including information on habitat type, gradient, substrate, instream cover, and canopy.

Species-specific criteria scores were developed for each habitat component. These scores were developed to depict the degree of suitability of the habitat to support the species over multiple life-stages. A query was developed, in collaboration with the CAWG, for determining the habitat component scores and using these scores to determine a usability score for each habitat unit, by species.

The usability score of each habitat unit in a study stream was plotted to identify stream segments with similar habitat quality for each species. A segment quality rating (good,

moderate, or poor) was determined based on the value of the weighted mean of usability scores for the habitat units within a stream segment.

For most species, the segment quality ratings were used to stratify focused survey efforts in 2002. Focused surveys for special-status amphibians and reptiles were conducted using survey protocols approved by the Amphibian and Reptile Subgroup (Subgroup) of the CAWG. Surveys for the MYLF and YT were completed in accordance with *A Standardized Protocol for Surveying Aquatic Amphibians* (Fellers and Freel 1995) using the 'Sample Survey' approach (vs. 'Complete' or 'Historical' Surveys) using 'Representative' selection of sites (vs. 'Random' selection of sites). FYLF surveys were completed according to a "modified Lind" (1997) protocol. WPT surveys were conducted in accordance with *Western Pond Turtle Survey Techniques* (Reese undated). Refer to the CAWG-8, (SCE 2003) TSR for a complete description of survey methodologies for these species.

Focused surveys were conducted in representative stream habitat for FYLF in May and June 2002. Seven stream sites were sampled for FYLF. These include portions of Big Creek, Ely Creek, Jose Creek, Rock Creek, Ross Creek, Stevenson Creek, and the San Joaquin River. These surveys were conducted in the study areas for the FERC Project Nos. 67, 120, 2085, and 2175.

Focused surveys were conducted in representative habitat in stream sites and meadows for YT in June and July 2002. Seven meadows were sampled for YT including Jackass Meadow, an unnamed meadow adjacent to Portal Forebay, Hell Hole Meadow, Poison Meadow, Mono Meadow, Balsam Meadow, an unnamed meadow adjacent to Portal Forebay, and an unnamed meadow adjacent to Mono Hot Springs. Five stream sites were surveyed for YT, including portions of Big Creek, Crater Creek, Mono Creek, South Fork San Joaquin River, and Tombstone Creek. These surveys were conducted in the study area for the Big Creek Nos. 2A, 8 and Eastwood Project.

Focused surveys were conducted in representative habitat in stream sites for MYLF in July 2002. Fourteen stream sites were sampled for MYLF. These include portions of Bear Creek, Big Creek, Bolsillo Creek, Camp 61 Creek, Camp 62 Creek, Chinquapin Creek, Crater Creek, Mono Creek, North Fork Stevenson Creek, North Slide Creek, Pitman Creek, South Fork San Joaquin River, South Slide Creek, and Tombstone Creek. These surveys were conducted in the study area for the Big Creek Nos. 2A, 8 and Eastwood Project.

Focused surveys were conducted in stream sites for WPT in July 2002. Portions of the following streams were sampled: Big Creek, Pitman Creek, North Fork Stevenson Creek, and the San Joaquin River. These surveys were conducted in the study area for the Big Creek Nos. 2A, 8 and Eastwood Project.

The annual temperature regime in Jose Creek and Willow Creek was monitored and correlated with focused surveys where egg masses were identified. This information was evaluated to determine the timing of FYLF egg deposition in Jose Creek, to help determine the optimum time for conducting surveys in other areas to maximize the

likelihood for discovering egg masses of this species, which is rare in the study area (only one confirmed location).

Bald Eagle and Osprey Nest Surveys

Available information regarding bald eagle nests near Shaver Lake was obtained from SCE biologists working with the SCE Forestry group, based at Camp Edison. Bald eagle and osprey surveys were conducted for all of the Projects considered in this BA/BE where there is appropriate nesting habitat for the species (i.e., close proximity to large, fish-bearing waters). Three nest surveys for bald eagle and osprey were conducted on April 18, May 15, and June 18, 2002. These surveys were conducted by helicopter to search for bald eagle and osprey nests within ½ mi of the Big Creek reservoirs (Florence Lake, Huntington Lake, Shaver Lake, and Mammoth Pool) and the San Joaquin and South Fork San Joaquin Rivers within the Big Creek area. The remainder of the area was not surveyed because it was determined not to be suitable nesting habitat for bald eagle and osprey by the Terrestrial Resources Working Group, a group comprised of representatives from state and federal agencies, and other stakeholders, formed as part of the ALP. Two qualified wildlife biologists visually searched for birds and nests with binoculars while the helicopter slowly flew over the study area. If birds or nests were detected, their location was recorded with a GPS unit and incorporated into a GIS database. Data that was collected at each nest included: date, time, observer(s), location, nest tree species, presence and behavior of adult bald eagle or osprey, and presence and behavior of fledglings.

Two bald eagle nests were detected in the area. These nests were monitored in accordance with California Department of Fish and Game (CDFG) protocol *Bald Eagle Breeding Survey Instructions* (Jurek 1999). This protocol requires three surveys during the nesting season: (1) early March for the early incubation period to determine whether the territory is occupied; (2) late April or early May for the early nestling period, to confirm that the territory is unoccupied or to determine whether the breeding pair is still tending the nest, and (3) mid-June for the late nestling period, to determine how many nestlings are approaching fledgling age. Observations were reported according to *An Illustrated Guide for Identifying Developmental Stages of Bald Eagle Nestlings in the Field* (Carpenter 1990). The standard forms were completed and submitted to CDFG. Data that was collected for each nest included: date, time, observer(s), location, nest tree species, tree and nest condition and size, presence and behavior of adult eagles, and number of fledglings.

Great Gray Owl Survey

Great gray owl surveys were conducted in appropriate nesting habitat identified in the vicinity of large, wet meadows or wet meadow complexes. This only included an area in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project. A description of the nesting and foraging habitat utilized by the great gray owl was obtained from the *USDA-FS Survey Protocol for the Great Gray Owl in the Sierra Nevada of California* (Beck and Winter 2000). Meadows occurring within 150 feet of Project facilities, including recreational facilities in the study area, were evaluated for potential nesting habitat for

great gray owls. Initially, ten meadows or combinations of "stringer" meadows that totaled at least 10 acres were identified. Through consultation with the Terrestrial Resources Working Group, six of the ten meadows identified were eliminated from further consideration due to their minimal size and/or because there was no Project nexus other than being adjacent to a Project stream, which was not felt to have a potentially significant impact to the species or was located on private property.

The two-year protocol-level survey for the great gray owl was conducted in 2002 and 2003 at four meadow complexes in the Big Creek area: Southwest Shaver Lake, North Shaver Lake, Northeast Shaver Lake, and Jackass Meadow. Surveys were conducted in accordance with the *USDA-FS Survey Protocol for the Great Gray Owl in the Sierra Nevada of California* (Beck and Winter 2000). This methodology involves callback surveys and meadow searches during the spring and summer. The USDA-FS protocol identifies survey periods based on elevation. Calling stations were established along survey routes 0.10 to 0.15 miles apart. Survey routes were designed to obtain complete coverage of the survey areas. Surveys consisted of both driving and walking survey routes. If a great gray owl was detected during a night survey, a follow-up day survey was completed. Day surveys were conducted during the first several hours of daylight. The goal of the follow-up day surveys was to visually confirm the presence and location of detected great gray owls and to locate any nest trees if the owl was detected during the incubation/brooding period. The final visit consisted of a meadow search to identify any evidence of great gray owl use of the study area. This included identification of any diagnostic sign of use (e.g., pellets, flight feathers).

Special-status Bat Surveys

Special-status bat surveys were conducted in 2002, 2003, and 2004 for the four Big Creek ALP Projects considered in this BA/BE. Qualified bat biologists searched Project facilities for signs of roosting bats (e.g., guano, staining, and culled insect parts). Roost surveys focused on Project structures such as powerhouses, dams, adits, and recreational buildings (i.e., campground structures). Bats were identified to species when possible. Any structure that could not be thoroughly investigated was monitored at emergence time with bat detectors. In addition, mist-netting and acoustic surveys were conducted in selected areas. Mist-netting was conducted from dusk to midnight. Sex, age (juvenile or adult), and reproductive status were determined, and their forearm measurements were recorded. Each bat was released on-site and hand-release echolocation calls were recorded at the time of release. Acoustic sampling was conducted with an Anabat II® bat detector system (Titley Electronics). The Anabat system uses a bat detector to detect bat ultrasonic echolocation calls in the field and uses a z-caim unit to convert the detected signals into time/frequency (kilohertz (kHz)) graphs on a laptop computer. Acoustic units (Anabat bat detector, z-caim, and laptop) were placed in appropriate locations to collect bat calls. Appropriate locations include rock outcroppings, roadsides, cattle troughs, springs, creeks, forest edges, snags, buildings, and mines. Acoustic units operated and collected data from sunset until midnight. Up to five detectors were placed at different sites each survey night.

Mule Deer Surveys

Deer migration at Mammoth Pool Reservoir was studied during the spring migration period in 2002. The study focused on documenting key migration routes across the reservoir and relative use; identifying potential migration barriers in the reservoir or along the shoreline; and documenting any deer mortality in the reservoir. Three types of surveys were completed to characterize deer migration at Mammoth Pool: observational surveys from fixed locations, observational boat surveys along the perimeter of the reservoir, and photographic surveys of migrating deer collected from remote cameras. Observational surveys of migrating deer were conducted from fixed locations in two 1.5-hour blocks, at dawn and dusk from April 15 to June 10, 2002. The initial surveys, beginning in April, were conducted three days a week. Surveys continued at that frequency through the week of May 12 when peak migration was anticipated based on higher frequency of incidental deer encounters in the Mammoth Pool vicinity. Survey frequency then increased to four days per week for the next two weeks, and then tapered from four, to three, to two, to one day per week until the week of June 9. Dusk observations were conducted from approximately 19:00 – 20:30 hours (hrs), and dawn observation periods were conducted from approximately 05:30 – 07:00hrs. During each survey, one observer was stationed at the Mammoth Pool Boat Launch and a second observer was stationed at the Windy Point Boat Launch (Figures TERR-14-2a through b) (SCE 2003)). Each observer was equipped with binoculars and the person at the Mammoth Pool Boat Launch was equipped with a spotting scope to remotely monitor deer migration from a distance to reduce disturbance. At each location, the observers recorded the time and number of deer crossings, the age-class and sex of migrating deer (if possible), the paths they took to cross (e.g., use of the road that crosses the crest of the dam or swimming across the reservoir), temperature, qualitative wind speed and direction, and any observed difficulty in crossing or in entering and exiting the reservoir.

Boat surveys were conducted in order to identify key migration trails and relative use (based on tracks), to identify any migration barriers, and to document any deer carcasses. Four boat surveys were conducted on May 1, May 7, May 15, and May 21, 2002, along the entire shoreline of Mammoth Pool to identify key deer migration trails and relative use (based on tracks). Surveys were conducted between 10:00 and 14:00 hrs, when deer are less active, to create the least disturbance for migrating deer. The entire shoreline of the reservoir was slowly boated by two biologists who examined the shoreline with binoculars. When evidence of tracks was detected, the boat was docked and the biologists examined the tracks to determine if they were from deer, and if they were approaching or leaving the water. In general, tracks were difficult to identify to species and difficult to determine if they were approaching or leaving the reservoir because of the coarse, loose sand that was present along many areas of the shoreline. All tracks observed were recorded during each survey, regardless of whether they were counted during a previous survey, due to the difficulty in erasing tracks so they would not be recounted. Therefore, tracks were recounted on subsequent visits. Data collected included GPS coordinates, number of tracks, entry or exit, slope of bank, substrate, and any deer access problems. The locations of any migration barriers along the shoreline or in the reservoir were noted. During these surveys, the locations and

number of any deer carcasses were recorded. All key deer migration trails, migration barriers, and deer carcasses observed during the survey were mapped on a 7.5-minute quadrangle USGS map and incorporated into a GIS layer (Figures TERR-14-3a through d) (SCE 2003)).

A remote camera study was installed to obtain information on deer using the road on the crest of the dam. Three remotely triggered, infrared beam cameras obtained photographs of deer using the road on the crest of the dam during the spring 2002 migration period. Cameras were provided by USDA-FS, and consisted of the Photoscout model (Highlander Sports, Inc., Huntsville, Alabama). For a short time, a Trailmaster™ TM500 Passive Infrared Trail Monitor (Goodson and Associates, Inc., Lenexa, Kansas) was also used, when one of the Photoscout models was inoperable.

One camera was set up east of the dam, one camera was located between the dam and the spillway, and the third camera was west of the spillway (Figures TERR-14-2a through b (SCE 2003)). Three cameras were set up in order to capture deer traveling the length of the road. It appeared that, on at least one occasion, the same deer was photographed in multiple cameras as he traveled the road during the Fall camera feasibility study. However, the deer are unmarked, and such observations are based on the appearance of the antlers on males. In the spring study, males do not have well-developed antlers. Therefore, it is not known whether the same deer were photographed multiple times. The cameras were placed among vegetation on the roadside in areas where the road was wide and vegetation was present on both sides of the road to prevent startling deer into jumping off the road. Cameras were set upon April 16, 2002. Cameras were checked approximately twice a week to replace film, change batteries, and make repairs, if necessary. Cameras were removed on June 5 and the timing, number, age-class, and sex (if possible) of deer migrating across the dam road was documented.

5.2 STATUS OF SPECIES IN THE VICINITY OF THE FOUR BIG CREEK ALP PROJECTS

This section describes the existing environment in the vicinity of each of the four Big Creek ALP Projects. This includes identification of federally listed threatened, endangered, and candidate species (FT, FE, and FC); FSS; and SNF MIS, which are known to occur or may potentially occur in the Project vicinities. This section does not address 1) those species that are unlikely to occur due to lack of suitable habitat, 2) species who's elevational or geographic range does not fall within the Project vicinity, and 3) special-status plant species not detected in the study area. Refer to Appendix A for a table of special-status plant and wildlife species and their potential for occurrence (i.e., known, potential, not detected, or unlikely) in the Project vicinities. Refer to Appendix C for a table of known occurrences of special-status species at each Project facility, recreation facility, road, or trail. Figures 5-1 and 5-2 provide maps of the locations of these known occurrences for special-status plants and wildlife, respectively. Refer to Appendix J for a description of the life history of each known or potentially occurring species addressed below.

Mammoth Pool (FERC Project No. 2085)

Federally Listed Species

Federally Listed Plant Species

There are no known occurrences of federally listed plant species in the vicinity of the Mammoth Pool Project.

Federally Listed Wildlife Species

Two federally listed wildlife species—VELB and bald eagle—are **known to occur** in the vicinity of the Mammoth Pool Project. In addition, three federally listed species—California red-legged frog (CRLF), American peregrine falcon, and Pacific fisher—were initially identified as **potentially occurring** in the Project vicinity. However, further analysis showed that CRLF is unlikely to occur in the Project vicinity. Refer to Appendix J for a description of the life history of each species. Refer to Appendices A and C and Figure 5-2 for more information on the occurrence of each of these species in the vicinity of the Mammoth Pool Project.

Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus) FT, FPD

A total of 42 elderberry shrubs, of which two showed signs of beetle occupancy, occur in the vicinity of the Mammoth Pool Project. These shrubs are located adjacent to the following Project road:

- 9S42, the Mammoth Pool Powerhouse Transmission Line access road from gate near County Road 225, Italian Bar Road to 8S44 (#18); and

Bald Eagle (Haliaeetus leucocephalus) *FT, FPD, SNF MIS, CE, CFP*

The California Natural Diversity Database (CNDDB) has records of two known occurrences of bald eagle in the vicinity of the Mammoth Pool Project (CDFG 2007). The USDA-FS database (USDA-FS 2001b) has records of occurrences of bald eagle scattered throughout the Project vicinity. There is a high concentration of wintering bald eagle occurrences at Redinger Lake located downstream of the Mammoth Pool Reservoir on the San Joaquin River, with one wintering adult observed at Redinger Lake in 2001. Bald eagles are known to winter at Mammoth Pool Reservoir. In 2001, there was one adult and one immature bald eagle detected wintering at Mammoth Pool Reservoir. In 2002, adult bald eagles and one subadult were observed at Mammoth Pool Reservoir. No bald eagle nests were detected in the vicinity of the Mammoth Pool Project during focused bald eagle nest surveys conducted April 18, May 15, and June 18, 2002.

*California Red-legged Frog (*Rana aurora draytonii*) FT, CSC*

On June 24, 1996, the USFWS listed the California red-legged frog (CRLF) as threatened. On March 13, 2001, a final designation of critical habitat was made for the

CRLF (USFWS 2001). The primary constituent elements of critical habitat for CRLF are aquatic and upland areas where suitable breeding and non-breeding habitat is interspersed throughout the landscape and is interconnected by unfragmented dispersal habitat. To possess the primary constituent elements, an area must include two (or more) suitable breeding locations, a permanent water source, and associated uplands surrounding these water bodies up to 300 feet from the water's edge. All these constituents must be within 1.25 miles of one another and connected by barrier-free dispersal habitat that is at least 300 feet wide. There is no Critical Habitat for this species in the Project vicinity.

The four Big Creek ALP Projects, including the Mammoth Pool Project, are within the historic range but not within the current known range, of the CRLF. The Project vicinities occur within the Sierra Nevada Foothills and Central Valley Recovery Unit for the CRLF (USFWS 2002a). This unit includes the western foothills and Sierra Nevada foothills, to approximately 5,000 feet elevation in the Central Valley hydrographic basin. However, the four Project vicinities are not within a core area.

A site assessment was prepared for the Big Creek ALP Projects, including the Mammoth Pool Project (Appendix I). The historical records nearest to the vicinity of the four Big Creek ALP Projects are 30 miles to the south, near Minkler, and 15 miles to the northwest in Willow Creek near O'Neals. The Minkler record dates back to 1916 and CRLF are presumed extirpated at this site. The O'Neals records date back to 1951 with CRLF seen as late as 1968. They are currently presumed extirpated. The nearest known extant population of CRLF to the vicinity of the Projects is in Mine Creek (near Mercey Hot Springs), approximately 90 miles to the west in the Coast Range foothills in Fresno County. Although small sections of Jose Creek and Chiquito Creek represent suitable habitat for CLRF, these sections lie outside of the four Big Creek ALP Projects. Therefore, CRLF are not expected to occupy the Project vicinities because of the lack of suitable habitat and because the Project vicinities are outside of the species' current known range. USFWS concurred with the findings of this report in October 2003.

American Peregrine Falcon (*Falco peregrinus anatum*) Former FE (Delisted on 8/20/99), FSS, SNF MIS, CE, CFP

No peregrine falcon nests are present in the study area, and CNDDB has no records of this species in the vicinity of the Mammoth Pool Project (CDFG 2007). However, appropriate nesting and foraging habitat is present in riverine, lacustrine, wetlands, oak woodland, coniferous forest, and riparian habitats near cliffs in the Project vicinity.

Pacific Fisher (*Martes pennanti pacifica*) FC, FSS, SNF MIS, CSC

There are no records of Pacific fisher in the Mammoth Pool Project vicinity. However, potential denning and foraging habitat is present in coniferous forests that contain specific vegetation and structural habitat aspects.

Forest Service Sensitive Species

Forest Service Sensitive Plant Species

Three FSS plant species—Mono Hot Springs evening primrose, flaming trumpet, and Yosemite lewisia—are **known to occur** in the vicinity of the Mammoth Pool Project. Refer to Appendix J for a description of the life history of each species. Refer to Appendices A and C and Figure 5-1 for more information on the occurrence of each of these species in the vicinity of the Mammoth Pool Project.

Mono Hot Springs evening primrose (Camissonia sierrae ssp. alticola) *FSS, CNPS 1B.2*

There are known occurrences of Mono Hot Springs evening primrose in the vicinity of the Mammoth Pool Reservoir HB valves and the Mammoth Pool Reservoir maintenance cabin.

*Flaming trumpet (*Collomia rawsoniana*) FSS, CNPS 1B.2*

There are known occurrences of flaming trumpet in the vicinity of the Mammoth Pool Reservoir.

*Yosemite lewisia (*Lewisia disepala*) FSS, CNPS 1B.2*

There are known occurrences of Yosemite lewisia in the vicinity of the Mammoth Pool Reservoir maintenance cabin.

Forest Service Sensitive Wildlife Species

Two FSS wildlife species—Western pond turtle and California spotted owl—are **known to occur** and two FSS wildlife species—FYLF and willow flycatcher—have been identified as **potentially occurring** in the vicinity of the Mammoth Pool Project. Refer to Appendix J for a description of the life history of each species. Refer to Appendices A and C and Figure 5-2 for more information on the occurrence of each of these species in the vicinity of the Mammoth Pool Project.

Western pond turtle (Actinemys marmorata) *FSS, CSC*

There are known occurrences of western pond turtle at Rock Creek, Diversion to San Joaquin River (river mile (RM) 0–0.40); and at Ross Creek, Diversion to San Joaquin River (RM 0–0.85).

*California spotted owl (*Strix occidentalis occidentalis*) FSS, SNF MIS, CSC*

There are known occurrences of California spotted owl in the vicinity of the Mammoth Tunnel (Mammoth Pool Powerhouse); and the San Joaquin River, Mammoth Pool Dam to Dam 6.

Foothill yellow-legged frog (*Rana boylii*) FSS, CSC

There are no known populations of FYLF in the vicinity of the Mammoth Pool Project. However, potential FYLF habitat (i.e., that rated as good or moderate in survey results) was identified in Rock Creek, Ross Creek, San Joaquin River, and Mammoth to Dam 6.

Willow flycatcher (*Empidonax traillii brewsteri*) FSS, SNF MIS, CE (nesting)

There are no known occurrences of willow flycatcher in the vicinity of the Mammoth Pool Project. However, this species could potentially occur in riparian habitat in the Project vicinity.

Sierra National Forest Management Indicator Species

The majority of SNF MIS species known or potentially occurring in the vicinity of the Project are addressed above with the exception of resident trout, osprey, mule deer, and avian guilds in riparian, oak woodland, meadow edge and mature mixed-conifer habitats. These species are discussed below.

Resident Trout

Resident trout occur in streams and lakes including reservoirs throughout the vicinity of the BCS ALP. Trout species found in these waters include rainbow trout, brown trout, and brook trout. All three species are indicators for habitat quantity and population trends. However, only rainbow and brown trout are found in waters of FERC Project No. 2085. Rainbow trout represent the most common and important recreational fish in the SNF (USDA-FS 1991). The present distribution of resident trout species is the result of extensive transplanting and stocking practices in the Big Creek System. Historical rainbow trout were likely limited to the lower reaches of the Merced, San Joaquin, and Kings River systems.

Osprey

Osprey are uncommon to common breeders in northern California, strictly associated with large fish-bearing waters, primarily in ponderosa pine and mixed conifer habitats. Osprey are known to occur in appropriate habitat throughout the four Big Creek ALP Projects.

Osprey were not detected in the vicinity of the Mammoth Pool Project during focused osprey and bald eagle surveys in the spring of 2002. However, there are USDA-FS and CNDDB records and incidental sightings reported for osprey and osprey nests concentrated in the vicinity of the Mammoth Pool Reservoir. Refer to TERR-9, Bald Eagle and Osprey TSRs for a complete description (SCE 2003; SCE 2004a).

Mule Deer

The San Joaquin mule deer herd is the main herd found in the vicinity of the four Big Creek ALP Projects. The range of the North Kings herd also extends into the Big Creek

Project vicinity (see Big Creek Nos. 2A, 8 and Eastwood, below). Mule deer in the Project vicinity are found from about 2,000 feet in elevation along the San Joaquin River up to about 12,000 feet in elevation along the crest of the Sierra. Mule deer in the area summer at about 6,000 to 10,000 feet in elevation and winter at about 1,200 to 3,600 feet in elevation.

The area around Mammoth Pool Reservoir has been identified as a mule deer holding area and mule deer are known to migrate through the Project vicinity. Deer have been observed swimming the reservoir, as well as crossing the dam road. Refer to TERR-14, Mule Deer TSR for a complete description (SCE 2003; SCE 2004a).

Avian Guilds

Avian guilds in the following habitats present in the Mammoth Pool Project vicinity are considered SNF MIS by the SNF. These avian guilds have not been identified to species by the USDA-FS.

Riparian Habitat

Riparian habitat in the Mammoth Pool Project vicinity includes montane, valley and foothill riparian vegetation types. Riparian vegetation is generally found in narrow bands along the streams and is often separated by rocky, unvegetated reaches. Avian species that may occur in this habitat include, but are not limited to, belted kingfisher (*Ceryle alcyon*), willow flycatcher (*Empidonax traillii brewsteri*), American dipper (*Cinclus mexicanus*), yellow warbler (*Dendroica petechia brewsteri*), yellow-breasted chat (*Icteria virens*), and song sparrow (*Melospiza melodia*).

Oak Woodland Habitat

Oak woodland habitat in the Mammoth Pool Project vicinity includes blue oak woodland, oak woodland/montane hardwood, and oak woodland with rock substrate/montane hardwood with rock substrate vegetation types. Avian species that may occur in this habitat include, but are not limited to, western scrub jay (*Aphelocoma californica*), American crow (*Corvus brachyrhynchos*), red-tailed hawk (*Buteo jamaicensis*), acorn woodpecker (*Melanerpes formicivorus*), oak titmouse (*Baeolophus inornatus*), fox sparrow (*Passarella iliaca*), and black-headed grosbeak (*Pheucticus melanocephalus*).

Meadow Edge Habitat

Meadow edge habitat in the Mammoth Pool Project vicinity includes only the wet montane meadow/wet meadow vegetation type. Avian species that may occur in this habitat include, but are not limited to, yellow-rumped warbler (*Dendroica coronata*), dark-eyed junco (*Junco hyemalis*), mountain bluebird (*Sialia currocoides*), western bluebird (*Sialia mexicana*), white-crowned sparrow (*Zonotrichia leucophrys*), black-headed grosbeak, and western meadowlark (*Sturnella neglecta*).

Mature Mixed-conifer Habitat

Mature mixed-conifer habitat in the Mammoth Pool Project vicinity includes the Sierran mixed coniferous forest and Sierran mixed coniferous forest with rock substrate vegetation types. Avian species that may occur in this habitat include, but are not limited to, northern flicker (*Colaptes auratus*), vireo spp. (*Vireo* spp.), Stellar's jay (*Cyanocitta stelleri*), common raven (*Corvus corax*), mountain chickadee (*Poecile gambeli*), bushtit (*Psaltriparus minimus*), brown creeper (*Certhia Americana*), white-breasted nuthatch (*Sitta carolinensis*), red-breasted nuthatch (*Sitta canadensis*), Townsends' solitaire (*Myadestes townsendi*), thrush spp. (*Cathurus* spp.), American robin (*Turdus migratorius*), spotted towhee (*Pipilo maculates*), dark-eyed junco, western wood-peewee (*Contopus sordidulus*), yellow warbler, western tanager (*Piranga ludoviciana*), and black-headed grosbeak.

Big Creek Nos. 1 and 2 Project (FERC Project No. 2175)

Federally Listed Species

Federally Listed Plant Species

There are no known occurrences of federally listed plant species in the vicinity of the Big Creek Nos. 1 and 2 Project.

Federally Listed Wildlife Species

Five federally listed wildlife species—MYLF, YT, bald eagle, American peregrine falcon, and Pacific fisher—are **known to occur** in the vicinity of the Big Creek Nos. 1 and 2 Project. Refer to Appendix J for a description of the life history of each species. Refer to Appendices A and C and Figure 5-2 for more information on the occurrence of each of these species in the vicinity of the Big Creek Nos. 1 and 2 Project.

Mountain Yellow-Legged Frog (Rana muscosa) *FC, FSS, CSC*

There are known populations of MYLF within the vicinity of Huntington Lake Reservoir. Potential MYLF habitat (i.e., that rated as good or moderate in survey results) was identified along Ely Creek; Big Creek, Huntington Lake to Dam 4; Big Creek, Dam 4 to Dam 5; and the Dam 4 Forebay.

Yosemite Toad (Bufo canorus) *FC, FSS, CSC*

There are known occurrences of YT in the vicinity of the Big Creek Nos. 1 and 2 Project at Huntington Lake Reservoir.

Bald Eagle (Haliaeetus leucocephalus) *FT, FPD, SNF MIS, CE, CFP*

Bald eagles are known to winter and have been observed foraging in the vicinity of Big Creek Nos. 1 and 2 Project at Huntington Lake. A nest was identified at Huntington Lake in 2003, after the breeding season. In 2004, one juvenile was observed that

fledged the nest (Smith, pers. comm., 2005). In 2005, this nest produced two fledglings (Sorini-Wilson, pers. comm., 2005).

American Peregrine Falcon* (Falco peregrinus anatum*) Former FE (Delisted on 8/20/99), FSS, SNF MIS, CE, CFP

The USDA-FS database has several records of observations throughout the Project vicinity, concentrated near the town of Big Creek, where a pair is known to have nested on Big Creek Powerhouse No. 1 in 1999 (USDA-FS 2001b). The pair has also nested on Sunset Point for the last few years. Appropriate nesting and foraging habitat is present in riverine, lacustrine, wetlands, oak woodland, coniferous forest, and riparian habitat types near cliffs throughout the Project vicinity.

Pacific Fisher* (Martes pennanti pacifica) *FC, FSS, SNF MIS, CSC

There are several records of Pacific fisher in the vicinity of Ely Creek; Powerhouse No. 1; Powerhouse No. 2; Huntington-Pitman-Siphon; Huntington Lake Reservoir; Big Creek, Huntington Lake to Dam 4; and along several Project roads. Potential denning and foraging habitat is present in coniferous forests that contain specific vegetation and structural habitat aspects.

Forest Service Sensitive Species

Forest Service Sensitive Plant Species

One FSS plant species—subalpine fireweed—is **known to occur** and five FSS plant species—scalloped moonwort, Bolander's candle moss, veined water lichen, three-ranked hump moss, and broad-nerved hump moss—are identified as **potentially occurring** in the vicinity of the Big Creek Nos. 1 and 2 Project. Refer to Appendix J for a description of the life history of these species. Refer to Appendices A and C and Figure 5-1 for more information on the occurrence of these species in the vicinity of the Big Creek Nos. 1 and 2 Project.

Subalpine fireweed* (Epilobium howellii) *FSS, CNPS 1B.3

There are known occurrences of subalpine fireweed in the Big Creek Nos. 1 and 2 Project vicinity of Huntington Lake.

Scalloped moonwort* (Botrychium crenulatum) *FSS, CNPS 2.2

There are no known occurrences of scalloped moonwort in the vicinity of the Big Creek Nos. 1 and 2 Project, and this species was not observed during surveys conducted in representative habitat in the Project vicinity. However, this species could potentially occur in appropriate habitat (i.e., lower montane coniferous forests and in meadows, seeps, and bogs) in the Project vicinity.

Bolander's candle moss* (Bruchia bolanderi) *FSS, CNPS 2.2

There are no known occurrences of Bolander's candle moss in the vicinity of the Big Creek Nos. 1 and 2 Project, and this species was not observed during surveys conducted in representative habitat in the Project vicinity. However, this species could potentially occur in appropriate habitat (i.e., moist soils in montane coniferous forests and in meadows, seeps, and bogs) in the Project vicinity.

Veined water lichen* (Hydrothyria venosa) *FSS

There are no known occurrences of veined water lichen in the vicinity of the Big Creek Nos. 1 and 2 Project, and this species was not observed during surveys conducted in representative habitat in the Project vicinity. However, this species could potentially occur in appropriate habitat (i.e., streams in mixed conifer forests) in the Project vicinity.

Three-ranked hump moss* (Meesia triquetra) *FSS, CNPS 4.2

There are no known occurrences of three-ranked hump moss in the vicinity of the Big Creek Nos. 1 and 2 Project, and this species was not observed during surveys conducted in representative habitat in the Project vicinity. However, this species could potentially occur in appropriate habitat (i.e., moist soils in montane coniferous forests and in meadows, seeps, and bogs) in the Project vicinity.

Broad-nerved hump moss* (Meesia uliginosa) *FSS, CNPS 2.2

There are no known occurrences of broad-nerved hump moss in the vicinity of the Big Creek Nos. 1 and 2 Project, and this species was not observed during surveys conducted in representative habitat in the Project vicinity. However, this species could potentially occur in appropriate habitat (i.e., moist soils in montane coniferous forests and in meadows, seeps, and bogs) in the Project vicinity.

Forest Service Sensitive Wildlife Species

Seven FSS wildlife species—northern goshawk, great gray owl, California spotted owl, Western red bat, Sierra Nevada red fox, American marten, and California wolverine—are **known to occur** and three FSS wildlife species—western pond turtle, FYLF, and willow flycatcher—are identified as **potentially occurring** in the vicinity of the Big Creek Nos. 1 and 2 Project. Refer to Appendix J for a description of the life history of each species. Refer to Appendices A and C and Figure 5-2 for more information on the occurrence of each of these species in the vicinity of the Big Creek Nos. 1 and 2 Project.

Northern goshawk* (Accipiter gentilis) *FSS, SNF MIS, CSC

There are known occurrences of northern goshawk in the vicinity of the Big Creek Nos. 1 and 2 Project, at Huntington Lake and 8S05, Canyon Road (from Huntington Lake Road to Powerhouse No. 2 and 8S05E) (#21).

Great gray owl* (Strix nebulosa) *FSS, CE (nesting)

There are known occurrences of great gray owl in the vicinity of the Big Creek Nos. 1 and 2 Project at Huntington Lake.

California spotted owl* (Strix occidentalis occidentalis) *FSS, SNF MIS, CSC

There are known occurrences of California spotted owls in the vicinity of the Big Creek Nos. 1 and 2 Project at Tunnel No. 2, including Adits 5 and 6 (Powerhouse No. 2); Big Creek, Huntington Lake to Dam 4; Big Creek, Dam 4 to Dam 5; and 8S05, Canyon Road (from Huntington Lake Road to Powerhouse No. 2 and 8S05E) (#21).

Western red bat* (Lasiurus blossevilli) *FSS

There are known occurrences of western red bat in the vicinity of the Big Creek Nos. 1 and 2 Project at the Huntington Lake Reservoir.

Sierra Nevada red fox* (Vulpes vulpes necator) *FSS, CT

There are known occurrences of Sierra Nevada red fox in the vicinity of the Big Creek Nos. 1 and 2 Project at Huntington Lake Dams 1, 2, 3 and 3a; Ely Creek; the gaging stations at Big Creek below Huntington at Dam 1, Ely Creek at Diversion Dam, and Huntington Dam; the Intake Gate House at Huntington Lake Dam 1, and Tunnel No. 1 (Powerhouse No. 1); Tunnel No. 2; Adit 6 at Tunnel 2 and Ely Creek Diversion Piping (Powerhouse No. 2); the inlet structure and gate 1A and 1B at Dam 2 (Huntington-Pitman-Shaver); in the vicinity of Huntington Lake; Ely Creek, Diversion to Big Creek; Road 8S66, from West End of Dam 2 to 8S66A (#22); and 8S66BC Road from the East End of Dam 1 to Dam 1 Drainage Gates (#99).

American marten* (Martes americana) *FSS, SNF MIS

There are known occurrences of American marten in the vicinity of the Big Creek Nos. 1 and 2 Project at Huntington Lake; Balsam Creek; the 60" and 84" flowlines below Huntington Lake (Powerhouse No. 1); the lower 84", 60", and 42" valve houses at the top of Powerhouse No. 1 penstocks; the Powerhouse No. 1 vent stacks and penstocks; Tunnel 2, including Adit 2 (Powerhouse No. 2); and the Scot Lake domestic water diversion.

California wolverine* (Gulo gulo luteus) *FSS, CT, CFP

There are known occurrences of California wolverine in the vicinity of the Big Creek Nos. 1 and 2 Project at Huntington Lake, and at Tunnel No. 2, including Adit 5 (Powerhouse No. 2).

Western pond turtle (*Actinemys marmorata*) FSS, CSC

No known populations of WPT were detected during surveys in the vicinity of the Big Creek Nos. 1 and 2 Project. However, there are agency records of WPT occurrences,

and potential habitat (i.e., that rated as good or moderate in survey results) was identified along Ely Creek, Big Creek; Big Creek, Huntington Lake to Dam 4; and Big Creek, Dam 4 to Dam 5.

Foothill yellow-legged frog* (Rana boylii) *FSS, CSC

There are no known populations of FYLF in the vicinity of the Big Creek Nos. 1 and 2 Project. However, potential FYLF habitat (i.e., that rated as good or moderate in survey results) was identified at the following in Ely Creek, Big Creek from Huntington Lake to Dam 4, and Big Creek between Dam 4 to Dam 5.

Willow flycatcher* (Empidonax traillii brewsteri) *FSS, SNF MIS, CE (nesting)

There are no known occurrences of willow flycatcher in the vicinity of the Big Creek Nos. 1 and 2 Project, and this species was not observed during surveys conducted in representative habitat in the Project vicinity. However, this species could potentially occur in riparian habitat in the Project vicinity.

Sierra National Forest Management Indicator Species

The majority of SNF MIS species known or potentially occurring in the vicinity of the Project are addressed above with the exception of resident trout, osprey, mule deer, and avian guilds in riparian, oak woodland, meadow edge, and mature mixed-conifer habitats. These species are discussed below.

Resident Trout

Resident trout occur in the vicinity of the Big Creek Nos. 1 and 2 Project include rainbow trout, brown trout, and rainbow-golden trout hybrids[1]. Refer to the Mammoth Pool Project above for further information about resident trout.

Osprey

There are USDA-FS and CNDDB records and incidental sightings reported for osprey and osprey nests concentrated in the vicinity of Huntington Lake. Refer to TERR-9, Bald Eagle and Osprey TSRs for a complete description (SCE 2003; SCE 2004a).

Mule Deer

As described above, the San Joaquin deer herd—including the Huntington herd, which is part of the larger San Joaquin herd—is known to occur in the in the vicinity of the four Big Creek ALP Projects, including the Big Creek Nos. 1 and 2 Project. The Huntington Lake area has been identified as a mule deer summer and winter range and several

[1] While rainbow-golden trout hybrids indicate that golden trout were stocked in the vicinity at one or more times, no remaining populations of golden trout were identified.

migration corridors occur in the Project vicinity. Refer to TERR-14, Mule Deer TSRs for a complete description (SCE 2003; SCE 2004a).

Avian Guilds

Avian guilds in riparian, oak woodland, meadow edge, and mature mixed-conifer habitats present in the Big Creek Nos. 1 and 2 Project vicinity are considered MIS in the SNF. As stated previously, these avian guilds have not been identified to species by the USDA-FS. See the above Mammoth Pool Project description for a list of avian species that characterize these habitats.

Riparian habitat in the Big Creek Nos. 1 and 2 Project vicinity includes montane, valley and foothill riparian vegetation types; oak woodland habitat includes blue oak woodland, oak woodland/montane hardwood, and oak woodland with rock substrate/montane hardwood with rock substrate vegetation types; meadow edge habitat includes only the wet montane meadow/wet meadow vegetation type; mature mixed-conifer habitat includes the Sierran mixed coniferous forest and Sierran mixed coniferous forest with rock substrate vegetation types.

Big Creek Nos. 2A, 8 and Eastwood Project (FERC Project No. 67)

Federally Listed Species

Federally Listed Plant Species

There are no known occurrences of federally listed plant species in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project.

Federally Listed Wildlife Species

Four federally listed wildlife species—YT, bald eagle, American peregrine falcon, and Pacific fisher—are **known to occur** and two federally listed wildlife species—VELB and MYLF—are identified as **potentially occurring** in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project. Refer to Appendix J for a description of the life history of each species. Refer to Appendices A and C and Figure 5-2 for more information on the occurrence of each of these species in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project.

Yosemite Toad* (Bufo canorus) *FC, FSS, CSC

There are known populations of YT in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project. Potential YT habitat (i.e., that rated as good or moderate in survey results), was identified at Tombstone Creek, and the South Fork San Joaquin River.

Bald Eagle* (Haliaeetus leucocephalus) *FT, FPD, SNF MIS, CE, CFP

The nest at the south shore of Shaver Lake on Kokanee Point was first detected in 1999. In 2000, two chicks were reported, but both chicks died, presumably from a

winter storm. In 2001, two chicks successfully fledged. The nest was unsuccessful in 2002, but produced three young in 2003. In 2005, one chick fledged successfully (Byrd, pers. comm., 2005).

American Peregrine Falcon* (Falco peregrinus anatum) *Former FE (Delisted on 8/20/99), FSS, SNF MIS, CE, CFP

The USDA-FS database has several records of observations in the Project vicinity, concentrated near the town of Big Creek. No peregrine falcon nests are present in the Project vicinity. However, appropriate nesting and foraging habitat is present in riverine, lacustrine, wetlands, oak woodland, coniferous forest, and riparian habitat types near cliffs throughout the Project vicinity.

Pacific Fisher* (Martes pennanti pacifica) *FC, FSS, SNF MIS, CSC

There are records of Pacific fisher in the vicinity of Powerhouse No. 2A, Huntington-Pitman-Siphon, Shaver Lake, and along several Project roads. Potential denning and foraging habitat is present in coniferous forests that contain specific vegetation and structural habitat aspects.

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) FT, FPD

A total of 15 elderberry shrubs occur in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project, none of which showed signs of VELB occupancy. These shrubs are located near the following Project facility and road:

- Powerhouse No. 8, Tunnel No. 8
- 8S03A Access road to Big Creek Powerhouse No. 8 from 8S03 (#166)

Mountain Yellow-Legged Frog* (Rana muscosa) *FC, FSS, CSC

There are no known occurrences of MYLF within the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project. However, potential MYLF habitat (i.e., that rated as good or moderate in survey results), was identified along Tombstone Creek, Crater Creek, Chinquapin Creek, Camp 62 Creek, Bolsillo Creek, Bear Creek, Mono Creek, Pitman Creek, Stevenson Creek, Balsam Creek, South Fork San Joaquin River, Florence Lake to Mammoth Pool, North Fork Stevenson Creek, Florence Lake dam arches, Bear Diversion Pool, Mono Diversion Pool, and Dam 5 Forebay. Meadows associated with these stream reaches also represent potential habitat. Total acres of meadows are not provided.

Forest Service Sensitive Species

Forest Service Sensitive Plant Species

Two FSS plant species—Mono Hot Springs evening primrose and short-leaved hulsea—are **known to occur** and five FSS plant species—scalloped moonwort,

Bolander's candle moss, veined water lichen, three-ranked hump moss, and broad-nerved hump moss—are identified as **potentially occurring** in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project. Refer to Appendix J for a description of the life history of each species. Refer to Appendices A and C and Figure 5-1 for more information on the occurrence of each of these species in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project.

Mono Hot Springs evening primrose **(Camissonia sierrae ssp. alticola)** ***FSS, CNPS 1B.2***

There are known occurrences of Mono Hot Springs evening primrose in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project, at Florence Lake Reservoir and Dam, Bear Creek Diversion Pool and Dam, Hooper Creek Diversion Pool and Dam, North Slide Creek Diversion, and South Slide Creek Diversion. There are known occurrences in the vicinity of the following gaging stations: Bear Creek below Diversion Dam, Bear Creek Conduit at Diversion Dam, Bear Creek upstream of Diversion Dam (with cable crossing), Hooper Creek below Diversion Dam, Ward Tunnel at Intake, Crater Creek Diversion Ditch near Florence Lake, and Florence Dam Reservoir. There are known occurrences in the vicinity of the following water conveyance systems: Ward Tunnel, including Inlet Structure at Florence Lake;, Gate House at Florence Lake; Ward Tunnel, Minimum Pool Weir; Mono-Bear Siphon, including Bear Inlet Structure at Bear Forebay; Bear Tunnel; Bear Adit; Bear Flowline; Mono Tunnel; Mono Flow Line, and Combined Flow Line; and Hooper Conveyance, including Hooper Diversion Piping to Florence Lake; North Slide Creek Diversion Piping; and South Slide Creek Diversion Piping. There are known occurrences in the vicinity of the Florence Lake Weather Station; the Florence Lake Relief Cabin; the buildings, storage yard, water supply and treatment, and fuel, gasoline, and propone facilities at the Florence Lake Work Camp. There are known occurrences in the vicinity of the following bypass stream reaches: Bear Creek, Diversion to South Fork San Joaquin River; Crater Creek, Diversion to South Fork San Joaquin River; Hooper Creek, Diversion to South Fork San Joaquin River; and South Fork San Joaquin River, Florence Lake to Mammoth Pool. There are also known occurrences in the vicinity of the Florence Lake Boat Ramp; the Florence Lake Work Camp Access Road from Gate on 7S01 near Picnic Area; 7S01BA Florence Work Camp road from 7S01B (#219); 7S370F Access road to Florence Dam (#237); and the trails to Bear Creek Gage upstream of Bear Forebay (#32); North and South Slide Creek diversions; and Tombstone Creek Diversion.

Short-leaved hulsea **(Hulsea brevifolia)** ***FSS, CNPS 1B.2***

There are known occurrences of short-leaved hulsea in the vicinity of Big Creek Nos. 2A at the Camp 72 Adit at Huntington-Pitman-Shaver; the EPS-BC1 220kV Power Transmission Line; 8S94 Pitman Creek Diversion Access Road (#56); and Road 8S02 from Highway 168 to 8S02B (#54).

Scalloped moonwort* (Botrychium crenulatum) *FSS, CNPS 2.2

There are no known occurrences of scalloped moonwort in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project, and this species was not observed during surveys conducted in representative habitat in the Project vicinity. However, this species could potentially occur in appropriate habitat (i.e., lower montane coniferous forests and in meadows, seeps, and bogs) in the Project vicinity.

Bolander's candle moss* (Bruchia bolanderi) *FSS, CNPS 2.2

There are no known occurrences of Bolander's candle moss in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project, and this species was not observed during surveys conducted in representative habitat in the Project vicinity. However, this species could potentially occur in appropriate habitat (i.e., moist soils in montane coniferous forests and in meadows, seeps, and bogs) in the Project vicinity.

Veined water lichen* (Hydrothyria venosa) *FSS

There are no known occurrences of veined water lichen in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project, and this species was not observed during surveys conducted in representative habitat in the Project vicinity. However, this species could potentially occur in appropriate habitat (i.e., streams in mixed conifer forests) in the Project vicinity.

Three-ranked hump moss* (Meesia triquetra) *FSS, CNPS 4.2

There are no known occurrences of three-ranked hump moss in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project, and this species was not observed during surveys conducted in representative habitat in the Project vicinity. However, this species could potentially occur in appropriate habitat (i.e., moist soils in montane coniferous forests and in meadows, seeps, and bogs) in the Project vicinity.

Broad-nerved hump moss* (Meesia uliginosa) *FSS, CNPS 2.2

There are no known occurrences of broad-nerved hump moss in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project, and this species was not observed during surveys conducted in representative habitat in the Project vicinity. However, this species could potentially occur in appropriate habitat (i.e., moist soils in montane coniferous forests and in meadows, seeps, and bogs) in the Project vicinity.

Forest Service Sensitive Wildlife Species

Ten FSS wildlife species—western pond turtle, northern goshawk, great gray owl, California spotted owl, willow flycatcher, Townsend's western big-eared bat, pallid bat, Sierra Nevada red fox, American marten, and California wolverine—are **known to occur** and one FSS wildlife species—FYLF—is identified as **potentially occurring** in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project. Refer to Appendix J for a description of the life history of each species. Refer to Appendices A and C and Figure

5-2 for more information on the occurrence of each of these species in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project.

Western pond turtle* (Actinemys marmorata) *FSS, CSC

There are known populations of WPT at Shaver Lake, Camp 62 Creek, Stevenson Creek, North Fork Stevenson Creek, Dam 5 Forebay, and Dam 6 Forebay.

Northern goshawk* (Accipiter gentilis) *FSS, SNF MIS, CSC

There are known occurrences of northern goshawk in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project at the Vent Valve House at Huntington-Pitman-Siphon Water Conveyance; Stevenson Creek, Shaver lake Dam to San Joaquin River; and 8S05, Canyon Road (from Powerhouse No. 2 and 8S05E to Powerhouse No. 8) (#21).

Great gray owl* (Strix nebulosa) *FSS, CE (nesting)

There are known occurrences of great gray owl in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project at Shaver Lake Reservoir, and Road 9S58, from Gate to North Fork Stevenson Gage.

California spotted owl* (Strix occidentalis occidentalis) *FSS, SNF MIS, CSC

There are known occurrences of California spotted owl in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project at the EPS–BC1 220 kV Power Transmission Line and the Eastwood Switchyards. There are known occurrences in the vicinity of the following bypass or flow augmented streams: Stevenson Creek, Shaver Lake Dam to San Joaquin River; South Fork San Joaquin River, Florence Lake to Mammoth Pool; Balsam Creek, Forebay to Balsam Creek Diversion; and North Fork Stevenson Creek, Tunnel Outlet to Shaver Lake. There are also known occurrences in the vicinity of road 9S312, Access to Eastwood Substation from Highway 168 (#19).

Willow flycatcher* (Empidonax traillii brewsteri) *FSS, SNF MIS, CE (nesting)

There are known occurrences of willow flycatcher in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project at Shaver Lake Reservoir and Dam and the Bear Creek Diversion Dam. There are known occurrences in the vicinity of the following gaging stations: Bear Creek below Diversion Dam, Bear Creek Conduit at Diversion Dam, South Fork San Joaquin River below Hooper Creek, and Stevenson Creek below Shaver Lake. There are known occurrences in the vicinity of the following water conveyance systems: Bear Inlet Structure at Bear Forebay, Bear Tunnel, and Bear Flowline at Mono-Bear-Siphon; and the Shaver Lake HB Valves. There are known occurrences in the vicinity of the following bypass stream reaches and flow augmented streams: Bear Creek, Diversion to South Fork San Joaquin River; Hooper Creek, Diversion to South Fork San Joaquin River; Stevenson Creek, Shaver Lake dam to San Joaquin River; and South Fork San Joaquin River, Florence Lake to Mammoth Pool. There are also known occurrences in the vicinity of the following roads: Access Road to Shaver Dam south (#49) and Access Road to Shaver Dam north (#83).

Townsend's western big-eared bat (Corynorhinus townsendii) *FSS, CSC*

There are known occurrences of Townsend's western big-eared bat in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project at Tombstone Creek Diversion Piping. There are known roosts at the 102" Valve House at Powerhouse 2A and at the Eastwood School Site.

Pallid bat (Antrozous pallidus) *FSS, CSC*

There are known occurrences of pallid bat in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project at Big Creek Powerhouse No. 8; Tunnel No. 7, at the Huntington-Pitman-Siphon water conveyance system; Florence Lake Reservoir; Shaver Lake Reservoir; Bear Diversion Pool; and Dam 5 Forebay.

Sierra Nevada red fox (Vulpes vulpes necator) *FSS, CT*

There are known occurrences of Sierra Nevada red fox in the vicinity of Big Creek Nos. 2A, 8 and Eastwood, at the gaging station at Florence Lake Reservoir, Shaver Lake Reservoir, and Huntington-Pitman Siphon Conduit Gate 2 Release. There are known occurrences at the following water conveyance structures: Tunnel No. 5 and Adit 1, at Tunnel No. 5, both at Powerhouse No. 2A; Ward Tunnel; and the Steel Conduit with Air Vents, Siphon with 4" and 10" Drain Valves, Vent Valve House, Tunnel No. 7, and Tunnel No. 7 Vent, at Huntington-Pitman-Siphon. There are also known occurrences at the EPS-BC1 220 kV Power Transmission Line and at the following Project roads: Camp Edison Roads (#2) and 8S83 from 8S66 to Huntington-PItman Siphon (#48).

American marten (Martes americana) *FSS, SNF MIS*

There are known occurrences of American marten in the vicinity of Big Creek Nos. 2A, 8 and Eastwood, at the Shaver Lake Reservoir, Camp 62 Creek Diversion, and at the following gaging stations: Camp 62 Creek below Diversion Dam, Mono-Bear Conduit (flow meter near Camp 62), Camp 62 at Diversion Dam, and Chinquapin Creek at Diversion Dam. There are known occurrences in the vicinity of the following water conveyance structures: Camp 62 Adit, Camp 62 Creek Borehole, and Camp 62 Adit Valving. There are known occurrences in the vicinity of the cabin, storage yard, fuel and gasoline, and emergency cabin heating structures at Camp 62. There are known occurrences in the vicinity of the following bypass stream reaches and flow augmented streams: Camp 62 Creek, Diversion to South Fork San Joaquin River; Balsam Creek, Diversion to Big Creek; and Balsam Creek, Forebay to Balsam Creek Diversion. There are also known occurrences in the vicinity of the Camp Edison Campground; Camp Edison Boat Ramp/Launch; Camp Edison Roads (#2); and the trail to Camp 62 Creek Gage and Diversion Dam (#12).

California wolverine (Gulo gulo luteus) *FSS, CT, CFP*

There are known occurrences of California wolverine in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project at the Ward Tunnel water conveyance and the EPS-BC1 220kV Power Transmission Lines.

*Foothill yellow-legged frog (*Rana boylii*) FSS, CSC*

There are no known occurrences of FYLF in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project. However, potential FYLF habitat (i.e., that rated as good or moderate in survey results) was identified along Pitman Creek, Diversion to Big Creek; Big Creek, Dam 5 to San Joaquin River; and Stevenson Creek, Shaver Lake Dam to San Joaquin River.

Sierra National Forest Management Indicator Species

The majority of SNF MIS species known or potentially occurring in the vicinity of the Project are addressed above, with the exception of resident trout, osprey, mule deer, and avian guilds in riparian, oak woodland, meadow edge and mature mixed-conifer habitats. These species are discussed below.

Resident Trout

Resident trout occurring in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project includes rainbow trout, rainbow-golden trout hybrids[2], eastern brook trout, and brown trout. Refer to the Mammoth Pool Project above for further information about resident trout.

Osprey

There are USDA-FS and CNDDB records and incidental sightings reported for osprey and osprey nests, concentrated in the vicinity of the Shaver Lake and along two Project roads. There also is a single osprey report in the vicinity of Florence Lake. Refer to TERR-9, Bald Eagle and Osprey TSRs (SCE 2003; SCE 2004a).

Mule Deer

The North Kings mule deer herd is known to occur in and migrate through the Big Creek Nos. 2A, 8 and Eastwood Project vicinity near Shaver Lake. Both summer and winter range and several migration corridors occur or cross the Project vicinity. Refer to TERR-14, Mule Deer TSRs (SCE 2003; SCE 2004a).

Avian Guilds

Avian guilds in the riparian, oak woodland, meadow edge, and mature mixed-conifer habitats present in the Big Creek Nos. 2A, 8 and Eastwood Project vicinity are considered SNF MIS in the SNF. As stated previously, these avian guilds have not been identified to species by the USDA-FS. See the above Mammoth Pool Project description for a list of avian species that characterize these habitats.

[2] While rainbow-golden trout hybrids indicate that golden trout were stocked in the vicinity at one or more times, no remaining populations of golden trout were identified.

Riparian habitat in the Big Creek Nos. 2A, 8 and Eastwood Project vicinity includes montane, valley and foothill riparian vegetation types; oak woodland habitat includes oak woodland and oak woodland/montane hardwood vegetation types; meadow edge habitat includes the wet montane meadow/wet meadow and dry montane meadow/perennial grassland vegetation types; and mature mixed-conifer habitat includes the Sierran mixed coniferous forest and Sierran mixed coniferous forest with rock substrate vegetation types.

Big Creek No. 3 Project (FERC Project No. 120)

Federally Listed Species

Federally Listed Plant Species

There are no known occurrences of federally listed plant species in the vicinity of the Big Creek No. 3 Project.

Federally Listed Wildlife Species

Three federally listed wildlife species—VELB, bald eagle and American peregrine falcon—are **known to occur** in the vicinity of the Big Creek No 3. Project. Refer to Appendix J for a description of the life history of these species. Refer to Appendices A and C and Figure 5-2 for more information on the occurrence of this species in the vicinity of the Big Creek No. 3 Project.

Valley Elderberry Longhorn Beetle* (Desmocerus californicus dimorphus) *FT, FPD

A total of 515 elderberry shrubs occur in the vicinity of the Big Creek No. 3 Project, eight of which showed signs of beetle occupancy. These shrubs are in the following locations:

- Big Creek Powerhouse No. 3 near the penstocks, rock/sand traps and surge chamber
- 8S05, Canyon Road (from junction with 8S03 to junction with Italian Bar Road) (#21)
- 9S89 from Italian Bar Road east to Powerhouse No. 3 and administrative building (#61)
- Miscellaneous Powerhouse No. 3 roads (i.e., water tank access road and shop) (#5, #13, #127, #215, #256, and #257)

Bald Eagle* (Haliaeetus leucocephalus) *FT, FPD, SNF MIS, CE, CFP

No bald eagle nests have been observed in the vicinity of the Big Creek No. 3 Project. However, wintering bald eagles have been observed in the vicinity of Powerhouse No. 3 on Redinger Reservoir, and appropriate bald eagle foraging habitat is present on the San Joaquin River upstream of Dam 6.

American Peregrine Falcon* (Falco peregrinus anatum) *Former FE (Delisted on 8/20/99), FSS, SNF MIS, CE, CFP

The USDA-FS database has several records of observations in the Project vicinity. No peregrine falcon nests are present in the vicinity of the Big Creek No. 3 Project. However, appropriate nesting and foraging habitat is present in riverine, lacustrine, wetlands, oak woodland, coniferous forest, and riparian habitats near cliffs throughout the Project vicinity.

Forest Service Sensitive Species

Forest Service Sensitive Plant Species

There are no known occurrences of FSS plant species in the vicinity of the Big Creek No. 3 Project.

Hardhead (Mylopharodon conocephalus) FSS

Hardhead occur in the Stevenson Reach of the San Joaquin River (Dam 6 to Redinger Lake), which is the bypass reach of FERC Project No. 120. This species also occurs downstream in Redinger Lake and the San Joaquin River downstream of Redinger Lake, which is part of the non-ALP FERC No. 2017 Project.

Forest Service Sensitive Wildlife Species

Five FSS wildlife species—WPT, northern goshawk, California spotted owl, willow flycatcher, and pallid bat—are **known to occur** and one FSS wildlife species—FYLF—is identified as **potentially occurring** in the vicinity of the Big Creek No. 3 Project. Refer to Appendix J for a description of the life history of each species. Refer to Appendices A and C and Figure 5-2 for more information on the occurrence of each of these species in the vicinity of the Big Creek No. 3 Project.

Western pond turtle* (Actinemys marmorata) *FSS, CSC

There are known occurrences of WPT in the vicinity of the Big Creek No. 3 Project. Additionally, WPT habitat (i.e., that rated as good or moderate in survey results) was identified along the San Joaquin River, Dam 6 to Redinger, and the Dam 6 Forebay.

Northern goshawk* (Accipiter gentilis) *FSS, SNF MIS, CSC (nesting)

There are known occurrences of northern goshawk in the vicinity of the Big Creek No. 3 Project, at Adit 2, Tunnel No. 3 at Powerhouse No. 3; and at 8S05, Canyon Road (from junction with 8S03 to junction with Italian Bar Road) (#21).

California spotted owl* (Strix occidentalis occidentalis) *FSS, SNF MIS, CSC

There are known occurrences of California spotted owl in the vicinity of the Big Creek No. 3 Project, at 8S05, Canyon Road (from junction with 8S03 to junction with Italian Bar Road) (#21).

Willow flycatcher* (Empidonax traillii brewsteri) *FSS, SNF MIS, CE (nesting)

There are known occurrences of willow flycatcher in the vicinity of the Big Creek No. 3 Project, at the trail to Stevenson Creek Gage below Shaver Lake.

Pallid bat* (Antrozous pallidus) *FSS, CSC

There are known occurrences of pallid bat in the vicinity of the Big Creek No. 3 Project, at the Angler Access Stairway at Mammoth Powerhouse, and the Parking Area near Mammoth Powerhouse Gate. There are pallid bat roosts at Tunnel 3, Adits 1, 2 and 3 at the Powerhouse No. 3.

Foothill yellow-legged frog* (Rana boylii) *FSS, CSC

There are no known occurrences of FYLF in the vicinity of the Big Creek No. 3 Project. However, potential FYLF habitat (i.e., that rated as good or moderate in survey results) was identified along the San Joaquin River, Dam 6 to Redinger.

Sierra National Forest Management Indicator Species

The majority of SNF MIS species known or potentially occurring in the vicinity of the Project are addressed above with the exception of resident trout, osprey, mule deer, and avian guilds in riparian, oak woodland, meadow edge and mature mixed-conifer habitats. These species are discussed below.

Resident Trout

Resident trout occurring within the Big Creek No. 3 Project include rainbow trout and brown trout. Refer to the Mammoth Pool Project above for further information about resident trout.

Osprey

There are several USDA-FS and CNDDB records and incidental sightings reported for osprey and osprey nests concentrated in the vicinity of the San Joaquin River and along several Project roads. Refer to TERR-9, Bald Eagle and Osprey TSRs for a complete description (SCE 2003; SCE 2004a).

Mule Deer

The Huntington mule deer herd and San Joaquin deer herd, part of the larger San Joaquin herd, is known to occur in the vicinity of the Big Creek No. 3 Project. Refer to TERR-14, Mule Deer TSRs for a complete description (SCE 2003; SCE 2004a).

Avian Guilds

Avian guilds in the riparian and oak woodland habitats present in the Big Creek No. 3 Project vicinity are considered SNF MIS in the SNF. As stated previously, these avian guilds have not been identified to species by the USDA-FS. See the above Mammoth Pool Project description for a list of avian species that characterize this habitat.

Riparian habitat in the Big Creek No. 3 Project vicinity include montane, valley and foothill riparian vegetation types, and oak woodland habitat includes only the blue oak woodland vegetation type.

6.0 EFFECTS OF PROPOSED ACTION AND MANAGEMENT RECOMMENDATIONS

This section discusses potential impacts on terrestrial resources from continued operations and maintenance of the four Big Creek ALP Projects under the Proposed Action. The evaluation of impacts on biological resources under the federal ESA of 1973 (ESA) requires consideration of both the resource itself and how that resource fits into a regional or local context. An impact is considered "substantial" under the ESA if it jeopardizes the continued existence of a federally listed species. To "jeopardize", as defined in 50 CFR Section 402.22, means to engage in an action that could reasonably be expected, directly or indirectly, to appreciably reduce the likelihood of both the survival and recovery of a listed species in the wild by reducing reproduction, numbers, or distribution.

Similarly, the evaluation of whether impacts on biological resources would result in adverse effects on FSS species requires consideration of both the resource itself and how that resource fits into a regional or local context. Significant impacts are those that would result in a trend toward a sensitive species becoming federally listed.

The assessment first identifies potential resource issues under current Project operations (No Action Alternative) and discusses new environmental measures recommended in the Proposed Action for each of the four Big Creek ALP Projects (Section 4.0). Potential resource issues include:

- Protection of special-status plant species
- Protection of VELB and their habitat
- Protection of special-status amphibians and reptiles and their habitat
- Protection of raptors on Project structures (powerlines or transmission lines)
- Protection of active raptor nests and bald eagle wintering roosts
- Protection of breeding habitat of riparian-nesting songbirds
- Protection of special-status bats
- Protection of mesocarnivore habitat and denning sites
- Protection of special-status species at newly identified Project facilities, roads, and trails
- Protection of special-status species prior to construction of new Project facilities
- Protection of Sierra National Forest Management Indicator Species

6.1 MAMMOTH POOL (FERC PROJECT NO. 2085)

Protection of Special-status Plant Species

Upland special-status plant species, including Mono Hot Springs evening primrose, flaming trumpet and Yosemite lewisia, are known to occur in the vicinity of the Mammoth Pool Project. Impact analyses show that, under the No Action Alternative, routine maintenance activities in the Project vicinity may result in loss of Mono Hot Springs evening primrose as a result of trimming by hand and with equipment, or use of herbicides.

Under the Proposed Action, SCE will enhance protection of special-status plant populations through implementation of AP measures included in the Vegetation and Integrated Pest Management Plan and implementation of several environmental programs. AP measures include:

- Development of buffer areas around and documentation of special-status plant populations
- Monitoring of the effectiveness of AP measures
- Conducting special-status plant surveys in the vicinity of the four Big Creek ALP Projects following methods employed during Big Creek ALP studies

Environmental programs that SCE will implement to further protect special-status plant species are described in Section 4.0 and include:

- Northern Hydro Special-status Species Information Program (NHSSIP)
- Environmental Training Program
- Environmental Compliance Program

FSS moss species potentially occurring in the Project vicinity include Bolander's candle moss, three-ranked hump moss, and broad-nerved hump moss. These species occur in moist soils in montane coniferous forests and in meadows, seeps, and bogs. Minimum instream flows (MIF) recommended under the Proposed Action would either maintain or enhance appropriate habitats in floodplains that may support these species. Project operations and maintenance activities conducted in the Project vicinity under the Proposed Action will not result in the disturbance and/or removal of these species or their habitats.

Protection of VELB and their Habitat

Forty-two elderberry shrubs below 3,000 feet elevation, which represent VELB habitat, occur in the vicinity of the Mammoth Pool Project. The shrubs occur along the following roads:

- 9S42, Mammoth Pool Powerhouse Transmission Line Access Road from gate near County Road 225, Italian Bar Road, to 8S44 (#18)

- 8S03, from Big Creek Powerhouse No. 8 to Mammoth Pool Powerhouse (#33)

Vegetation management activities, including trimming by hand and equipment, and road maintenance activities could potentially affect VELB habitat (i.e., elderberry shrubs) under the No Action Alternative.

Under the Proposed Action, SCE will implement the USFWS-approved VELB Management Plan (Appendix E) to enhance the protection of VELB and their habitat. This plan includes the following enhancement measures:

- Identification of protected areas

- Measures to protect VELB and their habitat during vegetation management and road maintenance

- Mitigation measures for trimming of stems and branches

- Mitigation monitoring and reporting

Several training programs will also be implemented by SCE under the Proposed Action to enhance the protection of VELB and their habitat. These include:

- Environmental Training Program

- ESAP

- NHSSIP

- Environmental Compliance Program

Protection of Special-status Amphibians and Reptiles and their Habitats

There are no known populations of foothill yellow-legged frog (FYLF) in the vicinity of the Mammoth Pool Project. However, potential FYLF habitat (i.e., that rated as good or moderate in survey results) was identified in Rock Creek, Ross Creek, San Joaquin River, and Mammoth to Dam 6.

There are known populations of western pond turtle (WPT) in Rock Creek and Ross Creek. Additionally, potential turtle habitat (i.e., that rated as good or moderate in survey results) was identified in Rock Creek, Ross Creek, San Joaquin River, and Mammoth to Dam 6.

Under the Proposed Action, five environmental measures are recommended to enhance aquatic habitat and address water quality issues. These measures include higher minimum instream flow (MIF) requirements such as implementation of Sediment

Management Prescriptions, Vegetation and Integrated Pest Management Plan (specifically BMPs for use of herbicides and pesticides), Temperature Monitoring and Control Plan, and Flow Monitoring and Reservoir Water Level Measurement Plan.

Several training programs will also be implemented under the Proposed Action to enhance the protection of special-status amphibians and reptiles and their habitat. These include:

- Environmental Training Program
- ESAP
- NHSSIP
- Environmental Compliance Program

Implementation of these measures under the Proposed Action will either maintain or enhance habitat for amphibians and aquatic reptiles. However, these actions will also likely enhance habitat for non-native fish species. This may continue to limit the presence of suitable aquatic habitat in the vicinity of this Project.

Protection of Raptors on Project Structures (Power Lines or Transmission Lines)

Several raptor species are known, or could potentially occur, in the vicinity of the Mammoth Pool Project. These include bald eagle, American peregrine falcon, osprey, northern goshawk, and California spotted owl. While there have been no known raptor mortalities on the MPPH–BC3 220 kV Transmission Line, this powerline structure does not meet APLIC guidelines and, therefore, may pose a potential risk to raptors.

Under the Proposed Action, specific measures and programs identified in the Bald Eagle Management Plan (Appendix H) will be implemented to enhance protection of raptors from electrocution on Project powerline structures. These include:

- Reporting of raptor mortality
- Retrofitting of Project distribution powerline structures with raptor safe designs during on-going maintenance
- Protection of active and inactive nests on Project powerline structures

Under the Proposed Action, SCE will also implement the Avian Protection Program (APP) to inform SCE Personnel of the appropriate procedures and measures to follow when conducting maintenance activities on Project powerline structures. Several additional training programs that will enhance the protection of raptors and their habitat include:

- Environmental Training Program

- ESAP
- Avian Protection Program (APP)
- NSSHIP
- Environmental Compliance Program

Protection of Active Raptor Nests and Bald Eagle Wintering Roosts

As stated above, several raptor species could potentially nest in the Project vicinity. Additionally, there are potential bald eagle wintering roosts at the Mammoth Pool reservoir in the vicinity of the following roads:

- Mammoth Pool Fishwater Generator access road from 6S25, Mammoth Pool Road, to the base of Mammoth Pool Dam (#6)
- 9S42, Mammoth Pool Powerhouse Transmission Line access road from the gate near County Road 225, Italian Bar Road, to 8S44 (#18)

Under the No Action Alternative, vegetation management activities may disturb raptor species potentially nesting in the Project vicinity. All Project vegetation management activities, such as trimming with equipment and road maintenance activities, including paving/graveling and grading, occur during summer months and, therefore, should not disturb bald eagle wintering roosts.

Under the Proposed Action, SCE will implement the Bald Eagle Management Plan (Appendix H), Vegetation and Integrated Pest Management Plan, and several environmental programs to enhance protection of active raptor nests.

AP measures specified in the Bald Eagle Management Plan (Appendix H) include requiring SCE to obtain necessary permission and permits prior to removal of or actions to active raptor nests (eggs, young and incubating adults present) and inactive bald eagle (non-breeding)).

AP measures specified in the Vegetation and Integrated Pest Management Plan to protect active raptor nests during vegetation maintenance activities include:

- Monitoring the location and status of raptor nests through surveys and/or communication with appropriate agencies
- Delineation of a species-specific sensitive area around active nests in areas where maintenance activities are scheduled
- Staging of all equipment outside the sensitive area
- Conducting management activities continuously through the sensitive area without stopping

SCE will also implement the following programs to enhance the protection of raptor nests and bald eagle wintering roosts in the Mammoth Pool Project vicinity:

- Environmental Training Program
- ESAP
- APP
- NSSHIP
- Environmental Compliance Program

Protection of Breeding Habitat for Riparian-Nesting Songbirds

Riparian-nesting songbirds could potentially occur in the vicinity of the Mammoth Pool Project, including the willow flycatcher. SCE does not implement maintenance activities that would result in removal of breeding habitat for these species. MIF recommended as part of the Proposed Action would either maintain or enhance riparian habitat for riparian-nesting songbirds.

Under the Proposed Action, implementation of training programs will also enhance the protection of riparian-nesting songbirds and their habitat, including:

- Environmental Training Program
- ESAP
- NHSSIP
- Environmental Compliance Program

Protection of Special-status Bats

Special-status bat species are not known to occur in the vicinity of the Mammoth Pool Project. Therefore, no enhancement measures are proposed.

Protection of Mesocarnivore Habitat and Denning Sites

There are no known occurrences of mesocarnivores in the vicinity of the Mammoth Pool Project. Potential habitat has been identified in the Project vicinity for Pacific fisher. However, there are no known mesocarnivore denning sites, and Project operations and maintenance activities would not result in removal of appropriate habitat for these species.

Under the Proposed Action, several training programs will be implemented that will enhance the protection of mesocarnivores and their habitat. These include:

- Environmental Training Program
- ESAP
- NHSSIP
- Environmental Compliance Program

Additionally, to protect mesocarnivores from the possibility of secondary poisoning from rodenticides used to control unwanted vertebrate pests on earthen dams, SCE will apply pesticides according to permit requirements and implement the following Best Management Practices (BMPs) for the use of pesticides, as specified in the Vegetation and Integrated Pest Management Plan. Applicable BMPs include:

- BMP 5.8 - Pesticide Application According To Label Directions and Applicable Legal Requirements
- BMP 5.9 - Pesticide Application Monitoring and Evaluation
- BMP 5.10 - Pesticide Spill Contingency Planning
- BMP 5.11 - Cleaning and Disposal of Pesticide Containers and Equipment

Protection of Special-status Species at Newly Identified Project Facilities, Roads, and Trails

SCE has recently identified several roads to be included in the Mammoth Pool Project. These roads were identified following completion of surveys for the Big Creek ALP Projects. There are no CNDDB or USDA-FS records for special-status plant species along these roads. Under the No Action Alternative, implementation of vegetation management including trimming by hand and with equipment, and road maintenance activities including grading/graveling of unpaved roads, paving or patching of existing paved roads, and cleaning of culverts and ditches could result in removal or disturbance of special-status plant populations and VELB or their habitat potentially present.

Under the Proposed Action, SCE will complete focused surveys for special-status plants and VELB to document the presence of special-status resources in the vicinity of the newly identified Project roads. Surveys will follow agency- and stakeholder-approved survey methods as described in the FTSPP (SCE 2001). If special-status resources are identified, SCE will implement AP measures specified in the Vegetation and Integrated Pest Management Plan and/or VELB Management Plan. If it is determined that future maintenance activities would result in trimming of one or more elderberry shrub branches or stems ≥ 1 inch in diameter, SCE will follow the mitigation approaches described in the VELB Management Plan and consult with USFWS to adequately mitigate for potential project effects.

Refer to the Vegetation and Integrated Pest Management Plan for a list of the newly identified roads to be surveyed in the Mammoth Pool Project vicinity.

Protection of Special-status Species at New Helicopter Landing Sites to be Developed

Under the Proposes Action, SCE would develop two new helicopter landing sites in the Mammoth Pool Project vicinity, at the Mammoth Pool Dam and at San Joaquin River above Shakeflat Creek. Development of these sites will require removal of several trees and shrubs.

There are no CNDDB or USDA-FS records for special-status plants in the vicinity of these proposed helicopter landing sites. Prior to development of these sites, SCE will complete focused surveys for special-status plants. Surveys will follow agency- and stakeholder-approved survey methods as described in the FTSPP (SCE 2001). SCE will locate the landing pad to avoid effects to any special-status species that are identified during surveys.

Because both of these helicopter landing sites are above 3,000 feet in elevation and VELB are not known to grow above this elevation (see VELB Management Plan), SCE will not conduct surveys for VELB and potential VELB habitat.

Bald eagle and osprey are known to occur on the reservoir and along the San Joaquin River in the vicinity of these two sites. If construction is proposed to occur during raptor nesting season (i.e., April through August) SCE will conduct clearance surveys for bald eagle nests and/or other active raptor nests prior to development of the helicopter landing sites. If construction is proposed to occur during winter, SCE will complete all work activities during daylight hours (i.e., 9:00 a.m. to 4 p.m.) to avoid disturbance of bald eagle night roosts. SCE will locate the landing pad to avoid effects to any nest trees, and site development activities (i.e., tree removal) will be scheduled to avoid disturbance of active raptor nests identified during surveys.

Protection of Special-status Species Prior to Construction of New Project Facilities

If new Project facilities not evaluated in this document must be constructed following issuance of the new License, construction activities could result in adverse effects on special-status species. Under the Proposed Action, SCE will implement the proposed Special-status Species License Article which states that prior to construction of new Project features not evaluated in this BA/BE on National Forest Service land that may affect Forest Service special–status species and their habitat (i.e., Forest Service sensitive and/or management indicator species), SCE will prepare a Biological Evaluation to describe the potential impact of the action on the species or its habitat. For state or federally listed species, federal candidate (FC), California Species of Concern (CSC), and California Fully Protected (CFP) species, SCE will prepare a Biological Assessment or other required document and obtain any necessary permits or approvals.

Protection of Sierra National Forest Management Indicator Species

The majority of SNF MIS species known or potentially occurring in the vicinity of the Project are addressed above with the exception of resident trout, osprey, mule deer,

and avian guilds in riparian, oak woodland, meadow edge and mature mixed-conifer habitats. These species are discussed below.

Resident Trout

Resident trout including rainbow trout and brown trout are known to occur in the Mammoth Pool Project vicinity.

Under the Proposed Action, five environmental measures are recommended to enhance aquatic habitat and address water quality issues in the vicinity of the Mammoth Pool Project that will also improve habitat quality for trout. These measures include higher MIF requirements, implementation of the Sediment Management Prescriptions (SCE 2007b), Vegetation and Integrated Pest Management Plan (specifically BMPs for the use of herbicides and pesticides), Temperature Monitoring and Control Plan, and Flow Monitoring Plan and Reservoir Water Level Measurement Plan. Implementation of these measures would enhance habitat for resident trout.

Osprey

Ospreys are known to occur in the vicinity of the Mammoth Pool Reservoir. See *Protection of Raptors on Project Structures (Power Lines or Transmission Lines),* and *Protection of Active Raptor Nests and Bald Eagle Wintering Roosts*, above, for measures and programs that will be implemented during the term of the license to protect nesting osprey.

Mule Deer

The San Joaquin mule deer herd crosses Mammoth Pool Reservoir as they migrate from their winter habitat at 1,200 to 3,600 feet in elevation to their breeding grounds at 6,000 to 10,000 feet in elevation.

Under the Proposed Action, SCE will implement the proposed Mule Deer License Article (SCE 2007b) to enhance protection of deer crossing Mammoth Pool Reservoir during spring migration. This includes maintaining existing facilities in Mammoth Pool to protect mule deer migration, placement of sand on the dam road, implementation of road closures, and monitoring the presence of debris build-up in the reservoir.

Avian Guilds

Riparian, oak woodland, meadow edge, and mature mixed-conifer habitats have been identified at various locations within the Mammoth Pool Project vicinity. Under the Proposed Action, ongoing O/M activities will not result in removal of these upland or riparian habitats. If new Project facilities not covered in this BA/BE are proposed in the future, SCE will comply with the proposed Special-status Species License Article (SCE 2007b) to protect avian guilds associated with these habitats.

6.2 BIG CREEK NOS. 1 AND 2 (FERC PROJECT NO. 2175)

Protection of Special-status Plant Species

Subalpine fireweed is known to occur in the vicinity of Big Creek Nos. 1 and 2 Project facilities.

Under the Proposed Action, SCE will implement the measures and programs specified in the Vegetation and Integrated Pest Management Plan to enhance protection of special-status plant populations documented in the Project area. See Mammoth Pool Project (FERC Project No. 2085) above for a description of these measures.

Several aquatic, wetland, and riparian special-status species have the potential to occur in the Project vicinity. These include Bolander's candle moss, three-ranked hump moss, and broad-nerved hump moss, which occur in moist soils in montane coniferous forests and in meadows, seeps, and bogs. Veined water lichen, which occurs in streams in mixed conifer forests, also could potentially occur in the Project vicinity. MIF recommended under the Proposed Action would either maintain or enhance appropriate habitats in the floodplains that may support these species. Project operations and maintenance activities conducted in the Project vicinity under the Proposed Action will not result in the disturbance and/or removal of these species or their habitats.

Protection of VELB and their Habitat

No occurrences of VELB or their habitat (elderberry shrubs below 3,000 feet in elevation) were detected during VELB surveys in the Big Creek Nos. 1 and 2 Project vicinity.

Protection of Special-status Amphibians and Reptiles and their Habitat

There are no known populations of FYLF in the vicinity of the Big Creek Nos. 1 and 2 Project. However, potential FYLF habitat (i.e., that rated as good or moderate in survey results) was identified at the following in Ely Creek, Big Creek from Huntington Lake to Dam 4, and Big Creek between Dam 4 to Dam 5.

There are known populations of MYLF within the vicinity of Huntington Lake Reservoir. Potential MYLF habitat (i.e., that rated as good or moderate in survey results) was identified along Ely Creek; Big Creek, Huntington Lake to Dam 4; Big Creek, Dam 4 to Dam 5; and the Dam 4 Forebay.

There are known populations of YT in the vicinity of Huntington Lake Reservoir.

No known populations of WPT were detected during surveys in the vicinity of the Big Creek Nos. 1 and 2 Project. However, there are agency records of WPT occurrences, and potential habitat (i.e., that rated as good or moderate in survey results) was identified along Ely Creek, Big Creek; Big Creek, Huntington Lake to Dam 4; and Big Creek, Dam 4 to Dam 5.

Under the Proposed Action, five environmental measures are recommended to enhance aquatic habitat and address water quality issues. These measures include higher MIF requirements, implementation of the Sediment Management Prescriptions, Vegetation and Integrated Pest Management Plan (specifically BMPs for use of herbicides and pesticides), Temperature Monitoring and Control Plan, and Flow Monitoring and Reservoir Water Level Measurement Plan.

Several training programs will be implemented under the Proposed Action to enhance the protection of special-status amphibians and reptiles and their habitat. See the Mammoth Pool Project (FERC Project No. 2085) above for a brief description of these measures and programs. Implementation of these measures under the Proposed Action will either maintain or enhance habitat for amphibians and aquatic reptiles. However, these measures will also likely enhance habitat for non-native fish species. This will likely continue to limit the presence of suitable habitat in this Project vicinity.

Protection of Raptors on Project Structures (Power Lines or Transmission Lines)

Special-status raptor species are known or could potentially occur in the vicinity of the Big Creek Nos. 1 and 2 Project. These include bald eagle, American peregrine falcon, osprey, northern goshawk, great gray owl, and California spotted owl. While there have been no known raptor mortalities on the Musick 7 kV powerline, the powerline does not meet APLIC guidelines and therefore, may pose a potential risk to raptors.

Under the Proposed Action, specific measures and programs identified in the Bald Eagle Management Plan (Appendix H) will be implemented to enhance protection of raptors from electrocution on Project structures. See Mammoth Pool Project above for a description of these measures and programs.

Protection of Active Raptor Nests and Bald Eagle Wintering Roosts

There is one known active bald eagle nest and one known active peregrine falcon nest in the Big Creek Nos. 1 and 2 Project vicinity, and other raptors could potentially nest or roost in the area.

The known bald eagle nest is located at the eastern end of Huntington Lake. The known peregrine falcon nest is in the vicinity of the following Project roads:

- 8S301, from gate with 8S66T to penstock surge pipes (#28); and
- 8S302, access to Big Creek No. 1 42-inch gatehouse (#47).

Under the No Action Alternative, vegetation management activities, such as trimming with equipment, and road maintenance activities, including paving/graveling and grading, may disturb breeding falcons.

Under the Proposed Action, SCE will implement measures identified in the Bald Eagle Management Plan (Appendix H) to enhance protection of active raptor nests on Project powerline structures. To protect active nests during vegetation maintenance activities,

SCE will implement measures specified in the Vegetation and Integrated Pest Management Plan. See the Mammoth Pool Project above for a brief description of these measures.

Adverse effects on bald eagle and peregrine falcon are not expected to occur from recreation activities. Recreation, including camping, flat-water boating, and use of interpretive and day-use areas, are ongoing at Huntington Lake and associated recreation facilities. These activities are limited to existing facilities and the reservoir. Despite possible disturbance from these activities during nesting season, special-status raptors (e.g., bald eagle and peregrine falcon) have continued to nest or have initiated nesting in the vicinity of these facilities. Continued recreation activities and use of these facilities at the existing intensity and frequency would not result in adverse effects to nesting raptors.

Protection of Breeding Habitat for Riparian-Nesting Songbirds

Riparian-nesting songbirds, such as the willow flycatcher, could potentially occur in the Big Creek Nos. 1 and 2 Project vicinity. SCE does not implement maintenance activities that would result in removal of breeding habitat for these species. MIF recommended under the Proposed Action would either maintain or enhance riparian habitat for these species. Training programs will also enhance the protection of riparian-nesting songbirds and their habitat. See Mammoth Pool Project above for a description of these measures and programs.

Protection of Special-status Bats

Western red bats are known to occur in the vicinity of the Big Creek Nos. 1 and 2 Project.

Under the Proposed Action, SCE will implement the proposed Special-status Bat Species License Article (SCE 2007b) which states that SCE will consult with CDFG and USDA-FS prior to conducting any non-routine maintenance activities to enhance protection of special-status bats. Several training programs will also be implemented under the Proposed Action to enhance protection of special-status bats, which include:

- Environmental Training Program
- ESAP
- NHSSIP
- Environmental Compliance Program

Protection of Mesocarnivore Habitat and Denning Sites

Mesocarnivores known or potentially occurring in the Project vicinity includes Sierra Nevada red fox, American marten, Pacific fisher, and California wolverine. Potential habitat for all of these species has been identified in the Project vicinity. There are no

known denning sites in the Project vicinity and Project operation and maintenance activities would not result in removal of appropriate habitat for these species.

Under the Proposed Action, several training programs will enhance the protection of mesocarnivores and their habitat, and implementation of BMPs for the use of rodenticides and programs, as specified in the Vegetation and Integrated Pest Management Plan would enhance protection of these species. See Mammoth Pool Project above for a description of these measures and programs.

Protection of Special-status Species at Newly Identified Project Facilities, Roads, and Trails

SCE has recently identified several roads and one helicopter landing site to be included in the Big Creek Nos. 1 and 2 Project. These roads and the helicopter landing site were identified following completion of surveys for the Big Creek ALP Projects. There are no CNDDB or USDA-FS records for special-status plant species at these locations. Under the No Action Alternative, implementation of vegetation management including trimming by hand and with equipment, and road maintenance activities including grading/graveling of unpaved roads, paving or patching of existing paved roads, and cleaning of culverts and ditches could result in removal or disturbance of special-status plant populations and VELB or their habitat potentially present.

Under the Proposed Action, SCE will complete focused surveys for special-status plants and VELB to document the presence of special-status resources in the vicinity of the newly identified Project roads and helicopter landing site. If special-status resources are identified, SCE will implement AP measures specified in the Vegetation and Integrated Pest Management Plan and/or VELB Management Plan. If it is determined that future maintenance activities would result in trimming of one or more elderberry shrub branches or stems ≥ 1 inch in diameter, SCE will follow the mitigation approaches described in the VELB Management Plan and consult with USFWS to adequately mitigate for potential project effects.

Refer to the Vegetation and Integrated Pest Management Plan for a list of the newly identified roads and helicopter landing site to be surveyed in the Big Creek Nos. 1 and 2 Project vicinity.

Protection of Special-status Species Prior to Construction of New Project Facilities

If new Project facilities not evaluated in this document must be constructed following issuance of the new License, construction activities could result in adverse effects on special-status species. Under the Proposed Action, SCE will implement the proposed Special-status Species License Article which states that prior to construction of new Project features not evaluated in this BA/BE on National Forest Service Land that may affect Forest Service special-status species and their habitat (i.e., Forest Service sensitive and/or management indicator species), SCE will prepare a Biological Evaluation to describe the potential impact of the action on the species or its habitat. For state or federally listed species, FC, CSC, CFP species, SCE will prepare a

Biological Assessment or other required document and obtain any necessary permits or approvals.

Sierra National Forest Management Indicator Species

The majority of SNF MIS species known or potentially occurring in the vicinity of the Project are addressed above with the exception of resident trout, osprey, mule deer, and avian guilds in riparian, oak woodland, meadow edge and mature mixed-conifer habitats. These species are discussed below.

Resident Trout

Resident trout including rainbow trout, rainbow-golden trout hybrids, and brown trout are known to occur in the Big Creek Nos. 1 and 2 Project vicinity.

Under the Proposed Action, five environmental measures are recommended to enhance aquatic habitat and address water quality issues in the vicinity of the Big Creek Nos. 1 and 2 Project that will also improve habitat quality for trout. See Mammoth Pool Project above for a description of these measures.

Osprey

Ospreys are known to occur in the Project in the vicinity of Huntington Lake. See *Protection of Raptors on Project Structures (Power Lines or Transmission Lines),* and *Protection of Active Raptor Nests and Bald Eagle Wintering Roosts*, above, for measures and programs that will be implemented during the term of the license to protect nesting osprey.

Mule Deer

The Huntington mule deer herd (part of the larger San Joaquin herd) is known to forage year round in, and migrate through, the Big Creek Nos. 1 and 2 Project vicinity. However, Project facilities, roads, and trails do not impede or prevent mule deer migration. There are no anticipated impediments to mule deer migration or substantial changes in habitat in the Big Creek Nos. 1 and 2 Project vicinity.

Avian Guilds

Riparian, oak woodland, meadow edge, and mature mixed-conifer habitats have been identified at various locations within the Big Creek Nos. 1 and 2 Project vicinity. Under the Proposed Action, ongoing O/M activities will not result in removal of these upland or riparian habitats. See Mammoth Pool Project above for a description of measures to protect avian guilds in these habitats.

6.3 BIG CREEK NOS. 2A, 8 AND EASTWOOD (FERC PROJECT NO. 67)

Protection of Special-status Plant Species

Upland special–status species, including Mono Hot Springs evening primrose and short-leaved hulsea, are known to occur in the Big Creek Nos. 2A, 8 and Eastwood Project vicinity. Impact analyses indicate that, under existing Project operations (No Action Alternative), losses of Mono Hot Springs evening primrose and short-leaved hulsea could result from vegetation management, including trimming by hand and herbicide use, at various locations in the Project vicinity.

Under the Proposed Action, SCE will implement the measures and programs as specified in the Vegetation and Integrated Pest Management Plan. See Mammoth Pool Project (FERC Project No. 2085) above for a description of these measures and programs.

Several aquatic, wetland, and riparian special-status species are known to occur or have the potential to occur in the Project vicinity. Special-status moss species potentially occurring in the Project vicinity include Bolander's candle moss, three-ranked hump moss, and broad-nerved hump moss. These species occur in moist soils in montane coniferous forests and in meadows, seeps, and bogs. Veined water lichen, which occurs in streams in mixed conifer forests, also could potentially occur in the Project vicinity. MIF and CRMF recommended under the Proposed Action would either maintain or enhance appropriate habitats in the floodplains that may support these species. Project operations and maintenance activities conducted in the Project vicinity under the Proposed Action will not result in the disturbance and/or removal of these species or their habitats.

Potential resource issues from work activities necessary to decommission the North and South Slide Creek diversions, Crater Creek Diversion, and Tombstone Creek Diversion structures and associated ancillary features include removal or disturbance of special-status plant populations as a result of equipment use or foot traffic. Mono Hot Springs evening primrose is known to occur in the vicinity of these diversions. Under the Proposed Action, this special-status plant species would be protected during the decommissioning by the measures and programs specified in the Vegetation and Integrated Pest Management Plan and the Decommissioning Plan.

Protection of VELB and their Habitat

Fifteen elderberry shrubs below 3,000 feet elevation, which represent VELB habitat, are known to occur in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project. These shrubs occur in the vicinity of Powerhouse No. 8, Tunnel 8, and along the access road to Powerhouse No. 8 from 8S03. Vegetation management activities, including trimming by hand and equipment and herbicide use, and road maintenance activities, including road grading, graveling/paving, and maintenance of culverts/ditches/water bars, could affect VELB and their habitat under existing Project operations (No Action Alternative).

Under the Proposed Action, SCE has developed a VELB Management Plan (Appendix E) to enhance the protection of VELB and their habitat. Implementation of measures and programs defined in this Plan would enhance protection of VELB. See the Mammoth Pool Project above for a description of these measures.

Protection of Special-status Amphibians and Reptiles and their Habitat

There are no known populations of FYLF in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project. However, potential FYLF habitat (i.e., that rated as good or moderate in survey results) was identified along Pitman Creek, Diversion to Big Creek; Big Creek, Dam 5 to San Joaquin River; and Stevenson Creek, Shaver Lake Dam to San Joaquin River.

There are no known populations of MYLF within the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project. However, potential MYLF habitat (i.e., that rated as good or moderate in survey results) was identified along Tombstone Creek, Crater Creek, Chinquapin Creek, Camp 62 Creek, Bolsillo Creek, Bear Creek, Mono Creek, Pitman Creek, Stevenson Creek, Balsam Creek, South Fork San Joaquin River, Florence Lake to Mammoth Pool, North Fork Stevenson Creek, Florence Lake dam arches, Bear Diversion Pool, Mono Diversion Pool, and Dam 5 Forebay.

There are known populations of YT in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project Crater Creek. Potential YT habitat (i.e., that rated as good or moderate in survey results) was identified at Tombstone Creek, South Fork San Joaquin River, and Florence Lake to Mammoth Pool.

There are known populations of WPT at Camp 62 Creek, Stevenson Creek, North Fork Stevenson Creek, Dam 5 Forebay, and Dam 6 Forebay.

Under the Proposed Action, five environmental measures are recommended to enhance aquatic habitat and address water quality issues. These measures include higher MIF requirements, and implementation of the Sediment Management Prescriptions, Vegetation and Integrated Pest Management Plan (specifically BMPs for use of herbicides and pesticides), Temperature Monitoring and Management Plan and Flow Monitoring and Reservoir Water Level Measurement Plan. Several training programs will also be implemented under the Proposed Action to enhance the protection of special-status amphibians and reptiles and their habitat. See the Mammoth Pool Project above for a brief description of these measures and programs. Implementation of these measures under the Proposed Action will either maintain or enhance habitat for amphibians and aquatic reptiles. However, these actions will also likely enhance habitat for non-native fish species. This will likely continue to limit the presence of suitable aquatic habitat in the vicinity of this Project.

As stated under the No Action Alternative, North and South Slide Creek diversions, Crater Creek Diversion and Tombstone Creek Diversion are currently out of service. The decommissioning of these diversions under the Proposed Action would permanently return a portion of these bypass reaches to free-flowing conditions and

would likely continue to maintain downstream meadows adjacent to Tombstone Creek (Jackass Meadow) that represents potential habitat for YT and MYLF. However, if extensive non-Project-related historic grazing and recreation continue in these meadows and stream reaches, habitat for these special-status amphibians would continue to be limited.

Protection of Raptors on Project Structures (Power Lines or Transmission Lines)

Several special-status raptor species are known or could potentially occur in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project. These include bald eagle, peregrine falcon, osprey, northern goshawk, great gray owl, and California spotted owl. While there have been no known raptor mortalities on the EPS-BC1 220kV power transmission line, this transmission line does not meet APLIC guidelines, and therefore may pose a potential risk to raptors.

Under the Proposed Action, specific measures and programs identified in the Bald Eagle Management Plan (Appendix H) will be implemented to enhance protection of raptors from electrocution on Project powerline structures. See the Mammoth Pool Project above for a description of these measures.

Protection of Active Raptor Nests and Bald Eagle Wintering Roosts

As stated above, several raptor species are known or could potentially nest in the Project area. There are known osprey and bald eagle nests, and potential bald eagle wintering roosts in the Project vicinity, and other raptors could potentially nest or roost in the area.

The potential bald eagle wintering roosts are in the vicinity of the road 8S05, Canyon Road (Powerhouse No. 2 and 9S05E to Powerhouse No. 8) (#21). The known bald eagle nest is on the south shore of Shaver Lake. The known osprey nests are in the vicinity of two access roads to Shaver Dam from Highway 168 (#83 and #49).

Under the No Action Alternative, the bald eagle nest at Shaver Lake is not in the direct vicinity of any Project roads or facilities, and will therefore not be affected by routine O/M activities. However, vegetation management activities, such as trimming by equipment and road maintenance activities, including paving/graveling and grading, may disturb breeding osprey. All Project vegetation management activities, such as trimming with equipment and road maintenance activities, including paving/graveling and grading, occur during summer months and, therefore, should not disturb bald eagle wintering roosts.

Under the Proposed Action, SCE will implement measures identified in the Bald Eagle Management Plan (Appendix H) to enhance protection of active raptor nests on Project structures. To protect active nests during vegetation maintenance activities, SCE will implement measures specified in the Vegetation and Integrated Pest Management Plan. See the Mammoth Pool Project above for a brief description of these measures.

Adverse effects on raptor species are not expected to occur from recreation activities in the Project vicinity. Recreation, including camping, flat-water boating, and use of interpretive and day-use areas, are ongoing at Shaver Lake and associated recreation facilities. These activities are limited to existing facilities and the reservoir. Despite possible disturbance from these activities during nesting season, special-status raptors (e.g., bald eagle and peregrine falcon) have continued to nest or have initiated nesting in the vicinity of these facilities. Continued recreation activities and use of these facilities at the existing intensity and frequency would not result in adverse effects to nesting raptors.

Short-term, temporary disturbance resulting from work activities necessary to decommission the North and South Slide Creek diversions, Crater Creek Diversion, and Tombstone Creek Diversion structures may affect two special-status raptors—bald eagle and California spotted owl—that are known to occur in the vicinity of these diversions. There are no known raptor nests in the vicinity of these diversions. Measures to protect these species will be included in the Decommissioning Plan and Agency permit conditions.

Protection of Breeding Habitat for Riparian-Nesting Songbirds

Riparian-nesting songbirds that are known or could potentially occur in the Big Creek Nos. 2A, 8 and Eastwood Project vicinity include willow flycatcher. Riparian habitat along Tombstone Creek, Crater Creek, Mono Creek, Bolsillo Creek, Bear Creek, Stevenson Creek (Shaver Lake Dam to San Joaquin River) and North Fork Stevenson Creek bypass stream reaches may represent breeding habitat for riparian nesting songbirds. However, grazing (under USDA-FS grazing leases) in the vicinity of Tombstone Creek, Crater Creek, Mono Creek, Stevenson Creek (Shaver Lake Dam to San Joaquin River), and North Fork Stevenson Creek bypass stream reaches may adversely impact this habitat.

SCE does not implement maintenance activities that would result in removal of breeding habitat for these species. MIF and CRMF recommended in the Proposed Action would either maintain or enhance riparian habitat for these species. Training programs implemented under the Proposed Action will also enhance the protection of riparian-nesting songbirds and their habitat. See the Mammoth Pool Project above for a description of these measures.

Protection of Special-status Bats

FSS bat species, including Townsend's big-eared bat and pallid bat, are known to occur in the Project vicinity. Additionally, Townsend's big-eared bat is known to roost at a valve house at Big Creek Powerhouse No. 2A and at the Eastwood School storage yard.

Under the Proposed Action, SCE will implement the proposed Special-status Bat Species License Article (SCE 2007b) and training programs to avoid disturbance of

special-status bat species. See the Big Creek Nos. 1 and 2 Project above for a brief description of these measures.

Work activities necessary to decommission the Tombstone Creek Diversion structures and ancillary features may cause disturbance to Townsend's big-eared bat, which are known to occur in the vicinity of the Tombstone Creek diversion piping. These bats would be protected during the decommissioning process in compliance with the Special-status Bat License Article and Decommissioning Plan.

Protection of Mesocarnivore Habitat and Denning Sites

Mesocarnivores known or potentially occurring in the Project vicinity include Sierra Nevada red fox, American marten, Pacific fisher, and California wolverine. Potential habitat has been identified for these four species in the vicinity of the Project. There are no known denning sites in the Project vicinity and routine operations and maintenance activities would not result in removal of appropriate habitat for these species.

Under the Proposed Action, several training programs will enhance the protection of mesocarnivores and their habitat, and implementation of BMPs for the use of rodenticides and programs, as specified in the Vegetation and Integrated Pest Management Plan, would enhance protection of these species. See the Mammoth Pool Project above for a description of these measures.

Protection of Special-status Species at Newly Identified Project Facilities, Roads, and Trails

SCE has recently identified several roads, one trail, and nine existing helicopter landing sites to be included in the Big Creek Nos. 2A, 8 and Eastwood Project. The roads, the trail, and the helicopter landing sites were identified following completion of surveys for the Big Creek ALP Projects. There are agency (CNDDB and/or USDA-FS) records for short-leaved hulsea and Mono Hot Springs evening primrose in the vicinity of several of these roads; and agency records for Mono Hot Springs evening primrose in the vicinity of one of the helicopter landing sites (Bear). Under the No Action Alternative, implementation of vegetation management including trimming by hand and with equipment, and road maintenance activities including grading/graveling of unpaved roads, paving or patching of existing paved roads, and cleaning of culverts and ditches could result in removal or disturbance of special-status plant populations and VELB or their habitat potentially present.

Under the Proposed Action, SCE will implement AP measures specified in the Vegetation and Integrated Pest Management Plan to enhance protection of these the known populations of short-leaved hulsea and Mono Hot Springs evening primrose. Additionally, SCE will complete focused surveys for special-status plants and VELB to document their presence in the vicinity of the newly identified Project roads, trail, and helicopter landing sites. Surveys will follow agency- and stakeholder-approved survey methods as described in the FTSPP (SCE 2001). If special-status resources are identified, SCE will implement AP measures specified in the Vegetation and Integrated

Pest Management Plan and/or VELB Management Plan. If it is determined that future maintenance activities would result in trimming of one or more elderberry shrub branches or stems ≥ 1 inch in diameter, SCE will follow the mitigation approaches described in the VELB Management Plan and consult with USFWS to adequately mitigate for potential project effects.

Refer to the Vegetation and Integrated Pest Management Plan for a list of the newly identified roads, the trail, and the helicopter landing sites to be surveyed in the Big Creek Nos. 2A, 8 and Eastwood Project vicinity.

Protection of Special-status Species at New Helicopter Landing Sites to be Developed

Under the Proposed Action, SCE would develop five new helicopter landing sites in the Big Creek Nos. 2A, 8 and Eastwood Project vicinity, at Florence Lake Dam, South Fork San Joaquin River Florence Spill Station, South Fork San Joaquin River below Hooper Creek, Mono Creek at Diversion, and Mono Creek below Lake T.A. Edison. Development of these sites will require removal of several trees and shrubs.

There are no CNDDB or USDA-FS records for special-status plants in the vicinity of these proposed helicopter landing sites. Prior to development of these sites, SCE will complete focused surveys for special-status plants. Surveys will follow agency- and stakeholder-approved survey methods as described in the FTSPP (SCE 2001). SCE will locate the landing pad to avoid effects to any special-status species that are identified during surveys.

Because the helicopter landing sites are above 3,000 feet in elevation, SCE will not conduct surveys for VELB and potential VELB habitat.

Bald eagles and peregrine falcons are known to occur in the vicinity of these sites at Florence Lake and along the South Fork San Joaquin River, and there is potential foraging and nesting habitat for great gray owls along the South Fork San Joaquin River. SCE will conduct clearance surveys for bald eagle nests and/or other active raptor nests prior to development of the helicopter landing pads. SCE will locate the landing pad to avoid effects to any nest trees, and site development activities (i.e., tree removal) will be scheduled to avoid disturbance of any active raptor nests identified during surveys.

Protection of Special-status Species Prior to Construction of New Project Facilities

Under the Proposed Action, SCE will implement the proposed Special-status Species License Article, which states that prior to construction of new Project features not evaluated in this BA/BE on National Forest Service Land that may affect Forest Service special-status species and their habitat (i.e., Forest Service sensitive and/or management indicator species), SCE will prepare a Biological Evaluation to describe the potential impact of the action on the species or its habitat. For state or federally listed species, federal candidate species, California species of special concern, and

California fully protected species, SCE will prepare a Biological Assessment or other required document and obtain any necessary permits or approvals.

Sierra National Forest Management Indicator Species

The majority of SNF MIS species known or potentially occurring in the vicinity of the Project are addressed above with the exception of resident trout, osprey, mule deer, and avian guilds in riparian, oak woodland, meadow edge, and mature mixed-conifer habitats. These species are discussed in the following section below.

Resident Trout

Resident trout including rainbow trout, brown trout, rainbow-golden trout hybrids, and brook trout are known to occur in the Big Creek Nos. 2A, 8 and Eastwood Project vicinity.

Under the Proposed Action, seven environmental measures are recommended to enhance aquatic habitat and address water quality issues in the vicinity of the Mammoth Pool Project that will also improve habitat quality for trout. These measures include higher MIF requirements, establishment of CRMFs at specific locations, implementation of measures to increase the passage of large woody debris over Bear Creek Diversion, and implementation of the Sediment Management Prescriptions, Temperature Monitoring and Control Plan, Vegetation and Integrated Pest Management Plan) (specifically BMPs for the use of herbicides and pesticides), and Flow Monitoring and Reservoir Water Level Measurement Plan. Implementation of these measures would enhance habitat for resident trout.

Osprey

There are known osprey nests in the vicinity of two access roads to Shaver Dam from Highway 168. Under current Project operations (No Action Alternative), vegetation management activities, such as trimming by equipment and road maintenance activities, including paving/graveling and grading, may disturb breeding osprey. See *Protection of Raptors on Project Structures (Power Lines or Transmission Lines),* and *Protection of Active Raptor Nests and Bald Eagle Wintering Roosts*, above, for measures and programs that will be implemented during the term of the license to protect nesting osprey.

Mule Deer

The North Kings deer herd is known to occur in and migrate through the Big Creek Nos. 2A, 8 and Eastwood Project near Shaver Lake. Under the Proposed Action, SCE will maintain protection of mule deer migration and habitat by implementing measures specified in the proposed Mule Deer License Article (SCE 2007). For the Big Creek Nos. 2A, 8 and Eastwood Project, this includes implementing road closures to prevent the disturbance of mule deer and other wildlife in this vicinity.

Avian Guilds

Riparian, oak woodland, meadow edge, and mature mixed-conifer habitats have been identified at various locations within the Big Creek Nos. 2A, 8 and Eastwood Project vicinity. Under the Proposed Action, ongoing O/M activities will not result in removal of these upland or riparian habitats. If new Project facilities not covered in this BA/BE are proposed in the future, SCE will comply with the proposed Special-status Species License Article to protect avian guilds associated with these habitats.

6.4 BIG CREEK NO. 3 (FERC PROJECT NO. 120)

Protection of Special-status Plant Species

There are no special-status plant species known to occur or potentially occurring in the Big Creek No. 3 Project vicinity. Therefore, no enhancement measures are proposed.

Protection of VELB and their Habitat

A total of 515 elderberry shrubs below 3,000 feet elevation, which represent VELB habitat, are known to occur in the vicinity of the Big Creek No. 3 Project. These shrubs occur along the Powerhouse No. 3, penstocks, rock/sand trap and surge chamber, and along the following roads:

- 8S05, Canyon Road (from junction with 8S03 to junction with Italian Bar Road) (#21)
- 9S89 from Italian Bar Road east to Big Creek Powerhouse No. 3 and administrative buildings (#61)
- Miscellaneous Powerhouse No. 3 roads (i.e., water tank access road and shop) (#5, #13, #127, #215, #256, and #257)

Vegetation management activities, including trimming by hand and equipment and herbicide use, and road maintenance activities, including road grading, graveling/paving, snow removal/sanding and maintenance of culverts/ditches/water bars, may negatively impact elderberry shrubs under existing Project operations (No Action Alternative).

Under the Proposed Action, SCE has developed a VELB Management Plan (Appendix E) to enhance the protection of VELB and their habitat. Implementation of this Plan would further enhance protection of VELB and their habitat. See the Mammoth Pool Project above for a brief description of these measures.

Protection of Special-status Fish, Amphibians, and Reptiles and their Habitat

There are no known populations of FYLF in the vicinity of the Big Creek No. 3 Project. However, potential FYLF habitat (i.e., that rated as good or moderate in survey results) was identified along the San Joaquin River, Dam 6 to Redinger.

There are no known populations or appropriate habitat to support MYLF within the vicinity of the Big Creek No. 3 Project.

There are no known populations or appropriate habitat to support YT in the vicinity of the Big Creek No. 3 Project.

There are known populations of WPT along the San Joaquin River, Dam 6 to Redinger, and the Dam 6 Forebay in the Project vicinity.

Hardhead are known to occur in the San Joaquin River in the lower portion of the reach between Dam 6 and Redinger Lake. The increased MIFs in the bypass reach, while providing cooler water temperatures beneficial to resident trout, may provide temperatures below the preferred range for hardhead. This may represent an adverse effect on hardhead. The Temperature Monitoring and Control Plan will implement a study to evaluate this trade-off. If needed, it would propose reclassification of the Basin Plan beneficial use for this reach to favor hardhead with warmer water temperatures.

Under the Proposed Action, five environmental measures are recommended to enhance aquatic habitat and address water quality issues. These measures include higher minimum instream flow (MIF) requirements, and implementation of the Sediment Management Prescriptions, Vegetation and Integrated Pest Management Plan (specifically BMPs for use of herbicides and pesticides), Temperature Monitoring and Control Plan, and Flow Monitoring and Reservoir Water Level Measurement Plan. Several training programs will also be implemented under the Proposed Action to enhance the protection of special-status amphibians and reptiles and their habitat. See the Mammoth Pool Project above for a brief description of these measures and programs. Implementation of these measures under the Proposed Action will either maintain or enhance physical habitat for amphibians, aquatic reptiles, and fish.

Protection of Raptors on Project Structures (Power Lines or Transmission Lines)

The Big Creek No. 3 Project does not include Project powerlines or transmission lines; therefore there is no potential for electrocution of raptors. Under the Proposed Action, no enhancement measures are proposed.

Protection of Active Raptor Nests and Bald Eagle Wintering Roosts

Several special-status raptors are known or could potentially occur in the Project vicinity, including bald eagle, American peregrine falcon, osprey, northern goshawk, and California spotted owl.

There are potential bald eagle wintering roosts in the vicinity of Big Creek No. 3 Project roads. However, all Project vegetation management activities, such as trimming with equipment, and road maintenance activities, including paving/graveling and grading, occur during summer months and, therefore, should not disturb bald eagle wintering roosts.

Under the Proposed Action, SCE will implement measures identified in the Bald Eagle Management Plan (Appendix H) to enhance protection of active raptor nests on Project structures. To protect active nests during vegetation maintenance activities, SCE will implement measures specified in the Vegetation and Integrated Pest Management Plan. See the Mammoth Pool Project above for a brief description of these measures.

Protection of Breeding Habitat for Riparian-nesting Songbirds

Riparian-nesting songbirds that are known or could potentially occur in the Big Creek No. 3 Project vicinity include the willow flycatcher.

SCE does not implement maintenance activities that would result in removal of breeding habitat for these species. MIF and CRMF recommended in the Proposed Action would either maintain or enhance riparian habitat for this species. Training programs will also enhance the protection of riparian-nesting songbirds and their habitat. See the Mammoth Pool Project above for a brief description of these measures.

Protection of Special-status Bats

Pallid bats are known to roost at Powerhouse No. 3 and at Adits 1, 2, 3 at Tunnel 3.

Under the Proposed Action, SCE will implement the proposed Special-status Bat Species License Article and training programs to avoid disturbance of special-status bat species. See the Big Creek Nos. 1 and 2 Project above for a description of these measures.

Protection of Mesocarnivore Habitat and Denning Sites

The only mesocarnivore known or potentially occurring in the Big Creek No. 3 Project vicinity is the Pacific fisher. No potential mesocarnivore habitat was identified in the Project vicinity. There are no known denning sites in the Project vicinity and Project operation and maintenance activities would not result in removal of appropriate habitat for this species.

Under the Proposed Action, implementation of several training programs will enhance the protection of mesocarnivores and their habitat, and implementation of programs and BMPs for the use of rodenticides, as specified in the Vegetation and Integrated Pest Management Plan, would enhance protection of these species. See the Mammoth Pool Project above for a brief description of these measures.

Protection of Special-status Species at Newly Identified Project Facilities, Roads, and Trails

SCE has recently identified several roads to be included in the Big Creek No. 3 Project. These roads were identified following completion of surveys for the Big Creek ALP Projects. There are no CNDDB or USDA-FS records for special-status plants in the vicinity of these roads. Under the No Action Alternative, implementation of vegetation management including trimming by hand and with equipment, and road maintenance

activities including grading/graveling of unpaved roads, paving or patching of existing paved roads, and cleaning of culverts and ditches could result in removal or disturbance of special-status plant populations and VELB or their habitat potentially present.

Under the Proposed Action, SCE will complete focused surveys for special-status plants and VELB to document their presence in the vicinity of the newly identified Project roads and helicopter landing sites. Surveys will follow agency- and stakeholder-approved survey methods as described in the FTSPP (SCE 2001). If special-status resources are identified, SCE will implement AP measures specified in the Vegetation and Integrated Pest Management Plan and/or VELB Management Plan. If it is determined that future maintenance activities would result in trimming of one or more elderberry shrub branches or stems ≥ 1 inch in diameter, SCE will follow the mitigation approaches described in the VELB Management Plan and consult with USFWS to adequately mitigate for potential project effects.

Refer to the Vegetation and Integrated Pest Management Plan for a list of the newly identified roads, the trail, and the helicopter landing sites to be surveyed in the Big Creek No. 3 Project vicinity.

Protection of Special-status Species Prior to Construction of New Project Facilities

Under the Proposed Action, SCE will implement the Special-status Species License Article, which states that, prior to construction of new Project features not evaluated in this BA/BE on National Forest Service Land that may affect Forest Service special-status species and their habitat (i.e., Forest Service sensitive and/or management indicator species), SCE will prepare a Biological Evaluation to describe the potential impact of the action on the species or its habitat. For state or federally listed species, federal candidate species, California species of special concern, and California fully protected species, SCE will prepare a Biological Assessment or other required document and obtain any necessary permits or approvals.

Sierra National Forest Management Indicator Species

The majority of SNF MIS species known or potentially occurring in the vicinity of the Project are addressed above with the exception of resident trout, osprey, mule deer, and avian guilds in riparian and oak woodland habitats. These species are discussed below.

Resident Trout

Resident trout including rainbow trout and brown are known to occur in the vicinity of the Big Creek No. 3 Project. The increased MIFs in the bypass reach will provide cooler water temperatures beneficial to resident trout and may provide temperatures below the preferred range for hardhead. This may represent an adverse effect on hardhead. The Temperature Monitoring and Control Plan will implement a study to evaluate this trade-off. If needed, it would propose reclassification of this reach or part of it to favor hardhead with warmer water temperatures.

Under the Proposed Action, five environmental measures are recommended to enhance aquatic habitat and address water quality issues in the vicinity of the Mammoth Pool Project that will also improve habitat quality for trout. These measures include higher MIF requirements, and implementation of the Sediment Management Prescriptions, Vegetation and Integrated Pest Management Plan (specifically BMPs for the use of herbicides and pesticides), Temperature Monitoring and Control Plan, and Flow Monitoring and Reservoir Water Level Measurement Plan. Implementation of these measures would enhance habitat for resident trout.

Osprey

Osprey are known to occur in the vicinity of the San Joaquin River and along several Project roads. See *Protection of Raptors on Project Structures (Power Lines or Transmission Lines),* and *Protection of Active Raptor Nests and Bald Eagle Wintering Roosts*, above, for measures and programs that will be implemented during the term of the License to protect nesting osprey.

Mule Deer

The Huntington mule deer herd, which is part of the larger San Joaquin herd, is known to migrate through and winter in the Big Creek Nos. 3 Project vicinity. However, Project facilities, roads, and trails do not impede or prevent mule deer migration. Under the Proposed Action, there are no anticipated impediments to mule deer migration or substantial changes in habitat in the Project vicinity.

Avian Guilds

Riparian and oak woodland habitats have been identified at various locations within the Big Creek No. 3 Project vicinity. Under the Proposed Action, ongoing O/M activities will not result in removal of these upland or riparian habitats. If new Project facilities not covered in this BA/BE are proposed in the future, SCE will comply with the proposed Special-status Species License Article to protect avian guilds associated with these habitats.

7.0 CUMULATIVE EFFECTS

USFWS is required to consider cumulative effects in formulating their biological opinions (50 CFR §402.14(g)(3) and (4)). Cumulative effects under ESA are defined as *"…effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in the biological assessment. Future Federal actions that are unrelated to the proposed action are not considered because they require separate consultation pursuant to Section 7 of the act*." The action under consideration is the relicensing of the four Big Creek ALP Projects with the implementation of environmental measures as described in the Proposed Action (See Section 4). Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower development. The following identifies the geographic and temporal scope considered in the environmental analysis, a description of hydroelectric projects and private actions considered in this evaluation and an evaluation of the cumulative effects on special status resources from the Proposed Action when added to other actions.

7.1 GEOGRAPHIC SCOPE

The geographic scope for the cumulative impact analysis defines the physical limits or boundaries of the effects on resources when considered with the contributing effects from other hydropower and non-hydropower activities. For the four Big Creek ALP Projects under consideration in the APDEA, the geographic scope appropriate for evaluating cumulative effects is the Upper San Joaquin River Basin upstream of Millerton Reservoir. In the cumulative impacts analysis completed for three other Big Creek Projects (Big Creek No. 4 (FERC Project No. 2017)); Portal Hydroelectric Power Project (FERC Project No. 2174); and Vermilion Valley Hydroelectric Project (FERC Project No. 2086)), the Commission limited the geographic scope to the Upper San Joaquin River Basin above Millerton Reservoir. The rationale for not including the San Joaquin River downstream of Friant Dam is that Millerton Reservoir has sufficient storage capacity to control the timing of discharge from Friant Dam regardless of the timing of inflows from the SCE projects in the upper basin area. However, occasionally during periods of high run-off, the combined storage capacity at the BCS projects and the storage capacity at Millerton may be insufficient to store or control all the water run-off. Therefore, any shifts in the timing or volume of flows from Friant Dam, that are controllable, are under the control of the U.S. Bureau of Reclamation, and not as a consequence of the operation of the hydroelectric projects comprising the BCS.

7.2 TEMPORAL SCOPE

The temporal scope for the cumulative impact analysis for the four Big Creek ALP Projects defines the length of time that should be considered when evaluating resource effects of the Proposed Action in the context of past and reasonably foreseeable future actions. Evaluations of past and future actions are limited by the amount of available information for each resource. Based on the anticipated term of the new license for the four Big Creek ALP Projects, the temporal scope for this analysis considers 46 years

into the future, concentrating on potential resource effects from reasonably foreseeable future actions.

7.3 PROJECTS CONSIDERED

Hydroelectric projects and private actions are considered in this analysis. Each of these is described below.

Hydroelectric Projects

Seven SCE hydroelectric projects were considered in this analysis. These include the four Big Creek ALP projects and the Big Creek No, 4 Project, Portal Hydroelectric Power Projects, and Vermilion Valley Hydroelectric Projects. These projects are listed below. A complete discussion of the interrelationship of these projects is provided in Section 1.

- Big Creek No. 4, FERC Project No. 2017 (Granted a new FERC License in December 2003.)
- Vermilion Valley Hydroelectric Project, FERC Project No. 2086 (Currently operating under an annual license. The Vermilion Valley Hydroelectric Project does not contain any power generation.)
- Portal Hydroelectric Power Project, FERC Project No. 2174 (Currently operating under an annual license)
- Mammoth Pool Project, FERC Project 2085
- Big Creek Nos. 1 and 2, FERC Project 2175
- Big Creek Nos. 2A, 8 and Eastwood, FERC Project No. 67
- Big Creek No. 3, FERC Project No. 120

Private Actions in the Vicinity of the Big Creek ALP Projects

Private Development

Private development that may occur in the vicinity of the four Big Creek Projects includes the construction of private homes or other structures on nearby lands, including lands around Project reservoirs (e.g., Shaver Lake). Such private actions must be approved by Fresno or Madera County. The County's permit approval process will specify which permits must be obtained from other regulatory agencies (e.g., CDFG, USFWS, U.S. Army Corps of Engineers, etc.), and which California Environmental Quality Act (CEQA) documents must be completed. The only known reasonably foreseeable future private development project within the geographic area is the Central Sierra Historical Society (CSHS) Museum Project that has recently received Fresno

County Planning Commission approval for the Conditional Use Permit (CUP) No. 3106 and Variance Application No. 3802.

The CSHS proposes to build a museum on 18.96 acres adjacent to Camp Edison and bounded to the west by Highway 168. The property is owned by SCE who will issue a lease agreement for a term of 30 years to the CSHS. This lease agreement may be renewed for two additional 30-year terms. The proposed Museum Project will consist of a temporary museum building, a main building, a paved road, three parking lots, pedestrian trails, signage, amphitheater, exterior exhibits, and above-and below-ground utilities. The Project would be constructed in phases from 2006 through 2011. Visitation to the site is expected to be 1,000 annual visitors, with the majority of visitors consisting of school children during the school year.

Management of SCE-owned Lands

SCE purchased timberland from the Fresno Flume and Lumber Company in 1919 as the site of a hydroelectric reservoir, which was created with construction of the Shaver Lake Dam (Big Creek Nos. 2A, 8 and Eastwood) in 1927. Management of the land was primarily custodial from 1919 to 1979, which allowed the land to recover from logging by its previous owners. Under the land management plan that SCE adopted in 1980, SCE-owned timberland is currently managed for a variety of resources including water, wildlife, recreation, and timber. SCE practices uneven-aged timber management and has introduced prescribed burning, which improves the quality of wildlife habitat, encourages new plant growth and tree regeneration, and protects property and structures by reducing the risk of wildfires.

SCE practices sustainable-yield and selective timber harvest. Timber harvests that occur on SCE lands are approved through the Timber Harvest Plan (THP) Process, regulated by the California Department of Forestry and Fire Protection (CDF) through the 1973 Forest Practices Act (FPA). The FPA regulates when, where, and how commercial timber harvests can be conducted, to prevent adverse affects to soils, riparian corridors, and resident wildlife and wildlife habitat. The FPA requires the development of a THP, an environmental review document submitted by landowners to CDF that describes the proposed timber harvest and outlines the steps that will be taken to prevent damage to the environment. A Registered Professional Forester must prepare the THP.

7.4 CUMULATIVE EFFECTS ANALYSIS

This section addresses the cumulative effects of the seven SCE hydroelectric Projects and private actions on special-status species followed by a focused analysis of effects on special-status amphibians

Analysis of Cumulative Effects on Special-status Species

The operation and maintenance of the seven Big Creek Projects in combination with other private actions in the Upper San Joaquin River Basin will not result in cumulative effects on native terrestrial plant and wildlife species. The location of special-status terrestrial plant and wildlife species in the vicinity of the four Big Creek ALP Projects is provided in Section 5. Environmental Analysis of Proposed Action.

Under the Proposed Action, several environmental measures and programs are recommended that will enhance habitat and improve habitat quality for special-status terrestrial species. Proposed measures that will protect special-status plant species include the development of buffer areas around and documentation of special-status plant populations; monitoring the effectiveness of AP measures; conducting special-status plant surveys; increasing MIF and CRMF for the enhancement of wetland and riparian plant species; and implementation of environmental programs (e.g., NHSSIP, Environmental Training Program, and Environmental Compliance Program) that will further protect plant species. Proposed measures for the eradication of noxious weeds and invasive ornamental species will enhance habitat for both special-status plant and wildlife species.

Under the Proposed Action, measures and programs that will protect special-status wildlife species include implementation of AP and long-term mitigation measures for VELB; implementation of AP measures for special-status raptors; increased MIF and CRMF for the enhancement of riparian habitat and associated species; implementation of a Water Temperature Monitoring and Control Plan, Riparian Monitoring Plan, and Sediment Management Prescriptions, implementation of the proposed measures for special-status species, special-status bats, and migrating mule deer; monitoring of wildlife mortalities in the Project vicinities; and implementation of environmental programs (e.g., NHSSIP, Environmental Training Program, and Environmental Compliance Program) that will further protect wildlife species.

SCE actively manages its privately owned timberlands for wildlife species, in addition to other secondary management priorities, such as timber harvest. Forestry practices that enhance wildlife habitat include creation of a complex forest structure through maintaining uneven-aged tree stands (through selective removal of trees) and retaining dead trees snags and woody debris for cavity-nesting birds, rodents, and mesocarnivores that rely on such structures for shelter, and for nesting and denning sites. SCE also uses prescribed burning, which enhances wildlife habitat and prevents uncontrolled forest fires. Appropriate measures to protect special-status terrestrial species on SCE-owned lands are developed and implemented as part of the THPs required under the NMFA, as described above.

Reasonably foreseeable future developments that will occur in the Basin include private development in the vicinity of SCE-owned lands, such as the construction of the Central Sierra Historical Museum and the ongoing maintenance of SCE lands. Measures to protect terrestrial resources affected will be developed and implemented as through the Fresno County CUP process and other agency required permits.

Development of the CSHS museum project and ongoing management of SCE's lands, when combined with the four Big Creek ALP Projects would not result in cumulative effects on special-status species.

Analysis of Cumulative Effects on Special-status Amphibians

The operation and maintenance of the seven Big Creek Projects in combination with other land and wildlife management practices in the Upper San Joaquin River Basin have cumulatively resulted in effects on native special-status amphibians. Native aquatic amphibians known or potentially present in the vicinity of the four Big Creek ALP Projects include FYLF, YT, and MYLF. The location of these species in the vicinity of the four Big Creek ALP Projects is provided in Section 5. Over the last 50 years, amphibian populations have declined markedly in numbers and range.

Under the Proposed Action, several environmental measures are recommended to enhance aquatic habitat and address water quality issues that will also improve habitat quality for special-status amphibians. These measures include implementation of BMPs for the use of herbicides and pesticides near aquatic habitats; establishment of new or higher MIF and CRMF to enhance sediment transport and riparian conditions in selective bypass streams and river reaches; implementation of revised operating and maintenance procedures to minimize effects of sediment releases at several Project forebays and reservoirs; implementation of a Water Temperature Monitoring and Control Plan, and implementation measures to increase the passage of LWD over Bear Creek Diversion.

The historic introduction of non-native salmonids (e.g., brown trout and eastern brook trout) is thought to have resulted in extirpation of a number of native amphibians from several locations in the Sierra Nevada. Although native to California, rainbow trout did not occur in the Upper San Joaquin River Basin above 5,000 ft in elevation and their introduction may have also contributed to the decline of native amphibian populations. Under the Proposed Action, SCE has committed to partially fund stocking of trout into Project reservoirs and selected bypass streams and rivers. However, there is no indication that current stocking locations overlap current habitats occupied by native amphibians.

Historic grazing that occurs on USDA-FS lands under special use permits (SUP) or other permits issued by USDA-FS has also resulted in adverse effects on potential habitat for YT and MYLF in meadows in the upper basin, including but not limited to Jackass Meadow and Hellhole Meadow, in the vicinity of the Big Creek Nos. 2A, 8 and Eastwood Project. The USFS is currently evaluating their grazing management policies in the SNF, and revisions to these policies will likely improve future protection of potential habitat for special-status amphibians.

Fish stocking in Project bypass reaches and impoundments will not result in adverse effects to sensitive amphibians, as none are known to occur there. The CDFG has the authority to manage fish stocking in the watershed, and is currently evaluating their practices in light of declining amphibian populations. The areas where this conflict

occurs are largely not affected by the BCS. Areas, which may be beneficially affected, however, are several large meadows in the upper watershed, which will benefit from SCE's proposed decommissioning of the Tombstone, North Slide, South Slide and Crater diversions. This will maintain natural flows through the affected meadows.

Cumulatively, the environmental measures related to increased flow releases (both MIF and CRMF), control of herbicide and pesticide use, and sediment and LWD management either required or proposed for the seven Big Creek Projects will improve aquatic and riparian habitat conditions in bypass streams in the basin. The improved habitat conditions will likely result in higher fish populations. Although the quality of potential habitat for special-status amphibians may increase in the basin in the future, higher fish populations may suppress any increase in amphibian populations, except in meadows, where decommissioning of small diversions may provide a benefit. The effects of the four Big Creek ALP Projects when evaluated cumulatively with other past, present, and future projects in the basin will likely result in little overall change in habitat quality for special-status amphibians and is unlikely to result in increased special-status amphibian population listings in the future.

7.5 CUMULATIVE EFFECTS DETERMINATION

After reviewing the current status of the federally listed species and other special-status species included in this BA/BE, the existing environment, the effects of the Proposed Action, and cumulative effects from other present, and future actions that are reasonably certain to occur in the basin (as required under the ESA), it is our determination that the Proposed Action, is not likely to jeopardize the continued existence of these species, and is not likely to destroy or adversely modify designated critical habitat. For many resources, implementation of measures under the Proposed Action will result in enhanced protection and habitat quality for some species. No special-status species designated critical habitat is present in the vicinity of the four Big Creek Projects and therefore, none will be affected.

8.0 CONCLUSIONS AND DETERMINATION

Section 8.1 provides the definitions for all possible effects determinations—as defined by USFWS and USDA-FS, respectively—for special-status species potentially occurring in vicinity of the four Big Creek ALP Projects. Section 8.2 provides the effects determinations for special-status species based on the findings of this BA/BE.

8.1 EFFECTS DETERMINATION DEFINITIONS

USFWS Effects Determinations

- **No effect** – Is the appropriate conclusion when the effects of the action will not affect any listed species or its critical habitat.

- **Likely to benefit** – Is the appropriate conclusion when an action is likely to directly or indirectly benefit a listed species or its critical habitat.

- **May affect, not likely to adversely affect** – Is the appropriate conclusion when the effects of an action on a species or its critical habitat are likely to be insignificant and discountable.

- **May affect, likely to adversely affect** – Is the appropriate conclusion when an action is likely to directly or indirectly have an adverse effect on a listed species or its critical habitat.

USDA-FS Effects Determinations

- **No effect** – Is the appropriate conclusion for a Forest Service Sensitive Species (FSS) when the effects of the action will not affect the species.

- **May affect individuals, but is not likely result in a trend toward federal listing** – Is the appropriate conclusion for a FSS when the effects of an action on a species will not lead to federal listing or loss of species viability.

- **May affect individuals, and is likely to result in a trend toward federal listing** – Is the appropriate conclusion for a FSS when the effects of an action on a species will lead to federal listing or loss of species viability.

8.2 EFFECTS DETERMINATIONS FOR FEDERAL AND USDA-FS SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE BIG CREEK ALP PROJECTS

Based on the findings presented in this BA/BE, it is determined that the proposed Project will have the following effects on federal species and their habitats:

Federally Listed Invertebrates

Valley elderberry longhorn beetle. It is our determination that the Proposed Action *may affect, but is not likely to adversely affect* valley elderberry longhorn beetle with

implementation of the AP and mitigation measures proposed in the VELB Management Plan for the four Big Creek ALP Projects (Appendix E) (SCE 2007b; Volume 4, SD-G (Book 19)).

Federally Listed Amphibians

California red-legged frog. It is our determination that the Proposed Action will have ***no effect*** on **California red-legged frog**. This determination is based on the following: 1) limited breeding/rearing habitat was identified, and no detections were made, during surveys; 2) the four Projects are outside the current range and designated "Core Areas" for the species; 3) the closest historical records are 30 miles to the south (near Minkler), and 15 miles to the northwest (in Willow Creek near O'Neals), of the four Projects, and; 4) there are no proposed "Critical Habitats" within the vicinity of the four Projects.

Mountain yellow-legged frog. It is our determination that the Proposed Action is ***may affect, but is not likely to adversely affect*** **mountain yellow-legged frog**. Higher MIF and augmented flow release requirements and implementation of the Sediment Management Prescriptions, the Vegetation and Integrated Pest Management Plan, the Flow Monitoring and Reservoir Water Level Measurement Plan, and SCE programs will either maintain or enhance habitat for this species. However, these actions will also likely enhance habitat for non-native fish species. This, in combination with grazing in appropriate habitat potentially supporting this species, will likely continue to limit the presence of suitable habitat in the vicinity of the four Big Creek ALP Projects. Decommissioning of small diversions will likely benefit MYLF in meadows associated with these diversions.

Yosemite toad. It is our determination that the Proposed Action is ***may affect, but is not likely to adversely affect*** **Yosemite toad.** Higher MIF and augmented flow release requirements and implementation of the Sediment Management Prescriptions, the Vegetation and Integrated Pest Management Plan, the Flow Monitoring and Reservoir Water Level Measurement Plan, and SCE programs will either maintain or enhance habitat for this species. However, these actions will also likely enhance habitat for non-native fish species. This, in combination with grazing in appropriate habitat potentially supporting this species, will likely continue to limit the presence of suitable habitat in the vicinity of the four Big Creek ALP Projects. Decommissioning of small diversions will likely benefit YT in meadows associated with these diversions.

Federally Listed Birds

Bald eagle. It is our determination that the Proposed Action is ***will have no effect*** **bald eagle** with implementation of the AP measures proposed in the Bald Eagle Management Plan (Appendix H) for the Big Creek ALP Projects.

American peregrine falcon. It is our determination that the Proposed Action is ***will have no effect on*** **American peregrine falcon** with implementation of the AP measures proposed in the Vegetation and Integrated Pest Management Plan.

Federally Listed Mammals

Pacific fisher. It is our determination that the Proposed Action will have ***no effect*** on **pacific fisher.** This determination is based on the fact that there are no known denning sites in the vicinity of the Projects, and Project operations and maintenance activities would not result in removal of appropriate habitat for this species. Furthermore, Project programs and implementation of BMPs should enhance protection of Pacific fisher and their habitat.

Forest Service Sensitive Plants

Scalloped moonwort. It is our determination that the Proposed Action ***may affect individuals, but is not likely to result in a trend toward federal listing*** of **scalloped moonwort**. There is potential habitat for this species in the vicinity of the Big Creek Nos. 1 and 2 and Big Creek Nos. 2A, 8 and Eastwood Projects. Ongoing operations and maintenance activities conducted in these Project vicinities will not result in disturbance and/or removal of these habitats. Furthermore, proposed MIF would either maintain or enhance appropriate habitats in the floodplains that may support this species.

Bolander's candle moss. It is our determination that the Proposed Action ***may affect individuals, but is not likely to result in a trend toward federal listing*** of **Bolander's candle moss**. There is potential habitat for this species in the vicinity of the Big Creek Nos. 1 and 2 and Big Creek Nos. 2A, 8 and Eastwood Projects. Ongoing operations and maintenance activities conducted in these Project vicinities will not result in disturbance and/or removal of these habitats. Furthermore, proposed MIF would either maintain or enhance appropriate habitats in the floodplains that may support this species.

Mono Hot Springs evening primrose. It is our determination that the Proposed Action will have ***no effect*** on **Mono Hot Springs evening primrose** with implementation of the AP measures proposed in the Vegetation and Integrated Pest Management Plan.

Flaming Trumpet. It is our determination that the Proposed Action will have ***no effect*** on **Flaming Trumpet.**

Subalpine fireweed. It is our determination that the Proposed Action will have ***no effect*** on **subalpine fireweed** with implementation of the AP measures proposed in the Vegetation and Integrated Pest Management Plan.

Short-leaved hulsea. It is our determination that the Proposed Action will have ***no effect*** on **short-leaved hulsea** with implementation of the AP measures proposed in the Vegetation and Integrated Pest Management Plan.

Veined water lichen. It is our determination that the Proposed Action ***may affect individuals, but is not likely to result in a trend toward federal listing*** of **veined water lichen.** Ongoing operations and maintenance activities conducted in these

Project vicinities will not result in disturbance and/or removal of these habitats. Furthermore, proposed MIF would either maintain or enhance appropriate habitats in the floodplains and streams that may support this species.

Yosemite lewisia. It is our determination that the Proposed Action will have ***no effect*** on **Yosemite lewisia** with implementation of the AP measures proposed in the Vegetation and Integrated Pest Management Plan.

Three-ranked hump moss. It is our determination that the Proposed Action ***may affect individuals, but is not likely to result in a trend toward federal listing*** of **three-ranked hump moss*.*** Ongoing operations and maintenance activities conducted in these Project vicinities will not result in disturbance and/or removal of these habitats. Furthermore, proposed MIF would either maintain or enhance appropriate habitats in the floodplains that may support this species.

Broad-nerved hump moss. It is our determination that the Proposed Action ***may affect individuals, but is not likely to result in a trend toward federal listing*** of **broad-nerved hump moss*.*** Ongoing operations and maintenance activities conducted in these Project vicinities will not result in disturbance and/or removal of these habitats. Furthermore, proposed MIF would either maintain or enhance appropriate habitats in the floodplains that may support this species.

Forest Service Sensitive Amphibians and Reptiles

Foothill yellow-legged frog. It is our determination that the Proposed Action ***may affect individuals, but is not likely to result in a trend toward federal listing*** of **foothill yellow-legged frog**. Higher MIF and augmented flow release requirements and implementation of the Sediment Management Prescriptions, the Vegetation and Integrated Pest Management Plan, the Flow Monitoring and Reservoir Water Level Measurement Plan, and SCE programs will either maintain or enhance habitat for this species.

Western pond turtle. It is our determination that the Proposed Action will ***may affect individuals, but is not likely to result in a trend toward federal listing*** of **western pond turtle**. Higher MIF and augmented flow release requirements and implementation of the Sediment Management Prescriptions, the Vegetation and Integrated Pest Management Plan, the Flow Monitoring and Reservoir Water Level Measurement Plan, and SCE programs will either maintain or enhance habitat for this species. Enhancement of habitat would represent a beneficial effect for this species.

Forest Service Sensitive Fish

Hardhead. It is our determination that the Proposed Action ***may affect individuals, but is not likely to result in a trend toward federal listing*** of hardhead. Higher MIFs in the San Joaquin River between Dam 6 and Redinger Lake will enhance the amount of physical habitat for hardhead, but will lower summer water temperatures below the preferred range. This may represent an adverse effect on hardhead in this reach. The Temperature Monitoring and Control Plan will implement a study to evaluate this trade-

off. If needed, it would propose reclassification of the Basin Plan beneficial use for this reach to favor hardhead with warmer water temperatures.

Forest Service Sensitive Birds

Northern goshawk. It is our determination that the Proposed Action will have ***no effect*** on **Northern goshawk**. It has been determined that ongoing operations and maintenance activities conducted in these Project vicinities will not result in disturbance of these species and/or removal of habitat.

Great gray owl. It is our determination that the Proposed Action will have ***no effect*** on **great gray owl.** It has been determined that ongoing operations and maintenance activities conducted in these Project vicinities will not result in disturbance of these species and/or removal of habitat.

California spotted owl. It is our determination that the Proposed Action will have ***no effect*** on **California spotted owl.** It has been determined that ongoing operations and maintenance activities conducted in these Project vicinities will not result in disturbance of these species and/or removal of habitat.

Willow flycatcher. It is our determination that the Proposed Action will ***may affect individuals, but is not likely to result in a trend toward federal listing*** of **willow flycatcher.** This determination is based on the fact that ongoing Project operations will not result in removal of breeding habitat for these species. Furthermore, proposed MIF would either maintain or enhance riparian habitat for these species. Enhancement of habitat would represent a beneficial effect for this species.

Forest Service Sensitive Mammals

Western red bat. It is our determination that the Proposed Action will **have no effect on** the **western red bat** with implementation of the proposed Special-status Bat Species License Article and training programs to enhance protection of this species.

Townsend's western big-eared bat. It is our determination that the Proposed Action will have ***no effect*** on **Townsend's western big-eared bat** with implementation of the proposed Special-status Bat Species License Article and training programs to enhance protection of this species.

Pallid bat. It is our determination that the Proposed Action will have ***no effect*** on **pallid bat** with implementation of the proposed Special-status Bat Species License Article and training programs to enhance protection of this species.

American marten. It is our determination that the Proposed Action will have ***no effect*** on **American marten.** This determination is based on the fact that there are no known denning sites in the vicinity of the Projects, and Project operations and maintenance activities would not result in removal of appropriate habitat for this species. Furthermore, Project programs and implementation of BMPs should enhance protection of American marten and their habitat.

California wolverine. It is our determination that the Proposed Action will have ***no effect*** on **California wolverine.** This determination is based on the fact that there are no known denning sites in the vicinity of the Projects, and Project operations and maintenance activities would not result in removal of appropriate habitat for this species. Furthermore, Project programs and implementation of BMPs should enhance protection of California wolverine and their habitat.

Sierra Nevada red fox. It is our determination that the Proposed Action will have ***no effect*** on **Sierra Nevada red fox.** This determination is based on the fact that there are no known denning sites in the vicinity of the Projects, and Project operations and maintenance activities would not result in removal of appropriate habitat for this species. Furthermore, Project programs and implementation of BMPs should enhance protection of Sierra Nevada red fox and their habitat.

Sierra National Forest Management Indicator Species

Resident Trout. It is our determination that the Proposed Action will ***likely benefit*** **resident trout.** Implementation of measures to increase MIFs and to establish CRMFs in selected reaches, implementation of BMPs for the use of pesticides near aquatic habitats, implementation of the Sediment Management Prescriptions (SCE 2007b), implementation of a Water Temperature Monitoring and Control Plan, and Flow Monitoring and Reservoir Water Level Measurement Plan in Project forebays and reservoirs would result in an increase in habitat for this species. Enhancement of habitat resulting from these measures would represent a beneficial effect for these species.

Osprey. It is our determination that the Proposed Action will have ***no effect*** on **osprey** with implementation of the AP measures proposed in the Vegetation and Integrated Pest Management Plan.

Mule deer. It is our determination that the Proposed Action ***will have no effect on*** **mule deer** with implementation of the AP measures proposed in the proposed Mule Deer License Article.

Avian guilds in riparian habitat. It is our determination that the Proposed Action ***may affect individuals, but is not likely to result in a trend toward federal listing*** of **avian guilds in riparian habitat.** This determination is based on the fact that ongoing Project operations will not result in removal of breeding habitat for these species. Furthermore, proposed MIF would either maintain or enhance riparian habitat for these species. Enhancement of habitat would represent a beneficial effect for this species.

Avian guilds in oak woodland habitat. It is our determination that the Proposed Action will have ***no effect,*** on **avian guilds in oak woodland habitat.** It has been determined that ongoing operations and maintenance activities conducted in these Project vicinities will not result in disturbance of these species and/or removal of habitat.

Avian guilds in meadow-edge habitat. It is our determination that the Proposed Action will have ***no effect,*** on **avian guilds in meadow-edge habitat.** It has been

determined that ongoing operations and maintenance activities conducted in these Project vicinities will not result in disturbance of these species and/or removal of habitat.

Avian guilds in mature mixed-conifer habitat. It is our determination that the Proposed Action will have ***no effect,*** on **avian guilds in mature mixed-conifer habitat.** It has been determined that ongoing operations and maintenance activities conducted in these Project vicinities will not result in disturbance of these species and/or removal of habitat.

9.0 LIST OF PREPARERS

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TABLES

Table 2-1. Summary of Big Creek ALP and Additional USFWS Consultation.[1]

Date	Discussion
12/07/00	Letter from T.J. McPheeters (SCE) to D. Boergers (FERC) requesting SCE to be designated as the non-federal lead for Section 7 consultation under the ESA.
12/21/00	Letter from L. Crow (FERC) to W. White (USFWS) granting SCE's request to be designated the non-federal lead for Section 7 consultation under the ESA.
02/12/01	Meeting between G. Rabone (SCE), J. Nolan-Summers and E. Bianchi (ENTRIX), B. Pistor (Kearns and West), and M. Boroja and J. Wild (USFWS) to inform USFWS of the Big Creek ALP progress to date and discuss USFWS concerns about the ALP.
03/08/01	Letter from J. Nolan-Summers (ENTRIX), on behalf of SCE, to J. Wild (USFWS) requesting a USFWS Species List for the proposed Big Creek ALP projects.
04/10/01	Letter from J. Knight (USFWS) to J. Nolan-Summers (ENTRIX) providing a USFWS Species List for the proposed Big Creek ALP projects.
06/28/01	Letter to C. Anthony (SCE) from D. Pierce (USFWS) containing comments on the Draft Technical Study Plan Package (DTSPP).
07/11/01	Telephone conversation between J. Nolan-Summers (ENTRIX) and J. Wild (USFWS) to discuss USFWS comments and SCE responses to the DTSPP. USFWS verbally approved SCE responses and the DTSPP.
08/01/01	Meeting between G. Rabone and T. Taylor (SCE), J. Nolan-Summers, E. Bianchi, and Wayne Lifton (ENTRIX), T. Jackson (Pacific Legacy), and M. Boroja, J. Wild, and G. Taylor (USFWS) to discuss FTSPP. USFWS requested additional information including detailed study methodologies, timing, and proposed avoidance and protection measures prior to implementation of field studies for the following study plans: CAWG-3, Determine Flow-related Physical Habitat in Bypass Reaches, CAWG-7, Characterize Fish Populations; REC-3, Whitewater Recreation Assessment Study; CUL-1, Prehistoric Cultural Resources; and CUL-2, Historic Era (Pre-1954) Cultural Resources.
08/03/01	FTSPP published and provided to M. Boroja, D. Giglio, G. Taylor, and J. Wild (USFWS).
08/20/01	Letter from G. Rabone (SCE) to M. Boroja (USFWS) including detailed information on study methodologies, timing, and proposed avoidance and protection measures for implementation of electrofishing surveys as part of CAWG-7, Characterize Fish Populations Study Plan.
09/11/01	Email from J. Wild (USFWS) to J. Nolan-Summers (ENTRIX) providing approval to implement electrofishing surveys as part of CAWG-7, Characterize Fish Populations Study Plan, consistent with the proposed methodologies, timing, and proposed avoidance and protection measures provided in the 08/20/01 letter.
01/08/02	Letter from J. Nolan-Summers (ENTRIX), on behalf of SCE, to J. Wild (USFWS) requesting an updated USFWS Species List for the proposed Big Creek ALP projects.
01/23/02	Letter from J. Knight (USFWS) to J. Nolan-Summers (ENTRIX) providing an updated USFWS Species List for the proposed Big Creek ALP projects.

Table 2-1. Summary of Big Creek ALP and Additional USFWS Consultation[1] (continued).

Date	Discussion
03/25/02	Letter from T.J. McPheeters (SCE) to J. Wild (USFWS) including detailed information on study methodologies, timing, and proposed avoidance and protection measures for implementation of whitewater boating studies as part of REC-3, Whitewater Recreation Assessment, study plan.
04/04/02	Letter from G. Rabone (SCE) to J. Wild (USFWS) including detailed information on study methodologies, timing, and proposed avoidance and protection measures for conducting shovel probe surveys as part of CUL-1, Prehistoric Cultural Resources; and CUL-2, Historic Era (Pre-1954) Cultural Resources Study Plans.
05/01/02	Meeting between J. Nolan-Summers (ENTRIX) and J. Wild (USFWS). USFWS provided approval to implement whitewater boating studies as part of REC-3, Whitewater Recreation Assessment Study Plan consistent with the proposed methodologies, timing, and avoidance and protection measures provided in the 03/25/02 letter.
05/01/02	As part of the Amphibian Subgroup meeting, meeting between J. Nolan-Summers (ENTRIX), on behalf of SCE, C. Cox (SWRCB), and J. Wild (USFWS) to discuss potential amphibian issues for the ALP projects. USFWS identified that SCE has two options for California red-legged frog: assume presence of frogs in all appropriate habitat or complete surveys in accordance with the proposed new USFWS protocol once it is released. USFWS will only be providing conservation recommendations for Yosemite toad and mountain yellow-legged frog. If these two species were proposed for listing, USFWS would complete a conference opinion at the time of listing and that conference would then be implemented as part of the license. USFWS will not, at this time, include mountain yellow-legged frog or foothill yellow-legged frog in the Biological Opinion for the projects.
05/05/02	Telephone conversation between J. Nolan-Summers (ENTRIX) and J. Wild (USFWS). USFWS provided approval to implement shovel probe studies as part of CUL-1, Prehistoric Cultural Resources; and CUL-2, Historic Era (Pre-1954) Cultural Resources study plans consistent with the proposed methodologies, timing, and avoidance and protection measures provided in the 04/05/02 letter.
08/07/02	Letter from T.J. McPheeters (SCE) to J. Wild (USFWS) including detailed information on study methodologies, timing, and proposed avoidance and protection measures for conducting wetted perimeter studies at streams/tributaries to, and flowing from, the Portal Forebay as part of CAWG-3, Determine Flow-Related Physical Habitat in Bypass Reaches.
08/20/02	Telephone conversation between J. Nolan-Summers (ENTRIX) and J. Wild (USFWS). USFWS provided approval to implement wetted perimeter studies as part of CAWG-3, Determine Flow-Related Physical Habitat in Bypass Reaches, study Plan consistent with the proposed methodologies, timing, and avoidance and protection measures provided in the 08/07/02 letter.
10/09/02	Letter from L. Tigas (ENTRIX), on behalf of SCE, to J. Wild (USFWS) requesting an updated USFWS Species List for the proposed Big Creek ALP projects.
10/29/02	Letter from J. Knight (USFWS) to L. Tigas (ENTRIX) providing an updated USFWS Species List for the proposed Big Creek ALP projects.

Table 2-1. Summary of Big Creek ALP and Additional USFWS Consultation[1] (continued).

Date	Discussion
04/17/03	Telephone conversation between J. Nolan-Summers (ENTRIX) and J. Wild (USFWS). USFWS provided approval to implement the Tied-for-first whitewater boating survey as part of REC-3 consistent with the proposed methodologies, timing, and avoidance and protection measures provided in the 04/30/03 letter, which was provided to USFWS in draft form on 4/16/03.
04/21/03	Letter from J. Nolan-Summers (ENTRIX), on behalf of SCE, to J. Wild (USFWS) providing results of special-status plant clearance surveys for Cultural Studies as part of CUL-1 and CUL-2 study plans for the Big Creek Alternative Licensing Process (FERC Project Nos. 67, 120, 2085, and 2175), Big Creek No. 4 (FERC Project No. 2017), Portal (FERC Project No. 2174), and Vermilion Valley (FERC Project No. 2086).
04/30/03	Letter from T.J. McPheeters (SCE) to J. Wild (USFWS) providing an addendum to the March 25, 2002, letter regarding survey methodology for the Tied-for-First whitewater boating study.
04/30/03	Letter from T.J. McPheeters (SCE) to J. Wild (USFWS) including detailed information on study methodologies, timing, and proposed avoidance and protection measures for conducting PHABSIM studies as part of CAWG-3, Determine Flow-related Physical Habitat in Bypass Reaches, Study Plan.
04/30/03	Telephone conversation between J. Nolan-Summers (ENTRIX) and J. Wild (USFWS). USFWS provided approval to implement the PHABSIM studies as part of CAWG-3 consistent with the proposed methodologies, timing, and avoidance and protection measures provided in the 04/30/03 letter.
10/03/03	Telephone conversation between L. Tigas (ENTRIX) and J. Wild (USFWS). USFWS confirmed that no presence/absence surveys for California red-legged frog (*Rana aurora draytonii*) would be required by USFWS for the Big Creek ALP projects.
10/10/03	2002 DTSRP distributed to the Plenary Group and the public.
10/15/03	Telephone conversation between J. Nolan-Summers (ENTRIX) and J. Wild (USFWS). J. Wild provided contact information for D. Carney, the new USFWS representative assigned to the Big Creek ALP.
11/20/03	Meeting with G. Rabone (SCE), J. Nolan-Summers and E. Bianchi (ENTRIX), R. Gerson, J. Wild, and D. Carney (USFWS) regarding overall project timeline and proposed BA/BE schedule. J. Wild reconfirmed that no presence/absence surveys for California red-legged frog would be required for the ALP projects.
12/2003	2002 DTSRP approved by the Plenary.
07/05/04	Meeting with G. Rabone (SCE), D. Carney and J. Wild (USFWS) J. Nolan-Summers (RBI), and E. Bianchi (ENTRIX) to discuss the PAD BA/BE.
08/31/04	USFWS Big Creek ALP site visit attended by G. Rabone and W. Allen (SCE), L. Tigas (ENTRIX), D. Carney and D. Giglio (USFWS), C. Whelan and P. Strand (USDA-FS), and J.Nolan-Summers (RBI).
09/1/04	USFWS Big Creek ALP site visit attended by G. Rabone and W. Allen (SCE), L. Tigas (ENTRIX), D. Carney and D. Giglio (USFWS), C. Whelan and P. Strand (USDA-FS), and J. Nolan-Summers (RBI).

Table 2-1. Summary of Big Creek ALP and Additional USFWS Consultation[1] (continued).

Date	Discussion
10/25/04	PAD BA/EA distributed to USFWS.
11/3/04	Conference call with G. Rabone (SCE), E. Bianchi (ENTRIX), A. Bowers (USFWS), and J. Nolan-Summers (RBI) regarding comments on Preliminary Administrative Draft BA/BE.
11/2004	2003 DTSRP distributed to the Plenary Group and the public.
12/2004	2003 DTSRT approved by the Plenary Group.
01/06/05	E-mail from A. Bowers (USFWS) to J. Nolan-Summers with comments on the PAD BA/BE.
1/17/05	SCE provided response to comments on PAD BA/BE to D. Giglio, A. Bowers, and K. Brown (USFWS).
1/17/05	Meeting with W. Allen (SCE), A. Bowers (USFWS), E. Bianchi (ENTRIX) and J. Nolan-Summers (RBI) regarding USFWS comments on the PAD BA/BE and the overall schedule for ESA consultation.
05/2005	2004 DTSRP approved by Working Group.
05/27/05	Letter to G. Rabone from USFWS regarding instream flow settlement proposal for rainbow trout in Study area.
06/09/05	Meeting with A. Bowers (USFWS) and J. Nolan-Summers to discuss Big Creek ALP Management Plans and License Articles.
06/20/05	Meeting with K. Brown and A. Bowers (USFWS), G. Rabone (SCE), E. Bianchi (ENTRIX), and J. Nolan-Summers (RBI) regarding proposed VELB avoidance and protection measures.
06/23/05	E-Mail from J. Nolan-Summers (RBI) to A. Bowers and K. Brown (USFWS) that included additional information requested at the June 20, 2005.
10/13/05	Meeting with A. McMillan (SCE), P. Trenham (USFWS), J. Nolan-Summers (RBI) and E. Bianchi (ENTRIX) regarding Bald Eagle Management Plan and VELB Management Plan. Obtained tentative approval on plans, including Avoidance and Protection Measures and Mitigation.
10/06/05	Conference call between P. Trenham (USFWS) and J. Nolan-Summers (RBI) regarding the Bald Eagle Management Plan and VELB Management Plan.
10/24/05	Distributed Revised VELB Management Plan mitigation section to Pete Trenham (USFWS).
11/07/05	E-mail from P. Trenham (USFWS) providing final comments on VELB Management Plan.
11/xx/05	SCE submits revised BA/BE for the four Big Creek ALP Projects (provided in Volume 3, SD-F of the PDEA)
01/18/06	Meeting with P. Trenham (USFWS), and J. Nolan-Summers (RBI) to discuss Big Creek ALP BA/BE.
3/30/06	E-mail from P. Trenham (USFWS) providing approval to implement the VELB Management Plan

Table 2-1. Summary of Big Creek ALP and Additional USFWS Consultation[1] (continued).

Date	Discussion
10/24/06	SCE met with USFWS and USDA-FS to select a VELB mitigation site in the Project area. USFWS concurred that the elderberry seedlings should be planted at mitigation Site No. 2.
February 2007	SCE submits letter to USFWS providing additional information regarding the implementation of VELB mitigation.

[1]Includes only consultation pertinent to this BA/BE

Table 4-1. List of Existing and Proposed Project Facilities.

Mammoth Pool (FERC Project No. 2085)

Dams and Diversions

Large Dams

Mammoth Pool Dam
Mammoth Pool Spillway

Small Diversions

Rock Creek
Ross Creek

Power Generation

Mammoth Pool PH
Mammoth Pool Fish Water Generator

Gaging Stations

Streams

Mammoth Pool Fish Water Generator
San Joaquin River above Shakeflat Creek (with cable crossing)
Rock Creek Below Diversion[1]
Ross Creek Below Diversion[1]

Reservoir

Mammoth Pool Dam
Mammoth Pool PH

Water Conveyance

Mammoth Pool Powerhouse

Intake Gate House
Adit Portals 1 & 2 at Shakeflat Creek
Mammoth Tunnel
Rock Creek Diversion Piping & Borehole
Ross Creek Diversion Piping & Borehole
Surge Chamber, Rock Trap
Rock Trap Flushing Channel
Valve House
Penstocks

Fishwater Generator

Mammoth Pool Diversion Tunnel

HB Valves

Mammoth Pool Reservoir

Cabins

Mammoth Pool Reservoir Maintenance Cabin

Power Transmission Lines

MPPH - BC3 220KV

Helicopter Landing Sites

Mammoth Pool Dam
San Joaquin River above Shakeflat Creek

Big Creek Nos. 1 and 2 (FERC Project No. 2175)

Dams and Diversions

Large Dams

Huntington Lake Dams 1, 2, 3, & 3a

Moderate Diversion Dams

Dam 4

Table 4-1. List of Existing and Proposed Project Facilities (continued).

Small Diversions
- Balsam Creek
- Ely Creek
- Adit 8 Creek

Power Generation
- Big Creek PH No. 1
- Big Creek PH No. 2

Gaging Stations

Streams
- Big Creek below Huntington Lake at Dam 1
- Balsam Creek at Diversion Dam
- Ely Creek at Diversion Dam
- Big Creek Below Dam 4[1]
- Ely Creek below Diversion Dam[1]
- Balsam Creek below diversion to Big Creek[1]

Reservoir
- Huntington Dam
- Dam 4

Powerhouse
- Big Creek PH No.1
- Big Creek PH No.2

Water Conveyance

Powerhouse No. 1
- Intake Gate House at Huntington Lake - Dam 1
- Tunnel No. 1
- Incline Adit
- Upper 84" Valve House below Huntington Lake
- Upper 60" Valve House below Huntington Lake
- 60" & 84" Flowlines below Huntington Lake
- Lower 84" Valve House at top of PH No.1 Penstock
- Lower 60" Valve House at top of PH No.1 Penstock
- 42" Valve House at top of PH No.1 Penstock
- Vent Stacks
- Penstocks

Powerhouse No. 2
- Inlet Structure at Dam 4
- Tunnel No. 2
- Adit 1, Tunnel 2
- Adit 2, Tunnel 2
- Adit 3, Tunnel 2
- Adit 4, Tunnel 2
- Adit 5, Tunnel 2
- Adit 6, Tunnel 2
- Adit 7, Tunnel 2
- Adit 7&1/2, Tunnel 2
- Adit 8, Tunnel 2
- Adit 7&1/2, Leakage Weir
- Shoo fly Piping & Splashgate Structure (Adit 8/Shoofly Diversion)
- Diversion Shaft, Bulkhead and Drain Valve at Adit 8

Table 4-1. List of Existing and Proposed Project Facilities (continued).

Balsam Creek Diversion Piping (Adit 3)
Ely Creek Diversion Piping (Adit 6)
Rock Trap/Surge Chamber (9' Gate House) on the railroad grade
42" Valve House and valves below railroad grade
Drain Piping & Valves (10" & 24") from Surge Chamber, below railroad grade
Vent Stacks below railroad grade
Penstocks

Huntington-Pitman-Shaver

Inlet Structure & Gate 1A and 1B at Dam 2 (10' Gate House)

Adit 8 Creek

Shoo fly Complex

Weather Stations

Big Creek No. 1
Huntington Lake

Buildings/Camps

SCE Administrative Offices and Company Housing

Storage Yards

Big Creek PH No.1

Utilities

Water Supply/Treatment

Big Creek PH No.1

Domestic Water Diversions

Scott Lake

Sewage Treatment

Big Creek PH No.1 Community

Fuel - Gasoline & Diesel

Big Creek No.1 Garage

Propane

Big Creek PH No.1 Automotive Shop

Project Power Lines Less Than 33KV

Musick 7KV

Helicopter Landing Sites

Hodges (Big Creek Heliport)

Dams and Diversions

Large Dams

Florence Lake
Shaver Lake

Moderate Diversion Dams

Bear Creek Diversion
Mono Creek Diversion
Pitman Creek
Balsam Forebay
Dam 5

Small Diversions

Hooper Creek
Tombstone Creek[2]
North Slide Creek[2]
South Slide Creek[2]

Table 4-1. List of Existing and Proposed Project Facilities (continued).

Crater Creek[2]
Chinquapin Creek
Camp 62 Creek
Bolsillo Creek

Power Generation

Big Creek PH No. 2A
Big Creek PH No. 8
Eastwood Power Station

Gaging Stations

Streams

Bear Creek below Diversion Dam
Bear Creek Conduit at Diversion Dam
Bear Creek upstream of Diversion Dam (with cable crossing)
Big Creek below Dam 5 (with cable crossing)
Bolsillo Creek above Intake
Bolsillo Creek below Diversion Dam
Camp 62 Creek below Diversion Dam
Chinquapin Creek below Diversion Dam
Hooper Creek below Diversion Dam
Huntington-Shaver Conduit gate 2 release
Middle Fork Balsam Creek below Balsam Meadows Forebay
Mono Creek below Diversion Dam
Mono Creek Conduit at Diversion Dam
Mono-Bear Conduit (flow meter near Camp 62)
North Fork Stevenson Creek at Perimeter Rd.
Pitman Creek above Diversion (total flow)
Pitman Creek below Diversion (minimum release)
South Fork San Joaquin River below Hooper Creek
South Fork San Joaquin River above Hooper Creek (with cable crossing)
Stevenson Creek below Shaver Lake
Ward Tunnel at Intake
Camp 62 Creek at Diversion Dam
Chinquapin Creek at Diversion Dam
Crater Creek Diversion Ditch near Florence Lake[2]
Crater Creek below Diversion Dam[2]
North Slide Creek below Diversion Dam[2]
South Slide Creek below Diversion Dam[2]
Tombstone Creek below Diversion Dam[2]
South Fork San Joaquin River near Florence Lake

Reservoir

Florence Dam
Mono Dam
Shaver Dam
Dam 5

Powerhouse

Big Creek PH No.2A
Big Creek PH No.8
Eastwood Power Station

Table 4-1. List of Existing and Proposed Project Facilities (continued).

Water Conveyance

Powerhouse No. 2A
- Intake Gate House at Shaver Lake
- Tunnel No. 5
- Adit 1, Tunnel 5
- Adit 2, "Shoo fly", Tunnel 5
- Surge Chamber, Rock Trap
- 102" Valve House
- Penstocks

Powerhouse No. 8
- Intake structure at Dam 5
- Tunnel No. 8
- Adit 1, Tunnel 8
- Surge Chamber - includes trash drain and penstocks valves
- Penstocks

Eastwood Power Station
- Inlet Structure (Gate 4)
- Power Tunnel
- Surge Chamber
- Tailrace Tunnel

Ward Tunnel
- Inlet Structure at Florence Lake
- Gate House at Florence Lake
- Ward Tunnel
- Minimum Pool Weir
- Chinquapin Creek Borehole
- Camp 62 Adit
- Camp 62 Creek Borehole
- Bolsillo Creek Borehole

Mono-Bear Siphon
- Bear Inlet Structure at Bear Forebay
- Bear Tunnel
- Bear Adit
- Bear Flowline
- Mono Inlet Structure at Mono Forebay
- Mono Tunnel
- Mono Flow Line
- Combined Flow Line (siphon)
- Camp 62 Adit Valving

Huntington-Pitman-Shaver
- Steel Conduit with Air Vents
- Siphon w 4" and 10" Drain Valves
- Vent Valve House
- Tunnel No. 7
- Tunnel No. 7 Vent
- Pitman Diversion Shaft
- Camp 72 Adit
- Diversion Tunnel from Tunnel 7 to Gate 3 at Balsam Meadow Forebay
- Diversion Tunnel Vent

Table 4-1. List of Existing and Proposed Project Facilities (continued).

Gate 3 Outlet to Balsam Forebay
Gate 2 Outlet to NF Stevenson Creek

Tombstone

Tombstone Creek Diversion Piping[2]

Hooper

Hooper Diversion Piping to Florence Lake
North Slide Creek Diversion Piping[2]
South Slide Creek Diversion Piping[2]

Diversion Channels

Crater Creek[2]

HB Valves

Shaver Lake

Weather Stations

Florence Lake
Kaiser Ridge/Mt Givens
Shaver Lake

Cabins

Camp 62
Florence Lake Relief

Buildings/Camps

Florence Work Camp
Big Creek PH No. 8 Facilities

Storage Yards

Florence Lake Work Camp
Camp 62
Big Creek PH No.2 & PH No.2A
Eastwood School Site

Utilities

Water Supply/Treatment

Camp Edison
Florence Work Camp

Fuel - Gasoline & Diesel

Big Creek PH No.8
Camp 62
Florence Work Camp

Propane

Big Creek PH No.8
Florence Work Camp - Generator, Heating

Project Power Lines Less Than 33KV

Jumbo 12KV
Pitman 33KV (to diversion)

Power Transmission Lines

EPS - BC1 220KV

Switchyards

Eastwood Switchyard

Helicopter Landing Sites

Mt. Givens Telecom Site
Bear Creek Diversion

Table 4-1. List of Existing and Proposed Project Facilities (continued).

Camp 62 at Junction of Kaiser Pass Road
Eastwood School
Pitman Creek at Diversion
Florence Lake Dam
Florence Lake Camp
Florence Lake Gaging Station
South Fork San Joaquin River Florence Spill Station
Hooper Creek at Diversion
South Fork San Joaquin River below Hooper[1]
Mono Creek at Diversion[1]
Mono Creek below Lake T.A. Edison[1]
Tiffany Pines at Camp Edison
Summit at Shaver Hill

Big Creek No. 3 (FERC Project No. 120)

Dams and Diversions

Moderate Diversion Dams

Dam 6

Power Generation

Big Creek PH No. 3

Gaging Stations

Streams

San Joaquin River above Stevenson Creek (at dam 6)

Powerhouse

Big Creek PH No.3

Water Conveyance

Powerhouse No. 3

Intake Gate House at Dam 6
Tunnel No. 3
Adit 1, Tunnel 3
Adit 2, Tunnel 3
Adit 3, Tunnel 3
Surge Chamber, Rock/Sand Trap
Rock/Sand Trap Drain Piping & Valves
Rock Trap Flushing Channel
Manifold Structure
Valve House
Penstocks

Buildings/Camps

Big Creek PH No.3 Facilities

Storage Yards

Big Creek PH No.3

Helicopter Landing Sites

San Joaquin River above Shakeflat Creek[1]
Mammoth Pool Dam[1]

Utilities

Water Supply/Treatment

Big Creek PH No.3

Fuel - Gasoline & Diesel

Table 4-1. List of Existing and Proposed Project Facilities (continued).

Big Creek PH No.3

Project Power Lines Less Than 33 KV

Manifold 2.4 KV

[1]New facility recommended under the Proposed Action.

[2]Recommended for decommissioning under the Project Action.

Table 4-2. List of Reservoirs, Forebays and Diversion Pools Associated with the Four Big Creek ALP Projects.

Project Feature
Mammoth Pool, FERC Project No. 2085
Reservoirs, Forebays, and Diversion Pools
Large Reservoir
Mammoth Pool Reservoir
Big Creek Nos. 1 and 2, FERC Project No. 2175
Reservoirs, Forebays, and Diversion Pools
Large Reservoir
Huntington Lake
Moderate Forebays or Diversion Pools
Dam 4 Forebay
Big Creek Nos. 2A, 8 and Eastwood, FERC Project No. 67
Reservoirs, Forebays, and Diversion Pools
Large Reservoir
Florence Lake
Shaver Lake
Moderate Forebays or Diversion Pools
Bear Diversion Pool
Mono Diversion Pool
Hooper Diversion Pool
Pitman Diversion Pool
Balsam Forebay
Dam 5 Forebay
Big Creek No. 3, FERC Project No. 120
Reservoirs, Forebays, and Diversion Pools
Moderate Forebays or Diversion Pools
Dam 6 Forebay

Table 4-3. List of Project Roads and Trails.

SCE Map No.	SCE Road Name/Description	USDA-FS Road No.
Mammoth Pool Project (FERC No. 2085)		
Roads		
6	Mammoth Pool Fishwater Generator access road from 6S25, Mammoth Pool Road, to base of Mammoth Pool Dam	06S025G
80	Access road from 8S03 to Mammoth Pool penstock	08S003B
79	Access road to Mammoth Pool Transmission Line from 8S03	08S003C
144	8S03CA, spur road to Mammoth Pool Transmission Line	08S003CA
145	Access road to Mammoth Pool Transmission Line from 8S03C	08S003CB
146	Access road to Mammoth Pool Transmission Line from 8S03C	08S003CC
78	Access road from 8S03 to Mammoth Pool Powerhouse surge chamber	08S003D
213	8S44, Mammoth Pool Transmission Line access road	08S044
37	8S44Y, Mammoth Pool Transmission Line access road from gate near 8S03 to 9S42	08S044Y
138	8S44YA, Mammoth Pool Transmission Line access road	08S044YA
136	8S44YB, Mammoth Pool Transmission Line access road	08S044YB
18	9S42, Mammoth Pool Powerhouse Transmission Line access road from gate near County Road 225, Italian Bar Road, to 8S44	09S042
135	Access road to Mammoth Pool Transmission Line from 9S42	09S042A
102	7S47B Access road to Rock Creek Tunnel Muck Pile	07S047B
33	8S03 (from Powerhouse No. 8 to Mammoth Pool Powerhouse)	08S003(02)
30	6S25, Mammoth Pool Road, from 7S20, Shake Flat Creek access, to end at east abutment	06S025(03)
164	6S25DA, spur to Windy Point Picnic Area from 6S25D	06S025DA
Trail		
75	Trail to San Joaquin River Gage above Shakeflat Creek	27E05
Big Creek Nos. 1 and 2 Project (FERC No. 2175)		
Roads		
21	8S05, Canyon Road (from Huntington Lake Road to Powerhouse No. 2 and 8S05E)	08S005(02)
81	Powerhouse No.2 access road from Canyon Road	08S005C
160	Access to Big Creek No. 2 switchyard	08S005CA
16	Old housing road 1 adjacent to Powerhouse No. 2 from 8S05, Canyon Road	08S005E
159	Old housing road 3 adjacent to Powerhouse No. 2 from 8S05E	08S005EA
158	Old housing road 2 adjacent to Powerhouse No. 2 from 8S05E	08S005EC
69	Access road south from Railroad Grade to West Portal	08S008A
41	8S13 from gate to 8S05, the Canyon Road	08S013(02)
168	8S13K Access road to Powerhouse No. 2 penstock	08S013K
22	8S66, from west end of Dam 2 to 8S66A	08S066(01)
23	8S66 from gate to west end of Dam 2	08S066(02)
207	8S66A, access road to gaging station on Big Creek below Huntington Lake	08S066A

Table 4-3. List of Project Roads and Trails (continued).

SCE Map No.	SCE Road Name/Description	USDA-FS Road No.
42	8S66B from Dam 2 to end	08S066B
171	Short road between 8S66B and 8S66BC	08S066BA
99	East end of Dam 1 to Dam 1 drainage gates	08S066BC
107	8S66C on public lands from 8S301 to 8S66 east	08S066C(02)
107	8S66C on public lands from 8S301 to 8S66 east	08S066C(03)
107	8S66C on SCE private lands from gate to 8S302	08S066C(04)
184	Road over Dam 2	08S066X
186	8S082 access to Hydro offices at Big Creek	08S082
1	8S082A access to Hydro offices at Big Creek	08S082A
249	Access road to Warehouse	08S082AA
185	8S082B access to Powerhouse No. 1	08S082B(02)
248	Upper access road to Wastewater treatment plant from 8S82B	08S082BA
247	Lower access road to Wastewater treatment plant from 8S82B	08S082BB
245	Access road to Fish Farm upper gate	08S082BC
188	8S082C access to Hydro offices at Big Creek	08S082C
187	8S082D access to Hydro offices at Big Creek	08S082D
250	Upper access road to SCE company housing	08S082E
252	Lower access road to SCE company housing	08S082EA
251	Access road to Domestic water treatment plant from FRE 2710	08S082F
246	Upper access road to Powerhouse No. 1 from FRE 2710	08S082J
189	8S082X access to Hydro offices at Big Creek	08S082X
48	8S83 from 8S66 to 8S83A	08S083(02)
200	8S83A, connector road between 8S66C and 8S83	08S083A
28	8S301 from gate with 8S66C to penstock surge pipes	08S301
47	8S302, access to Big Creek No. 1 42-inch gatehouse	08S302
Trail		
261	Trail to Scott Lake Domestic Diversion	NA
Big Creek Nos. 2A and 8, and Eastwood Project (FERC No. 67)		
Roads		
68	Mono Creek Diversion access road	05S080Z
4	7S01B Access road to Florence Work Camp	07S001B(02)
219	7S01BA Florence Work Camp road from 7S01B	07S001BA
71	7S370D Access road to Florence Dam and water storage tank from 7S370	07S370D
237	7S370F Access road to Florence Dam from 7S370	07S370F
54	8S02 from Highway 168 to 8S02B	08S002(01)
54	8S02 from Highway 168 to 8S02B	08S002(02)
197	8S02B Access to Huntington-Pitman-Shaver tunnel adit	08S002B
33	8S03 (from 8S05, Canyon Road, to 8S03A, Powerhouse No. 8 access road)	08S003(01)
166	Access road to Powerhouse No. 8 from 8S03	08S003A

Table 4-3. List of Project Roads and Trails (continued).

SCE Map No.	SCE Road Name/Description	USDA-FS Road No.
21	8S05, Canyon Road (from Powerhouse No. 2 and 8S05E to Powerhouse No. 8)	08S005(01)
77	8S05F Access road to Powerhouse No. 8 penstock from 8S05	08S005F
157	8S05FB Access road to Powerhouse No. 8 penstock from 8S05F	08S005FB
167	Road to communication line near Powerhouse No. 8	08S005L
69	Access road south from Railroad Grade to West Portal	08S008A
41	8S13 from the gate to 8S05, Canyon Road	08S013(02)
258	8S47 Access road to Eastwood Powerstation Transmission Line tower - from gate to end	08S047(02)
48	8S83 from 8S83A to Huntington Shaver Siphon	08S083(01)
56	Pitman Creek Diversion access road	08S094
174	8S303 Access road to Eastwood Overflow Campground	08S303
156	9S03 from 8S08 to FRE 2710	09S003(01)
262	9S17 access road to Eastwood Transmission line from Hwy 168	09S017
55	9S24 from Hwy 168 to North Fork Stevenson Creek gate No. 2 (Tunnel No. 7 Outlet)	09S024
89	9S32 from gate near Highway 168 to EPH Transmission Line	09S032
50	9S32A, spur from 9S32 to east side of Balsam Forebay	09S032A
153	9S32AB, spur from 9S32A to Balsam Forebay	09S032AB
170	Road below Balsam Forebay Dam	09S032C
208	9S32CA Access road to Eastwood Powerstation Transmission Line tower	09S032CA
232	9S32CB Access road to Eastwood Powerstation Transmission Line tower	09S032CB
242	9S32CC Access road to Eastwood Powerstation Transmission Line tower	09S032CC
231	9S32CD Access road to Eastwood Powerstation Transmission Line tower	09S032CD
230	9S32CE Access road to Eastwood Powerstation Transmission Line tower	09S032CE
241	9S32CF Access road to Eastwood Powerstation Transmission Line tower	09S032CF
84	9S58 from Shaver Marina to North Fork Stevenson Gage	09S058
114	Access road to Eastwood Power Tunnel entrance	09S058K
243	9S311 Access to Eastwood Powerstation Transmission Line tower	09S311(01)
243	9S311 Access to Eastwood Powerstation Transmission Line tower	09S311(02)
244	9S311A Access to Eastwood Powerstation Transmission Line tower	09S311A
19	9S312 access to Eastwood Substation from Highway 168	09S312
2	Camp Edison Roads	NA
83	Access road to Shaver Dam north	NA
49	Access road to Shaver Dam south	NA
109	Access road to Eagle Point Boat Only Day Use Area from 9S58	NA
110	Access road to Eastwood Tailrace	NA
115	Access Tunnel to Eastwood Power Station	NA
Trails		
265	Trails to North-South Slide Creek Diversions	NA

Table 4-3. List of Project Roads and Trails (continued).

SCE Map No.	SCE Road Name/Description	USDA-FS Road No.
108	Trail to Pitman Creek Gage near Tamarack Mountain (below shaft)	NA
74	Trail to Big Creek Gage below Dam 5	NA
91	Trail to Bolsillo Creek Gage above Intake	NA
12	Trail to Camp 62 Creek Gage and Diversion Dam	NA
259	Trail to South Fork San Joaquin River Gage downstream of Jackass Meadow	NA
260	Trail to Chinquapin Creek Gage and Diversion Dam	NA
92	Trial to Bear Creek Gage upstream of Bear Forebay	28E01
14	Trail to Tombstone Creek Diversion	NA
88	Trail from Jackass Meadow Campground to Florence Dam outlet and Gage	NA
86	Trail to Crater Creek Diversion Ditch (off of the Dutch Lake Trail)	NA
17	Two trails to Stevenson Creek Gage below Shave Lake Dam	NA
Big Creek No. 3 Project (FERC No. 120)		
Roads		
21	8S05, Canyon Road (from junction with 8S03 to junction with Italian Bar Road)	08S005(03)
72	Access road to Powerhouse No. 3 penstocks and gate house downhill from 8S05, Canyon Road	08S005A
217	8S05B Access road to Powerhouse No. 3 penstock from 8S05 Canyon Road	08S005B
119	8S05G Access road to Powerhouse No. 3 surge chamber uphill from 8S05 Canyon Road	08S005G
24	8S05T Access to tailings	08S005T
29	8S05TA Access to tailings	08S005TA
216	9S20 Access to Carpenter shop	09S020
85	9S20A Access road to transmission line tower	09S020A
62	9S20B Access road to transmission line tower	09S020B
64	9S20C Connector road between 9S20 loop	09S020C
13	9S20D Access to Carpenter Shop	09S020D
257	9S20DA Access to Garage and shops	09S020DA
51	9S20E Access to material yard	09S020E
87	9S20F Connector road between 9S20 loop	09S020F
127	9S88 from Italian Bar Road to old company housing	09S088
5	9S88A Access to old company housing	09S088A
256	9S88X Access road to Powerhouse No. 3 water tank and shop	09S088X
215	9S88XA Access road to old company housing from 9S88X	09S088XA
61	9S89 Access road to Powerhouse No. 3 administrative bldg. from Italian Bar Road	09S089
59	9S89BA Access road to Powerhouse No. 3 and switchyard	09S089BA

NA = Not Available

Table 4-4. Physical Constraints of Project Facilities.[1]

	MIF Max Pipe Capacity (cfs)	Diverted Max Pipe Capacity (cfs)	Max Drain Gate Capacity (cfs)
Mammoth Pool (FERC Project No. 2085)			
Rock Creek, Diversion to San Joaquin River	No Existing	30 cfs	43 cfs
Ross Creek, Diversion to San Joaquin River	No Existing	10 cfs	33 cfs
San Joaquin River, Mammoth Pool Dam to Dam 6	50 cfs	Mammoth Tunnel = 2,100 cfs	HB Valve 1,800 cfs
Big Creek Nos. 1 and 2 (FERC Project No. 2175)			
Ely Creek, Diversion to Big Creek	No Existing	9 cfs	18 cfs
Adit 8 Creek, Diversion to Big Creek			
Big Creek, Huntington Lake to Dam 4	5 cfs	Tunnel 1 = 690 cfs	3 gates at 594 cfs each
Big Creek, Dam 4 to Dam 5	No Existing	Tunnel 2 = 600 cfs	1179 CF
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67)			
Mono Creek, Diversion to South Fork San Joaquin River	16 cfs	450 cfs	2 gates at 85 cfs each
Balsam Creek, Diversion to Forebay	No Existing	9 cfs	33 cfs
Big Creek, Dam 5 to San Joaquin River	12 cfs	Tunnel 8 = 1,173 cfs	2 gates at 989 cfs each
North Fork Stevenson Creek, tunnel outlet to Shaver Lake	10 cfs	Diversion Channel 1,500 cfs	1,500 cfs
Balsam Creek, Forebay to Balsam Creek Diversion	3 cfs	EPS Power Tunnel = 2,500 cfs	130 cfs
Pitman Creek, Diversion to Big Creek	10 cfs	Tunnel 7 = 1,480 cfs (combined with Huntington) 800 cfs (Pitman Only)	14 cfs
Bear Creek, Diversion to SF San Joaquin River	16 cfs	450 cfs	2 gates at 70 cfs each
SF San Joaquin River, Florence to Mammoth Pool	81 cfs	Ward Tunnel = 1,760 cfs	2 gates at 400 cfs each
Crater Creek, Diversion to SF San Joaquin River[2]	No Existing	Diversion Channel 80 cfs	None
Chinquapin Creek, Diversion to SF San Joaquin River	2 cfs	30 cfs	10 cfs
Camp 62 Creek, Diversion to SF San Joaquin River	1 cfs	30 cfs	33 cfs

Table 4-4. Physical Constraints of Project Facilities (continued).[1]

	MIF Max Pipe Capacity (cfs)	Diverted Max Pipe Capacity (cfs)	Max Drain Gate Capacity (cfs)
Bolsillo Diversion, Division to SF San Joaquin River	0.65 cfs	30 cfs	23 cfs
Hooper Creek, Diversion to SF San Joaquin River	15 cfs	85 cfs	80 cfs
South Slide Creek, Diversion to Confluence with North Slide Creek[2]	No Existing	4 cfs	None
North Slide Creek, Diversion to SF San Joaquin River[2]	No Existing	4 cfs	None
Tombstone Creek, Diversion to SF San Joaquin River[2]	No Existing	7 cfs	None
Stevenson Creek, Shaver lake Dam to San Joaquin River	36 cfs	Tunnel 5 = 650 cfs	HB Valve 450 cfs
Big Creek No. 3 (FERC Project No. 120)			
San Joaquin River, Dam 6 to Redinger	146 cfs	Tunnel 3 = 2,431 cfs	4 gates at 1,100 cfs each

[1]Assumes reservoir of diversion is at full capacity. Capacities are generally derived from operating assumptions, engineering design or calculations.
[2]Recommended for decommissioning under the Proposed Action.

Table 4-5. Vegetation Management in the Vicinity of the Four Big Creek ALP Projects.

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Mammoth Pool (FERC Project No. 2085)			
Dams and Diversions			
Mammoth Pool	A		A
Rock Creek		R	
Ross Creek	R	R	
Power Generation			
Mammoth Pool PH	R		R
Mammoth Pool Fish Water Generator	R		R
Gaging Stations			
Mammoth Pool Fish Water Generator	R		
Water Conveyance - Mammoth Pool Powerhouse			
Intake Gate House	R		R
Surge Chamber, Rock Trap	R		
Rock Trap Flushing Channel	I		
Valve House	R		
Penstocks	R		R
Power Transmission Lines			
MPPH - BC3 220KV	A		
Helicopter Landing Sites			
San Joaquin River above Shakeflat Creek*	R	R	R
Mammoth Pool Dam*	R	R	R
Project Roads			
6S25 Mammoth Pool Road, from 7S20, Shake Flat Creek access to end at east abutment (#30) *	R	R	R
6S25DA Spur to Windy Point Picnic Area from 6S25D (#164) *	I	I	I
6S25G Mammoth Pool Fish Water Generator access road from 6S25 (Mammoth Pool Road) to Base of Mammoth Pool Dam (#6)	R	R	R
7S47B Access road to Rock Creek Tunnel Muck Pile (#102) *	R	R	I
8S03 from PH No. 8 to Mammoth Pool PH (#33)	R	R	R
8S03B Access road from 8S03 to Mammoth Pool penstock (#80) *	R	R	R
8S03B Access road to Mammoth Pool Transmission Line from 8S03C (#145)	R	R	I
8S03C Access road from 8S03 to Mammoth Pool transmission line (#79)	R	R	
8S03CA Spur road to Mammoth Pool Transmission Line (#144) *	R	R	I
8S03CC Access road to Mammoth Pool Transmission Line from 8S03C (#146)	R	R	I

Table 4-5. Vegetation Management in the Vicinity of the Four Big Creek ALP Projects (continued).

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
8S03D Access road from 8S03 to Mammoth Pool PH Surge Chamber (#78)	R	R	
8S44 Mammoth Pool transmission line access road (#213)	R	R	
8S44Y Mammoth Pool PH Transmission Line access road from gate near 8S03 to 9S42 (#37)	R	R	
8S44YA Mammoth Pool transmission line access road (#138)	R	R	
8S44YB Mammoth Pool Transmission Line access road (#136) *	R	R	I
9S42 Mammoth Pool PH Transmission Line access road from gate near County Road 225, Italian Bar Road, to 8S44 (#18)	R	R	
9S42A Access road to Mammoth Pool transmission line from 9S42 (#135)	R	R	
Project Trail			
Trail to San Joaquin River Gage above Shakeflat Creek (#75)	I	I	I
Big Creek Nos. 1 and 2 (FERC Project No. 2175)			
Dams and Diversions			
Huntington Lake Dams 1, 2, 3, 3a	A		A
Dam 4	A		A
Balsam Creek	R	R	R
Ely Creek	R	R	R
Power Generation			
Big Creek PH No. 1	R		R
Big Creek PH No. 2	R		R
Gaging Stations			
Big Creek below Huntington Lake at Dam 1	R		
Balsam Creek at Diversion Dam	A		
Water Conveyance - Powerhouse No. 1			
Upper 84" Valve House below Huntington Lake	R		R
Upper 60" Valve House below Huntington Lake	R		R
60" & 84" Flowlines below Huntington Lake	R		R
Lower 84" Valve House at top of Ph 1 penstock	R		R
Lower 60" Valve House at top of Ph 1 penstock	R		R
42" Valve House at top of Ph 1 penstock	R		R
Vent Stacks	R		R
Penstocks	R		R
Water Conveyance - Powerhouse No. 2			
Vent Stacks below railroad grade	R		R
Penstocks	R		R

Table 4-5. Vegetation Management in the Vicinity of the Four Big Creek ALP Projects (continued).

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Adit 7&1/2, Tunnel 2	R		
Adit 8, Tunnel 2	R		R
Adit 7&1/2 Leakage Weir	R		
Balsam Creek Diversion Piping (Adit 3)	R		A
Ely Creek Diversion Piping (Adit 6)			R
Rock Trap/Surge Chamber (9' Gate House) on the railroad grade	R		R
42" Valve House and valves below railroad grade	R		R
Drain piping & Valves (10" & 24") from Surge Chamber, below railroad grade	R		R
Water Conveyance - Huntington-Pitman-Shaver			
Inlet Structure & Gate 1A and 1B at Dam 2 (10' Gate House)	R		
Weather Stations			
Big Creek No. 1	R		R
Huntington Lake	R		R
Buildings/Camps			
Big Creek PH No.1 Facilities	R		R
Storage Yards			
Big Creek PH No. 1	I		I
Utilities – Water Supply/Treatment			
Big Creek PH No. 1	R		R
Utilities – Sewage Treatment			
Big Creek PH No. 1 Community	A		A
Project Power Lines Less than 33kV			
Musick 7KV	A		A
East Incline 7KV (Not in Service)	A		A
Miscellaneous			
Fish Hatchery	R		
Helicopter Landing Sites			
Hodges (Big Creek) Heliport	R	R	R
Project Roads			
8S05 Canyon Road (from Huntington Lake Road to PH No. 2 and 8S05E) (#21)	R	R	
8S05C PH No.2 access road from Canyon Road (#81)	R	R	
8S05C Powerhouse No.2 access road from Canyon Road (#81)	R	R	R
8S05CA Access to Big Creek No. 2 switchyard (#160) *	R	R	R
8S05E Old housing road 1 adjacent to Powerhouse No. 2 from 8S05, Canyon Road (#16)		I	

Table 4-5. Vegetation Management in the Vicinity of the Four Big Creek ALP Projects (continued).

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
8S05EA Old housing road 2 adjacent to Powerhouse No. 2 from 8S05E (#159)		I	
8S05EC Old housing road 3 adjacent to Powerhouse No. 2 from 8S05E (#158)		I	
8S082 Access to Hydro offices at Big Creek (#186) *	R		I
8S082A Access to Hydro offices at Big Creek (#1)	R		I
8S082B Access to Hydro offices at Big Creek (#185) *	R		I
8S082C Access to Hydro offices at Big Creek (#188) *	R		I
8S082D Access to Hydro offices at Big Creek (#187) *	R		I
8S082X Access to Hydro offices at Big Creek (#189) *	R		I
8S08A Access road south from Railroad Grade to West Portal (#69) *	R	R	R
8S13 from the gate to 8S05, the Canyon Road (#41)	R	R	
8S13K Access road to Powerhouse No. 2 penstock (#168) *	R	R	R
8S301 From gate with 8S66C to penstock surge pipes (#28)	R	R	R
8S302 Access to Big Creek No. 1 42-inch gatehouse (#47)	R	R	R
8S66 from gate to west end of Dam 2 (#23)	R	R	R
8S66 West end of Dam 2 to 8S66A (#22)	R	R	
8S66A Access road to gaging station on Big Creek below Huntington Lake (#207)	R	R	
8S66B from Dam 2 to end (#42)	R	R	R
8S66BA Short road between 8S66B and 8S66BC (#171) *	R	I	R
8S66BC East end of Dam 1 to Dam 1 drainage gates (#99) *	R	R	R
8S66C on public lands from 8S301 to gate to 8S302 (#107) *	R	R	R
8S66X Road over Dam 2 (#184)	R		R
8S82AA Access road to Warehouse (#249) *	R		I
8S82BA Upper access road to Wastewater treatment plant from 8S82B (#248) *	R	R	R
8S82BB Lower access road to Wastewater treatment plant from 8S82B (#247) *	R	R	R
8S82BC Access road to Fish Farm upper gate (#245) *	R		R
8S82E Upper access road to SCE company housing (#250) *	R		I
8S82EA Lower access road to SCE company housing (#252) *	R		I
8S82F Access road to Domestic water treatment plant from FRE 2710 (#251) *	R		I
8S82J Upper access road to Powerhouse No. 1 from FRE 2710 (#246) *	R		I
8S83 segment from 8S66 to 8S83A (#48)	R	R	R
8S83A Connector road between 8S66C and 8S83 (#200)	R	R	R
Project Trail			
Trail to Scott Lake Domestic Diversion (#261)	I		I

Table 4-5. Vegetation Management in the Vicinity of the Four Big Creek ALP Projects (continued).

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67)			
Dams and Diversions			
Florence Lake	A		A
Shaver Lake	A		A
Bear Creek Diversion	R		
Mono Creek Diversion	R		
Pitman Creek	R		
Balsam	A		A
Dam 5	A		A
Camp 62 Creek	R		A
Bolsillo Creek	R		
Power Generation			
Big Creek PH No. 2A	R		R
Big Creek PH No. 8	R		R
Gaging Stations			
Camp 62 Creek below Diversion Dam	R		
Huntington-Shaver Conduit gate 2 release	R		
Middle Fork Balsam Creek below Balsam Meadows Forebay	R		
Stevenson Creek below Shaver Lake	R		R
South Fork San Joaquin River above Hooper Creek (with cable crossing)	R		
Water Conveyance - Powerhouse No. 2A			
Intake Gate House at Shaver Lake	I		
Surge Chamber, Rock Trap	I		
102" Valve House	R		R
Penstocks	R		R
Water Conveyance - Powerhouse No. 8			
Intake structure at Dam 5	R		R
Adit 1, Tunnel 8		R	
Surge Chamber - includes trash drain and penstocks valves	R		R
Penstocks	R		R

Table 4-5. Vegetation Management in the Vicinity of the Four Big Creek ALP Projects (continued).

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Water Conveyance - Eastwood Power Station			
Inlet Structure (Gate 4)	R		R
Surge Chamber	R		A
Water Conveyance - Mono-Bear Siphon			
Combined Flow Line (siphon)	I		
Water Conveyance - Huntington-Pitman-Shaver			
Siphon w 4" and 10" Drain Valves	R		R
Vent Stacks	R		R
Gate 3 Outlet to Balsam Forebay	R		R
Gate 2 Outlet to NF Stevenson Creek	R		
Water Conveyance - Diversion Channel			
Crater Creek	I		
Water Conveyance - HB Valves			
Shaver Lake	R		R
Weather Stations			
Florence Lake	R		R
Kaiser Ridge/Mt Givens	R		R
Shaver Lake	R		R
Buildings/Camps			
Florence Work Camp	R		R
Big Creek 8 Facilities	R		R
Storage Yards			
Florence Lake Work Camp	I		
Camp 62	I		
Big Creek PH No.2 & PH No.2A	I		I
Eastwood School Site	I		I
Utilities - Water Supply/Treatment			
Camp Edison	R		R
Florence Work Camp	R		R
Utilities - Fuel/Gasoline/Diesel			
Big Creek PH No. 8	A		A
Florence Work Camp	R		
Project Power Lines Less than 33kV			
Jumbo 12KV	A		A

Table 4-5. Vegetation Management in the Vicinity of the Four Big Creek ALP Projects (continued).

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Pitman 33KV (to diversion)	A		A
Power Transmission Lines			
EPS - BC1 220KV	A		
Switchyards			
Eastwood Switchyard	A		A
Recreation - Shaver Lake			
Camp Edison Campground	A	A	A
Camp Edison Boat Ramp/Launch	A	A	A
Day Use Areas on North Shore Roads 1 & 2	A	A	A
Day Use Area off Hwy 168 (The Point)	A	A	A
Eagle Point Boat Only Day-Use Area	A	A	A
Balsam Meadow Forebay			
Balsam Meadow Forebay Day-Use Picnic Area	A	A	A
Balsam Meadow Trailhead and Parking	A	A	A
Helicopter Landing Sites			
Eastwood School*	R	R	R
Camp 62 at junction of Kaiser Pass Road*	R	R	R
Bear Creek Diversion*	R	R	R
Florence Lake Camp*	R	R	R
Florence Lake Dam*	R	R	R
Florence Lake Gaging Station*	R	R	R
South Fork San Joaquin River Florence Spill Station*	R	R	R
South Fork San Joaquin River below Hooper*	R	R	R
Hooper Creek at Diversion*	R	R	R
Mono Creek at Diversion*	R	R	R
Mono Creek below Lake T.A. Edison*	R	R	R
Mt. Givens Telecom Site*	R	R	R
Summit at Shaver Hill*	R	R	R
Tiffany Pines at Camp Edison*	R	R	R
Project Roads			
5S80Z Mono Creek Diversion access road (#68)	I	I	I
7S01B Florence Work Camp access road from gate on 7S01 near picnic area (#4)	R	R	
7S01BA Florence Work Camp road from 7S01B (#219) *	I	I	I
7S370D Access road to Florence Dam and water storage tank from 7S370 (#71) *	I	I	I

Table 4-5. Vegetation Management in the Vicinity of the Four Big Creek ALP Projects (continued).

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
7S370F Access road to Florence Dam from 7S370 (#237) *	I	I	I
8S02 from Highway 168 to 8S02B (#54) *	I	I	I
8S02B Access to Huntington-Pitman-Shaver tunnel adit (#197) *	I	I	I
8S03, Canyon Road from PH No. 8 to Mammoth Pool PH (#33)	R	R	R
8S03A Access road to Powerhouse No. 8 from 8S03 (#166) *	R	R	R
8S05, Canyon Road (from PH No. 2 and 8S05E to 8S05A PH No. 8 access road) (#21)	R	R	R
8S05F Access road off 8S05, Canyon Road, that accesses Powerhouse No. 8 penstock (#77)	R	R	R
8S05FB Access road to Powerhouse No. 8 penstock from 8S05 (#157)	R	R	R
8S05L Road to communication line near Powerhouse No. 8 (#167) *	I	I	I
8S08A Access road south from Railroad Grade to West Portal (#69)	R	R	R
8S13 from the gate to 8S05, Canyon Road (#41)	R	R	R
8S13 from the gate to 8S05, the Canyon Road (#41)	R	R	
8S303 Access road to Eastwood Overflow Campground (#174) *	I	I	I
8S47 Access road to Eastwood Powerstation Transmission Line tower - from gate to end (#258) *	R	R	R
8S83 segment from 8S83A to Huntington-Shaver Siphon (#48)	R	R	R
8S94 Pitman Creek Diversion access road (#56)	I	I	I
9S03 from 8S08 to FRE 2710 (non-project segment on SCE private lands) (#156) *	I	I	I
9S17 Access road to Eastwood Transmission line from Hwy 168 (#262) *	I	I	I
9S24 from Hwy 168 to North Fork Stevenson Creek gate No. 2 (Tunnel No. 7 Outlet) (#55)	R	R	R
9S311 Access to Eastwood Powerstation Transmission Line tower (#243) *	R	R	R
9S311A Access to Eastwood Powerstation Transmission Line tower (#244) *	R	R	R
9S312 Access to Eastwood Substation from Highway 168 (#19)	R	R	R
9S32 from gate near Highway 168 to EPH Transmission Line (#89)	I	I	I
9S32A Spur from 9S32 to east side of Balsam Forebay (#50)	R	R	R
9S32AB Spur from 9S32A to Balsam Forebay (#153) *	R	R	R
9S32C Road below Balsam Forebay Dam to EPH transmission line (#170)	I	I	I
9S32CA Access road to Eastwood Powerstation Transmission Line tower (#208) *	R	R	R
9S32CB (#232) *	R	R	R
9S32CC (#242) *	R	R	R
9S32CD (#231) *	R	R	R
9S32CE (#230) *	R	R	R
9S32CF (#241) *	R	R	R
9S58 from Shaver Marina to NF Stevenson gage (#84)	R	R	R

Table 4-5. Vegetation Management in the Vicinity of the Four Big Creek ALP Projects (continued).

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
9S58K Access road to Eastwood Power Tunnel entrance (#114)	R	R	R
Access road to Eagle Point Boat Only Day Use Area (off of 9S58) (#109)	R	R	
Access road to Eastwood Tailrace (off of 9S58) (#110)	I	I	I
Access road to Shaver Dam north (#83)	R	R	R
Access road to Shaver Dam south (#49)	R	R	
Camp Edison Roads (#2)	R	R	
Project Trails			
Trail to Big Creek Gage below Dam 5 (#74) *	R		R
Two trails to Stevenson Creek Gage below Shaver Lake Dam (#17)	R		R
Trail to Pitman Creek Gage near Tamarack Mountain (below shaft) (#108)	I		I
Trail to Bolsillo Creek Gage above Intake (#91)	I		I
Trail to Camp 62 Creek Gage and Diversion Dam (#12)	I		I
Trail to Chinquapin Creek Gage and Diversion Dam (#260)	I		I
Trails to North-South Slide Creek Diversions (#265)	I		I
Trail to South Fork San Joaquin River Gage downstream of Jackass Meadow (#259) *	I		I
Trail to Bear Creek Gage upstream of Bear Forebay (#92)	I		
Trail to Tombstone Creek Diversion (#14)	I		
Trail to Crater Creek Diversion Ditch (off of the Dutch Lake Trail) (#86)	I		
Big Creek No. 3 (FERC Project No. 120)			
Dams and Diversions			
Dam 6	R		R
Power Generation			
Big Creek PH No.3	R		R
Water Conveyance - Powerhouse No. 3			
Valve House	R		R
Penstocks	R		R
Adit 1, Tunnel 3		R	
Adit 2, Tunnel 3		R	
Adit 3, Tunnel 3		R	
Rock/Sand Trap Drain Piping & Valves	R		R
Manifold Structure	R		R
Buildings/Camps			
Big Creek PH No.3 Facilities	R		R

Table 4-5. Vegetation Management in the Vicinity of the Four Big Creek ALP Projects (continued).

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Storage Yards			
Big Creek PH No.3	I		I
Utilities - Water Supply/Treatment			
Big Creek PH No. 3	R		R
Project Power Lines Less than 33kV			
Manifold 2.4KV	A		A
Project Roads			
8S05, Canyon Road (from junction with 8S03 to junction with Italian Bar Road) (#21)	R	R	R
8S05A Access road to Powerhouse No. 3 penstocks and gate house downhill from 8S05 (#72)	R	R	R
8S05B Access road to Powerhouse No. 3 penstock from 8S05 Canyon Road (#217) *	R	R	R
8S05G Access road to Powerhouse No. 3 penstocks and gate house uphill from 8S05 (#119)	R	R	R
8S05T Access to tailings (#24) *		I	
8S05TA Access to tailings (#29) *		I	
9S20 Access to Carpenter shop (#216) *	R		R
9S20A (#85) *	R		R
9S20B Access road to carpenter shop from Italian Bar Road (#62) *	R		R
9S20C Connector road between 9S20B loop (#64) *	R		R
9S20D Access to Carpenter Shop (#13) *	R		R
9S20DA Access to garage and shops (#257) *	R		R
9S20E (#52) *	R		R
9S20F Connector road between 9S20 loop (#87) *	R		R
9S88 from Italian Bar Road to old company housing (#127)	I		I
9S88A Access to old company housing (#5)	R		R
9S88X Access road to PH No. 3 water tank and shop (#256)	R	R	R
9S88XA Access road to old company housing from 9S88X (#215) *	R		R
9S89 Access road to Big Creek Powerhouse No. 3 and administrative buildings from Italian Bar Road (#61)	R	R	R
9S89BA Access road to PH3 and switchyard (#59) *	R		R

Notes:

A = Annual (activity typically occurs each year)

R = Regular (activity will occur one or more times in a 5-year period)

I = Infrequent (activity typically will occur during a 20-year period but less than once every 5 years) Only Project facilities, Project-related recreation features, Project roads, and trails where SCE currently implements vegetation management are included.

* Indicates Project roads and helicopter landing sites that were added to the Project after resource surveys for the Big Creek ALP Projects were conducted.

Table 4-6. Herbicides and Other Agents Used in the Vicinity of the Four Big Creek ALP Projects.

Herbicides				
	Garlon 4® at 0.6-1.5 lbs/ acre [1]	**Pathfinder II®**	**Accord® at 0.6-1.0 lbs/acre [2]**	**Velpar® at 2 lbs/acre**
Active Ingredient	Triclopyr	Triclopyr	Glyphosate	Hexazinone
Other Agents				
	Hasten®	**R-11®**	**In-Place®**	
Properties	Spray Adjuvant Non-ionic Surfactant and Esterified Vegetable Oils	Wetting Agent Non-ionic Surfactant Spreader Activator	Deposition and Retention Agent	

[1]These rates represent average coverage (20%) to maximum expected coverage (50%) using a 3.0 lbs. per acre mixture.

[2]These rates represent average coverage (30%) to maximum expected coverage (50%) using a 2.0 lbs. per acre mixture.

Table 4-7. Operation and Maintenance Activities Conducted Along Project Roads and Trails Associated with the Four Big Creek ALP Projects.

SCE Map No.	SCE Road Name/Description	USFS Road No.	SCE Operation & Maintenance Activities						
			Road Repair/ Clearing						
			Grading	Gravel/ Paving	Snow Removal/Sanding	Culverts/Ditches/Water Bars	Signage	Fencing	Gates
Mammoth Pool Project (FERC No. 2085)									
Roads									
6	Mammoth Pool Fishwater Generator access road from 6S25, Mammoth Pool Road, to base of Mammoth Pool Dam	06S025G	I	I		R		X*	X
80	Access road from 8S03 to Mammoth Pool penstock	08S003B	R	I		R			X
79	Access road to Mammoth Pool Transmission Line from 8S03	08S003C	R	I		R			X
144	8S03CA, spur road to Mammoth Pool Transmission Line	08S003CA	R	I		R			
145	Access road to Mammoth Pool Transmission Line from 8S03C	08S003CB	R	I		R			
146	Access road to Mammoth Pool Transmission Line from 8S03C	08S003CC	R	I		R			
78	Access road from 8S03 to Mammoth Pool Powerhouse surge chamber	08S003D	R	I		R			
213	8S44, Mammoth Pool Transmission Line access road	08S044	R	I		R	X*		X
37	8S44Y, Mammoth Pool Transmission Line access road from gate near 8S03 to 9S42	08S044Y	R	I		R	X*		X
138	8S44YA, Mammoth Pool Transmission Line access road	08S044YA	R	I		R	X*		X
136	8S44YB, Mammoth Pool Transmission Line access road	08S044YB	R	I		R	X*		X
18	9S42, Mammoth Pool Powerhouse Transmission Line access road from gate near County Road 225, Italian Bar Road, to 8S44	09S042	R	I		R	X*		X
135	Access road to Mammoth Pool Transmission Line from 9S42	09S042A	R	I		R	X*		X
102	7S47B Access road to Rock Creek Tunnel Muck Pile	07S047B	R	I		R			
33	8S03 (from Powerhouse No. 8 to Mammoth Pool Powerhouse)	08S003(02)	I	I	A	R	X*	X*	X

Table 4-7. Operation and Maintenance Activities Conducted Along Project Roads and Trails Associated with the Four Big Creek ALP Projects (continued).

SCE Map No.	SCE Road Name/Description	USFS Road No.	SCE Operation & Maintenance Activities						
			Road Repair/ Clearing						
			Grading	Gravel/ Paving	Snow Removal/Sanding	Culverts/Ditches/Water Bars	Signage	Fencing	Gates
30	6S25, Mammoth Pool Road, from 7S20, Shake Flat Creek access, to end at east abutment	06S025(03)	I	I		I			
164	6S25DA, spur to Windy Point Picnic Area from 6S25D	06S025DA	R	I		R			
Trail									
75	Trail to San Joaquin River Gage above Shakeflat Creek	27E05	I			I			
Big Creek Nos. 1 and 2 Project (FERC No. 2175)									
Roads									
21	8S05, Canyon Road (from Huntington Lake Road to Powerhouse No. 2 and 8S05E)	08S005(02)	I	I	A	R	X*	X*	X
81	Powerhouse No.2 access road from Canyon Road	08S005C	I	I	A	R	X*		
160	Access to Big Creek No. 2 switchyard	08S005CA	I	I	A	R	X*		
16	Old housing road 1 adjacent to Powerhouse No. 2 from 8S05, Canyon Road	08S005E	I			I			
159	Old housing road 3 adjacent to Powerhouse No. 2 from 8S05E	08S005EA	I			I			
158	Old housing road 2 adjacent to Powerhouse No. 2 from 8S05E	08S005EC	I			I			
69	Access road south from Railroad Grade to West Portal	08S008A	R	I		R			
41	8S13 from gate to 8S05, the Canyon Road	08S013(02)	I	I	A	R	X*		
168	8S13K Access road to Powerhouse No. 2 penstock	08S013K	I	I	I	R	X*		
22	8S66, from west end of Dam 2 to 8S66A	08S066(01)	I	I	A	R			
23	8S66 from gate to west end of Dam 2	08S066(02)	I	I	A	R			
207	8S66A, access road to gaging station on Big Creek below Huntington Lake	08S066A	I	I	A	R			
42	8S66B from Dam 2 to end	08S066B	I	I	I	R	X*		
171	Short road between 8S66B and 8S66BC	08S066BA	I	I	I	R	X*		
99	East end of Dam 1 to Dam 1 drainage gates	08S066BC	I	I	A	R			

Table 4-7. Operation and Maintenance Activities Conducted Along Project Roads and Trails Associated with the Four Big Creek ALP Projects (continued).

SCE Map No.	SCE Road Name/Description	USFS Road No.	SCE Operation & Maintenance Activities						
			Road Repair/ Clearing						
			Grading	Gravel/ Paving	Snow Removal/Sanding	Culverts/Ditches/Water Bars	Signage	Fencing	Gates
107	8S66C on public lands from 8S301 to 8S66 east	08S066C(02)	I	I	I	R			
107	8S66C on public lands from 8S301 to 8S66 east	08S066C(03)	I	I	I	R			
107	8S66C on SCE private lands from gate to 8S302	08S066C(04)	I	I	I	R			
184	Road over Dam 2	08S066X	I	I	A	R			
186	8S082 access to Hydro offices at Big Creek	08S082	I	I	A*	R	X*		
1	8S082A access to Hydro offices at Big Creek	08S082A	I	I	A*	R	X*		
249	Access road to Warehouse	08S082AA	I	I	A*	R	X*		
185	8S082B access to Powerhouse No. 1	08S082B(02)	I	I	A*	R	X*		
248	Upper access road to Wastewater treatment plant from 8S82B	08S082BA	I	I	A*	R	X*		
247	Lower access road to Wastewater treatment plant from 8S82B	08S082BB	I	I	A*	R	X*		
245	Access road to Fish Farm upper gate	08S082BC	I	I	A*	R	X*		
188	8S082C access to Hydro offices at Big Creek	08S082C	I	I	A*	R	X*		
187	8S082D access to Hydro offices at Big Creek	08S082D	I	I	A*	R	X*		
250	Upper access road to SCE company housing	08S082E	I	I	A*	R	X*		
252	Lower access road to SCE company housing	08S082EA	I	I	A*	R	X*		
251	Access road to Domestic water treatment plant from FRE 2710	08S082F	I	I	A*	R	X*		
246	Upper access road to Powerhouse No. 1 from FRE 2710	08S082J	I	I	A*	R	X*		
189	8S082X access to Hydro offices at Big Creek	08S082X	I	I	A*	R	X*		
48	8S83 from 8S66 to 8S83A	08S083	I	I		R			
200	8S83A, connector road between 8S66C and 8S83	08S083A	I	I					
28	8S301 from gate with 8S66C to penstock surge pipes	08S301	I	I	I	R			X
47	8S302, access to Big Creek No. 1 42-inch gatehouse	08S302	I	I	I	R	X*		
Trail									
261	Trail to Scott Lake Domestic Diversion	NA	I			I			

Table 4-7. Operation and Maintenance Activities Conducted Along Project Roads and Trails Associated with the Four Big Creek ALP Projects (continued).

SCE Map No.	SCE Road Name/Description	USFS Road No.	SCE Operation & Maintenance Activities						
			Road Repair/ Clearing						
			Grading	Gravel/ Paving	Snow Removal/Sanding	Culverts/Ditches/Water Bars	Signage	Fencing	Gates
Big Creek No. 2A, 8 and Eastwood Project (FERC No. 67)									
Roads									
68	Mono Creek Diversion access road	05S080Z	I			I			
4	7S01B Access road to Florence Work Camp	07S001B(02)	I	I	R	R	X*		X
219	7S01BA Florence Work Camp road from 7S01B	07S001BA	I	I	R	R	X*		X
71	7S370D Access road to Florence Dam and water storage tank from 7S370	07S370D	R	I		R			X
237	7S370F Access road to Florence Dam from 7S370	07S370F	I			I			
54	8S02 from Highway 168 to 8S02B	08S002(01)							
54	8S02 from Highway 168 to 8S02B	08S002(02)	I*			I*			X
197	8S02B Access to Huntington-Pitman-Shaver tunnel adit	08S002B	I						
33	8S03 (from 8S05, Canyon Road, to 8S03A, Powerhouse No. 8 access road)	08S003(01)	I	I	A	R	X*	X*	
166	Access road to Powerhouse No. 8 from 8S03	08S003A	I	I	A	R	X*	X*	
21	8S05, Canyon Road (from Powerhouse No. 2 and 8S05E to Powerhouse No. 8)	08S005(01)	I	I	A	R	X*	X*	X
77	8S05F Access road to Powerhouse No. 8 penstock from 8S05	08S005F	I	I		R			
157	8S05FB Access road to Powerhouse No. 8 penstock from 8S05F	08S005FB	I	I		R			
167	Road to communication line near Powerhouse No. 8	08S005L	I	I		I			
69	Access road south from Railroad Grade to West Portal	08S008A	R	I		R			X
41	8S13 from the gate to 8S05, Canyon Road	08S013(02)	I	I	A	R	X*		X
258	8S47 Access road to Eastwood Powerstation Transmission Line tower - from gate to end	08S047(02)	R			R			
48	8S83 from 8S83A to Huntington Shaver Siphon	08S083	I	I		R			
56	Pitman Creek Diversion access road	08S094	I*	I*	A*	R*			X

Table 4-7. Operation and Maintenance Activities Conducted Along Project Roads and Trails Associated with the Four Big Creek ALP Projects (continued).

SCE Map No.	SCE Road Name/Description	USFS Road No.	SCE Operation & Maintenance Activities						
			Road Repair/ Clearing						
			Grading	Gravel/ Paving	Snow Removal/Sanding	Culverts/Ditches/Water Bars	Signage	Fencing	Gates
174	8S303 Access road to Eastwood Overflow Campground	08S303	I	I		R			
156	9S03 from 8S08 to FRE 2710	09S003(01)	R	I		R			
262	9S17 access road to Eastwood Transmission line from Hwy 168	09S017	I	I	I	R	X*		
55	9S24 from Hwy 168 to North Fork Stevenson Creek gate No. 2 (Tunnel No. 7 Outlet)	09S024	I	I	A	R			X
89	9S32 from gate near Highway 168 to EPH Transmission Line	09S032	I	I	A	R			X
50	9S32A, spur from 9S32 to east side of Balsam Forebay	09S032A	I	I	R	R			
153	9S32AB, spur from 9S32A to Balsam Forebay	09S032AB	I	I	R	R			
170	Road below Balsam Forebay Dam	09S032C	R			R			
208	9S32CA Access road to Eastwood Powerstation Transmission Line tower	09S032CA	R			R			
232	9S32CB Access road to Eastwood Powerstation Transmission Line tower	09S032CB	R			R			
242	9S32CC Access road to Eastwood Powerstation Transmission Line tower	09S032CC	R			R			
231	9S32CD Access road to Eastwood Powerstation Transmission Line tower	09S032CD	R			R			
230	9S32CE Access road to Eastwood Powerstation Transmission Line tower	09S032CE	R			R			
241	9S32CF Access road to Eastwood Powerstation Transmission Line tower	09S032CF	R			R			
84	9S58 from Shaver Marina to North Fork Stevenson Gage	09S058	I	I	A*	R	X*	X*	X
114	Access road to Eastwood Power Tunnel entrance	09S058K	I	I	A*	R	X*	X*	X
243	9S311 Access to Eastwood Powerstation Transmission Line tower	09S311(01)	R	I		R			X

Table 4-7. Operation and Maintenance Activities Conducted Along Project Roads and Trails Associated with the Four Big Creek ALP Projects (continued).

SCE Map No.	SCE Road Name/Description	USFS Road No.	SCE Operation & Maintenance Activities						
			Road Repair/ Clearing						
			Grading	Gravel/ Paving	Snow Removal/Sanding	Culverts/Ditches/Water Bars	Signage	Fencing	Gates
243	9S311 Access to Eastwood Powerstation Transmission Line tower	09S311(02)	R	I		R			
244	9S311A Access to Eastwood Powerstation Transmission Line tower	09S311A	R			R			
19	9S312 access to Eastwood Substation from Highway 168	09S312	I	I	A	R			X
2	Camp Edison Roads	NA	I	I	A	R			
83	Access road to Shaver Dam north	NA	I		A*	R	X*	X*	X
49	Access road to Shaver Dam south	NA	I		A*	R	X*	X*	X
109	Access road to Eagle Point Boat Only Day Use Area from 9S58	NA	I			I			
110	Access road to Eastwood Tailrace	NA	I			I			
115	Access Tunnel to Eastwood Power Station	NA	I	I	A*	R	X*	X*	X
Trails									
265	Trails to North-South Slide Creek Diversions	NA							
108	Trail to Pitman Creek Gage near Tamarack Mountain (below shaft)	NA	R			R			
74	Trail to Big Creek Gage below Dam 5	NA	R			R			
91	Trail to Bolsillo Creek Gage above Intake	NA	R			R			
12	Trail to Camp 62 Creek Gage and Diversion Dam	NA	R			R			
259	Trail to South Fork San Joaquin River Gage downstream of Jackass Meadow	NA	I			I			
260	Trail to Chinquapin Creek Gage and Diversion Dam	NA	R			R			
92	Trail to Bear Creek Gage upstream of Bear Forebay	28E01	R			R			
14	Trail to Tombstone Creek Diversion	NA							
88	Trail from Jackass Meadow Campground to Florence Dam outlet and Gage	NA	I			I			
86	Trail to Crater Creek Diversion Ditch (off of the Dutch Lake Trail)	NA	I			I			

Table 4-7. Operation and Maintenance Activities Conducted Along Project Roads and Trails Associated with the Four Big Creek ALP Projects (continued).

SCE Map No.	SCE Road Name/Description	USFS Road No.	SCE Operation & Maintenance Activities						
			Road Repair/ Clearing						
			Grading	Gravel/ Paving	Snow Removal/Sanding	Culverts/Ditches/Water Bars	Signage	Fencing	Gates
17	Two trails to Stevenson Creek Gage below Shave Lake Dam	NA	R			R			
Big Creek No. 3 Project (FERC No. 120)									
Roads									
21	8S05, Canyon Road (from junction with 8S03 to junction with Italian Bar Road)	08S005(03)	I	I	A	R	X*	X*	X
72	Access road to Powerhouse No. 3 penstocks and gate house downhill from 8S05, Canyon Road	08S005A	I	I		R			
217	8S05B Access road to Powerhouse No. 3 penstock from 8S05 Canyon Road	08S005B	R			R			
119	8S05G Access road to Powerhouse No. 3 surge chamber uphill from 8S05 Canyon Road	08S005G	I	I		R			
24	8S05T Access to tailings	08S005T	R	I		R			
29	8S05TA Access to tailings	08S005TA	R	I		R			
216	9S20 Access to Carpenter shop	09S020		I		I	X*	X*	X
85	9S20A Access road to transmission line tower	09S020A	I	I		R	X*	X*	X
62	9S20B Access road to transmission line tower	09S020B	I	I		R	X*	X*	X
64	9S20C Connector road between 9S20 loop	09S020C	R	I		R			
13	9S20D Access to Carpenter Shop	09S020D	R	I		R			
257	9S20DA Access to Garage and shops	09S020DA	R	I		R			
51	9S20E Access to material yard	09S020E	R	I		R			
87	9S20F Connector road between 9S20 loop	09S020F	I	I		R			
127	9S88 from Italian Bar Road to old company housing	09S088	I	I		R	X*	X*	X
5	9S88A Access to old company housing	09S088A	R	I		R			
256	9S88X Access road to Powerhouse No. 3 water tank and shop	09S088X	I	I		R	X*	X*	X
215	9S88XA Access road to old company housing from 9S88X	09S088XA	R			R	X*	X*	

Table 4-7. Operation and Maintenance Activities Conducted Along Project Roads and Trails Associated with the Four Big Creek ALP Projects (continued).

SCE Map No.	SCE Road Name/Description	USFS Road No.	SCE Operation & Maintenance Activities						
			Road Repair/ Clearing						
			Grading	Gravel/ Paving	Snow Removal/Sanding	Culverts/Ditches/Water Bars	Signage	Fencing	Gates
61	9S89 Access road to Powerhouse No. 3 administrative bldg. from Italian Bar Road	09S089	I	I		R	X*	X*	X
59	9S89BA Access road to Powerhouse No. 3 and switchyard	09S089BA	I	I		R			

X - Done
A - Annual (activity typically occurs each year)
R - Regular (activity will occur one or more times in a 5-year period)
I - Infrequent (activity typically occurs during a 20-year period, but less than once every 5 years)
* - Activity occurs at less than 50% at this type of facility in the Big Creek Study Area
NA = Not Applicable
(1) Road also included in FERC boundary of Big Creek Nos. 1 and 2 Project (FERC Project No. 2175).

Table 4-8. Existing Sediment Management and Operational Practices in the Vicinity of the Four Big Creek ALP Projects.

	Sediment Control				Facility Testing		Project Operations	
	Physical Removal		Mechanical Control					
	Hand	Equipment	Sediment Trap/ Sand Box	Hydraulic Sluicing	Tunnel Inspection	Gate/Valve Testing	High Flow Release	Channel-Riparian Maintenance Flow
Mammoth Pool (FERC Project No. 2085)								
Large Dams								
Mammoth Pool							R[4]	
Moderate Diversion Dams								
San Joaquin River Dam 6		I[3]		I[3]	I[3]	R[2]		
Small Diversions								
Rock Creek	R[3]	I[3]				A[3]		
Ross Creek	R[3]	I[3]				A[3]		
Big Creek Nos. 1 and 2 (FERC Project No. 2175)								
Large Dams								
Huntington Lake Dams 1, 2, 3, 3a								
Moderate Diversion Dams								
Big Creek Dam 4					I[3]	R[2]		
Small Diversions								
Ely Creek	A[5]	I[5]				A[3]		
Adit No. 8	I[3]							
Big Creek 2A, 8 and Eastwood (FERC Project No. 67)								
Large Dams								
Florence Lake								
Shaver Lake							R[4]	
Moderate Diversion Dams								
Bear Creek Diversion		A[2]						
Mono Creek Diversion		A[2],I[3]						
Hooper Creek		A[2],I[3]						
Pitman Creek		I[2]	A[1]					
Balsam								
Big Creek Dam 5		I[3]			I[3]	R[2]		
Small Diversions								
Tombstone Creek								
North Slide Creek								
South Slide Creek								
Crater Creek								
Chinquapin Creek	A[4]					A[5]		
Camp 62 Creek	A[1]					A[5]		
Bolsillo Creek	A[1]					A[5]		
Balsam Creek	A[1]					A[3]		

A=Annual (activity typically occurs each year)
R=Regular (activity typically will occur one or more times in a 5-year period)
I=Infrequent (activity typically will occur during a 20-year period, but less than once every 5 years)
[1]Spring
[2]Summer
[3]Fall
[4]Spring/Summer
[5]Spring/Fall

Table 4-9. Existing and Recommended Minimum Instream Flow Requirements under the Proposed Action and CDFG Alternative.[1]

Stream Reach	Proposal	Water Year Types	Month																							
			Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sept	
			InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]
Mammoth Pool (FERC Project No. 2085)																										
San Joaquin River - Mammoth Pool to Dam 6	Existing (No Action)	Wet, Above Normal	25	none	10	none	10	none	10	none	10	none	10	none	10/25	none	25	none	25	none	30	none	30	none	30/25	none
	Existing (No Action)	Below Normal, Dry, and Critical	12.5	none	10	none	10	none	10	none	10	none	10	none	10/12.5	none	12.5	none	12.5	none	30	none	30	none	30/12.5	none
	Proposed Action	All Years	72	80	72	80	50	55	50	55	50	55	72	80	112	125	112	125	112	125	90	100	90	100	72	80
	CDFG Alternative	Wet, Above Normal	120	none	100	none	80	none	75	none	75	none	75	none	120	none	150	none	150	none	120	none	120	none	120	none
	CDFG Alternative	Below Normal, Dry, and Critical	100	none	100	none	80	none	60	none	60	none	60	none	120	none	120	none	100	none	100	none	100	none	100	none
Rock Creek, below the Diversion	Existing (No Action)	All Years	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
	Proposed Action	All Years	0.35	0.5	0.35	0.5	0.35	0.5	0.75	1	0.75	1	0.75	1	1.5	2	1.5	2	1.5	2	0.75	1	0.35	0.5	0.35	0.5
	CDFG Alternative	Wet, Above Normal	2	none	2	none	2	none	2	none	2	none	4	none	4	none	4	none	3	none	2	none	2	none	2	none
	CDFG Alternative	Below Normal, Dry, and Critical	2	none	2	none	2	none	2	none	2	none	3	none	3	none	3	none	2	none	2	none	2	none	2	none
Ross Creek, below the Diversion	Existing (No Action)	All Years	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
	Proposed Action	Wet, Above Normal, Below Normal	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5
	Proposed Action	Dry, Critical	Turned Out	Turned Out	Turned Out	none	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	Turned Out	Turned Out	Turned Out	Turned Out	Turned Out	Turned Out
	CDFG Alternative	Wet, Above Normal	1	none	1	none	1	none	1	none	1	none	2	none	3	none	3	none	2	none	1	none	1	none	1	none
	CDFG Alternative	Below Normal, Dry, and Critical	0.5	none	0.5	none	0.5	none	0.5	none	0.5	none	2	none	2	none	2	none	1	none	0.5	none	0.5	none	0.5	none
Big Creek No. 1 and 2 (FERC Project 2175)																										
Big Creek, Huntington Lake to Dam 4	Existing (No Action)	All Years	2	none	2	none	2/0	none	0	none	0	none	0	none	0/2	none	2	none	2	none	2	none	2	none	2	none
	Proposed Action	All Years	1.5	2	1.5	2	1.5	2	1.5	2	1.5	2	1.5	2	Fully Open	none	Fully Open	none	Fully Open	none	2	3	2	3	2	3
	CDFG Alternative[3]	All Years	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
Big Creek Dam 4 to Dam 5	Existing (No Action)	All Years	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
	Proposed Action	All Years	6	8	5	7	5	7	5	7	5	7	5	7	10	12	10	12	10	12	10	12	10	12	10	12
	CDFG Alternative	Wet, Above Normal	10	none	7	none	7	none	7	none	7	none	7	none	20	none	20	none	20	none	15	none	15	none	15	none
	CDFG Alternative	Below Normal, Dry, and Critical	7	none	7	none	7	none	7	none	7	none	7	none	15	none	15	none	15	none	10	none	10	none	10	none

Table 4-9. Existing and Recommended Minimum Instream Flow Requirements under the Proposed Action and CDFG Alternative (continued).[1]

Stream Reach	Proposal	Water Year Types	Month																							
			Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sept	
			InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]
Balsam Creek, Diversion to Big Creek	Existing (No Action)	All Years	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
	Proposed Action	All Years	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.75	1	0.75	1	0.75	1
	CDFG Alternative	Wet, Above Normal	2	none	1	none	1	none	1	none	1	none	2	none	3	none	3	none	2	none	2	none	2	none	2	none	2	none
	CDFG Alternative	Below Normal, Dry, and Critical	1	none	1	none	1	none	1	none	1	none	1	none	2	none	2	none	1	none	1	none	1	none	1	none
Ely Creek	Existing (No Action)	All Years	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
	Proposed Action	All Years	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.75	1	1.5	2	1.5	2	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5
	CDFG Alternative	Wet, Above Normal	1	none	1	none	1	none	1	none	1	none	1	none	3	none	3	none	3	none	2	none	2	none	1	none
	CDFG Alternative	Below Normal, Dry, and Critical	1	none	1	none	1	none	1	none	1	none	1	none	2	none	2	none	1	none	1	none	1	none	1	none
Big Creek 2A, 8 and Eastwood (FERC Project No. 67)																										
SF San Joaquin River, Florence Lake to Bear Creek	Existing (No Action)	Wet, Above Normal	17	none	15	none	15	none	15	none	15	none	15	none	15	none	27	none	27	none	27	none	27	none	27	none
	Existing (No Action)	Below Normal, Dry, and Critical	13	none	11	none	11	none	11	none	11	none	11	none	11	none	20	none	20	none	20	none	20	none	20	none
	Proposed Action	All Years	27	30	22	25	22	25	22	25	22	25	22	25	36	40	36	40	36	40	32	35	32	35	32	35
	CDFG Alternative	Wet, Above Normal	40	none	35	none	30	none	30	none	30	none	30	none	45	none	45	none	45	none	40	none	40	none	40	none
	CDFG Alternative	Below Normal, Dry, and Critical	35	none	35	none	25	none	25	none	25	none	25	none	40	none	40	none	40	none	35	none	35	none	35	none
Bear Creek, below the Diversion	Existing (No Action)	Wet, Above Normal	2	none	2	none	2	none	2	none	2	none	2	none	2	none	3	none	3	none	3	none	3	none	3	none
	Existing (No Action)	Below Normal, Dry and Critical	1	none	1	none	1	none	1	none	1	none	1	none	1	none	2	none	2	none	2	none	2	none	2	none
	Proposed Action	All Years	5	7	5	7	4	6	3	4	3	4	3	4	8	10	8	10	8	10	5	7	5	7	5	7
	CDFG Alternative	Wet, Above Normal	7	none	7	none	6	none	4	none	4	none	4	none	12	none	12	none	10	none	8	none	7	none	7	none
	CDFG Alternative	Below Normal, Dry, and Critical	7	none	7	none	5	none	4	none	4	none	4	none	10	none	10	none	9	none	7	none	7	none	7	none
Mono Creek, Downstream of Mono Diversion	Existing (No Action)	Wet, Above Normal	9	none	7.5	none	7.5	none	7.5	none	7.5	none	7.5	none	7.5	none	13	none	13	none	13	none	13	none	13	none
	Existing (No Action)	Below Normal, Dry and Critical	6	none	5	none	5	none	5	none	5	none	5	none	5	none	9	none	9	none	9	none	9	none	9	none
	Proposed Action		22	25	22	25	22	25	16	18	16	18	16	18	22	25	22	25	22	25	27	30	27	30	22	25
	CDFG Alternative	Wet, Above Normal	30	none	25	none	20	none	20	none	20	none	30	none	35	none	35	none	30	none	30	none	30	none	30	none
	CDFG Alternative	Below Normal, Dry, and Critical	25	none	25	none	20	none	20	none	20	none	20	none	30	none	30	none	25	none	25	none	25	none	25	none

Table 4-9. Existing and Recommended Minimum Instream Flow Requirements under the Proposed Action and CDFG Alternative (continued).[1]

Stream Reach	Proposal	Water Year Types	Month																							
			Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sept	
			InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]
Bolsillo Creek, below the Diversion	Existing (No Action)	All Years	0.4	none	0.4	none	0.4	none	0.4	none	0.4	none	0.4	none	0.4	none	0.4	none	0.4	none	0.4	none	0.4	none	0.4	none
	Proposed Action	All Years	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.75	1	0.75	1	0.75	1	0.35	0.5	0.35	0.5	0.35	0.5
	CDFG Alternative	Wet, Above Normal	1	none	1	none	1	none	1	none	1	none	1	none	3	none	4	none	4	none	3	none	2	none	1	none
	CDFG Alternative	Below Normal, Dry and Critical	1	none	1	none	1	none	1	none	1	none	1	none	3	none	3	none	3	none	1	none	1	none	1	none
Camp 62 Creek, below the Diversion	Existing (No Action)	All Years	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none
	Proposed Action	All Years	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.75	1	0.75	1	0.75	1	0.35	0.5	0.35	0.5	0.35	0.5
	CDFG Alternative	Wet, Above Normal	1	none	0.5	none	0.5	none	0.5	none	0.5	none	0.5	none	5	none	5	none	5	none	2	none	2	none	1	none
	CDFG Alternative	Below Normal, Dry, and Critical	0.5	none	0.5	none	0.5	none	0.5	none	0.5	none	0.5	none	4	none	4	none	4	none	1	none	1	none	1	none
Camp 61[2]	Proposed Action	Wet, Above Normal, Below Normal	1.5	2	1.5	2	1.5	2	1.5	2	1.5	2	1.5	2	3	4	3	4	3	4	2	3	2	3	2	3
	Proposed Action	Dry, Critical	0.75	1.25	0.75	1.25	0.75	1.25	0.75	1.25	0.75	1.25	0.75	1.25	0.75	1.25	0.75	1.25	0.75	1.25	0.75	1.25	0.75	1.25	0.75	1.25
Chinquapin Creek, below the Diversion	Existing (No Action)	All Years	0.5	none	0.5	none	0.5	none	0.5	none	0.5	none	0.5	none	0.5	none	1	none	1	none	1	none	1	none	1	none
	Proposed Action	All Years	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.35	0.5	0.75	1	0.75	1	0.75	1	0.35	0.5	0.35	0.5	0.35	0.5
	CDFG Alternative	Wet, Above Normal	1	none	1	none	1	none	0.5	none	0.5	none	0.5	none	3	none	3	none	2	none	1	none	1	none	1	none
	CDFG Alternative	Below Normal, Dry, and Critical	0.5	none	0.5	none	0.5	none	0.5	none	0.5	none	0.5	none	2	none	2	none	2	none	1	none	1	none	1	none
Crater Creek, below the	Existing (No Action)	All Years	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
	Proposed Action[6]	All Years	Remove Diversion From Service																							
	CDFG Alternative	Wet, Above Normal	2	none	2	none	2	none	2	none	2	none	2	none	8	none	8	none	6	none	4	none	3	none	2	none
	CDFG Alternative	Below Normal, Dry, and Critical	2	none	2	none	2	none	2	none	2	none	2	none	5	none	5	none	5	none	2	none	2	none	2	none
North Slide Creek, Diversion to SF San Joaquin River	Existing (No Action)	All Years	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none
	Proposed Action[6]	All Years	Remove Diversion From Service																							
	CDFG Alternative	Wet, Above Normal	1	none	1	none	1	none	1	none	1	none	1	none	3	none	2	none	1	none	1	none	1	none	1	none
	CDFG Alternative	Below Normal, Dry, and Critical	0.75	none	0.75	none	0.75	none	0.75	none	0.75	none	0.75	none	2	none	2	none	0.75	none	0.75	none	0.75	none	0.75	none

Table 4-9. Existing and Recommended Minimum Instream Flow Requirements under the Proposed Action and CDFG Alternative (continued).[1]

Stream Reach	Proposal	Water Year Types	Month																							
			Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sept	
			InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]
South Slide Creek, below the	Existing (No Action)	All Years	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none	0.2	none
	Proposed Action[6]	All Years	Remove Diversion From Service																							
	CDFG Alternative	Wet, Above Normal	1	none	1	none	1	none	1	none	1	none	1	none	3	none	2	none	1	none	1	none	1	none	1	none
	CDFG Alternative	Below Normal, Dry, and Critical	0.75	none	0.75	none	0.75	none	0.75	none	0.75	none	0.75	none	2	none	2	none	0.75	none	0.75	none	0.75	none	0.75	none
Tombstone Creek, below the	Existing (No Action)	All Years	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
	Proposed Action[6]	All Years	Remove Diversion From Service																							
	CDFG Alternative	Wet, Above Normal	6	none	4	none	4	none	4	none	4	none	4	none	6	none	6	none	6	none	6	none	6	none	6	none
	CDFG Alternative	Below Normal, Dry, and Critical	4	none	3	none	3	none	3	none	3	none	3	none	4	none	4	none	4	none	4	none	4	none	4	none
Hooper Creek, below the Diversion	Existing (No Action)	All Years	2	none	2	none	2	none	2	none	2	none	2	none	2	none	2	none	2	none	2	none	2	none	2	none
	Proposed Action	All Years	1.5	2	1.5	2	1.5	2	1.5	2	1.5	2	1.5	2	3	4	3	4	3	4	2	3	2	3	2	3
	CDFG Alternative	Wet, Above Normal	3	none	2	none	2	none	2	none	2	none	2	none	6	none	6	none	6	none	4	none	4	none	3	none
	CDFG Alternative	Below Normal, Dry, and Critical	2	none	2	none	2	none	2	none	2	none	2	none	4	none	4	none	4	none	3	none	3	none	3	none
Balsam Creek, Forebay to Balsam Creek Diversion	Existing (No Action)	All Years	0.5	none	0.5	none	0.5	none	0.5	none	0.5	none	0.5	none	0.5	none	0.5	none	1	none	1	none	1	none	1	none
	Proposed Action	All Years	0.75	1	0.75	1	0.75	1	0.75	1	0.75	1	0.75	1	1.5	2	1.5	2	1.5	2	0.75	1	0.75	1	0.75	1
	CDFG Alternative	Wet, Above Normal	2	none	1.5	none	1.5	none	1.5	none	1.5	none	1.5	none	3	none	4	none	3	none	2	none	2	none	2	none
	CDFG Alternative	Below Normal, Dry, and Critical	1.5	none	1.5	none	1.5	none	1.5	none	1.5	none	1.5	none	3	none	3	none	3	none	1.5	none	1.5	none	1.5	none
Big Creek Dam 5 to San Joaquin River	Existing (No Action)	Wet, Above Normal	3	none	3/2	none	2	none	2	none	2	none	2	none	3	none	3	none	3	none	3	none	3	none	3	none
	Existing (No Action)	Below Normal, Dry and Critical	2	none	2/1	none	1	none	1	none	1	none	1	none	2	none	2	none	2	none	2	none	2	none	2	none
	Proposed Action	All Years	6	8	5	7	5	7	5	7	5	7	5	7	10	12	10	12	10	12	10	12	10	12	10	12
	CDFG Alternative	Wet, Above Normal	10	none	8	none	8	none	8	none	8	none	8	none	20	none	20	none	20	none	15	none	15	none	10	none
	CDFG Alternative	Below Normal, Dry, and Critical	8	none	8	none	8	none	8	none	8	none	8	none	15	none	15	none	15	none	10	none	10	none	10	none

Table 4-9. Existing and Recommended Minimum Instream Flow Requirements under the Proposed Action and CDFG Alternative (continued).[1]

Stream Reach	Proposal	Water Year Types	Month																							
			Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sept	
			InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]	InstQ[4]	AvgQ[5]
NF Stevenson Creek, below tunnel 7 to Shaver Lake	Existing (No Action)	Wet, Above Normal	4	none	4	none	4	none	3.5	none	3.5	none	3.5	none	5	none	5	none	5	none	4.5	none	4.5	none	4.5	none
	Existing (No Action)	Below Normal, Dry, and Critical	3	none	3	none	3	none	3	none	3	none	3	none	4	none	4	none	4	none	3.5	none	3.5	none	3.5	none
	Proposed Action	All Years	12	none	12	none	12	none	12	none	12	none	12	none	12	none	12	none	12	none	12	none	12	none	12	none
	CDFG Alternative	Wet, Above Normal	12	none	12	none	12	none	8	none	8	none	8	none	25	none	25	none	20	none	15	none	15	none	12	none
	CDFG Alternative	Below Normal, Dry, and Critical	12	none	12	none	12	none	8	none	8	none	8	none	20	none	20	none	20	none	12	none	12	none	12	none
Pitman Creek, below the Diversion	Existing (No Action)	All Years	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none	0.3	none
	Proposed Action	All Years	0.5	0.8	0.5	0.8	0.5	0.8	0.5	0.8	0.5	0.8	0.5	0.8	2	2.5	2	2.5	2	2.5	0.5	0.8	0.5	0.8	0.5	0.8
	CDFG Alternative	Wet, Above Normal	2	none	1.5	none	1.5	none	1.5	none	1.5	none	1.5	none	5	none	5	none	5	none	3	none	2	none	2	none
	CDFG Alternative	Below Normal, Dry, and Critical	1.5	none	1.5	none	1.5	none	1.5	none	1.5	none	1.5	none	3	none	3	none	3	none	1.5	none	1.5	none	1.5	none
Stevenson Creek, Shaver Lake to San Joaquin River	Existing (No Action)	All Years	3	none	3/2	none	2	none	2	none	2	none	2	none	3	none	3	none	3	none	3	none	3	none	3	none
	Proposed Action	All Years	4	5	4	5	4	5	4	5	4	5	4	5	8	10	8	10	8	10	6	8	6	8	6	8
	CDFG Alternative	Wet, Above Normal	8	none	5	none	5	none	5	none	5	none	5	none	15	none	15	none	10	none	8	none	8	none	8	none
	CDFG Alternative	Below Normal, Dry, and Critical	5	none	5	none	5	none	5	none	5	none	5	none	10	none	10	none	9	none	8	none	8	none	8	none
Big Creek No. 3 - FERC Project No. 120																										
San Joaquin River, Dam 6 to Redinger Lake	Existing (No Action)	All Years	3	none	3	none	3	none	3	none	3	none	3	none	3	none	3	none	3	none	3	none	3	none	3	none
	Proposed Action	All Years	45	50	22	25	18	20	18	20	18	20	45	50	72	80	72	80	72	80	54	60	45	50	45	50
	CDFG Alternative	Wet, Above Normal	75	none	25	none	25	none	25	none	25	none	75	none	100	none	100	none	100	none	75	none	75	none	75	none
	CDFG Alternative	Below Normal, Dry, and Critical	50	none	25	none	20	none	20	none	20	none	60	none	80	none	80	none	80	none	60	none	50	none	50	none

[1]Only streams for which minimum instream flows are proposed either in the Proposed Action or CDFG Alternative are included.
[2]Portal Project (FERC Project No. 2174) bypass stream reach.
[3]Not included in the CDFG Alternative Proposal.
[4]Flow refers to the minimum instantaneous flow, which is the flow value used to construct the average daily flow value measured in time increments of at least 15 minutes.
[5]Avg. refers to the 24-hour average flow of the incremental readings from midnight of one day to midnight of the next day.
[6]Small diversion will be decommissioned under the proposed action.

Table 4-10. Recommended Channel Riparian Maintenance Flows under the Proposed Action.

Bypass and Flow Augmented Reaches[1]

Stream Reach	Water Year	Implementation Timing	Flow Days 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Big Creek Nos. 2A, 8, and Eastwood Project (FERC Project No. 67)																																
South Fork San Joaquin River (Florence to San Joaquin River)	Wet Years	Release to be made starting between Jun 1 and Jul 7	400	800	1,200	1,600	1,600	1,600	1,000	750	750	500	500	500	150	ramp down[2]																
	AN Years	Release to be completed prior to Memorial Day weekend to the extent feasible	ramp up[3]	peak flow[4]	peak flow[4]	700	500	500	500	ramp down[2]																						
Bear Creek (Diversion to South Fork San Joaquin River)	Wet Years	May 15 to June 30	Starting between May 15 and June 30 in Wet Years, SCE shall not divert water at the Bear Creek Diversion for 10 consecutive days																													
Mono Creek[5] (Diversion to South Fork San Joaquin River)	Wet Years (V* > 0.2)[6]	Release to be made starting between Jul 1 and Aug 5	400	400	400	800	800	800	500	500	350	350	ramp down[2]																			
	Wet Years (V* < 0.2)[6]	Release to be made starting between Jul 1 and Aug 5	ramp up[7]	450	450	450	450	450	450	450	450	ramp down[2]																				
	AN Years	Release to be made starting between Jul 1 and Aug 5	ramp up[7]	ramp up[7]	450	450	345	240	ramp down[2]																							
Bolsillo Creek (Diversion to South Fork San Joaquin River)	Wet Years	April 1 to June 30	Beginning April 1 and June 30 in Wet Years, SCE shall not divert water at the Bolsillo Creek Diversion																													
Camp 62 Creek (Diversion to South Fork San Joaquin River)	Wet Years	April 1 to June 30	Beginning April 1 and June 30 in Wet Years, SCE shall not divert water at the Camp 62 Creek Diversion																													
Chinquapin Creek (Diversion to South Fork San Joaquin River)	Wet Years	April 1 to June 30	Beginning April 1 and June 30 in Wet Years, SCE shall not divert water at the Chinquapin Creek Diversion																													
Portal Project (FERC Project No. 2174)[8]																																
Camp 61 Creek[7] (Diversion to South Fork San Joaquin River)	Wet Years Initial Flow Schedule	Release to be made starting between May 1 and Jun 30	ramp up[7]	28	28	40	40	40	40	28	28	ramp down[2]																				
	AN Years Initial Flow Schedule	Release to be made starting between May 1 and Jun 30	ramp up[7]	22	22	30	30	30	30	22	22	ramp down[2]																				
	Wet Years Modified Flow Schedule[9]	Release to be made starting between May 1 and Jun 30	ramp up[7]	28	28	40	40	40	40	40	40	28	28	ramp down[2]																		
	AN Years Modified Flow Schedule[9]	Release to be made starting between May 1 and Jun 30	ramp up[7]	22	22	30	30	30	30	30	30	22	22	ramp down[2]																		

[1] Only streams for which a specified Channel Riparian Maintenance Flow (CRMF) schedule is proposed are included. NOTE: The existing license conditions (No Action) do not require any scheduled CRMF releases or releases through timing of diversion operations.

[2] Ramp down represents a gradual flow decrease, from the CRMF release to minimum instream flow.

[3] Ramp Up represents gradual flow increase from base flow to a peak flow that will provide approximately 75% of the areal extent of inundation measured at 1,600 cfs.

[4] Peak Flow will provide approximately 75% of the areal extent of inundation measure at 1,600 cfs.

[5] CRMF releases into Mono Creek must begin during the period between July through August 5.

[6] Wet water year CRMF release schedules in Mono Creek are based on V* monitoring results from the last sediment monitoring event.

[7] Ramp up represents a gradual flow increase, over one day, from minimum instream flow to the subsequent days prescribed flow.

[8] Camp 61 Creek is the bypass stream reach associated with the Portal Project that is undergoing the Traditional Licensing Process.

[9] Modified flow release schedule is implemented if the results from sediment monitoring conducted after two wet water year releases yields a V* value greater than 0.25.

Table 4-11. Sediment Issues and Proposed Sediment Management Prescriptions for the Four Big Creek ALP Projects.[1]

Facility	FERC Project Number(s)	Sediment Issue	Sediment Management Prescriptions and Monitoring
Balsam Creek Diversion Bolsillo Creek Diversion Camp 62 Diversion Chinquapin Creek Diversion Hooper Creek Diversion Pitman Creek Diversion Ross Creek Diversion Rock Creek Diversion Ely Creek Diversion	67 67 67 67 67 67 2085 2085 2175	Accumulation of sediment behind the diversion may block the intake structure.	**Sediment Pass Through**[2,3] To reduce the accumulation of sediment behind the diversion, the low-level outlet will be opened during each spring runoff period in wet years when the diversion is turned out. **Physical Removal of Sediment** If necessary, physical removal of sediment by hand or equipment will be conducted during the low flow period in the spring prior to runoff, or in the fall. If feasible, any trapped sediment will be removed. Sediments removed from the channel will be either placed above the high water elevation (mean annual flood elevation) where they will not be re-entrained or the sediments will be removed to an offsite location, which will be pre-approved by the USDA-FS and CDFG if the agencies have jurisdiction over the disposal location.
Dam 4 Forebay	2175	Accumulation of sediment behind the dam may block the low-level outlet valves or intake structure.	**Sediment Pass Through**[2,3] Within five years of approval of this sediment prescription by FERC, SCE will implement the sediment pass through activities. This prescription will be implemented subsequently at least once every five years thereafter. Sediment pass through activities will be completed over one or two days and will occur between January 1 and March 31. SCE will open the low-level outlet and repeatedly fluctuate the water surface elevation (WSE) of the forebay, between the elevation of the tunnel invert intake and the low-level outlet. This approach will assist in mobilization of sediment from the banks of the forebay. During implementation of the sediment pass through prescription, a flow not less than the minimum instream flow (MIF) downstream of the dam will be maintained through the low-level outlet (opened at its maximum capacity). Following the first day of implementation, the licensee will inspect the forebay for the presence of residual sediment and determine if a second day of sediment pass through activities are necessary. If it is determined that a second day is necessary, the approach described above will be implemented for a second day. After sediment pass through is completed and the low-level outlet has been closed, a minimum of 600 cfs will be spilled over the dam for at least 24 hours (clear water release). This additional release will allow for continued mobilization of sediment downstream. **Monitoring** Monitoring of pools downstream of the dam will be conducted prior to, and after implementation of the prescription, to determine if the sediment prescription has resulted in deposition of fine sediment in the stream. The weighted mean value of the level of fine sediments (V^*_w) in a representative set of five pools below the diversion will be measured according to the procedures defined by Hilton and Lisle (1993). V^*_w values shall be initially determined (baseline condition) prior to implementation of the sediment management prescription. Additional V^*_w will be determined following implementation of the sediment prescription. The monitoring measurement locations will be approved by the USDA-FS, CDFG and the State Water Resources Control Board (State Water Board) and other interested governmental agencies. When scheduling sampling site selection or field data collections, SCE will give interested governmental agencies 30-days advance notice to provide them with the opportunity to participate or observe. If field conditions or operational situations preclude a 30-day notification, SCE will provide notice as far in advance as feasible.

Table 4-11. Sediment Issues and Proposed Sediment Management Prescriptions for the Four Big Creek ALP Projects (continued).[1]

Dam 4 Forebay	2175	Accumulation of sediment behind the dam may block the low-level outlet valves or intake structure.	**Monitoring (continued)** V^*_w results will be reported to the USDA-FS, CDFG and State Water Board, and other interested government agencies within six months of completing sediment prescriptions[4]. Following submittal of the monitoring results, SCE will consult with USDA-FS, CDFG and State Water Board and other interested government agencies to determine if modifications to the sediment prescription are warranted. Monitoring will be discontinued in subsequent years, upon approval of the USDA-FS, CDFG and State Water Board. SCE will also monitor turbidity during implementation of sediment prescriptions at three locations (upstream of the forebay, immediately downstream of the forebay and 1,000 feet downstream of the forebay). Monitoring will be conducted on an hourly basis from 8 hours prior to initiation of sediment prescriptions to at least 8 hours after the clear water release). In each year prior to implementation of sediment prescriptions, SCE will also monitor turbidity during two storm events at the same locations described above. Monitoring during the storm event will be conducted on an hourly basis for 24 hours. Turbidity monitoring results will be reported to the USDA-FS, CDFG and State Water Board and other interested government agencies within six months of completing sediment prescriptions[4]. Following submittal of the monitoring results, SCE will consult with USDA-FS, CDFG and State Water Board and other interested government agencies to determine if modifications to the sediment prescription are warranted. Monitoring will be discontinued in subsequent years, upon approval of the USDA-FS, CDFG and State Water Board.
Dam 5 Forebay	67	Accumulation of sediment behind the dam may block the low level outlet valves or intake structure.	**Sediment Removal and Pass Through[2,3]** Within five years of approval of this sediment prescription by FERC, SCE will implement the sediment prescriptions described below. Any sediment prescriptions will be initiated between January 1 and March 31 and will be implemented at least every five years after the initial implementation. **Sediment Removal** After implementing any sediment pass through prescription, described below, an inspection of the forebay will be conducted to determine if physical removal of sediment is necessary. If SCE determines it to be necessary, SCE will implement this sediment removal prescription. First the low-level outlet will be opened to drawdown the forebay. Once the forebay is drained, SCE will use mechanical equipment (e.g., dozer, excavator) to remove sediment. During sediment removal activities, MIF required downstream of the dam will be maintained. In areas where heavy equipment must cross the channel in the forebay, culverts will be installed. Sediment will be transported to a sediment disposal site pre-selected in consultation with USDA-FS and CDFG if the agencies have jurisdiction over the disposal location. **Sediment Pass Through** Implement sediment pass through prescription as described under Dam 4 Forebay. **Monitoring** Implement monitoring as described under Dam 4 Forebay.

Table 4-11. Sediment Issues and Proposed Sediment Management Prescriptions for the Four Big Creek ALP Projects (continued).[1]

Dam 6 Forebay	120	Accumulation of sediment behind the dam may block the low-level outlet valves or intake structure.	**Sediment Removal and Pass Through**[2,3] SCE will conduct sediment prescriptions at Dam 6 Forebay at least every five years beginning the year following implementation of sediment prescriptions at Dam 4 and Dam 5. Sediment prescriptions at Dam 6 Forebay will be initiated between January 1 and March 31. **Sediment Removal** An inspection of the forebay will be initiated to determine if physical removal of sediment is necessary. If SCE determines it to be necessary, SCE will implement this sediment removal prescription. During sediment removal, two of the four low-level outlets will be opened to drawdown the forebay. No more than two of the four low-level outlets will be opened at any time. Once the forebay is drained, SCE will use mechanical equipment (e.g., dozer, excavator) to remove sediment. MIF required downstream of the dam will be maintained through the forebay. In areas where heavy equipment must cross the channel in the forebay, culverts will be installed. Sediment will be transported to a sediment disposal site pre-selected in consultation with USDA-FS and CDFG if the agencies have jurisdiction over the disposal location. **Sediment Pass Through** Implement the sediment pass through prescription, as described above under Dam 4 Forebay, with the following modifications. During each forebay WSE fluctuation, a different sequence of two of the four low-level outlets will be opened. During implementation of the sediment pass through prescription, a flow not less than the MIF will be maintained downstream of the dam through the two low-level outlets (opened to their maximum capacities). After the sediment pass through is completed and the low-level outlets have been closed, a minimum of 3,000 cfs will be spilled over the dam for at least 24 hours. This additional release will allow for continued mobilization of sediment downstream. **Monitoring** Implement monitoring as described under Dam 4 Forebay.
Mono Creek Diversion	67	Accumulation of sediment behind the dam may block the outlet valves or intake structure.	**Sediment Removal**[2,3] Within five years of approval of this sediment prescription by FERC, SCE will inspect the forebay to determine if physical removal of sediment is necessary. If physical removal of sediment is necessary, the following prescription will be implemented. Any sediment removal activities will occur in Wet Years prior to the implementation of channel riparian maintenance (CRM) flows. An inspection of the forebay will be completed at least every five years thereafter. The forebay will be drawn down for a period no longer than two weeks between July 1 and August 31 to allow for removal of sediment from the forebay using mechanical equipment. A trench will be created within the forebay from the confluence of Mono Creek and the forebay to the low-level outlet prior to sediment removal activities. This trench will be used to transport the 25 cfs MIF or the maximum flow through the lower level outlet valve, whichever is less. Once the trenching is completed, mechanical equipment will be used to remove sediment from the forebay. This sediment will be transported to a sediment disposal site pre-selected in consultation with USDA-FS and CDFG if the agencies have jurisdiction over the disposal location. Upon completion of the sediment removal, the low-level outlet will be closed and a flow will be spilled over the dam consistent with the CRM flow condition for Mono Diversion for at least 24 hours. Once sediment prescriptions are complete, flows will be returned to the MIF (25 cfs).

Table 4-11. Sediment Issues and Proposed Sediment Management Prescriptions for the Four Big Creek ALP Projects (continued).[1]

Mono Creek Diversion	67	Accumulation of sediment behind the dam may block the outlet valves or intake structure.	**Sediment Removal[2,3] (continued)** **Monitoring** Fine sediment monitoring will be done in Mono Creek as part of the proposed CRM flow license requirement. SCE will monitor turbidity during implementation of sediment prescriptions at three locations (upstream of the forebay, immediately downstream of the forebay and 1,000 feet downstream of the forebay). Monitoring will be conducted on an hourly basis from 8 hours prior to initiation of sediment prescriptions to at least 8 hours after the clear water release. Turbidity monitoring results will be reported to the USDA-FS, CDFG and State Water Board and other interested government agencies within six months of completing sediment prescriptions[4]. Following submittal of the monitoring results, SCE will consult with USDA-FS, CDFG and State Water Board and other interested government agencies to determine if modifications to the sediment prescription are warranted. Monitoring will be discontinued in subsequent years, upon approval of the USDA-FS, CDFG and State Water Board.
Mammoth Pool Dam	2085	Accumulation of sediment at intake structure leading to Howell-Bunger (HB) valve.	**Sediment Pass Through[2,3]** During wet years, SCE will comply with its whitewater obligations for the Mammoth Pool Project license and the project's Recreation Plan. The operation of the Howell-Bunger (HB) valve to provide pre-spill release flows from Mammoth Pool Reservoir for whitewater boating opportunities may allow sediment accumulated at the intake structure to pass downstream. **Monitoring** SCE will monitor turbidity during implementation of pre-spill release at two locations (downstream of the dam and just upstream of Mammoth Pool Powerhouse). Monitoring will be conducted on an hourly basis from 8 hours prior to initiation of pre-spill releases to 48hours after HB value is opened. Turbidity monitoring results will be reported to the USDA-FS, CDFG and State Water Board and other interested government agencies within six months of completing the monitoring activities. Following submittal of the monitoring results, SCE will consult with USDA-FS, CDFG and State Water Board and other interested government agencies to determine if modifications to the pre-spill release is warranted. Monitoring will be discontinued in subsequent years, upon approval of the USDA-FS, CDFG and State Water Board.
Portal Forebay Balsam Meadow Forebay	2174 67	Accumulation of sediment behind the dam may block low-level outlets or intake structure.	**Sediment Removal[2,3]** Within five years of approval of this sediment prescription by FERC, SCE will inspect the forebays to determine if physical removal of sediment is necessary. If physical removal of sediment is necessary, this prescription will be implemented. An inspection of the forebays will be completed at least every five years thereafter. If necessary, the forebay will be drawn down in the late fall to allow for removal of sediment using mechanical equipment. A trench will be created within the forebay from the point of inflow to the low-level outlet prior to sediment removal activities. This trench will be used to transport the required MIF around the sediment removal area. Once the trenching is completed, mechanical equipment will be used to remove sediment from the forebay. This sediment will be transported to a sediment disposal site pre-selected in consultation with USDA-FS and CDFG if the agencies have jurisdiction over the disposal location. If the licensee determines that "flushing" flows are required as part of the sediment management, such flows will only be released within the time frames and peak magnitudes specified in the Portal CRM flow unless otherwise agreed to by the USDA-FS and other interested governmental agencies.

Table 4-11. Sediment Issues and Proposed Sediment Management Prescriptions for the Four Big Creek ALP Projects (continued).[1]

Portal Forebay Balsam Meadow Forebay	2174 67	Accumulation of sediment behind the dam may block low-level outlets or intake structure.	**Sediment Removal[2,3] (continued)** **Monitoring** SCE will monitor turbidity during implementation of sediment prescriptions at three locations (upstream of the forebay, immediately downstream of the forebay and 1,000 feet downstream of the forebay). Monitoring will be conducted on an hourly basis from 8 hours prior to initiation of sediment prescriptions to at least 8 hours after the completion of sediment removal activities. Turbidity monitoring results will be reported to the USDA-FS, CDFG and State Water Board and other interested government agencies within six months of completing sediment prescriptions[4]. Following submittal of the monitoring results, SCE will consult with USDA-FS, CDFG and State Water Board and other interested government agencies to determine if modifications to the sediment prescription are warranted. Monitoring will be discontinued in subsequent years, upon approval of the USDA-FS, CDFG and State Water Board.

[1]SCE will consult with the USDA-FS, CDFG and other regulatory agencies regarding information needs and permitting requirements for the sediment activities. If additional information is needed in order to obtain approval of necessary permits, then SCE will provide that information.

[2]Other regulatory or operational constraints may take precedence of sediment management prescriptions. These constraints may include, but not be limited to: (i) necessary repairs to the dam(s) or associated equipment; (ii) providing water supplies during drought periods to downstream water users or for environmental purposes; (iii) operating generating facilities to address power shortages in California due to unscheduled power outages of other power generation facilities, State declared energy emergencies, or orders from a State agency with authority to dispatch power generated by the Projects; (iv) reducing downstream flooding risks; (v) meeting the terms of the Mammoth Pool Operating Contract or other obligations to downstream water rights holders; or (vi) meeting other Project license water release requirements. In the event that sediment management prescriptions are not conducted due to conflicting operational constraints, SCE will make a good faith effort to complete the sediment management prescription(s) in the following year.

[3]SCE will provide notification of Sediment Pass Through or Sediment Removal activities to the USDA-FS, State Water Board, CDFG and other interested parties, including the Whitewater Boating Community, 30 days prior to commencing work.

[4]Deviations from turbidity standards in the Basin Plan will not be considered violations during the first two cycles of sediment prescriptions, but will be reported to the State Water Board, who will determine whether modifications should be made to the sediment management prescriptions, monitoring programs, or whitewater pre-spill releases contained in this Plan.

Table 5-1. Vegetation Communities and Wildlife Habitats Within 1/4 Mile of the Big Creek ALP Project Facilities.

Vegetation Community/ Wildlife Habitat	Mammoth Pool (FERC No. 2085)	Big Creek Nos. 1 and 2 (FERC No. 2175)	Big Creek Nos. 2A, 8, and Eastwood (FERC No. 67)	Big Creek No. 3 FERC No. 120
Gray Pine-Chaparral Woodland/ Mixed Chaparral	X	X	X	X
Gray Pine-Chaparral Woodland with Rock Substrate/ Mixed Chaparral with Rock Substrate	X	X	X	X
Westside Ponderosa Pine Forest/ Ponderosa Pine Forest	X			
Westside Ponderosa Pine Forest with Rock Substrate/ Ponderosa Pine Forest with Rock Substrate				
Sierran Mixed Coniferous Forest/ Sierran Mixed Coniferous Forest	X	X	X	X
Sierran Mixed Coniferous Forest with Rock Substrate/ Sierran Mixed Coniferous Forest with Rock Substrate	X	X	X	
Jeffrey Pine Forest/ Jeffrey Pine Forest			X	
Jeffrey Pine Forest with Rock Substrate/ Jeffrey Pine Forest with Rock Substrate			X	
Jeffrey Pine-Fir Forest/ Jeffrey Pine Forest		X	X	
Jeffrey Pine-Fir Forest with Rock Substrate/ Jeffrey Pine Forest with Rock Substrate		X	X	
Lodgepole Pine Forest/ Lodgepole Pine Forest			X	
Blue Oak Woodland/ Blue Oak Woodland	X	X		X
Oak Woodland/ Montane Hardwood	X	X	X	X
Oak Woodland with Rock Substrate/ Montane Hardwood with Rock Substrate	X	X	X	
Mixed Montane Chaparral/ Mixed Chaparral or Montane Chaparral	X	X	X	X
Mixed Montane Chaparral with Rock Substrate/ Mixed Chaparral or Montane Chaparral with Rock Substrate	X	X	X	
Riparian/ Montane, Valley, and Foothill Riparian	X	X	X	
Wet Montane Meadow/ Wet Meadow	X	X	X	
Dry Montane Meadow/ Perennial Grassland			X	
Montane Freshwater Marsh/ Fresh Emergent Wetland				
Ruderal/ Ruderal	X	X	X	
Open Ground/ Open Ground	X	X	X	
Water/ Water	X	X	X	X
Developed/ Developed	X	X	X	X

FIGURES

FIGURES

Non-Internet Public Information

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APPENDIX A

SPECIAL-STATUS SPECIES KNOWN OR POTENTIALLY OCCURRING IN THE VICINITY OF THE FOUR BIG CREEK ALP PROJECTS

Appendix A. Special-Status Plant and Wildlife Species Known or Potentially Occurring in the Vicinity of the Four Big Creek ALP Projects.

Scientific/Common Name	Federal Status	FSS Status	Other Status	Blooming Period/Fertile	Habitat	Mammoth Pool (FERC Project No. 2085)	Big Creek Nos. 1 and 2 (FERC Project No. 2175)	Big Creek Nos. 2A, 8 & Eastwood (FERC Project No. 67)	Big Creek No. 3 (FERC Project No. 120)
Allium yosemitense Yosemite onion	–	FSS	CR, CNPS 1B.3	April–July	Broad-leaved upland forest, chaparral, cismontane woodland, lower montane coniferous forest; rocky, metamorphic substrate. 1,755–7,200 feet.	Unlikely	Not detected	Not detected	Unlikely
Botrychium crenulatum Scalloped moonwort	–	FSS	CNPS 2.2	Fertile June to July	Lower montane coniferous forests, bogs, meadows and seeps, marshes and swamps. 4,900–10,765 feet.	Unlikely	Potential	Potential	Unlikely
Botrychium lineare Slender moonwort	FC	FSS	CNPS 1B.3	Unknown when fertile	Upper montane coniferous forests at 8,530 feet.	Unlikely	Unlikely	Unlikely	Unlikely
Bruchia bolanderi Bolander's candle moss	–	FSS	CNPS 2.2	N/A	Lower montane coniferous forest, meadows and seeps, upper montane coniferous forest: damp soil. 5,575–9,190 feet.	Unlikely	Potential	Potential	Unlikely
Calyptridium pulchellum Mariposa pussypaws	FT	–	CNPS 1B.1	April–August	Cismontane woodland in shallow granite soils on granitic domes, restricted to exposed sites. 1,300–3,600 feet.	Unlikely	Unlikely	Not detected	Not detected
Camissonia sierrae ssp. *alticola* Mono Hot Springs evening primrose	–	FSS	CNPS 1B.2	May–August	Lower montane coniferous forest, upper montane coniferous forest: granitic, gravel and sand pans. 4,500–8,500 feet.	Known	Not detected	Known	Unlikely
Carlquistia muirii Muir's tarplant	–	FSS	CNPS 1B.3	July–August	Chaparral (montane), lower montane coniferous forest, upper montane coniferous forest. 3,605–8,205 feet.	Unlikely	Not detected	Not detected	Unlikely
Carpenteria californica Tree-anemone	–	FSS	CT, CNPS 1B.2	May–July	Cismontane woodland, chaparral. Endemic to Fresno County. Very localized on well-drained granitic soils, mostly on north-facing ravines and drainages. 1,500–4,000 feet.	Not detected	Not detected	Not detected	Not detected
Castilleja campestris ssp. *succulenta* Succulent owl's-clover	FT	–	CE, CNPS 1B.2	April–May	Vernal pools. 1,640–2,460 feet.	Unlikely	Unlikely	Unlikely	Unlikely
Clarkia biloba ssp. *australis* Mariposa clarkia	–	FSS	CNPS 1B.2	May–July	Chaparral, cismontane woodland. 980–3,100 feet.	Not detected	Not detected	Not detected	Not detected
Clarkia lingulata Merced clarkia	–	FSS	CE, CNPS 1B.1	May–June	Chaparral, cismontane woodland. 1312–1492 feet.	Unlikely	Unlikely	Not detected	Not detected
Collomia rawsoniana Flaming trumpet	–	FSS	CNPS 1B.2	July–August	Riparian forest, lower montane coniferous forest on stabilized alluvium in riparian zones, at mid elevations along perennial streams north of the San Joaquin River. 2,500–7,200 feet.	Known	Not detected	Not detected	Not detected
Cypripedium montanum Mountain lady's slipper	–	FSS	CNPS 4.2	March–August	Broad-leaved upland and lower montane coniferous forests, moist or dry shaded slopes. 700–7,200 feet.	Not detected	Not detected	Not detected	Not detected

Appendix A. Special-Status Plant and Wildlife Species Known or Potentially Occurring in the Vicinity of the Four Big Creek ALP Projects (continued).

Scientific/Common Name	Federal Status	FSS Status	Other Status	Blooming Period/Fertile	Habitat	Mammoth Pool (FERC Project No. 2085)	Big Creek Nos. 1 and 2 (FERC Project No. 2175)	Big Creek Nos. 2A, 8 & Eastwood (FERC Project No. 67)	Big Creek No. 3 (FERC Project No. 120)
Delphinium inopinum Unexpected larkspur	–	FSS	CNPS 4.3	May–July	Alpine boulder and rock fields at high elevations in rocky soil at the extreme southern boundary of the SNF. 7,200–9,200 feet.	Unlikely	Not detected	Not detected	Unlikely
Dicentra nevadensis Tulare County bleeding heart	–	FSS	CNPS 4.3	June–October	Subalpine coniferous forest in gravelly openings. 7,200–10,000 feet.	Unlikely	Not detected	Not detected	Unlikely
Epilobium howellii Subalpine fireweed	–	FSS	CNPS 1B.3	July–August	Meadows, subalpine coniferous forest, wet meadows, mossy seeps. 6,500–9,000 feet.	Unlikely	Known	Not detected	Unlikely
Erigeron aequifolius Hall's daisy	–	FSS	CNPS 1B.3	July–August	Broad-leaved upland forest, lower and upper montane coniferous forest, pinyon-juniper woodland, rocky soils. 4,900–8,000 feet.	Unlikely	Not detected	Not detected	Unlikely
Eriogonum nudum var. regirivum King's River buckwheat	–	FSS	CNPS 1B.2	August–November	Cismontane woodland; carbonate, rocky substrate. 490–985 feet.	Unlikely	Unlikely	Unlikely	Unlikely
Eriogonum prattenianum var. *avium* Kettle Dome buckwheat	–	FSS	CNPS 4.2	June–August	Upper montane coniferous forest on granitic soils. 3,900–8,500 feet.	Unlikely	Not detected	Not detected	Unlikely
Eriophyllum congdonii Congdon's woolly sunflower	–	FSS	CR, CNPS 1B.2	May–June	Chaparral, cismontane woodland, lower montane coniferous forest: on metamorphic soils. 1,600–6,200 feet.	Not detected	Not detected	Not detected	Not detected
Erythronium pluriflorum Shuteye Peak fawn lily	–	FSS	CNPS 1B.3	May–July	Upper montane coniferous forest, meadows, subalpine coniferous forest, rocky granitic outcrops and slopes. 6,758–8,366 feet.	Unlikely	Not detected	Not detected	Unlikely
Heterotheca monarchensis Monarch golden-aster	–	FSS	CNPS 1B.3	May–October	Cismontane woodland; carbonate substrate. 3,590–6,070 feet.	Unlikely	Unlikely	Unlikely	Unlikely
Hulsea brevifolia Short-leaved hulsea	–	FSS	CNPS 1B.2	May–August	Granitic or volcanic soils in openings and under canopy in mixed conifer and red fir forest. 4,900–8,900 feet.	Unlikely	Not detected	Known	Unlikely
Hydrothyria venosa Veined water lichen	–	FSS	–	N/A	Cold, clear, unpolluted streams in mixed conifer forests. 4,000–8,000 feet.	Unlikely	Potential	Potential	Unlikely
Lewisia congdonii Congdon's lewisia	–	FSS	CR, CNPS 1B.3	April–June	Chaparral, cismontane woodland, lower montane coniferous forest, upper montane coniferous forest, granitic, moist places on metamorphic soils. 1,600–9,200 feet.	Unlikely	Unlikely	Unlikely	Unlikely
Lewisia disepala Yosemite lewisia	–	FSS	CNPS 1B.2	April–June	Lower montane coniferous forest, pinyon juniper woodland, upper montane coniferous forest, fine gravel on rock outcrops or domes. 4,250–11,000 feet.	Known	Not detected	Not detected	Unlikely
Lupinus citrinus var. *citrinus* Orange lupine	–	FSS	CNPS 1B.2	April–July	Chaparral, cismontane woodland, lower montane coniferous forest, rocky granitic outcrops, usually in open areas (forest openings), on flat to rolling terrain. 2,000–5,000 feet.	Not detected	Unlikely	Not detected	Not detected

Appendix A. Special-Status Plant and Wildlife Species Known or Potentially Occurring in the Vicinity of the Four Big Creek ALP Projects (continued).

Scientific/Common Name	Federal Status	FSS Status	Other Status	Blooming Period/Fertile	Habitat	Mammoth Pool (FERC Project No. 2085)	Big Creek Nos. 1 and 2 (FERC Project No. 2175)	Big Creek Nos. 2A, 8 & Eastwood (FERC Project No. 67)	Big Creek No. 3 (FERC Project No. 120)
Meesia triquetra Three-ranked hump moss	–	FSS	CNPS 4.2	N/A	In bogs and wet woods. 6,000–8,000 feet.	Unlikely	Potential	Potential	Unlikely
Meesia uliginosa Broad-nerved hump moss	–	FSS	CNPS 2.2	N/A	In bogs and rock fissures, usually in alpine or arctic regions, sometimes in the lowlands. 7,500–9,000 feet.	Unlikely	Potential	Potential	Unlikely
Mimulus filicaulis Slender-stemmed monkeyflower	–	FSS	CNPS 1B.2	April–August	Cismontane woodland, lower montane coniferous forest, meadows and seeps, upper montane coniferous forest; vernally mesic environments. 2,950–5,745 feet.	Not detected	Not detected	Not detected	Unlikely
Mimulus gracilipes Slender-stalked monkeyflower	–	FSS	CNPS 1B.2	April–June	Lower and upper montane coniferous forest, pinyon-juniper woodlands; granitic sand substrate. 1,600–4,300 feet.	Not detected	Not detected	Not detected	Not detected
Mimulus pulchellus Pansy monkeyflower	–	FSS	CNPS 1B.2	May–July	Lower montane coniferous forest, meadows and seeps; vernally mesic environments. 1,965–6,565 feet.	Not detected	Not detected	Not detected	Unlikely
Orcuttia inaequalis San Joaquin Valley Orcutt grass	FT	–	CE, CNPS 1B.1	April–September	Vernal pools. 100–2,477 feet.	Unlikely	Unlikely	Unlikely	Unlikely
Sidalcea keckii Keck's checkerbloom	FE	–	CNPS 1B.1	April–May	Cismontane woodland, valley and foothill grassland; serpentine and clay substrate. 393–1,394 feet.	Unlikely	Unlikely	Unlikely	Not detected
Streptanthus fenestratus Tehipite Valley jewel-flower	–	FSS	CNPS 1B.3	April–July	Lower montane coniferous forest, upper montane coniferous forest. 3,490–5,745 feet.	Unlikely	Not detected	Not detected	Unlikely

Appendix A. Special-Status Plant and Wildlife Species Known or Potentially Occurring in the Vicinity of the Four Big Creek ALP Projects (continued).

Scientific/Common Name	Federal Status	FSS Status	Other Status	Blooming Period/Fertile	Habitat	Mammoth Pool (FERC Project No. 2085)	Big Creek Nos. 1 and 2 (FERC Project No. 2175)	Big Creek Nos. 2A, 8 & Eastwood (FERC Project No. 67)	Big Creek No. 3 (FERC Project No. 120)
Trifolium bolanderi Bolander's clover	–	FSS	CNPS 1B.2	June–August	Lower montane coniferous forest, meadows and seeps, upper montane coniferous forest; mesic environments. 7,900–8,530 feet.	Unlikely	Unlikely	Not detected	Unlikely
Viola pinetorum ssp. *grisea* Grey-leaved violet	–	FSS	CNPS 1B.3	April–July	Dry peaks and slopes in subalpine conifer forest and upper montane conifer forest. 4,875–11,050 feet.	Unlikely	Not detected	Not detected	Unlikely

LEGEND:

State Status
CR = California Rare
CT = California Threatened
CE = California Endangered
CNPS = California Native Plant Society
- 1B = rare, threatened or endangered in California and elsewhere
- 2 = rare in California but more common elsewhere
- 3 = need more information
- 4 = plants of limited distribution; a watch list
  - _.1 = Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
  - _.2 = Fairly endangered in California (20–80% occurrences threatened)
  - _.3 = Not very endangered in California (<20% of occurrences threatened or no current threats known)

Federal Status
FC = Candidate Species
FE = Federal Endangered
FPE = Federally proposed for listing as endangered
FT = Federal Threatened
FSS = Forest Service Sensitive
SNF MIS = Sierra National Forest Management Indicator Species

Known: Species identified either through literature review (USFS, CNDDB, CNPS) or during focused surveys completed in vicinity of the four Big Creek Projects.

Potential: Surveys were completed only in representative habitat potentially supporting the species. Species could potentially occur in potential habitat in the vicinity of the four Big Creek Projects that were not surveyed.

Not Detected: Species were not found during surveys completed in the vicinity of the four Big Creek Projects.

Unlikely: Regulatory agencies identified species as potentially occurring in the vicinity of the four Big Creek Projects. Upon further review, it was determined that the Projects were outside the species known elevation range or that no appropriate habitat is present.

Appendix A. Special-Status Plant and Wildlife Species Known or Potentially Occurring in the Vicinity of the Four Big Creek ALP Projects

Common Name Scientific Name	Federal Status	FSS Status	Other Status	Habitat	Mammoth Pool (FERC Project No. 2085)	Big Creek Nos. 1 and 2 (FERC Project No. 2175)	Big Creek Nos. 2A, 8 & Eastwood (FERC Project No. 67)	Big Creek No. 3 (FERC Project No. 120)
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	FT, FPD	–	–	Elderberry shrubs throughout the Central Valley and foothills below 3,000 feet elevation.	Known	Not detected	Potential	Known
Ambystoma californiense California tiger salamander	FT (Central California), FE (Sonoma and Santa Barbara Cos. only)	–	CSC	Vernal pools, annual grassland, and the grassy understory of valley-foothill oak woodland habitats below 4,500 feet. Requires seasonal wetlands or slow moving stream courses for reproduction.	Unlikely	Unlikely	Unlikely	Unlikely
Oncorhynchus clarki henshawi Lahontan cutthroat trout	FT	-	SNF MIS	Native to freshwater habitats of the Lahontan basin of central Nevada and mid-eastern California. In California, Lahontans occupy less than 5 percent of their historic habitats. Closest surviving populations in the San Joaquin basin are found in Portuguese Creek (Madera County) and Cow Creek (Fresno County).	Unlikely	Unlikely	Unlikely	Unlikely
Oncorhynchus clarki seleniris Paiute cutthroat trout	FT	-	SNF MIS	Native to Silver King Creek in the East Fork-Carson River drainage of east-central California. Self-sustaining pure populations have also become established outside the native range in Stairway Creek (Madera County). The extant pure populations all occur in headwater stream environments that are isolated from other fish species by barrier falls.	Unlikely	Unlikely	Unlikely	Unlikely
Mynopharadon conocephalus Hardhead	-	FSS		Freshwater fish native to California, with a distribution limited to the Sacramento-San Joaquin river system and the Russian River system. Occurs in the upper San Joaquin River both above and below Kerckhoff Dam.	Potential	Unlikely	Unlikely	Potential
Batrachoseps relictus Relictual slender salamander	–	FSS	CSC	Habitat requirements are poorly understood. Have been found under rocks, bark, and downed woody debris. Known from the SNF at elevations ranging from 600 to 8,000 feet.	Unlikely	Unlikely	Unlikely	Unlikely
Hydromantes brunus Limestone salamander	–	FSS	CT, CFP	Associated with limestone outcroppings in foothill woodland and chaparral habitats of Merced Canyon in Mariposa County from 836–2,624 feet.	Unlikely	Unlikely	Unlikely	Unlikely
Rana aurora draytonii California red-legged frog	FT	–	CSC	Breeds in quiet streams and permanent, deep, cool ponds with overhanging and emergent vegetation below 4,000 feet elevation. Known to occur adjacent to breeding habitats in riparian areas and heavily vegetated streamside shorelines, and non-native grasslands. Sierran streams historically supported populations of red-legged frog; however, these populations have been eliminated.	Unlikely	Unlikely	Unlikely	Unlikely
Rana boylii Foothill yellow-legged frog	–	FSS	CSC	Breeds in rocky streams with cool, clear water in a variety of habitats, including valley and foothill oak woodland, riparian forest, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadows; occurs at elevations ranging from 0 to 4,500 feet.	Potential	Potential	Potential	Potential
Rana muscosa Mountain yellow-legged frog	FC (Sierra Nevada), FE (San Gabriel, San Jacinto, and San Bernardino Mts. Only)	FSS	CSC	Occurs in the Sierras at elevations ranging from 4,500 to 12,000 feet; associated with streams, lakes, and ponds in montane riparian, lodgepole pine, subalpine conifer, and wet meadow habitats; breeds in shallow water in low gradient perennial streams and lakes. Known from the high elevations of the SNF.	Unlikely	Known	Potential	Unlikely

Appendix A. Special-Status Plant and Wildlife Species Known or Potentially Occurring in the Vicinity of the Four Big Creek ALP Projects (continued).

Common Name Scientific Name	Federal Status	FSS Status	Other Status	Habitat	Mammoth Pool (FERC Project No. 2085)	Big Creek Nos. 1 and 2 (FERC Project No. 2175)	Big Creek Nos. 2A, 8 & Eastwood (FERC Project No. 67)	Big Creek No. 3 (FERC Project No. 120)
Bufo canorus Yosemite toad	FC	FSS	CSC	Occurs in montane meadows and forest borders; breeds in shallow pools, at lake margins, or in pools of quiet streams at elevations ranging 6,400 to 11,300 feet. Known from the SNF.	Unlikely	Known	Known	Unlikely
Actinemys marmorata Western pond turtle	–	FSS	CSC	Perennial wetlands and slow moving creeks and ponds with overhanging vegetation up to 6,000 feet; suitable basking sites such as logs and rocks above the waterline.	Known	Potential	Known	Known
Gambelia silus Blunt-nosed leopard lizard	FE	–	CE, CFP	Scarce resident of sparsely vegetated alkali and desert scrub habitats in the San Joaquin Valley and adjacent foothills up to 3,000 feet.	Unlikely	Unlikely	Unlikely	Unlikely
Pandion haliaetus Osprey	–	–	SNF MIS, CSC	Breeds in northern California, associated strictly with large fish-bearing waters, primarily in ponderosa pine and mixed conifer habitats.	Known	Known	Known	Known
Haliaeetus leucocephalus Bald eagle	FT, FPD (Proposed delisting on 7/6/99) (nesting and wintering)	–	SNF MIS, CE, CFP	Local winter migrant to various California lakes. Most of the breeding population is restricted to more northern counties. Regular winter migrants to the region. Usually not found at high elevations in the Sierra.	Known	Known	Known	Known
Accipiter cooperi Cooper's hawk			CSC (nesting)	Breeding resident throughout most of the wooded portion of the state. Breeds in Sierra Nevada foothills, New York Mountains, Owens Valley, and other local areas in southern California. Dense stands of oak and riparian woodland for nesting and grassland for foraging up to 9,000 feet.	Potential	Potential	Known	Known
Accipiter gentilis Northern goshawk	–	FSS	SNF MIS, CSC (nesting)	Prefers middle to high elevation, mature, dense conifer forests for foraging and nesting. Casual in foothills during winter, northern deserts in pinyon-juniper woodland, and low elevation riparian habitats.	Known	Known	Known	Known
Buteo swainsoni Swainson's hawk	–	FSS	CT (nesting)	Uncommon breeding resident and migrant in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen County, and Mojave Desert. Riparian woodlands, juniper-sage flats, and oak woodlands for nesting. Grasslands and agricultural areas for foraging.	Unlikely	Unlikely	Unlikely	Unlikely
Falco peregrinus anatum American peregrine falcon	Former FE (Delisted on 8/20/99) (nesting)	FSS	SNF MIS, CE, CFP	Very uncommon breeding resident and uncommon as a migrant. Breeds in woodlands, forests, coastal habitats, and riparian areas near wetlands, lakes, rivers, or other water on high cliffs, banks, dunes, or mounds. Active nesting sites are known along the coast, in the Sierra Nevada, and in the mountains of northern California. Migrants occur along the coast and the western Sierra Nevada in spring and fall.	Potential	Known	Known	Known
Strix nebulosa Great gray owl	–	FSS	CE (nesting)	Nests in old-growth coniferous forests and forages in montane meadows. Distribution includes high elevations of the Sierra Nevada and Cascade Ranges from 4,500 to 7,500 feet.	Unlikely	Known	Known	Unlikely
Strix occidentalis occidentalis California spotted owl	–	FSS	SNF MIS CSC	Resides in dense, old growth, multi-layered mixed conifer, redwood, Douglas fir, and oak woodland habitats, from sea level up to approximately 7,600 feet. Known from the SNF.	Known	Known	Known	Known

Appendix A. Special-Status Plant and Wildlife Species Known or Potentially Occurring in the Vicinity of the Four Big Creek ALP Projects (continued).

Common Name Scientific Name	Federal Status	FSS Status	Other Status	Habitat	Mammoth Pool (FERC Project No. 2085)	Big Creek Nos. 1 and 2 (FERC Project No. 2175)	Big Creek Nos. 2A, 8 & Eastwood (FERC Project No. 67)	Big Creek No. 3 (FERC Project No. 120)
Empidonax traillii brewsteri Willow flycatcher	–	FSS	SNF MIS CE (nesting)	Wet meadow and montane riparian habitats from 2,000 to 8,000 feet. Most often occurs in broad, open river valleys or large mountain meadows with lush growth of shrubby willows. Known from the SNF.	Potential	Potential	Known	Known
Dendroica petechia brewsteri Yellow warbler			CSC (nesting)	Breeds in riparian woodlands from coastal and desert lowlands up to 8,000 feet in the Sierra Nevada. Also breeds in montane chaparral, open ponderosa pine, and mixed conifer habitats with substantial amounts of brush.	Potential	Potential	Known	Potential
Vireo bellii pusillus Least Bell's vireo	FE	–	CE (nesting)	Summer resident below 2,000 feet in Santa Barbara, Ventura, San Bernardino, Riverside, San Diego, Imperial, and Inyo counties. Prefers willows and other low, dense valley-foothill riparian habitat in the lower portion of canyons for breeding.	Unlikely	Unlikely	Unlikely	Unlikely
Lasiurus blossevilli *Western red bat*	–	FSS	–	Occurs from British Columbia to South America. In California, occurs from Shasta County to the Mexican border west of the Sierra crest. Roosts solitarily in foliage in forests and woodlands from sea level up through mixed coniferous forest. In California known to roost in cottonwood and willow.	Not detected	Known	Not detected	Not detected
Corynorhinus townsendi Townsend's western big-eared bat	–	FSS	CSC	Found in all but alpine and subalpine habitats; most abundant in mesic habitats. Requires caves, mines, tunnels, buildings, or other man-made structures for roosting. This species is extremely sensitive to disturbance and may abandon a roost if disturbed. Known from the SNF.	Not detected	Not detected	Known	Not detected
Antrozous pallidus Pallid bat	–	FSS	CSC	Inhabits grasslands, shrublands, woodlands, and forests from sea level up through mixed conifer forests. Typically roosts in caves, crevices, or mines. Requires open habitat for foraging.	Not detected	Not detected	Known	Known
Dipodomys nitratoides exilis Fresno kangaroo rat	FE	–	CE	Alkali desert scrub habitat and herbaceous habitat with scattered shrubs. Found in the San Joaquin Valley up to 1,800 feet.	Unlikely	Unlikely	Unlikely	Unlikely
Vulpes vulpes necator Sierra Nevada red fox	–	FSS	CT	Occurs throughout the Sierra Nevada at elevations above 7,000 feet in forests interspersed with meadows or alpine forests. Open areas are used for hunting, forested habitats for cover and reproduction. Known from the higher elevations of the SNF.	Unlikely	Known	Known	Unlikely
Martes Americana American (=pine) marten	–	FSS	SNF MIS	Within the SNF, martens are known from the high elevation forested plant communities. Optimal habitats are various mixed evergreen forests with more than 40% crown closure and large trees and snags for den sites. Most commonly found in red fir and lodgepole pine forests between 4,000 and 10,600 feet elevation.	Unlikely	Known	Known	Unlikely
Martes pennanti pacifica Pacific fisher	FC	FSS	CSC SNF MIS	Suitable habitat consists of large areas of mature, dense forest red fir, lodgepole pine, ponderosa pine, mixed conifer, and Jeffery pine forests with snags and greater than 50% canopy closure. Known from 4,000 to 8,000 feet elevations in the SNF.	Potential	Known	Known	Unlikely
Gulo gulo luteus California wolverine	–	FSS	CT, CFP	Mixed conifer, red fir, and lodgepole habitats, and probably sub-alpine conifer, alpine dwarf shrub, wet meadow, and montane riparian habitats. Occurs in Sierra Nevada from 4,300 to 10,800 feet. Majority of recorded sightings are found above 8,000 feet elevation.	Unlikely	Known	Known	Unlikely

Appendix A. Special-Status Plant and Wildlife Species Known or Potentially Occurring in the Vicinity of the Four Big Creek ALP Projects (continued).

Common Name Scientific Name	Federal Status	FSS Status	Other Status	Habitat	Mammoth Pool (FERC Project No. 2085)	Big Creek Nos. 1 and 2 (FERC Project No. 2175)	Big Creek Nos. 2A, 8 & Eastwood (FERC Project No. 67)	Big Creek No. 3 (FERC Project No. 120)
Odocoileus Hemionus Mule deer	–	–	SNF MIS	In the central Sierra, mule deer inhabit winter ranges at elevations of 1,200 to 3,600 feet from early October through mid-May. In the spring, they remain at their winter ranges at an average elevation of 3,400 feet until mid-May, and then begin a gradual upward movement, depending on snow pack. During the summer, mule deer are commonly found at 6,000 to 10,000 feet from late May to early November .	Known	Known	Known	Known
Ovis canadensis californiana Sierra Nevada (=California) bighorn sheep	FE	FSS	CE, CFP	Southern Sierra Nevada from Fresno and Mono counties and south. Alpine dwarf–shrub, low sage, sagebrush, bitterbrush, pinyon-juniper, palm oasis, desert riparian, desert succulent shrub, desert scrub, subalpine conifer, perennial grassland, montane chaparral, and montane riparian habitats.	Unlikely	Unlikely	Unlikely	Unlikely

LEGEND:

State Status	Federal Status
CFP = California Fully Protected	FC = Candidate Species
CSC = California Species of Special Concern	FE = Federal Endangered
CE = State Endangered	FPE = Federally proposed for listing as endangered
CT = State Threatened	FT = Federal Threatened
	FSS = Forest Service Sensitive
	SNF MIS = Sierra National Forest Management Indicator Species

Known: Species identified either through literature review (USFS, CNDDB, CNPS) or during focused surveys completed in vicinity of the four Big Creek Projects.

Potential: Surveys were completed only in representative habitat potentially supporting the species. Species could potentially occur in other potential habitat in the vicinity of the four Big Creek Projects that were not surveyed. For birds, the potential for occurrence refers to the potential for the species to nest in the Project area.

Not Detected: Species were not found during surveys completed in the vicinity of the four Big Creek Projects.

Unlikely: Regulatory agencies identified species as potentially occurring in the vicinity of the four Big Creek Projects. Upon further review, it was determined that the Projects were outside the species known elevation range or that no appropriate habitat is present.

APPENDIX B

U.S. FISH AND WILDLIFE SERVICE SPECIES LISTS

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 070119104459

Database Last Updated: January 4, 2006

Quad Lists

Listed Species

Fish

Hypomesus transpacificus

delta smelt (T)

Oncorhynchus (=Salmo) clarki henshawi

Lahontan cutthroat trout (T)

Oncorhynchus mykiss

Central Valley steelhead (T) (NMFS)

Amphibians

Rana aurora draytonii

California red-legged frog (T)

Birds

Haliaeetus leucocephalus

bald eagle (T)

Mammals

Ovis canadensis californiana

Sierra Nevada (=California) bighorn sheep (E)

Candidate Species

Amphibians

Bufo canorus

Yosemite toad (C)

Rana muscosa

mountain yellow-legged frog (C)

Mammals

Martes pennanti

fisher (C)

Quads Containing Listed, Proposed or Candidate Species:

WARD MOUNTAIN (395B)
HUNTINGTON LAKE (396B)
MUSICK MTN. (397A)
CASCADEL POINT (397B)
SHAVER LAKE (397D)
FLORENCE LAKE (415C)
KAISER PEAK (416C)
MT. GIVENS (416D)
SQUAW DOME (417A)
MAMMOTH POOL DAM (417D)

County Lists

Fresno County

Listed Species

Invertebrates

Branchinecta lynchi
Critical habitat, vernal pool fairy shrimp (X)
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Lepidurus packardi
Critical habitat, vernal pool tadpole shrimp (X)
vernal pool tadpole shrimp (E)

Fish

Oncorhynchus (=Salmo) clarki henshawi
Lahontan cutthroat trout (T)

Oncorhynchus (=Salmo) clarki seleniris
Paiute cutthroat trout (T)

Oncorhynchus mykiss
Central Valley steelhead (T) (NMFS)

Amphibians

Ambystoma californiense
California tiger salamander, central population (T)
Critical habitat, CA tiger salamander, central population (X)

Rana aurora draytonii
California red-legged frog (T)

Reptiles

Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Birds

Gymnogyps californianus
California condor (E)

Haliaeetus leucocephalus
bald eagle (T)

Mammals

Dipodomys ingens

giant kangaroo rat (E)

Dipodomys nitratoides exilis
Critical habitat, Fresno kangaroo rat (X)
Fresno kangaroo rat (E)

Dipodomys nitratoides nitratoides
Tipton kangaroo rat (E)

Ovis canadensis californiana
Sierra Nevada (=California) bighorn sheep (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Calyptridium pulchellum
Mariposa pussy-paws (T)

Camissonia benitensis
San Benito evening-primrose (T)

Castilleja campestris ssp. succulenta
Critical habitat, succulent (=fleshy) owl's-clover (X)
succulent (=fleshy) owl's-clover (T)

Caulanthus californicus
California jewelflower (E)

Cordylanthus palmatus
palmate-bracted bird's-beak (E)

Monolopia congdonii (=Lembertia congdonii)
San Joaquin woolly-threads (E)

Orcuttia inaequalis
Critical habitat, San Joaquin Valley Orcutt grass (X)
San Joaquin Valley Orcutt grass (T)

Orcuttia pilosa
Critical habitat, hairy Orcutt grass (X)

Pseudobahia bahiifolia
Hartweg's golden sunburst (E)

Pseudobahia peirsonii
San Joaquin adobe sunburst (T)

Sidalcea keckii

Critical habitat, Keck's checker-mallow (X)
Keck's checker-mallow (=checkerbloom) (E)

Candidate Species

Amphibians

Bufo canorus
Yosemite toad (C)

Rana muscosa
mountain yellow-legged frog (C)

Mammals

Martes pennanti
fisher (C)

Plants

Botrychium lineare
slender Moonwort (= narrowleaf grapefern) (C)

Madera County

Listed Species

Invertebrates

Branchinecta longiantenna
longhorn fairy shrimp (E)

Branchinecta lynchi
Critical habitat, vernal pool fairy shrimp (X)
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Lepidurus packardi
Critical habitat, vernal pool tadpole shrimp (X)
vernal pool tadpole shrimp (E)

Fish

Oncorhynchus (=Salmo) clarki henshawi
Lahontan cutthroat trout (T)

Oncorhynchus (=Salmo) clarki seleniris
Paiute cutthroat trout (T)

Oncorhynchus mykiss
Central Valley steelhead (T) (NMFS)

Amphibians

Ambystoma californiense

California tiger salamander, central population (T)
Critical habitat, CA tiger salamander, central population (X)

Rana aurora draytonii
California red-legged frog (T)

Reptiles

Gambelia (=Crotaphytus) sila
blunt-nosed leopard lizard (E)

Thamnophis gigas
giant garter snake (T)

Birds

Haliaeetus leucocephalus
bald eagle (T)

Mammals

Dipodomys nitratoides exilis
Fresno kangaroo rat (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Calyptridium pulchellum
Mariposa pussy-paws (T)

Castilleja campestris ssp. succulenta
Critical habitat, succulent (=fleshy) owl's-clover (X)
succulent (=fleshy) owl's-clover (T)

Cordylanthus palmatus
palmate-bracted bird's-beak (E)

Orcuttia inaequalis
Critical habitat, San Joaquin Valley Orcutt grass (X)
San Joaquin Valley Orcutt grass (T)

Orcuttia pilosa
Critical habitat, hairy Orcutt grass (X)
hairy Orcutt grass (E)

Pseudobahia bahiifolia
Hartweg's golden sunburst (E)

Tuctoria greenei
Critical habitat, Greene's tuctoria (=Orcutt grass) (X)

Candidate Species

Amphibians

Bufo canorus

Yosemite toad (C)

Rana muscosa

mountain yellow-legged frog (C)

Mammals

Martes pennanti

fisher (C)

Key:

(E) *Endangered* - Listed as being in danger of extinction.

(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.

(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.

(NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.

Critical Habitat - Area essential to the conservation of a species.

(PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.

(C) *Candidate* - Candidate to become a proposed species.

(V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.

(X) *Critical Habitat* designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list.

For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

> Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.

  During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

  Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our critical habitat page for maps.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. More info

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be April 19, 2007.

APPENDIX C

KNOWN OCCURRENCES OF SPECIAL-STATUS SPECIES BY PROJECT FACILITY, RECREATION FACILITY, ROAD, OR TRAIL

Appendix C. Known Occurrences of Special-Status Species by Project Facility, Recreation Facility, Road, Trail.

FACILITIES	HABITAT[4]	APPROX. ELEV. (ft.)	FEDERALLY LISTED OR CANDIDATE SPECIES								FOREST SERVICE SENSITIVE AND SNF MANAGEMENT INDICATOR SPECIES																			
			Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	Mountain yellow-legged frog (*Rana muscosa*)	Yosemite toad (*Bufo canorus*)	Bald eagle (*Haliaeetus leucocephalus*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	Great gray owl (*Strix nebulosa*)	Willow flycatcher (*Empidonax traillii brewsteri*)	California wolverine (*Gulo gulo luteus*)	Sierra Nevada red fox (*Vulpes vulpes necator*)	Mono Hot Springs evening primrose (*Camissonia sierrae ssp. alticola*)	Flaming trumpet (*Collomia rawsoniana*)	Subalpine fireweed (*Epilobium howellii*)	Short-leaved hulsea (*Hulsea brevifolia*)	Yosemite lewisia (*Lewisia disepala*)	Foothill yellow-legged frog (*Rana boylii*)	Western Pond Turtle (*Actinemys marmorata*)	Osprey (*Pandion haliaetus*)	Northern goshawk (*Accipiter gentilis*)	Northern goshawk PAC	California spotted owl (*Strix occidentalis occidentalis*)	California spotted owl PAC	Western red bat (*Lasiurus borealis*)	Townsend's western big-eared bat (*Corynorhinus townsendii*)	Pallid bat (*Antrozous pallidus*)	American (=pine) marten (*Martes americana*)
Mammoth Pool																														
Dams and Diversions																														
Large Dams																														
Mammoth Pool	SMC/RCK, PPF, UCHP/RCK, UCHP, DPCW, SMC, DEV, OGRD, WAT	3400																												
Mammoth Pool Spillway	PPF, UCHP/RCK, UCHP, SMC, DEV, OGRD, WAT	3400				K																K (N)								
Power Generation																														
Mammoth Pool PH	DPCW	2600																												
Mammoth Pool Fishwater Generator	DEV, OGRD, DPCW, SMC/RCK, UCHP, SMC, WAT, UCHP/RCK	3000																												
Gaging Stations																														
Streams																														
Mammoth Pool Fish Water Generator	SMC, UCHP/RCK, WAT, DEV, PPF, UCHP, DPCW	3000																												
San Joaquin River above Shakeflat Creek (with cable crossing)	SMC, SMC/RCK, OGRD, WAT, UCHP	2800-3000																				K								
Reservoir																														
Mammoth Pool Dam	WAT, OGRD, UCHP, UCHP/RCK, PPF, DEV	3400																												
Mammoth Pool PH	DPCW, WAT	2600																												
Water Conveyance																														
Mammoth Pool Powerhouse																														
Intake Gate House	WAT, OGRD, PPF, UCHP, UCHP/RCK, PPF/RCK	3400				K																								
Adit Portals 1 & 2 at Shakeflat Creek	SMC, SMC/RCK, PPF, OGRD, UCHP, PPF/RCK	3200																												
Mammoth Tunnel[1]	Not applicable	3100-3400				K																				K				
Rock Trap Flushing Channel	DPCW/RCK, DPCW, DEV, WAT	2600																												
Valve House	DPCW/RCK, DPCW, DEV, WAT	2600																												
Penstocks	DPCW/RCK, DPCW, DEV, WAT	2300-3100																												
HB Valves																														
Mammoth Pool Reservoir	WAT, UCHP/RCK, SMC, UCHP, DPCW, DEV, PPF, SMC/RCK	3400													K															
Cabins																														
Mammoth Pool Reservoir Maintenance Cabin	WAT, OGRD, PPF, UCHP, UCHP/RCK	3400				K									K				K			K (N)								
Power Transmission Lines																														
MPPH - BC3 220KV	WAT, BOW, DPCW, RUD, WAT, DPCW/RCK	1600-3800				K																								
Reservoirs, Forebays, and Diversion Pools																														
Large Reservoir																														
Mammoth Pool Reservoir	DPCW, SMC, SMC/RCK, UCHP, UCHP/RCK, OGRD, WAT, PPF, OW, PPF/RCK, MDW, OW/RCK	3400				K										K						K (N)	K							
Bypass Stream Reaches (Small Tributaries)																														
Rock Creek, Diversion to San Joaquin River[1, 2]	WAT	2600-3400																			K									
Ross Creek, Diversion to San Joaquin River[1, 2]	WAT	2200-3400																			K									
Bypass Stream Reaches (San Joaquin River)																														
San Joaquin River, Mammoth Pool Dam to Dam 6[1, 2]	WAT, RIP	2200-3400																								K				
Helicopter Landing Sites																														
Mammoth Pool Dam		3400				K									K				K			K								

Appendix C. Known Occurrences of Special-Status Species by Project Facility, Recreation Facility, Road, Trail (continued).

FACILITIES	HABITAT[4]	APPROX. ELEV. (ft.)	FEDERALLY LISTED OR CANDIDATE SPECIES								FOREST SERVICE SENSITIVE AND SNF MANAGEMENT INDICATOR SPECIES																				
			Valley elderberry longhorn beetle (*Desmoceruscalifornicus dimorphus*)	Mountain yellow-legged frog (*Rana muscosa*)	Yosemite toad (*Bufo canorus*)	Bald eagle (*Haliaeetus leucocephalus*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	Great gray owl (*Strix nebulosa*)	Willow flycatcher (*Empidonax traillii brewsteri*)	California wolverine (*Gulo gulo luteus*)	Sierra Nevada red fox (*Vulpes vulpes necator*)	Mono Hot Springs evening primrose (*Camissonia sierrae ssp. alticola*)	Flaming trumpet (*Collomia rawsoniana*)	Subalpine fireweed (*Epilobium howellii*)	Short-leaved hulsea (*Hulsea brevifolia*)	Yosemite lewisia (*Lewisia disepala*)	Foothill yellow-legged frog (*Rana boylii*)	Western Pond Turtle (*Actinemys marmorata*)	Osprey (*Pandion haliaetus*)	Northern goshawk (*Accipiter gentilis*)	Northern goshawk PAC	California spotted owl (*Strix occidentalis occidentalis*)	California spotted owl PAC	Western red bat (*Lasiurus borealis*)	Townsend's western big-eared bat (*Corynorhinus townsendii*)	Pallid bat (*Antrozous pallidus*)	American (=pine) marten (*Martes americana*)
Roads Within Project Boundaries: SCE controlled																														
6S025G Mammoth Pool Fishwater Generator access road from 6S25 (Mammoth Pool Road) to Base of Mammoth Pool Dam	UCHP, UCHP/RCK, WAT, SMC, PPF, SMC/RCK, DPCW	3200-3400				K																								
6S25, Mammoth Pool Road, from 7S20 (Shake Flat Creek access) to end of road at east abutment	WAT, OGRD, PPF, UCHP, UCHP/RCK, DEV, DPCW, SMC, SMC/RCK	3500																				K								
8S03 (from Powerhouse No. 8 to Mammoth Pool Powerhouse)	DPCW, WAT	2300-2400																												
8S44, Mammoth Pool Transmission Line access road																														
9S42 Mammoth Pool PH Transmission Line access road from gate near County Road 225, Italian Bar Road, to 8S44	BOW, DEV, WAT, DPCW	1600-4000	K			K																								
Big Creek Nos. 1 and 2																														
Dams and Diversions																														
Large Dams																														
Huntington Lake Dams 1, 2, 3, & 3a	DEV, MDW, OGRD, UCHP, WAT, JPWF, RIP, RUD	6900				K	K		K					K								K (N)								
Moderate Diversion Dams																														
Dam 4	SMC, DEV, SMC/RCK	4800				K	K		K																					
Small Diversions																														
Balsam Creek	SMC	4500				K																								K
Ely Creek	SMC, SMC/RCK	5200						K		K				K												K				
Power Generation																														
Big Creek PH No. 1	SMC, SMC/RCK, DEV	4800				K	K		K																					
Big Creek PH No. 2	DEV, DPCW, SMC, WAT	3000																												
Gaging Stations																														
Streams																														
Big Creek below Huntington Lake at Dam 1	WAT, JPWF, RUD, DEV, RIP	6900												K								K (N)								
Balsam Creek at Diversion Dam	WAT, DEV, RUD, OGRD, MDW, SMC, UCHP	4800				K																								
Ely Creek at Diversion Dam	SMC, SMC/RCK	5000						K		K				K												K				
Reservoir																														
Huntington Dam	WAT, JPWF, OGRD	6900		K	K	K								K								K (N)								
Powerhouse																														
Big Creek PH No. 1	WAT, SMC, SMC/RCK, DEV	4800				K	K		K																					
Big Creek PH No. 2	DPCW, DEV, SMC, WAT	3000																												
Water Conveyance																														
Powerhouse No. 1																														
Intake Gate House at Huntington Lake- Dam 1	WAT, RUD, DEV, JPWF, RIP	6900				K								K								K (N)								
Tunnel No. 1	WAT, RUD, DEV, JPWF, RIP	6600-6900				K	K (N)	K	K (N)	K				K								K (N)								
Incline Adit	WAT, RUD, DEV, JPWF, RIP	6900				K	K		K													K								
Upper 84" Valve House below Huntington Lake	JPWF, WAT, OGRD, UCHP	6900				K		K		K												K (N)								
Upper 60" Valve House below Huntington Lake	JPWF, WAT, OGRD, UCHP	6900				K		K		K												K (N)								
60" & 84" Flowlines below Huntington Lake	OGRD, JPWF, WAT, UCHP, OW, OW/RCK, SMC, JPWF/RCK	6200-6800					K (N)		K (N)													K								K
Lower 84" Valve House at top of PH No.1 Penstock	OW, OW/RCK, JPWF, SMC, WAT, JPWF/RCK	6200					K (N)		K (N)													K								K
Lower 60" Valve House at top of PH No.1 Penstock	OW, OW/RCK, JPWF, SMC, WAT, JPWF/RCK	6200					K (N)		K (N)													K								K
42" Valve House at top of PH No.1 Penstock	OW, OW/RCK, JPWF, SMC, WAT, JPWF/RCK	6200					K (N)		K (N)													K								K
Vent Stacks	OW, OW/RCK, JPWF, SMC, WAT, JPWF/RCK	6800					K (N)		K (N)													K								K
Penstocks	JPWF, OW, OW/RCK, SMC, SMC/RCK, DEV, WAT	4800-6200				K	K (N)		K (N)													K								K
Powerhouse No. 2																														
Inlet Structure at Dam 4	SMC, DEV, SMC/RCK, WAT	4800				K	K		K																					
Tunnel No. 2	SMC, DEV, SMC/RCK, WAT, UCHP, RIP	4800-5000				K	K	K	K	K			K	K								K				K				K
Adit 1, Tunnel 2	SMC, SMC/RCK, UCHP, WAT	4900				K																K								

Appendix C. Known Occurrences of Special-Status Species by Project Facility, Recreation Facility, Road, Trail (continued).

			FEDERALLY LISTED OR CANDIDATE SPECIES								FOREST SERVICE SENSITIVE AND SNF MANAGEMENT INDICATOR SPECIES																				
FACILITIES	**HABITAT[4]**	**APPROX. ELEV. (ft.)**	***Valley elderberry longhorn beetle (Desmocerus californicus dimorphus)***	***Mountain yellow-legged frog (Rana muscosa)***	***Yosemite toad (Bufo canorus)***	***Bald eagle (Haliaeetus leucocephalus)***	***American peregrine falcon (Falco peregrinus anatum)***	***Pacific fisher (Martes pennanti pacifica)***	***American peregrine falcon (Falco peregrinus anatum)***	***Pacific fisher (Martes pennanti pacifica)***	***Great gray owl (Strix nebulosa)***	***Willow flycatcher (Empidonax traillii brewsteri)***	***California wolverine (Gulo gulo luteus)***	***Sierra Nevada red fox (Vulpes vulpes necator)***	***Mono Hot Springs evening primrose (Camissonia sierrae ssp. alticola)***	***Flaming trumpet (Collomia rawsoniana)***	***Subalpine fireweed (Epilobium howellii)***	***Short-leaved hulsea (Hulsea brevifolia)***	***Yosemite lewisia (Lewisia disepala)***	***Foothill yellow-legged frog (Rana boylii)***	***Western Pond Turtle (Actinemys marmorata)***	***Osprey (Pandion haliaetus)***	***Northern goshawk (Accipiter gentilis)***	***Northern goshawk PAC***	***California spotted owl (Strix occidentalis occidentalis)***	***California spotted owl PAC***	***Western red bat (Lasiurus borealis)***	***Townsend's western big-eared bat (Corynorhinus townsendii)***	***Pallid bat (Antrozous pallidus)***	***American (=pine) marten (Martes americana)***
Adit 2, Tunnel 2	SMC, SMC/RCK, UCHP	5000																				K								K
Adit 3, Tunnel 2	SMC, UCHP	4800				K																								
Adit 4, Tunnel 2	SMC, UCHP	4900				K																								
Adit 5, Tunnel 2	SMC	4800						K		K			K														K				
Adit 6, Tunnel 2	SMC, SMC/RCK	5000						K		K				K													K				
Adit 7, Tunnel 2	SMC	4900						K		K																					
Adit 7&1/2, Tunnel 2	SMC, SMC/RCK, RIP	4800						K		K																					
Adit 8, Tunnel 2	SMC, SMC/RCK, RIP	4800						K		K																					
Adit 7&1/2 Leakage Weir	SMC, SMC/RCK, RIP	4800						K		K																					
Shoofly Piping & Splashgate Structure (Adit 8/Shoofly Diversion)	SMC, SMC/RCK, RIP	4800						K		K																					
Diversion Shaft, Bulkhead and Drain Valve at Adit 8	SMC, SMC/RCK, RIP	4800						K		K																					
Balsam Creek Diversion Piping (Adit 3)	SMC, UCHP	4800				K																									
Ely Creek Diversion Piping (Adit 6)	SMC, SMC/RCK	5000						K		K				K													K				
Rock Trap/Surge Chamber (9' Gate House) on the railroad grade	SMC, SMC/RCK, RIP	4700					K		K																						
42" Valve House and valves below railroad grade	SMC, SMC/RCK, RIP	4700-4800					K		K																						
Drain Piping & Valves (10" & 24") from Surge Chamber, below railroad grade	SMC/RCK, SMC, RIP	4700					K		K																						
Vent Stacks below railroad grade	SMC, SMC/RCK, RIP	4700					K		K																						
Penstocks	SMC, SMC/RCK, RIP, DPCW, WAT, DEV, SMC, UCHP	3000-4700					K		K																						
Huntington-Pitman-Shaver																															
Inlet Structure & Gate 1A and 1B at Dam 2 (10' Gate House)	WAT, JPWF, OGRD, DEV	6900				K	K	K	K	K				K								K (N)								
Weather Stations																															
Big Creek No. 1	SMC, WAT, DEV, SMC/RCK	4800				K	K		K																						
Huntington Lake	WAT, JPWF, DEV, JPWF/RCK, UCHP	7100				K	K		K													K (N)								
Buildings/Camps																															
Big Creek PH No.1 Facilities	SMC, SMC/RCK, DEV, WAT	4800				K	K		K																						
Storage Yards																															
Big Creek PH No. 1	SMC, DEV, WAT, SMC/RCK	4800				K	K		K																						
Utilities																															
Water Supply/Treatment																															
Big Creek PH No. 1	SMC, SMC/RCK, WAT, DEV	4800																				K									
Domestic Water Diversions																															
Scot Lake	SMC, SMC/RCK, WAT	5400				K																									K
Sewage Treatment																															
Big Creek PH No. 1 Community	SMC, SMC/RCK, WAT, DEV	4800				K	K		K													K									
Fuel- Gasoline & Diesel																															
Big Creek PH No. 1	SMC, SMC/RCK, WAT, DEV	4800				K																K									

Appendix C. Known Occurrences of Special-Status Species by Project Facility, Recreation Facility, Road, Trail (continued).

			FEDERALLY LISTED OR CANDIDATE SPECIES								FOREST SERVICE SENSITIVE AND SNF MANAGEMENT INDICATOR SPECIES																			
FACILITIES	**HABITAT[4]**	**APPROX. ELEV. (ft.)**	**Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)***	**Mountain yellow-legged frog *(Rana muscosa)***	**Yosemite toad *(Bufo canorus)***	**Bald eagle *(Haliaeetus leucocephalus)***	**American peregrine falcon *(Falco peregrinus anatum)***	**Pacific fisher *(Martes pennanti pacifica)***	**American peregrine falcon *(Falco peregrinus anatum)***	**Pacific fisher *(Martes pennanti pacifica)***	**Great gray owl *(Strix nebulosa)***	**Willow flycatcher *(Empidonax traillii brewsteri)***	**California wolverine *(Gulo gulo luteus)***	**Sierra Nevada red fox *(Vulpes vulpes necator)***	**Mono Hot Springs evening primrose *(Camissonia sierrae ssp. alticola)***	**Flaming trumpet *(Collomia rawsoniana)***	**Subalpine fireweed *(Epilobium howellii)***	**Short-leaved hulsea *(Hulsea brevifolia)***	**Yosemite lewisia *(Lewisia disepala)***	**Foothill yellow-legged frog *(Rana boylii)***	**Western Pond Turtle *(Actinemys marmorata)***	**Osprey *(Pandion haliaetus)***	**Northern goshawk *(Accipiter gentilis)***	**Northern goshawk PAC**	**California spotted owl *(Strix occidentalis occidentalis)***	**California spotted owl PAC**	**Western red bat *(Lasiurus borealis)***	**Townsend's western big-eared bat *(Corynorhinus townsendii)***	**Pallid bat *(Antrozous pallidus)***	**American (=pine) marten *(Martes americana)***
Propane																														
Big Creek PH No. 1 Automotive Shop	SMC, SMC/RCK, WAT, DEV	1800				K																K								
Project Power Lines Less Than 33KV																														
Musick 7KV	SMC, DPCW, UCHP, SMC/RCK, DEV	3000-4700					K		K																					
Reservoirs, Forebays, and Diversion Pools																														
Large Reservoir																														
Huntington Lake	WAT, JPWF, DEV, RUD, RIP, OGRD, JPWF/RCK, MDW, UCHP	7000		K	K	K (N)	K	K	K	K	K		K	K			K					K (N)	K	K			K			K
Moderate Forebays or Diversion Pools																														
Dam 4 Forebay	SMC, SMC/RCK, DEV, WAT	4800				K	K		K																					
Bypass Stream Reaches (Small Tributaries)																														
Ely Creek, Diversion to Big Creek[1, 2]	WAT	3500-5000						K		K				K													K			
Bypass Stream Reaches (Moderate Tributaries)																														
Big Creek, Huntington Lake to Dam 4[1, 2]	WAT, RIP	4800-6900				K	K	K	K	K													K (N)				K			
Big Creek, Dam 4 to Dam 5[1, 2]	WAT, RIP	3000-4800				K	K		K																		K			
Flow Augmented Streams																														
Rancheria Creek below Portal Powerhouse[1, 2]	WAT, RIP	6900-7000		K	K	K																K								
Helicopter Landing Sites																														
Hodges (Big Creek Heliport)		5000				K	K		K																					
Project Roads																														
8S05, Canyon Road (from Huntington Lake Road to PH No. 2 and 8S05E)	SMC, UCHP, SMC/RCK, BOW, WAT, DEV, DPCW, DPCW/RCK, OW, RIP	2000-4800				K	K	K	K	K													K			K				
8S05C Powerhouse No.2 access road from Canyon Road	DEV, WAT, DPCW, SMC	3000-3200																												
8S082A access to Hydro offices at Big Creek		4500-5000																												
8S082C access to Hydro offices at Big Creek[3]		4500-5000				K	K		K																					
8S082D access to Hydro offices at Big Creek[3]		4500-5000				K	K		K																					
8S082X access to Hydro offices at Big Creek[3]	SMC, OW, OW/RCK, WAT, DEV, SMC/RCK, UCHP	4900-5000				K	K		K																					
8S13 from the gate to 8S05, the Canyon Road	SMC, DPCW, RIP, UCHP	3800-4200					K		K																					
8S66 from gate to west end of Dam 2	WAT, JPWF, UCHP, RIP, MDW, OGRD	7000				K																								
8S66, from west end of Dam 2 to 8S66A	JPWF, WAT, UCHP, OGRD, JPWF/RCK	7000				K	K		K					K									K (N)							
8S66B, from Dam 2 to end	WAT, JPWF, RUD, DEV, RIP	7000				K																								
8S66BA Short road between 8S66B and 8S66BC[3]		7000																					K							
8S66BC East end of Dam 1 to Dam 1 drainage gates[3]	WAT, JPWF, RUD, DEV, RIP	7000				K								K									K							
8S66X Road over Dam 2	WAT, JPWF, OGRD, UCHP, JPWF/RCK, RIP, JPWF/RCK, MDW, DEV	6800-7000				K																								
8S82AA Access road to Warehouse[3]		4500-5000				K	K		K																					
8S82BA Upper access road to Wastewater treatment plant from 8S82B[3]		4500-5000				K	K		K																					
8S82BB Lower access road to Wastewater treatment plant from 8S82B[3]		4500-5000				K	K		K																					
8S82BC Access road to Fish Farm upper gate[3]		4500-5000				K	K		K																					

Appendix C. Known Occurrences of Special-Status Species by Project Facility, Recreation Facility, Road, Trail (continued).

FACILITIES	HABITAT[4]	APPROX. ELEV. (ft.)	FEDERALLY LISTED OR CANDIDATE SPECIES								FOREST SERVICE SENSITIVE AND SNF MANAGEMENT INDICATOR SPECIES																					
			Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	Mountain yellow-legged frog (*Rana muscosa*)	Yosemite toad (*Bufo canorus*)	Bald eagle (*Haliaeetus leucocephalus*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	Great gray owl (*Strix nebulosa*)	Willow flycatcher (*Empidonax traillii brewsteri*)	California wolverine (*Gulo gulo luteus*)	Sierra Nevada red fox (*Vulpes vulpes necator*)	Mono Hot Springs evening primrose (*Camissonia sierrae ssp. alticola*)	Flaming trumpet (*Collomia rawsoniana*)	Subalpine fireweed (*Epilobium howellii*)	Short-leaved hulsea (*Hulsea brevifolia*)	Yosemite lewisia (*Lewisia disepala*)	Foothill yellow-legged frog (*Rana boylii*)	Western Pond Turtle (*Actinemys marmorata*)	Osprey (*Pandion haliaetus*)	Northern goshawk (*Accipiter gentilis*)	Northern goshawk PAC	California spotted owl (*Strix occidentalis occidentalis*)	California spotted owl PAC	Western red bat (*Lasiurus borealis*)	Townsend's western big-eared bat (*Corynorhinus townsendii*)	Pallid bat (*Antrozous pallidus*)	American (=pine) marten (*Martes americana*)
8S82E Upper access road to SCE company housing[3]		5000				K	K		K																					
8S82EA Lower access road to SCE company housing[3]		5000				K	K		K																					
8S82F Access road to Domestic water treatment plant from FRE 2710[3]		5000				K	K		K																					
8S82J Upper access road to Powerhouse No. 1 from FRE 2710[3]		4500-5000				K	K		K																					
Old housing road 3 adjacent to PH No. 2 from 8S05E	SMC, DPCW, WAT, DEV	3200-3300																												
Trail Name/Description																														
Trail to Scott Lake Domestic Diversion		5000-5500																												
Big Creek Nos. 2A, 8 and Eastwood																														
Dams and Diversions																														
Large Dams																														
Florence Lake	DEV, LDG, WAT, JPF, JPF/RCK, OGRD	7350				K									K															
Shaver Lake	MDW, WAT, SMC, SMC/RCK, RUD	5400				K						K										K								
Moderate Diversion Dams																														
Bear Creek Diversion	WAT, JPF, JPWF, JPF/RCK, RIP	7400										K			K															
Mono Creek Diversion	JPF, RIP, MDW, WAT	7400																				K								
Hooper Creek	JPF, JPF/RCK	7500													K															
Pitman Creek	SMC, SMC/RCK, RUD	7100																												
Balsam	SMC, OGRD, RUD, MDW, UCHP	6800																				K								
Small Diversions																														
Tombstone Creek	LDG, JPF/RCK	7800																												
North Slide Creek	JPF, JPF/RCK, RIP	7600				K									K															
South Slide Creek	JPF, JPF/RCK, RIP	7600				K									K															
Chinquapin Creek	JPWF, JPF, JPWF/RCK	7600																												
Camp 62 Creek	OGRD, RIP, JPWF, JPF, JPWF/RCK	7400																												K
Power Generation																														
Big Creek PH No. 2A	DEV, DPCW, SMC, WAT	3100																												
Big Creek PH No. 8	DPCW, WAT	2600																											K	
Eastwood Power Station	SMC, UCHP	5600				K																K								
Gaging Stations																														
Streams																														
Bear Creek below Diversion Dam	WAT, RIP, JPF, JPF/RCK, JPWF	7400										K			K															
Bear Creek Conduit at Diversion Dam	WAT, RIP, JPF, JPF/RCK, JPWF	7400										K			K															
Bear Creek upstream of Diversion Dam (with cable crossing)	JPF/RCK, JPF, JPWF, RIP, WAT	7400													K															
Big Creek below Dam 5 (with cable crossing)	WAT, DPCW, SMC, RUD	2600																												
Camp 62 Creek below Diversion Dam	JPWF, JPWF/RCK, OGRD, RIP, JPF	7400																												K
Chinquapin Creek below Diversion Dam	JPWF, JPWF/RCK, JPF, RIP	7300																												
Hooper Creek below Diversion Dam	JPF, JPF/RCK	7600													K															
Huntington-Shaver Conduit gate 2 release	MDW, WAT, SMC, DEV, RUD, OGRD, UCHP	6700												K																
Middle Fork Balsam Creek below Balsam Meadows Forebay	WAT, DEV, RUD, OGRD, MDW, SMC, UCHP	6700																				K								
Mono Creek below Diversion Dam	JPF, WAT, MDW, RIP	7400																				K								
Mono Creek Conduit at Diversion Dam	JPF, WAT, MDW, RIP	7400																				K								
Mono-Bear Conduit (flow meter near Camp 62)	JPF, OGRD, JPWF, RIP, JPF/RCK	7000																												K
North Fork Stevenson Creek at Perimeter Rd.	SMC, RIP, WAT, SMC/RCK, RUD, UCHP	5700																												

Appendix C. Known Occurrences of Special-Status Species by Project Facility, Recreation Facility, Road, Trail (continued).

FACILITIES	HABITAT[4]	APPROX. ELEV. (ft.)	FEDERALLY LISTED OR CANDIDATE SPECIES								FOREST SERVICE SENSITIVE AND SNF MANAGEMENT INDICATOR SPECIES																				
			Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	Mountain yellow-legged frog (*Rana muscosa*)	Yosemite toad (*Bufo canorus*)	Bald eagle (*Haliaeetus leucocephalus*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	Great gray owl (*Strix nebulosa*)	Willow flycatcher (*Empidonax traillii brewsteri*)	California wolverine (*Gulo gulo luteus*)	Sierra Nevada red fox (*Vulpes vulpes necator*)	Mono Hot Springs evening primrose (*Camissonia sierrae ssp. alticola*)	Flaming trumpet (*Collomia rawsoniana*)	Subalpine fireweed (*Epilobium howellii*)	Short-leaved hulsea (*Hulsea brevifolia*)	Yosemite lewisia (*Lewisia disepala*)	Foothill yellow-legged frog (*Rana boylii*)	Western Pond Turtle (*Actinemys marmorata*)	Osprey (*Pandion haliaetus*)	Northern goshawk (*Accipiter gentilis*)	Northern goshawk PAC	California spotted owl (*Strix occidentalis occidentalis*)	California spotted owl PAC	Western red bat (*Lasiurus borealis*)	Townsend's western big-eared bat (*Corynorhinus townsendii*)	Pallid bat (*Antrozous pallidus*)	American (=pine) marten (*Martes americana*)
South Fork San Joaquin River below Hooper Creek	JPF, JPF/RCK, WAT	7000										K																		
Stevenson Creek below Shaver Lake	SMC, SMC/RCK, RUD, MDW	5200				K						K										K (N)								
Ward Tunnel at Intake	OGRD, WAT, JPF, JPF/RCK, UCHP, DEV	7400				K									K															
Camp 62 Creek at Diversion Dam	JPWF, JPWF/RCK, OGRD, RIP, JPF	7400																												K
Chinquapin Creek at Diversion Dam	JPWF, JPWF/RCK, JPF, RIP	7600																												K
Crater Creek Diversion Ditch near Florence Lake	JPF, JPF/RCK, OGRD, LDG, DEV	7400													K															
Reservoir																														
Florence Dam	OGRD, LDG, DEV, JPF, JPF/RCK, WAT	7350				K									K															
Mono Dam	JPF, WAT, MDW, RIP	7400																				K								
Shaver Dam	WAT, SMC, SMC/RCK, DEV, RUD, MDW	5400				K						K										K (N)								
Powerhouse																														
Big Creek PH No. 2A	DPCW, DEV, SMC, WAT	3100																												
Big Creek PH No. 8	WAT, DPCW, DPCW/RCK	2200																												
Eastwood Power Station	SMC, UCHP	6300				K																K								
Water Conveyance																														
Powerhouse No. 2A																														
Intake Gate House at Shaver Lake	SMC, WAT, DEV, RUD	5400				K																K (N)								
Tunnel No. 5	SMC, WAT, DEV, RUD, UCHP, SMC/RCK, RIP	5200-6200				K		K		K				K								K (N)								
Adit 1, Tunnel 5	SMC, RIP, RUD	5600												K																
Adit 2, "Shoo fly", Tunnel 5	SMC, SMC/RCK	5000						K		K																				
Surge Chamber, Rock Trap	SMC, SMC/RCK	5400					K	K	K	K																				
102" Valve House	SMC, SMC/RCK	5200						K		K																		K (R)		
Penstocks	SMC, WAT, DEV, DPCW, UCHP, SMC/RCK	3100-5200					K	K	K	K																				
Powerhouse No. 8																														
Intake structure at Dam 5	SMC, DPCW, WAT, DEV	3000																												
Tunnel No.8[1]	Not applicable	2900-3200																												
Adit 1, Tunnel 8	DPCW, SMC	3000																												
Surge Chamber - includes trash drain and penstocks valves	DPCW, WAT, DEV	2900																												
Penstocks	DPCW, WAT, DEV, DPCW/RCK	2200-2900																												
Eastwood Power Station																														
Inlet Structure (Gate 4)	MDW, WAT, SMC, OGRD, RUD, DEV	6700																				K								
Power Tunnel[1]	Not applicable	6300-6800																				K			K					
Surge Chamber	SMC, UCHP	6300																							K					
Tailrace Tunnel	DEV, WAT, SMC, MDW, UCHP	5400-6300				K																K (N)			K					
Ward Tunnel																														
Inlet Structure at Florence Lake	DEV, WAT, JPF, JPF/RCK, UCHP, OGRD	7400				K									K															
Gate House at Florence Lake	DEV, WAT, JPF, JPF/RCK, UCHP, OGRD	7400				K									K															
Ward Tunnel	WAT, DEV, JPF, JPF/RCK, UCHP, JPWF, JPWF/RCK, RIP, OGRD, MDW, UCHP/RCK, RUD	7000-7400				K							K	K	K															
Minimum Pool Weir	DEV, WAT, JPF, JPF/RCK, UCHP, OGRD	7400				K									K															
Chinquapin Creek Borehole	JPWF, JPWF/RCK, JPF, RIP	7600																												
Camp 62 Adit	JPWF, JPWF/RCK, JPF, OGRD, RIP	7300																												K
Camp 62 Creek Borehole	JPWF, JPWF/RCK, JPF, OGRD, RIP	7400																												K
Mono-Bear Siphon																														
Bear Inlet Structure at Bear Forebay	WAT, JPF, RIP, JPF/RCK, JPWF	7700										K			K															

Appendix C. Known Occurrences of Special-Status Species by Project Facility, Recreation Facility, Road, Trail (continued).

			FEDERALLY LISTED OR CANDIDATE SPECIES								FOREST SERVICE SENSITIVE AND SNF MANAGEMENT INDICATOR SPECIES																					
FACILITIES	**HABITAT[4]**	**APPROX. ELEV. (ft.)**	**Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)***	**Mountain yellow-legged frog *(Rana muscosa)***	**Yosemite toad *(Bufo canorus)***	**Bald eagle *(Haliaeetus leucocephalus)***	**American peregrine falcon *(Falco peregrinus anatum)***	**Pacific fisher *(Martes pennanti pacifica)***	**American peregrine falcon *(Falco peregrinus anatum)***	**Pacific fisher *(Martes pennanti pacifica)***	**Great gray owl *(Strix nebulosa)***	**Willow flycatcher *(Empidonax traillii brewsteri)***	**California wolverine *(Gulo gulo luteus)***	**Sierra Nevada red fox *(Vulpes vulpes necator)***	**Mono Hot Springs evening primrose *(Camissonia sierrae ssp. alticola)***	**Flaming trumpet *(Collomia rawsoniana)***	**Subalpine fireweed *(Epilobium howellii)***	**Short-leaved hulsea *(Hulsea brevifolia)***	**Yosemite lewisia *(Lewisia disepala)***	**Foothill yellow-legged frog *(Rana boylii)***	**Western Pond Turtle *(Actinemys marmorata)***	**Osprey *(Pandion haliaetus)***	**Northern goshawk *(Accipiter gentilis)***	**Northern goshawk PAC**	**California spotted owl *(Strix occidentalis occidentalis)***	**California spotted owl PAC**	**Western red bat *(Lasiurus borealis)***	**Townsend's western big-eared bat *(Corynorhinus townsendii)***	**Pallid bat *(Antrozous pallidus)***	**American (=pine) marten *(Martes americana)***
Bear Tunnel	WAT, JPF, JPF/RCK, JPWF, JPWF/RCK, UCHP, UCHP/RCK, RIP	7400-7700										K			K															
Bear Adit	JPF, JPF/RCK, JPWF, JPWF/RCK, WAT	7200													K															
Bear Flowline	WAT, JPF, JPF/RCK, JPWF, JPWF/RCK, UCHP, UCHP/RCK, RIP	7400-7700										K			K															
Mono Inlet Structure at Mono Forebay	JPF, RIP, MDW	7400																				K								
Mono Tunnel	JPF, JPF/RCK, JPWF, JPWF/RCK, UCHP, UCHP/RCK, RIP, MDW	7200-7500													K							K								
Mono Flow Line	JPF, JPF/RCK, JPWF, JPWF/RCK, UCHP, UCHP/RCK, RIP, MDW	7200-7500													K															
Combined Flow Line (siphon)	JPWF/RCK, JPF/RCK, UCHP, UCHP/RCK, JPF, MDW, RIP, OGRD, JPWF	6600-7400													K							K								
Camp 62 Adit Valving	JPF, JPWF, OGRD, RIP, JPWF/RCK	7400																												K
Huntington-Pitman-Shaver																														
Steel Conduit with Air Vents	SMC, RIP, MDW, WAT, JPWF, JPWF/RCK, UCHP	6900				K	K	K	K	K				K								K (N)								
Siphon w 4" and 10" Drain Valves	SMC, RIP, MDW, WAT, JPWF, JPWF/RCK, UCHP	6300-6600				K	K	K	K	K				K								K (N)								
Vent Valve House	SMC, JPWF, OW, OW/RCK, MDW, RIP	6800				K	K	K	K	K				K								K (N)	K							
Tunnel No. 7	WAT, JPWF, UCHP, DEV, SMC, OW, OW/RCK, SMC/RCK, RIP, JPWF/RCK, MDW, RUD	6700-7800				K	K		K					K								K (N)							K	
Tunnel No. 7 Vent	SMC, UCHP, MDW, WAT, OGRD	6800												K																
Camp 72 Adit	SMC, RUD, OGRD	7100																K												
Diversion Tunnel from Tunnel 7 to Gate 3 at Balsam Meadow Forebay[1]	Not applicable	6800-7000																				K								
Gate 3 Outlet to Balsam Forebay	WAT, MDW, SMC, UCHP, DEV, RUD, OGRD	6700																				K								
Tombstone																														
Tombstone Creek Diversion Piping	JPF/RCK, LDG, OGRD, WAT	7300-7800				K																						K		
Hooper																														
Hooper Diversion Piping to Florence Lake	JPF, JPF/RCK, LDG, WAT, RIP, OGRD, MDW, UCHP, DEV	7100-7500				K									K															
North Slide Creek Diversion Piping	RIP, JPF, JPF/RCK, LDG, WAT	7100-7600				K									K															
South Slide Creek Diversion Piping	RIP, JPF, JPF/RCK, LDG, WAT	7100-7600				K									K															
Diversion Channels																														
Crater Creek	JPF, JPF/RCK, RIP, WAT, OGRD, LDG, DEV	7400-8600													K															
Bypass Stream Reaches																														
Crater Creek, Diversion to SF San Joaquin River					K																									
Stevenson Creek, Shaver Lake Dam to San Joaquin River																														
HB Valves																														
Shaver Lake	WAT, SMC, DEV, RUD, MDW	5400				K						K										K (N)								
Weather Stations																														
Florence Lake	JPF, JPF/RCK, WAT, OGRD, UCHP, DEV, LDG	7400				K									K															
Kaiser Ridge/Mt Givens	JPWF, JPWF/RCK	8500																												
Shaver Lake	WAT, SMC, DEV, RUD	5400				K																K (N)								
Cabins																														
Camp 62	JPWF, JPWF/RCK, JPF, OGRD, RIP	7200																												K
Florence Lake Relief	JPF, JPF/RCK, WAT, OGRD, UCHP, DEV	7400				K									K															
Buildings/Camps																														
Florence Work Camp	JPF, JPF/RCK, WAT, OGRD, UCHP, DEV	7400				K									K															
Big Creek 8 Facilities	DPCW, WAT	2600																												

Appendix C. Known Occurrences of Special-Status Species by Project Facility, Recreation Facility, Road, Trail (continued).

			FEDERALLY LISTED OR CANDIDATE SPECIES								FOREST SERVICE SENSITIVE AND SNF MANAGEMENT INDICATOR SPECIES																			
FACILITIES	**HABITAT[4]**	**APPROX. ELEV. (ft.)**	**Valley elderberry longhorn beetle (*Desmoceurs californicus dimorphus*)**	**Mountain yellow-legged frog (*Rana muscosa*)**	**Yosemite toad (*Bufo canorus*)**	**Bald eagle (*Haliaeetus leucocephalus*)**	**American peregrine falcon (*Falco peregrinus anatum*)**	**Pacific fisher (*Martes pennanti pacifica*)**	**American peregrine falcon (*Falco peregrinus anatum*)**	**Pacific fisher (*Martes pennanti pacifica*)**	**Great gray owl (*Strix nebulosa*)**	**Willow flycatcher (*Empidonax traillii brewsteri*)**	**California wolverine (*Gulo gulo luteus*)**	**Sierra Nevada red fox (*Vulpes vulpes necator*)**	**Mono Hot Springs evening primrose (*Camissonia sierrae ssp. alticola*)**	**Flaming trumpet (*Collomia rawsoniana*)**	**Subalpine fireweed (*Epilobium howellii*)**	**Short-leaved hulsea (*Hulsea brevifolia*)**	**Yosemite lewisia (*Lewisia disepala*)**	**Foothill yellow-legged frog (*Rana boylii*)**	**Western Pond Turtle (*Actinemys marmorata*)**	**Osprey (*Pandion haliaetus*)**	**Northern goshawk (*Accipiter gentilis*)**	**Northern goshawk PAC**	**California spotted owl (*Strix occidentalis occidentalis*)**	**California spotted owl PAC**	**Western red bat (*Lasiurus borealis*)**	**Townsend's western big-eared bat (*Corynorhinus townsendii*)**	**Pallid bat (*Antrozous pallidus*)**	**American (=pine) marten (*Martes americana*)**
Storage Yards																														
Florence Lake Work Camp	JPF, JPF/RCK, WAT, OGRD, UCHP, DEV	7400				K									K														
Camp 62	JPWF, JPWF/RCK, RIP, OGRD, JPF	7400																												K
Big Creek PH No.2 & PH No.2A	DEV, WAT, DPCW,SMC	3000																												
Eastwood School Site	DPCW, WAT, SMC	3000																										K (R)		
Utilities																														
Water Supply/Treatment																														
Camp Edison	SMC, WAT, UCHP, SMC/RCK, MDW, RUD, OGRD	5400				K																								
Florence Work Camp	JPF, JPF/RCK, WAT, OGRD, UCHP, DEV	7400				K									K															
Fuel- Gasoline & Diesel																														
Big Creek PH No. 8	WAT, DPCW	2600																												
Camp 62	JPWF, JPWF/RCK, RIP, JPF, OGRD	7400																												K
Florence Work Camp	JPF, JPF/RCK, WAT, OGRD, UCHP, DEV	7400				K									K															
Propane																														
Big Creek PH No. 8	WAT, DPCW	2600																												
Camp 62 - Emergency Cabin Heating	JPWF, JPWF/RCK, JPF, OGRD, RIP	7400																												K
Florence Work Camp - Generator, Heating	JPF, JPF/RCK, WAT, UCHP, OGRD, DEV	7400				K									K															
Project Power Lines Less Than 33KV																														
Jumbo 12KV	DPCW, WAT, SMC	2200-3000																												
Pitman 33kV (to diversion)																														
Power Transmission Lines																														
EPS - BC1 220KV	SMC, UCHP, SMC/RCK, WAT, DEV, OGRD, RUD	4800-6700				K	K		K				K	K				K								K				K
Switchyards																														
Eastwood Switchyard	SMC, UCHP	6100																								K				
Reservoirs, Forebays, and Diversion Pools																														
Large Reservoir																														
Florence Lake	JPF, JPF/RCK, OGRD, WAT, DEV, UCHP, LDG, RIP	7400				K							K	K								K						K	
Shaver Lake	WAT, SMC, RIP, RUD, SMC/RCK, UCHP, MDW, DEV, OGRD	5400				K		K		K	K	K		K							K	K (N)						K	K
Moderate Forebays or Diversion Pools																														
Bear Diversion Pool	JPWF, JPF, JPF/RCK, WAT, RIP	7400													K														K	
Mono Diversion Pool	JPF, RIP, MDW	7400																				K								
Hooper Diversion Pool	JPF, JPF/RCK	7600													K															
Balsam Forebay	MDW, DEV, RUD, OGRD, SMC, UCHP	6700																				K								
Dam 5 Forebay	DPCW, WAT, DEV	4000																											K	
Bypass Stream Reaches (Small Tributaries)																														
Tombstone Creek, Diversion to SF San Joaquin River[1, 2]	WAT, RIP	7100-7800																												
North Slide Creek, Diversion to SF San Joaquin River[1, 2]	WAT, RIP	7100-7600				K																								
South Slide Creek, Diversion to Confluence with North Slide Creek[1, 2]	WAT, RIP	7100-7600				K																								
Crater Creek, Diversion to SF San Joaquin River[1, 2]	WAT, RIP	6800-8600			K										K															
Camp 62 Creek, Diversion to SF San Joaquin River[1, 2]	WAT, RIP	6500-7400																			K									K
Balsam Creek, Diversion to Big Creek[1, 2]	WAT, RIP	4200-6700				K																								K

Appendix C. Known Occurrences of Special-Status Species by Project Facility, Recreation Facility, Road, Trail (continued).

FACILITIES	HABITAT[4]	APPROX. ELEV. (ft.)	FEDERALLY LISTED OR CANDIDATE SPECIES								FOREST SERVICE SENSITIVE AND SNF MANAGEMENT INDICATOR SPECIES																				
			Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	Mountain yellow-legged frog (*Rana muscosa*)	Yosemite toad (*Bufo canorus*)	Bald eagle (*Haliaeetus leucocephalus*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	Great gray owl (*Strix nebulosa*)	Willow flycatcher (*Empidonax traillii brewsteri*)	California wolverine (*Gulo gulo luteus*)	Sierra Nevada red fox (*Vulpes vulpes necator*)	Mono Hot Springs evening primrose (*Camissonia sierrae ssp. alticola*)	Flaming trumpet (*Collomia rawsoniana*)	Subalpine fireweed (*Epilobium howellii*)	Short-leaved hulsea (*Hulsea brevifolia*)	Yosemite lewisia (*Lewisia disepala*)	Foothill yellow-legged frog (*Rana boylii*)	Western Pond Turtle (*Actinemys marmorata*)	Osprey (*Pandion haliaetus*)	Northern goshawk (*Accipiter gentilis*)	Northern goshawk PAC	California spotted owl (*Strix occidentalis occidentalis*)	California spotted owl PAC	Western red bat (*Lasiurus borealis*)	Townsend's western big-eared bat (*Corynorhinus townsendii*)	Pallid bat (*Antrozous pallidus*)	American (=pine) marten (*Martes americana*)
Bypass Stream Reaches (Moderate Tributaries)																														
Bear Creek, Diversion to SF San Joaquin River[1, 2]	WAT, RIP	6700-7400										K			K															
Mono Creek, Diversion to SF San Joaquin River[1, 2]	WAT, RIP	6300-7400																			K									
Hooper Creek, Diversion to SF San Joaquin River[1, 2]	WAT, RIP	7000-7500										K			K															
Pitman Creek, Diversion to Big Creek[1, 2]	WAT, RIP	5000-7000				K	K		K																					
Big Creek, Dam 5 to San Joaquin River[1, 2]	WAT, RIP	2200-3000																												
Stevenson Creek, Shaver Lake Dam to San Joaquin River[1, 2]	WAT, RIP	1600-5400				K						K									k	K (N)	K			K				
Bypass Stream Reaches (San Joaquin River)																														
SF San Joaquin River, Florence to Mammoth Pool[1, 2]	WAT, RIP	3400-7350				K						K			K											K				
Flow Augmented Streams																														
Balsam Creek, Forebay to Balsam Creek Diversion[1, 2]	WAT, RIP	4800-6700				K																K				K				K
NF Stevenson Creek, tunnel outlet to Shaver Lake[1, 2]	WAT, RIP	5400-6700				K																K				K				
Recreation Features																														
Shaver Lake																														
Camp Edison Campground	WAT, SMC, UCHP, MDW, OGRD, RUD, SMC/RCK	5500				K																								K
Camp Edison Boat Ramp/Launch	WAT, SMC, OGRD	5400				K																								K
Day Use Areas on North Shore Roads 1 & 2	WAT, SMC, SMC/RCK, UCHP, OGRD	5400				K																K								
Day Use Area off Hwy 168 (The Point)	SMC, WAT, MDW, UCHP, OGRD	5400				K																K (N)								
Eagle Point Boat Only Day Use Area	SMC, WAT, UCHP	5400																												
Balsam Meadow Forebay																														
Balsam Meadow Forebay Day Use Picnic Area	SMC, MDW, WAT, DEV, OGRD, RUD, UCHP	6700																				K								
Balsam MeadowTrailhead and Parking	SMC, UCHP, MDW, WAT, OGRD	6800																				K								
Helicopter Landing Sites																														
Bear		7400													K											K				
Florence Camp		7500				K																K								
Florence Gaging Station		7500				K																K								
Tiffany (Camp Edison)		5500				K					K			K								K								K
Summit (Shaver Hill)		5000																							K					
Florence Dam		7500				K																K								
S.F. San Joaquin River at Florence Lake (Spill)		7500				K	K		K																					
Mono Creek below Lake T.A. Edison		7400																							K					
Roads Within Project Boundaries: SCE controlled																														
7S01BA Florence Work Camp road from 7S01B		7500				K									K															
7S370F Access road to Florence Dam from FS370[3]		7500													K															
8S02 from Hwy 168 to 8S02B	SMC, RUD, UCHP, SMC/RCK	6600-6800																K												

Appendix C. Known Occurrences of Special-Status Species by Project Facility, Recreation Facility, Road, Trail (continued).

FACILITIES	HABITAT[4]	APPROX. ELEV. (ft.)	FEDERALLY LISTED OR CANDIDATE SPECIES								FOREST SERVICE SENSITIVE AND SNF MANAGEMENT INDICATOR SPECIES																			
			Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	Mountain yellow-legged frog (*Rana muscosa*)	Yosemite toad (*Bufo canorus*)	Bald eagle (*Haliaeetus leucocephalus*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	Great gray owl (*Strix nebulosa*)	Willow flycatcher (*Empidonax traillii brewsteri*)	California wolverine (*Gulo gulo luteus*)	Sierra Nevada red fox (*Vulpes vulpes necator*)	Mono Hot Springs evening primrose (*Camissonia sierrae ssp. alticola*)	Flaming trumpet (*Collomia rawsoniana*)	Subalpine fireweed (*Epilobium howellii*)	Short-leaved hulsea (*Hulsea brevifolia*)	Yosemite lewisia (*Lewisia disepala*)	Foothill yellow-legged frog (*Rana boylii*)	Western Pond Turtle (*Actinemys marmorata*)	Osprey (*Pandion haliaetus*)	Northern goshawk (*Accipiter gentilis*)	Northern goshawk PAC	California spotted owl (*Strix occidentalis occidentalis*)	California spotted owl PAC	Western red bat (*Lasiurus borealis*)	Townsend's western big-eared bat (*Corynorhinus townsendii*)	Pallid bat (*Antrozous pallidus*)	American (=pine) marten (*Martes americana*)
8S03 (from 8S05, Canyon Road to 8S03A, Powerhouse No. 8 access road	DPCW, WAT	2300-2400																												
8S05, Canyon Road (from Powerhouse No. 2 and 8S05E to Powerhouse No. 8)	SMC, UCHP, SMC/RCK, BOW, WAT, DEV, DPCW, DPCW/RCK, OW, RIP	2000-4800				K	K	K	K	K													K			K				
8S05F Access Road to PH No. 8 penstock from 8S05	DPCW, SMC	2800-3000				K																								
8S05FB Access Road to PH No. 8 penstock from 8S05	DPCW, SMC	2800-3000				K																								
8S13 from the gate to 8S05, the Canyon Road	SMC, DPCW, RIP, UCHP	3800-4200					K		K																					
8S303 Access road to Eastwood Overflow Campground[3]		7000				K		K		K													K							K
8S47 Access road to Eastwood Powerstation Transmission Line tower- from gate to end[3]		5000-5500																												K
8S83 from 8S66 to Huntington Shaver Siphon	JPWF, WAT, OGRD, UCHP, JPWF/RCK, UCHP, RIP, MDW, DEV	6800-7000				K	K	K	K	K				K								K (N)								
8S83A, connector road between 8S66T and 8S83	WAT, DEV, JPWF, OGRD, UCHP	7000				K	K	K	K	K				K								K (N)								
8S94 Pitman Creek Diversion Access Road	SMC, SMC/RCK, RUD	7000																K												
9S312, access to Eastwood Substation from Highway 168	SMC, UCHP	6400-6600																							K(N)	K				
9S32 from gate near Hwy 168 to EPH Transmission Line		6500						K		K												K								
9S32A, spur from 9S32 to east side of Balsam Forebay	SMC, OGRD, MDW, WAT, DEV, RUD, UCHP	6700																				K								
9S32AB spur from 9S32A to Balsam Forebay[3]		6500																				K								
9S32CA Access road to Eastwood Powerstation Transmission Line tower[3]		6500																												K
9S58, from Shaver Marina to North Fork Stevenson Gage	SMC, SMC/RCK, MDW, MARSH, RIP, RUD, UCHP, DEV	5300-5800				K		K		K	K											K (N)								
9S58K Access Road to Eastwood Power Tunnel Entrance	SMC, WAT, RUD, MAR, MDW, RIP, SMC/RCK, UCHP	5600				K																								
Access road to Eagle Point Boat Only Day Use Area from 9S58	SMC, WAT, UCHP, SMC/RCK, MDW	5400-5600																				K (N)								
Access road to Eastwood Tailrace (off of 9S58)	MDW, SMC, WAT, UCHP, DEV	5400				K																K (N)								
Access road to Shaver Dam north	SMC, WAT, DEV, RUD, MDW, SMC/RCK	5300				K						K										K (N)								
Access road to Shaver Dam south	SMC, WAT, DEV, RUD, MDW, SMC/RCK	5300				K						K										K (N)								
Access Tunnel to Eastwood Power Station	SMC, WAT, RUD, MAR, MDW, RIP, SMC/RCK, UCHP	5600																							K(N)					
Camp Edison Roads	SMC, WAT, UCHP, OGRD, SMC/RCK, RUD, MDW	5400				K								K																K
Florence Work Camp access road from gate on 7S01 near picnic area	JPF, JPF/RCK, OGRD, WAT, UCHP, LDG, DEV	7400				K									K															
Trail Name/Description																														
Trail to Big Creek Gage below Dam 5	SMC, SMC/RCK, WAT, DEV	5000-5400				K	K		K													K								
Trail to Camp 62 Creek Gage and Diversion Dam	JPF, JPWF, OGRD, RIP, JPWF/RCK	7000-7200																												K
Trail to Chinquapin Creek Gage and Diversion Dam	JPF, JPWF, JPWF/RCK, RIP, OGRD	7000-7400																												
Trail to Bear Creek Gage upstream of Bear Forebay	JPF, JPF/RCK, WAT, RIP, JPWF	7400													K										K(N)					
Trails to North-South Slide Creek Diversions	JPF, JPF/RCK, WAT, LDG	7100-7600				K									K															

Appendix C. Known Occurrences of Special-Status Species by Project Facility, Recreation Facility, Road, Trail (continued).

FACILITIES	HABITAT[4]	APPROX. ELEV. (ft.)	FEDERALLY LISTED OR CANDIDATE SPECIES								FOREST SERVICE SENSITIVE AND SNF MANAGEMENT INDICATOR SPECIES																				
			Valley elderberry longhorn beetle (*Desmoceruscalifornicus dimorphus*)	Mountain yellow-legged frog (*Rana muscosa*)	Yosemite toad (*Bufo canorus*)	Bald eagle (*Haliaeetus leucocephalus*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	Great gray owl (*Strix nebulosa*)	Willow flycatcher (*Empidonax traillii brewsteri*)	California wolverine (*Gulo gulo luteus*)	Sierra Nevada red fox (*Vulpes vulpes necator*)	Mono Hot Springs evening primrose (*Camissonia sierrae ssp. alticola*)	Flaming trumpet (*Collomia rawsoniana*)	Subalpine fireweed (*Epilobium howellii*)	Short-leaved hulsea (*Hulsea brevifolia*)	Yosemite lewisia (*Lewisia disepala*)	Foothill yellow-legged frog (*Rana boylii*)	Western Pond Turtle (*Actinemys marmorata*)	Osprey (*Pandion haliaetus*)	Northern goshawk (*Accipiter gentilis*)	Northern goshawk PAC	California spotted owl (*Strix occidentalis occidentalis*)	California spotted owl PAC	Western red bat (*Lasiurus borealis*)	Townsend's western big-eared bat (*Corynorhinus townsendii*)	Pallid bat (*Antrozous pallidus*)	American (=pine) marten (*Martes americana*)
Trail to Tombstone Creek Diversion	JPF, LDG, JPF/RCK, DEV, WAT, OGRD	7200-7800													K															
Trail from Jackass Meadow Campground to Florence Dam outlet and Gage	WAT, JPF/RCK, DEV, OGRD, WAT, MDW	7200				K																								
Two trails to Stevenson Creek Gage below Shaver Lake Dam		5000-5500				K																K								
Trail to SF San Joaquin River Gage downstream of Jackass Meadows[3]		7500				K																								
Big Creek No. 3																														
Dams and Diversions																														
Moderate Diversion Dams																														
Dam 6	DPCW, WAT	2600																												
Power Generation																														
Big Creek PH No. 3	BOW, DPCW, DEV	1800				K																								
Gaging Stations																														
Powerhouse																														
Big Creek PH No. 3	DEV, BOW, WAT, DPCW	1800				K																								
Water Conveyance																														
Powerhouse No.3																														
Intake Gate House at Dam 6	DPCW, WAT, DEV, DPCW/RCK	2600																												
Tunnel No. 3[1]	Not applicable	1800-2600				K																	K							
Adit 1, Tunnel 3	DPCW, DPCW/RCK, WAT	2600																										K (R)		
Adit 2, Tunnel 3	WAT, DPCW, DPCW/RCK	2600																					K					K (R)		
Adit 3, Tunnel 3	DPCW, BOW, DEV	2400																										K (R)		
Surge Chamber, Rock/Sand Trap	BOW, DPCW, UCHP, DEV	1800	K			K																								
Rock/Sand Trap Drain Piping & Valves	BOW, DPCW, DEV, WAT	1800	K			K																								
Rock Trap Flushing Channel	BOW, DPCW, DEV, WAT	1800	K			K																								
Manifold Structure	BOW, DPCW, DEV, WAT	1800				K																								
Valve House	BOW, DPCW, DEV, WAT	1800				K																								
Penstocks	BOW, DPCW, DEV, WAT	1400-1800	K			K																								
Storage Yards																														
Big Creek PH No.3	BOW, WAT, DEV	1800				K																								
Utilities																														
Water Supply/Treatment																														
Big Creek PH No. 3	BOW, DEV, WAT	1800				K	K		K													K								
Fuel- Gasoline & Diesel																														
Big Creek PH No. 3	BOW, DEV, WAT	1800				K																								
Project Power Lines Less Than 33KV																														
Manifold 2.4KV	BOW, DPCW, DEV	1800				K																								
Reservoirs, Forebays, and Diversion Pools																														
Bypass Stream Reaches (San Joaquin River)																														
San Joaquin River, Dam 6 to Redinger[1, 2]	WAT, RIP	1600-2200				K																								
Roads Within Project Boundaries: SCE controlled																														
8S05, Canyon Road (from junction with 8S03 to junction with Italian Bar Road)	SMC, UCHP, SMC/RCK, BOW, WAT, DEV, DPCW, DPCW/RCK, OW, RIP	2000-4800				K	K	K	K												K		K			K				
8S05G Access road to Powerhouse No. 3 surge chamber uphill from 8S05 Canyon Road	DPCW, BOW, DEV, WAT	2000-2400				K	K		K																					
9589BA Access road to PH No. 3 and Switchyard[3]		1500-2000				K																								
9S20 Access to Carpenter Shop[3]		1500-2000				K																								
9S20A Access to transmission line tower[3]		1500-2000				K																								
9S20B Access road to transmission line tower[3]		1500-2000				K																								
9S20BC Connector road between 9S20B loop[3]		1500-2000				K																								
9S20D Access to Carpenter Shop[3]		1500-2000				K																								

Appendix C. Known Occurrences of Special-Status Species by Project Facility, Recreation Facility, Road, Trail (continued).

FACILITIES	HABITAT[4]	APPROX. ELEV. (ft.)	FEDERALLY LISTED OR CANDIDATE SPECIES								FOREST SERVICE SENSITIVE AND SNF MANAGEMENT INDICATOR SPECIES																				
			Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	Mountain yellow-legged frog (*Rana muscosa*)	Yosemite toad (*Bufo canorus*)	Bald eagle (*Haliaeetus leucocephalus*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	American peregrine falcon (*Falco peregrinus anatum*)	Pacific fisher (*Martes pennanti pacifica*)	Great gray owl (*Strix nebulosa*)	Willow flycatcher (*Empidonax traillii brewsteri*)	California wolverine (*Gulo gulo luteus*)	Sierra Nevada red fox (*Vulpes vulpes necator*)	Mono Hot Springs evening primrose (*Camissonia sierrae ssp. alticola*)	Flaming trumpet (*Collomia rawsoniana*)	Subalpine fireweed (*Epilobium howellii*)	Short-leaved hulsea (*Hulsea brevifolia*)	Yosemite lewisia (*Lewisia disepala*)	Foothill yellow-legged frog (*Rana boylii*)	Western Pond Turtle (*Actinemys marmorata*)	Osprey (*Pandion haliaetus*)	Northern goshawk (*Accipiter gentilis*)	Northern goshawk PAC	California spotted owl (*Strix occidentalis occidentalis*)	California spotted owl PAC	Western red bat (*Lasiurus borealis*)	Townsend's western big-eared bat (*Corynorhinus townsendii*)	Pallid bat (*Antrozous pallidus*)	American (=pine) marten (*Martes americana*)
9S20DA Access to garage and shops[3]		1500-2000				K																								
9S20E Access to material yard[3]		1500-2000				K																								
9S20F Connector road between 9S20 Loop[3]		1500-2000				K																								
9S88 from Italian Bar Road to old company housing		1500-2000				K																								
9S88A Access to old company housing[3]		1500-2000				K																								
9S88X Access road to Powerhouse No. 3 road water tank access and shop	BOW, WAT, DEV	1600-1800				K																K								
9S88XA Access road to old company housing from 9S88X[3]		1500-2000				K																								
9S89 Access road to Powerhouse No. 3 administrative bldg. from Italian Bar Road	BOW, WAT, DEV	1600				K																K								
Trail																														
Trail to Stevenson Creek Gage below Shaver Lake	SMC, WAT, SMC/RCK, RUD, MDW, DEV	5300				K						K										K								

[1]Not surveyed for plants or VELB. Facility is completely underground or is outside of project boundaries or is a stream.
[2]There is potential for invasive plant species to be present along all Project bypass and flow-augmented streams.
[3]This facility has not been surveyed because it was identified by SCE of USDA-FS as a project facility after completion of resource surveys for the Big Creek ALP Projects. However, resource agency data was available for this location.
[4]Vegetation Communities and Wildlife Habitats within 1/4 mile of the facility based on vegetation community mapping; except for streams, which includes only riparian and water habitat.

APPENDIX E

VALLEY ELDERBERRY LONGHORN BEETLE MANAGEMENT PLAN

VALLEY ELDERBERRY LONGHORN BEETLE MANAGEMENT PLAN

BIG CREEK HYDROELECTRIC SYSTEM

MAMMOTH POOL (FERC Project No. 2085)
BIG CREEK Nos. 1 AND 2 (FERC Project No. 2175)
BIG CREEK Nos. 2A, 8, AND EASTWOOD (FERC Project No. 67)
BIG CREEK No. 3 (FERC Project No. 120)

FEBRUARY 2007

SUBMITTED BY
SOUTHERN CALIFORNIA EDISON COMPANY

TABLE OF CONTENTS

List of Tables

List of Figures

List of Attachments

1.0 INTRODUCTION

This Valley Elderberry Longhorn Beetle (VELB) Management Plan (Plan) has been developed for four Southern California Edison (SCE) hydroelectric projects included in the Big Creek Hydroelectric System, which is located in the Upper San Joaquin River Watershed. The Big Creek Hydroelectric System is comprised of four FERC licenses: Mammoth Pool (FERC No. 2085), Big Creek Nos. 1 and 2 (FERC No. 2175), Big Creek Nos. 2A, 8 and Eastwood (FERC No. 67), and Big Creek No. 3 (FERC No. 120). These Projects consist of seven powerhouses and four major reservoirs, and have a combined dependable operating capacity of about 890 megawatts (MW).

1.1 PREPARATION OF THE VELB MANAGEMENT PLAN

SCE has prepared this Plan in consultation with the U.S. Fish and Wildlife Service (USFWS), United States Department of Agriculture-Forest Service (USDA-FS), California Department of Fish and Game (CDFG) and other stakeholders involved in the Big Creek Alternative Licensing Process (ALP). The Plan was developed to address VELB management during on-going operations and maintenance of all Project facilities, roads, trails and recreation features of the four Big Creek Projects. This Plan, including the specified avoidance, protection, and mitigation measures, will supersede all previous documents developed by SCE for the four Big Creek Projects. The Plan will become effective upon the Federal Energy Regulatory Commission (FERC or Commission) approval.

The Draft VELB Management Plan was submitted to agencies and stakeholders on August 29, 2005. Comments on the plan were received from USDA-FS and USFWS.

1.1.1 Location of VELB and Their Habitat

The presence of VELB and their habitat (defined as elderberry shrubs below 3,000 feet in elevation) within the Project area was determined based on extensive field surveys conducted in the vicinity of the four Big Creek Projects (SCE 2002a; SCE 2003; SCE 2004, and SCE 2005). A total of 572 elderberry shrubs have been identified in the vicinity of the four Projects, 42 shrubs in the Mammoth Pool Project vicinity, 515 in the Big Creek No. 3 Project vicinity, and 15 in the Big Creek Nos. 2A, 8, & Eastwood Project vicinity. Of these, only 10 shrubs show evidence of potential VELB occupancy, as determined by the presence of exit holes (SCE 2002a; SCE 2005). This includes two in the Mammoth Pool Project vicinity and eight in the Big Creek No. 3 Project vicinity. Table 1 contains a summary of the number of shrubs by project facility or road.

Following completion of the surveys, SCE and/or USDA-FS identified additional roads to be included as Project roads and/or added to the FERC Project boundaries under the new license. Table 2 provides a list of each of these additional roads occurring at or below 3,000 feet in elevation. SCE will survey these roads to determine the location of potential VELB habitat (i.e., elderberry shrubs) within one year of FERC approval of this Plan.

2.0 MANAGEMENT ACTIVITIES

The implementation of management activities, including vegetation control and road maintenance, may result in adverse effects to VELB by trimming or pruning habitat. A summary of vegetation management and road maintenance activities conducted in the vicinity of the Projects is provided below. Refer to Attachment A for a description of vegetation management and road maintenance that occur in the vicinity of the four Big Creek Projects where potential VELB habitat is present.

2.1 VEGETATION MANAGEMENT

Vegetation management occurs at various locations in the vicinity of the four Big Creek Projects (e.g., Project facilities, roads). SCE conducts vegetation management in the spring and summer in these areas in association with on-going operations and maintenance. Vegetation management includes trimming of vegetation by hand or equipment and the use of herbicides. Refer to Attachment A for a list of vegetation management activities that occur in areas that support potential VELB habitat. Attachment B provides a list of vegetation management activities that will be implemented on Project roads that have not yet been surveyed for potential VELB habitat. These matrices also provide the frequency at which the maintenance activity typically occurs at a specific location. A description of vegetation management activities is provided below. In general, vegetation management activities occur during the spring and early summer to avoid work during high fire danger periods. Vegetation management implemented on a regular basis typically occurs one or more times in a five-year period. Activities implemented on an infrequent basis tend to occur at least once during a 20-year period, but less than once every five years.

The area where vegetation management occurs around Project facilities and along roads is limited to the area necessary to reduce fire hazard and to provide for worker/public health and safety. Vegetation management generally occurs within 150 feet of Project facilities (dams, small and moderate diversions, gaging stations, powerhouses, transmission lines) and within 10 feet on either side of roads.

SCE implements a combination of manual, mechanical, and chemical methods to control vegetation in the vicinity of the Big Creek Projects. Selection of an appropriate control method is based on an evaluation of worker/public health and safety, potential environmental effects, effectiveness of methods based on site characteristics, and economics. Each control method is summarized below.

2.1.1 Vegetation Trimming by Hand

One of the methods used to trim vegetation in the vicinity of the Big Creek Projects is with hand tools. This includes trimming of grasses and forbs with a string trimmer, as well as removing or trimming of overhanging shrubs and trees with a chain saw or other handheld saw. This maintenance activity is implemented on an as-needed basis in conjunction with facility inspections.

2.1.2 Vegetation Trimming with Equipment

Vegetation in the vicinity of the Projects is also trimmed using mechanical equipment, including a flail-type mower. A flail mower is a cutting device attached to a tractor that is used to cut brush along roadsides. As with trimming of vegetation by hand, this activity is implemented on an as-needed basis.

2.1.3 Herbicide Application

After vegetation has been trimmed by hand or mechanical methods, herbicides may also be applied. Two methods of herbicide application are utilized; these include basal and foliar application techniques. Basal application is used for shrub species and includes cutting of a shrub and applying an oil-based herbicide directly to the stump. Foliar application techniques include hand spraying of an herbicide, with an additive or other agent, to control overspray. The herbicides and other agents used in the vicinity of the four Big Creek Projects are listed in Table 3. The label or Material Safety Datasheet (MSDS) for each herbicide or other agent is provided as Attachment C. If more effective herbicides become available in the future, SCE will consult with USDA-FS and USFWS to obtain permission to substitute the use of herbicides listed in Table 3. The application of all herbicides is completed or supervised by a certified pesticide applicator in compliance with the specified herbicide application prescription.

Herbicides and other chemical agents used in the vicinity of the four Projects are as follows:

- Garlon 4® and Hasten® (a vegetable oil-based additive) are combined and applied using a basal bark application technique.
- Garlon 4® and Accord® are combined and applied using a foliar application technique.
- Accord® is used by itself or combined with either R-11® or In-Place® and applied using basal bark and foliar techniques.
- Pathfinder® is used as a spot treatment of individual plants.
- Velpar® is used as a pre-emergent and is applied directly to moist soil to treat grasses and broad-leaved plants.

2.2 ROAD MAINTENANCE

Road maintenance, including road grading, graveling and paving, occurs along Project roads at all four Big Creek Projects. Road maintenance activities typically occur during the spring and summer on a regular or infrequent basis. As with vegetation management, road maintenance is conducted on a regular basis and typically occurs one or more times in a five year period, while maintenance implemented on an infrequent basis will occur during a 20-year period, but less than once every five years. These road maintenance activities are conducted primarily for improved visibility and

therefore, increase safety on narrow mountain roads, and decrease the chance of brush fires being accidentally ignited.

3.0 AVOIDANCE AND PROTECTION MEASURES

The following measures will be implemented to avoid and protect VELB and their habitat. Measures apply only to areas where elderberry shrubs are present below 3,000 feet in elevation.

3.1 MEASURES

3.1.1 Protected Areas

- Each elderberry shrub, or group of shrubs, potentially affected by Project operation or maintenance activities, with one or more stems measuring 1 inch in diameter or greater (≥1) at ground level, will be flagged prior to implementation of management activities.

- Signage will be installed in areas where elderberry shrubs are known to occur.

3.1.2 Vegetation Control

- No elderberry shrub with one or more stems ≥1 inch in diameter at ground level will be removed.

- No elderberry shrub stems or branches ≥1 inch in diameter will be trimmed.

- Annual and biannual vegetation control will only be conducted July through April in areas within 100 feet of elderberry shrubs.

- No flail-type mower will be used within an elderberry shrub dripline with one or more stems measuring ≥1 inch in diameter at ground level.

- Basal bark or foliar techniques will be utilized when herbicide application must occur within 100 feet of the dripline of an elderberry shrub with one or more stems measuring ≥1 in diameter or greater at ground level. Basal application techniques include cutting of a non-elderberry shrub and applying an oil-based herbicide directly to the stump. Foliar application techniques include hand spraying of an herbicide, with a deposition/retention additive, to control overspray. The application of herbicides will be completed or supervised by a certified pesticide applicator in compliance with the herbicide application prescription. Herbicide application will occur from July through April on an as-needed basis.

3.1.3 Road Grading

- Non-emergency road grading will be conducted July through April and the use of a grader will be restricted to the road surface and adjacent berms to remove any eroded material and to maintain roadside berms.

3.2 SCE PROGRAMS

In addition to the above avoidance and protection measures, SCE also has established several programs to train personnel on the recognition and avoidance of special-status resources, including VELB and their habitat, in the vicinity of the four Big Creek Projects. These programs will continue to be implemented during the term of the license. Each program is described below.

3.2.1 Endangered Species Alert Program

The Endangered Species Alert Program (ESAP) was developed to provide SCE personnel with a means for identifying when they may be working within an area with the potential for occurrence of legally protected plants and animal species in the SCE Service Territory. This training is conducted on an annual basis. For each of these species within the SCE Service Territory, the ESAP Manual (SCE 2006a) includes a photograph, description, natural history information, and map showing the species' distribution in relation to SCE facilities. This manual and maps (or Geographic Information System (GIS) database) are reviewed prior to implementing any project that involves ground disturbing activities within the Project area. Should a proposed activity have the potential to conflict with a known sensitive species population, SCE's Northern Hydro Division Environmental Manager, SES, or other qualified personnel will be notified to evaluate the situation and, if needed, coordinate with and obtain appropriate permits from regulatory agencies.

3.2.2 Northern Hydro Special-status Species Information Program

SCE's Northern Hydro Division has developed a Special-status Species Information Program (NHSSIP) to provide SCE personnel with a means of identifying when they may be working within an area that could support a Forest Service Sensitive (FSS) species. This Program will require the use of the Environmental Compliance Program described below and will enhance the ESAP described above. This program includes a photograph or line drawing, description, natural history information, and map showing the species' distribution in relation to SCE facilities for all FSS species potentially occurring in the Project vicinity (SCE 2006b).

3.2.3 Environmental Training Program

SCE employees attend environmental training sessions on a regular basis, as well as on an as-needed basis. These training sessions include a review of background material, permit conditions, and instructions on how to avoid impacts to biological resources. Project-specific meetings may also be conducted in the field on a job-

specific or activity-specific basis to review appropriate maintenance protocols (A/P measures) in environmentally sensitive areas.

3.2.4 Compliance Program

SCE will develop a compliance program that includes a process that must be followed prior to implementation of specific O/M activities. This is a program designed to track O/M activities implemented, update resource information, and guide personnel in implementation of O/M activities in compliance with A/P measures developed for the Big Creek Hydroelectric System. The compliance program consists of three components, the Northern Hydroelectric Environmental Compliance Database, GIS Database, and the Compliance Process, as described below.

Northern Hydroelectric Environmental Compliance Database

The Northern Hydroelectric Environmental Compliance Database (Compliance Database) will be developed and integrated with SCE's existing databases. A component of the database will be designed for tracking the training records of SCE personnel, O/M activities that have been planned and completed, and noxious weed populations that have been identified and treated. The database will also include all A/P measures associated with this Plan. This database will be queried prior to implementation of specified O/M activities.

Geographic Information System Database

Several studies have been conducted for the Big Creek Hydroelectric System. The results of these studies, data obtained from the USDA-FS Special-status Species Database, the CNDDB, and other biological studies were incorporated into a GIS database. This information includes the locations of special-status species and their habitats, noxious weed population, and cultural resources in the vicinity of the Project. Because of the sensitive nature of the locations of some special-status species and cultural resources, some GIS data layers are confidential. Therefore, access to these layers will be limited to SCE employees who are trained in the sensitivity and proper use of the information.

Updating GIS Database

The GIS database will be evaluated annually during the term of the license to determine if updates are needed. Prior to updating the database, SCE will contact USDA-FS for the most recent version of its Special-status Species Database. SCE will also contact the USFWS for the current list of Threatened and Endangered Species and obtain any new versions of the CNDDB when they become available. Any new data on the location of resources (i.e., special-status species, cultural resources, and noxious weed populations) in the vicinity of the Project that are obtained during implementation of O/M activities or required monitoring will also be incorporated into the database on a regular basis. SCE will contact the agencies and obtain approval to use the newest available data sources if they become available.

Compliance Process

SCE will review all O/M work activity requests that are determined to be subject to environmental regulation. They will use the Database to determine which A/P measures are appropriate, given the timing and nature of the work to be conducted, and the proximity of special-status biological resources and/or cultural resources to the work location. SCE will require that contractors comply with all applicable A/P measures.

4.0 IMPACTS ANALYSIS

The following describes the approach for the assessment of potential impacts from O/M activities implemented over the term of the FERC license to elderberry shrubs. It is assumed in the impact analysis that the avoidance and protection measures, as described in Section 3.0, would be implemented at Project facilities and roads, and that non-compliance with measures in Section 3.0 would result in impacts to VELB. Operations and maintenance activities are conducted primarily to improve visibility and therefore increase safety on narrow mountain roads, and decrease the chance of brush fires being accidentally ignited. It is probable that these maintenance activities, which necessitate the reduction of a small fraction of existing habitat along roads, reduce the potential for widespread catastrophic adverse effects of brush fires on VELB habitat. This is an important part of the impact analysis. Assuming, therefore, that these activities protect the larger existing habitat, a further step in the impact analysis was to determine the most appropriate method of performing these activities with minimal adverse effects, and to mitigate for any unavoidable adverse effects.

Potential Project impacts on VELB were determined based on the protocols established by SCE as part of the Lower Tule Hydroelectric Project (SCE 2002b) and approved by USFWS in the Biological Opinion for the Lower Tule Hydroelectric Project (USFWS 2002) and Big Creek No. 4 VELB Management Plan and Draft Supplemental Report (SCE 2005b). Based on the location of plants in relation to Project facilities and roads and SCE's maintenance practices, it was determined that additional field surveys were needed to collect data on stems and branches to more adequately identify potential Project impacts. The following describes the methods of the impact analysis for the necessary O/M activities.

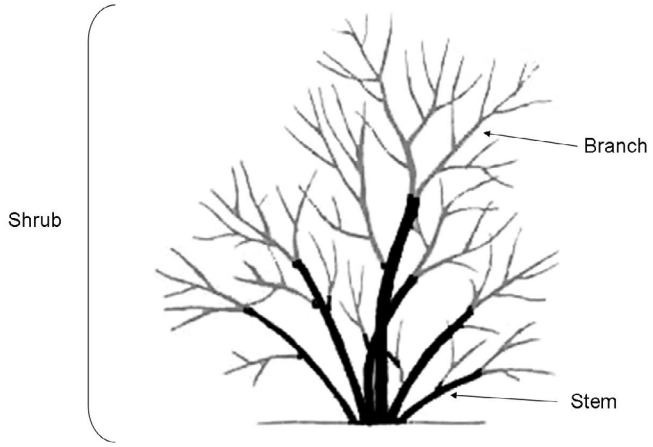
4.1 METHODS

SCE evaluated a total of 572 elderberry shrubs in the vicinity of Project facilities and roads to determine potential Project impacts from vegetation management and road maintenance. Analysis methods were based on an evaluation of the type of vegetation management and road maintenance activities that occur at each facility or road, the distance of the shrub from the facility, the presence of stems greater than or equal to 1 inch (≥1), and the ability to implement the activity in compliance with avoidance and protection measure defined in Section 3.0. Maintenance activities completed at each facility or road with elderberry plants in the vicinity are described in Section 2.0.

Surveys were completed by Janelle Nolan-Summers of Robertson-Bryan, Inc. (RBI), Joe Tanski of SCE, and Ed Bianchi of ENTRIX on June 28 and 29, 2005.

Table 2 of this Plan contains a list of additional Project roads occurring at or below 3,000 feet in elevation that have not yet been surveyed. SCE will survey these roads to determine the location of potential VELB habitat (i.e., elderberry shrubs) within one year of FERC approval of this Plan. Additionally, SCE will evaluate any elderberry shrubs identified during these surveys to determine potential Project impacts from vegetation management and road maintenance using the methods detailed below.

For those elderberry shrubs that were determined to be potentially trimmed, the number of stems and branches—by size class (<1, ≥ 1 & ≤ 3, >3 & < 5, ≥ 5)—that would be trimmed during maintenance activities was determined. For the purposes of this report, stems are defined as the main stalk or stalks of the plant and branches are defined as woody extensions from the main stems or stalks. The diagram below shows stems and branches.



Shrub – a woody plant with several stems and branches
Stem – the main stalk(s) of a plant
Branch – a woody extension from the stem or main stalk

4.2 RESULTS

It was determined that no shrubs would be removed over the term of the license for the four Big Creek Projects. Trimming would occur on 18 of the total 572 shrubs in the vicinity of the four Big Creek Projects. This includes trimming of shrubs in the vicinity of two Big Creek Projects, 13 in Big Creek No. 3, and 5 in Big Creek Nos. 2A, 8, and Eastwood. Table 4 lists the elderberry shrub number, distance of the shrub from the facility, stem diameter by size class, and number of stems and branches potentially trimmed by size class. None of the shrubs trimmed showed evidence of VELB occupancy. A total of 7 stems ≥ 1 & ≤ 3, 27 branches <1, and 1 branch ≥ 1 & ≤ 3 would be trimmed during the term of the license. Refer to Table 5 for a summary of survey results and to Figure 1 for the location of shrubs that would be trimmed by maintenance activities during the term of the license.

5.0 MITIGATION AND MITIGATION/RESOURCE MONITORING

This section outlines mitigation, mitigation/resource monitoring, and reporting procedures to be implemented during the term of the license.

5.1 MITIGATION

The USFWS has developed and approved the Conservation Guidelines for the Valley Elderberry Longhorn Beetle (July 9, 1999; Guidelines; Attachment D) to assist federal agencies and non-federal project applicants in obtaining incidental take authorizations through Endangered Species Act (ESA) consultation or permit processes. The Guidelines provide measures to avoid, minimize, and mitigate adverse effects on VELB. Although USFWS recommends that these Guidelines be used for all projects, they were primarily developed for construction-type projects that would result in ground disturbance and removal of shrubs. Because suitable habitat for VELB is defined as any live branch that is one inch (2.5 cm) or greater in diameter that occurs within 6 feet from the ground, (USFWS 1999) no mitigation is proposed for trimming of branches <1 inch in diameter. Maintenance of Project facilities and roads will result in trimming of stems and branches >1 inch in diameter from a small number of shrubs and mechanical vegetation control and herbicide application up to the dripline of an unspecified number of elderberry shrubs, but not in ground disturbance or removal of shrubs. This mitigation proposal is based on the USFWS (1999) guidance, with modifications developed cooperatively by SCE and the USFWS to address the specific requirements of the Project.

Table 2 of this Plan contains a list of additional Project roads occurring at or below 3,000 feet in elevation that have not yet been surveyed. SCE will survey these roads to determine the location of potential VELB habitat (i.e., elderberry shrubs) within one year of FERC approval of this Plan. If it is determined that potential VELB habitat is present along these additional roads that may potentially be affected by Project maintenance activities, SCE will follow the mitigation approach included in this Plan. SCE will seek approval from USFWS on mitigation for any potential impacts to VELB or their habitat from maintenance of Project roads identified in Table 2.

5.1.1 Proposed Mitigation

A total of 572 elderberry shrubs are present in the vicinity of the four Big Creek Projects. Maintenance activities will result in trimming of stems or branches ≥ 1 inch in diameter on six of these shrubs. That is, only approximately 1% of the total number of shrubs will be impacted. Additionally, the 572 shrubs in the Project area support a total of 1,511 stems ≥1 inch in diameter. Maintenance activities will result in the trimming of seven stems and one branch ≥ 1 inch in diameter. That is, less than 1% (0.53%) of the total number of the stems present in the vicinity of the four Projects will be trimmed. None of the shrubs to be trimmed are in riparian habitat. To compensate for trimming seven elderberry stems and one branch ≥ 1 & ≤ 3 inches in diameter, SCE proposes to plant a total of eight seedlings. Refer to Table 6 for a summary of the proposed mitigation. Planting eight local native seedlings would provide additional habitat for VELB and more

than adequately mitigate for trimming of seven stems and one branch during the term of the license.

SCE proposes to plant the seedlings on USDA-FS property in the Project vicinity adjacent to other elderberry shrubs. The specific locations of the seedlings to be planted will be agreed upon by SCE, USFWS, and USDA-FS, and will be in an area that will not be affected by future maintenance activities. SCE will plant seedlings in areas supporting native plant species; thus SCE does not propose to plant associated native plant species.

5.1.2 Mitigation/Resource Monitoring and Reporting

Monitoring of the mitigation site will be implemented following planting of the seedlings. This includes monitoring the general condition of the mitigation site and the condition of the elderberry plantings. SCE will monitor the site seven times over a 15 year period. SCE does not, however, propose to monitor for VELB occupancy at the proposed mitigation site because the Guidelines do not specify a threshold for VELB occupancy of planted cuttings/seedlings. SCE will conduct surveys and prepare monitoring reports for years 1, 2, 3, 5, 7, 10, and 15, with the first year beginning one year after the seedlings have been planted.

5.1.3 Success Criteria

A minimum survival rate of at least 60% of the elderberry shrubs will be maintained throughout the monitoring period. Within one year of discovery that survival is less than 60%, SCE will replace failed plantings to bring the survival rate above the minimum level. If SCE determines that the success criteria at the monitoring site cannot be met for reasons beyond their control (e.g., vandalism, fire, flood), SCE will provide USFWS with a letter report summarizing the reasons and, if possible, photographs that support the determination.

5.1.4 Survival of Trimmed Shrubs

As requested by USFWS, SCE will monitor the survival of the six shrubs with stems or branches $\geq$1 inch in diameter that will be trimmed. SCE will monitor these shrubs plus 12 adjacent untrimmed shrubs (two shrubs adjacent to each trimmed shrub) during the term of the license. The 12 shrubs that will not be trimmed will serve as a control group representing the natural survival of elderberry shrubs in the Project area. Data that will be collected for the six trimmed and 12 control shrubs will include shrub height, overall health of the shrub, the number of stems by size class, and the presence of dead stems by size class. SCE will include the results of the survival of trimmed shrubs compared with the survival of control shrubs in the mitigation monitoring reports described in Subsection 5.1.2. Monitoring will be conducted seven times over a 15-year period, as described in Subsection 5.1.2.

5.1.5 Implementation Schedule

Within one year of FERC approval of this Plan, SCE will complete planting of the seedlings. The first monitoring report will be submitted to the Commission, USDA-FS, and USFWS within three months after the surveys of the seedlings have been completed. Additional monitoring reports will be submitted within three months of the surveys to be conducted after years 2, 3, 5, 7, 10, and 15 following planting of the seedlings.

SCE will complete VELB and VELB habitat surveys at roads identified in Table 2 within one year of FERC approval of this Plan. Following completion of surveys, SCE will submit a report to USFWS that includes results of surveys, potential Project impacts, and appropriate mitigation measures, if necessary.

6.0 AGENCY CONSULTATION

Agency consultation has been ongoing during the Big Creek ALP. This includes consultation as part of the study plan development, technical studies, Preliminary Administrative Draft Biological Assessment/Biological Evaluation (BA/BE), and development of this Plan. Descriptions of consultation completed during the study plan development and during completion of technical studies are provided in the *Final Technical Study Plan Package for the Big Creek Hydroelectric System Alternative Licensing Process* (SCE 2001) and in the 2002 and 2003 *Technical Study Report Package for the Big Creek Hydroelectric System Alternative Licensing Process* (SCE 2003; SCE 2004).

Additionally, a complete summary of consultation and copies of correspondence completed to date for the four Big Creek Projects is provided in the BA/BE. Consultation completed with USFWS for development of this Plan consisted of three meetings and correspondence (i.e., letter, e-mail). This included meetings on February 17, 2005; June 20, 2005; and October 13, 2005. During these meetings, proposed avoidance and protection measures were discussed and revised, and the impact and mitigation approaches were evaluated. On June 23, 2005, USFWS requested additional information on the herbicides used in the vicinity of the four Big Creek Projects, a copy of the Holyoak (2005c) report, and information on roads. SCE provided the requested information on July 19, 2005. During the October 13, 2005 meeting USFWS and SCE tentatively agreed that planting of eight seedlings would adequately mitigate for impacts to VELB in the vicinity of the four Big Creek Projects and that implementing avoidance and protection measures in this Plan would provide protection for VELB habitat during the term of the license. Following completion of this meeting, USFWS provided tentative agreement on the VELB Management Plan after incorporation of revisions to the mitigation as agreed upon during the meeting.

Since this time, SCE and/or USDA-FS have identified additional roads to be included as Project roads and/or added to FERC Project boundaries that have not been surveyed for the presence of VELB or their habitat. SCE will complete surveys at these roads

and develop a report for USFWS review that includes survey results, potential Project impacts and proposed mitigation. SCE will follow the impacts analysis methods and mitigation approaches described in this Plan, and already approved by USFWS and other resource agencies. SCE will seek approval from USFWS on mitigation for any potential impacts to VELB or their habitat on Project roads identified in Table 2.

6.1 NEW FACILITIES

During the term of the license, SCE will notify FERC and the USFWS within 60 days if any new facilities are proposed that require ground-disturbing activities that have the potential to affect VELB. USDA-FS and CDFG will also be provided notification. The determination will be based on the known occurrence of VELB and their habitat in the vicinity of the Projects and the associated proposed activities. No new facilities are proposed at this time.

6.1.1 Identification of Need for Additional Surveys

The protocol-level surveys completed by SCE included all areas where Project-related ground-disturbance activities and/or maintenance activities occur within the vicinity of the four Projects. However, additional surveys will be completed by SCE if new facilities are proposed in areas not previously surveyed as part of implementing the terms and conditions of the new license order that may result in adverse effects on VELB or their habitat.

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TABLES

Table 1. Valley Elderberry Longhorn Beetle Habitat in the Vicinity of the Big Creek Projects.

Project Facility or Road	Number of Shrubs	Number of Shrubs with Exit Holes
Mammoth Pool Project Vicinity (FERC Project No. 2085)		
2002 Survey Results		
9S42, Mammoth Pool Powerhouse transmission line access road from gate near County Road 225, Italian Bar Road to 8S44 (#18)	32	2
8S03 (from Powerhouse No. 8 to Mammoth Pool Powerhouse) (#33)	10	0
Project Total	**42**	**2**
Big Creek Nos. 2A, 8 & Eastwood Project Vicinity (FERC Project No. 67)		
2002 Survey Results		
Powerhouse No. 8, Tunnel 8	4	0
Access Road to Powerhouse No. 8 from 8S03 (#166)	11	0
Project Total	**15**	**0**
Big Creek No. 3 Project Vicinity (FERC Project No. 120)		
2002 Survey Results		
Powerhouse No. 3 (penstocks)	5	5
Powerhouse No. 3 (rock/sand trap)	6	3
Powerhouse No. 3 (surge chamber)	10	0
8S05, Canyon Road (from junction with 8S03 to junction with Italian Bar Road) (#21)	484	0
9S89, Access road to Big Creek Powerhouse No. 3 and administrative buildings from Italian Bar Road (#61)	5	0
2004 Survey Results		
Miscellaneous Powerhouse No. 3 roads (i.e., water tank access road and shop) (#5, #13, #127, 215, #256 and #257)	5	0
Project Total	**515**	**8**
Grand Total	**572**	**10**

Table 2. New Project Roads at or Below 3,000 Feet in Elevation.

Mammoth Pool (FERC Project No. 2085)
7S47B Access road to Rock Creek Tunnel Muck Pile (#102)
8S03B Access road from 8S03 to Mammoth Pool penstock (#80)
8S03CA, spur road to Mammoth Pool Transmission Line (#144)
Big Creek Nos. 1 and 2 (FERC Project No. 2175)
8S05CA Access to Big Creek No. 2 switchyard (#160)
8S13K Access road to Powerhouse No. 2 penstock (#168)
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67)
8S03A Access road to Powerhouse No. 8 from 8S03 (#166)
8S05L Road to communication line near Powerhouse No. 8 (#167)
Big Creek No. 3 (FERC Project No. 120)
8S05B Access road to Powerhouse No. 3 penstock from 8S05 Canyon Road (#217)
8S05T Access to tailings (#24)
8S05TA Access to tailings (#29)
9S20 Access to Carpenter shop (#216)
9S20B Access road to carpenter shop from Italian Bar Road (#62)
9S20BA (#85)
9S20BC Connector road between 9S20B loop (#64)
9S20D Access to Carpenter Shop (#13)
9S20DA Access to garage and shops (#257)
9S20E (#52)
9S20F Connector road between 9S20 loop (#87)
9S88A Access to old company housing (#5)
9S88XA Access road to old company housing from 9S88X (#215)
9S89BA Access road to PH 3 and switchyard (#59)

Table 3. Herbicides and Other Agents Used at the Four Big Creek Projects.

	Garlon 4® at 0.6-1.5 lbs/ acre[1]	Pathfinder II®	Accord® at 0.6-1.0 lbs/acre[2]	Velpar® at 2 lbs/acre
Active Ingredient	triclopyr	triclopyr	glyphosate	Hexazinone
Other Agents				
	Hasten®	**R-11®**	**In-Place®**	
Properties	Spray Adjuvant Nonionic surfactant and esterified vegetable oils	Wetting Agent Nonionic surfactant Spreader Activator	Deposition and Retention Agent	

[1]These rates represent average coverage (20%) to maximum expected coverage (50%) using a 3.0 lbs. per acre mixture.

[2]These rates represent average coverage (30%) to maximum expected coverage (50%) using a 2.0 lbs. per acre mixture.

Table 4. Elderberry Shrub Impact Analysis Results.

						Impacts					
						Stems Trimmed			Branches Trimmed		
Shrub to be Affected	Facility or Road	Distance of Shrub from Facility (feet)	All Stems/Shrubs are Non-Riparian			Stem size (at point to be trimmed)	No. of stems estimated to be trimmed over the license term	Total no. of stems to be trimmed over the license term	Number of stems and size class from which branches originate	Branches <1 at point to be trimmed	Branches ≥ 1 & ≤3 at point to be trimmed
			Stem Diameter (inches)	Total Number of Stems	Exit Holes (Yes/No)						
Big Creek Nos. 2A, 8, and Eastwood (FERC Project No. 67)											
14	Access road to Powerhouse No. 8 from 8S03	3	< 1	n/a	No	0	0	0	1 (≥ 1 & ≤ 3)	1	0
			≥ 1 & ≤ 3	3	No	0	0	0		0	0
			> 3 & < 5	0	No	0	0	0		0	0
			≥ 5	0	No	0	0	0		0	0
15	Powerhouse No. 8, Tunnel 8	0	< 1	n/a	No	0	0	0	1 (> 3 & < 5)	0	0
			≥ 1 & ≤ 3	0	No	0	0	0		1	1
			> 3 & < 5	2	No	0	0	0		0	0
			≥ 5	0	No	0	0	0		0	0
16	Powerhouse No. 8, Tunnel 8	0	< 1	n/a	No	0	0	0	1 (≥ 1 & ≤ 3)	3	0
			≥ 1 & ≤ 3	1	No	0	0	0		0	0
			> 3 & < 5	1	No	0	0	0		0	0
			≥ 5	0	No	0	0	0		0	0
17	Powerhouse No. 8, Tunnel 8	0	< 1	n/a	No	0	0	0	1 (≥ 1 & ≤ 3)	3	0
			≥ 1 & ≤ 3	1	No	0	0	0		0	0
			> 3 & < 5	0	No	0	0	0		0	0
			≥ 5	0	No	0	0	0		0	0
18	Powerhouse No. 8, Tunnel 8	1	< 1	n/a	No	0	0	0		0	0
			≥ 1 & ≤ 3	1	No	1	1	1		0	0
			> 3 & < 5	0	No	0	0	0		0	0
			≥ 5	0	No	0	0	0		0	0
					Total		**1**	**1**		**8**	**1**

Table 4. Elderberry Shrub Impact Analysis Results (continued).

						Impacts					
						Stems Trimmed			Branches Trimmed		
Shrub to be Affected	Facility or Road	Distance of Shrub from Facility (feet)	All Stems/Shrubs are Non-Riparian			Stem size (at point to be trimmed)	No. of stems estimated to be trimmed over the license term	Total no. of stems to be trimmed over the license term	Number of stems and size class from which branches originate	Branches <1 at point to be trimmed	Branches ≥ 1 & ≤3 at point to be trimmed
Big Creek No. 3 (FERC Project No. 120)											
1	Powerhouse No. 3 (Surge Chamber)	3	< 1	n/a[1]	No	0	0	0	1 (> 3 & < 5)	4	0
			≥ 1 & ≤ 3	0	No	0	0	0		0	0
			> 3 & < 5	1	No	0	0	0		0	0
			≥ 5	0	No	0	0	0		0	0
2	8S05, Canyon Road (from Powerhouse No. 8 to junction with Italian Bar Road)	5	< 1	n/a	No	0	0	0	1 (≥ 1 & ≤ 3)	1	0
			≥ 1 & ≤ 3	3	No	0	0	0		0	0
			> 3 & < 5	0	No	0	0	0		0	0
			≥ 5	2	No	0	0	0		0	0
3	8S05, Canyon Road (from Powerhouse No. 8 to junction with Italian Bar Road)	6	< 1	n/a	No	0	0	0	1 (≥ 1 & ≤ 3)	1	0
			≥ 1 & ≤ 3	3	No	0	0	0		0	0
			> 3 & < 5	1	No	0	0	0		0	0
			≥ 5		No	0	0	0		0	0
4	8S05, Canyon Road (from Powerhouse No. 8 to junction with Italian Bar Road)	3	< 1	n/a	No	0	0	0	3 (≥ 1 & ≤ 3)	5	0
			≥ 1 & ≤ 3	3	No	0	0	0		0	0
			> 3 & < 5	1	No	0	0	0		0	0
			≥ 5	0	No	0	0	0		0	0
5	8S05, Canyon Road (from Powerhouse No. 8 to junction with Italian Bar Road)	5	< 1	n/a	No	0	0	0	1 (> 3 & < 5)	1	0
			≥ 1 & ≤ 3	2	No	0	0	0		0	0
			> 3 & < 5	1	No	0	0	0		0	0
			≥ 5	0	No	0	0	0		0	0

Table 4. Elderberry Shrub Impact Analysis Results (continued).

						Impacts					
						Stems Trimmed			Branches Trimmed		
Shrub to be Affected	Facility or Road	Distance of Shrub from Facility (feet)	All Stems/Shrubs are Non-Riparian			Stem size (at point to be trimmed)	No. of stems estimated to be trimmed over the license term	Total no. of stems to be trimmed over the license term	Number of stems and size class from which branches originate	Branches <1 at point to be trimmed	Branches ≥ 1 & ≤3 at point to be trimmed
			Stem Diameter (inches)	Total Number of Stems	Exit Holes (Yes/No)						
6	8S05, Canyon Road (from Powerhouse No. 8 to junction with Italian Bar Road)	3	< 1	n/a	No	0	0	0	1 (≥ 1 & ≤ 3)	1	0
			≥ 1 & ≤ 3	2	No	0	0	0		0	0
			> 3 & < 5		No	0	0	0		0	0
			≥ 5		No	0	0	0		0	0
7	8S05, Canyon Road (from Powerhouse No. 8 to junction with Italian Bar Road)	4	< 1	n/a	No					0	0
			≥ 1 & ≤ 3	2	No	1	1	1		0	0
			> 3 & < 5	0	No	0	0	0		0	0
			≥ 5	0	No	0	0	0		0	0
8	8S05, Canyon Road (from Powerhouse No. 8 to junction with Italian Bar Road)	5	< 1	n/a	No	0	0	0	3 (≥ 1 & ≤ 3)	3	0
			≥ 1 & ≤ 3	5	No	0	0	0		0	0
			> 3 & < 5	0	No	0	0	0		0	0
			≥ 5	0	No	0	0	0		0	0
9	8S05, Canyon Road (from Powerhouse No. 8 to junction with Italian Bar Road)	2	< 1	n/a	No	0	0	0	1 (≥ 1 & ≤ 3)	2	0
			≥ 1 & ≤ 3	1	No	0	0	0		0	0
			> 3 & < 5	0	No	0	0	0		0	0
			≥ 5	0	No	0	0	0		0	0
10	8S05, Canyon Road (from Powerhouse No. 8 to junction with Italian Bar Road)	4	< 1	n/a	No	0	0	0		0	0
			≥ 1 & ≤ 3	3	No	3[3]	3	3		0	0
			> 3 & < 5	0	No	0	0	0		0	0
			≥ 5	0	No	0	0	0		0	0

Table 4. Elderberry Shrub Impact Analysis Results (continued).

						Impacts					
						Stems Trimmed			Branches Trimmed		
Shrub to be Affected	Facility or Road	Distance of Shrub from Facility (feet)	All Stems/Shrubs are Non-Riparian			Stem size (at point to be trimmed)	No. of stems estimated to be trimmed over the license term	Total no. of stems to be trimmed over the license term	Number of stems and size class from which branches originate	Branches <1 at point to be trimmed	Branches ≥ 1 & ≤3 at point to be trimmed
			Stem Diameter (inches)	Total Number of Stems	Exit Holes (Yes/No)						
11	8S05, Canyon Road (from Powerhouse No. 8 to junction with Italian Bar Road)	4	< 1	n/a	No	0	0	0		0	0
			≥ 1 & ≤ 3	6	No	1	1	1		0	0
			> 3 & < 5	0	No	0	0	0		0	0
			≥ 5	0	No	0	0	0		0	0
12	8S05, Canyon Road (from Powerhouse No. 8 to junction with Italian Bar Road)	6	< 1	n/a	No	0	0	0	1 (≥ 1 & ≤ 3)	0	0
			≥ 1 & ≤ 3	1	No	0	0	0		1	0
			> 3 & < 5	0	No	0	0	0		0	0
			≥ 5	0	No	0	0	0		0	0
13	8S05, Canyon Road (from Powerhouse No. 8 to junction with Italian Bar Road)	5	< 1	n/a	No	0	0	0		0	0
			≥ 1 & ≤ 3	3	No	1	1	1		0	0
			> 3 & < 5	0	No	0	0	0		0	0
			≥ 5	0	No	0	0	0		0	0
					Total		**6**	**6**		**19**	**0**
					Grand Total		**7**	**7**		**27**	**1**

[1]Not Applicable - USFWS Guidelines do not require specific data on stems <1 inch in diameter. Specific data was not collected on these stems.

[2]Assumes a 50 year license term.

[3]This shrub supports 3 stems ≥1 inch in diameter. Other stems <1 inch are also present, but specific data was not collected on these stems.

Table 5. Results Summary.

Total Number of Shrubs Trimmed	Total Number of Stems to be Trimmed (≥1 & ≤3)	Total Number of Branches to be Trimmed (<1)	Total Number of Branches to be Trimmed (≥1 & ≤3)
18	7	27	1

Table 6. Mitigation Summary.

	Number of Stems or Branches to be Trimmed	Number of Seedlings to be Planted
Stems to be Trimmed (≥1 & ≤3)	7	7
Branches to be Trimmed (≥1 & ≤3)	1	1
Total	**8**	**8**

FIGURE

Placeholder for

Figure 1. Elderberry Shrubs to be Trimmed within the Four Big Creek ALP Projects

Non-Internet Public Information

This Figure has been removed in accordance with the Commission regulations at 18 CFR Section 388.112.

This Figure is considered Non-Internet Public information and should not be posted on the Internet. This information is provided in Volume 4 of the Application for New License and is identified as "Non-Internet Public" information. This information may be accessed from the FERC's Public Reference Room, but is not expected to be posted on the Commission's electronic library, except as an indexed item.

ATTACHMENT A

VEGETATION MANAGEMENT AND ROAD MAINTENANCE AT PROJECT FACILITIES AND ROADS THAT SUPPORT VELB HABITAT

Attachment A

Vegetation Management and Road Maintenance at Project Facilities and Roads that Support VELB Habitat

Road or Facility Name	Trimming			Roads Repair/Clearing			
	Hand	Equipment	Herbicides	Grading	Gravel/Paving	Snow Removal / Sanding	Culverts/Ditches/Water Bars
Mammoth Pool Project Vicinity							
8S03 (from Powerhouse No. 8 to Mammoth Pool Powerhouse) (#33)	R	R	R	I	I	A	R
9S42, Mammoth Pool Powerhouse transmission line access road from gate near County Road 225, Italian Bar Road, to 8S44 (#18)	R	R		R	I		R
Big Creek Nos. 2A, 8 and Eastwood							
Powerhouse No. 8, Tunnel 8	R		R				
Access road to Powerhouse 8 from 8S03 (#166)	R	R	R	I	I	A	R
Big Creek No. 3 Project Vicinity							
Powerhouse No. 3 (penstocks)	R		R				
Powerhouse No. 3 (rock/sand trap)	R		R				
Powerhouse No. 3 (surge chamber)	R		R				
Road 8S05, Canyon Road (from junction with 8S03 to junction with Italian Bar Road) (#21)	R	R	R	I	I	A	R
9S89 Access road to Powerhouse No. 3 and administrative building from Italian Bar Road (#61)	R	R	R	I	I		R
Miscellaneous Powerhouse No. 3 roads (i.e. water tank access road and shop) (#5, 13, 127, 215, 256, 257)	R		R	R	I		R

ATTACHMENT B

VEGETATION MANAGEMENT AND ROAD MAINTENANCE AT PROJECT ROADS NOT YET SURVEYED FOR VELB HABITAT

Attachment B

Vegetation Management and Road Maintenance at Project Roads Not Yet Surveyed for VELB Habitat

	Vegetation Management			Roads Repair / Clearing			
	Trimming						
	Hand	Equipment	Herbicides	Grading	Gravel / Paving	Snow Removal / Sanding	Culverts/Ditches/Water Bars
Mammoth Pool (FERC Project No. 2085)							
7S47B Access road to Rock Creek Tunnel Muck Pile (#102)	R	R	I	R	I		R
8S03B Access road from 8S03 to Mammoth Pool penstock (#80)	R	R	R	R	I		R
8S03CA, spur road to Mammoth Pool Transmission Line (#144)	R	R	I	R	I		R
Big Creek Nos. 1 and 2 (FERC Project No. 2175)							
8S05CA Access to Big Creek No. 2 switchyard (#160)	R	R	R	I	I	A	R
8S13K Access road to Powerhouse No. 2 penstock (#168)	R	R	R	I	I	I	R
Big Creek Nos. 2A, 8, and Eastwood (FERC Project No. 67)							
8S03A Access road to Powerhouse No. 8 from 8S03 (#166)	R	R	R	I	I	A	R
8S05L Road to communication line near Powerhouse No. 8 (#167)	I	I	I	I	I		i
Big Creek No. 3 (FERC Project No. 120)							
9S88A Access to old company housing (#5)	R		R	R	I		R
9S20D Access to Carpenter Shop (#13)	R		R	R	I		R
8S05T Access to tailings (#24)		I		R	I		R
8S05TA Access to tailings (#29)		I		R	I		R
9S20B Access road to carpenter shop from Italian Bar Road (#62)	R		R	I	I		R
9S20C Connector road between 9S20B loop (#64)	R		R	R	I		R
9S20A (#85)	R		R	I	I		R
9S88XA Access road to old company housing from 9S88X (#215)	R		R	R			R
9S20 Access to Carpenter shop (#216)	R		R		I		I
8S05B Access road to Powerhouse No. 3 penstock from 8S05 Canyon Road (#217)	R	R	R	R			R
9S20E (#52)	R		R	R	I		R
9S20DA Access to Garage and Shops (#257)	R		R	R	I		R
9S20F Connector Road Between 9S20 Loop (#87)	R		R	I	I		R
9S89BA Access road to Powerhouse No. 3 and Switchyard (#59)	R		R	I	I		R

ATTACHMENT C1

GARLON 4®

Specimen Label

Dow AgroSciences™

Garlon* 4

Specialty Herbicide

*Trademark of Dow AgroSciences LLC

For the control of woody plants and broadleaf weeds on rights-of-way, industrial sites, non-crop areas, non-irrigation ditch banks, forests, and wildlife openings, including grazed areas on these sites.

Active Ingredient:	
triclopyr: 3,5,6-trichloro-2-pyridinyloxyacetic acid, butoxyethyl ester	61.6%
Inert Ingredients	38.4%
Total	100.0%

Contains petroleum distillates
Acid Equivalent:
triclopyr - 44.3% - 4 lb/gal

EPA Reg. No. 62719-40

Precautionary Statements

Hazards to Humans and Domestic Animals

Keep Out of Reach of Children

CAUTION PRECAUCION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

Harmful If Swallowed, Inhaled, Or Absorbed Through Skin

Avoid contact with eyes, skin, or clothing. Avoid breathing mists or vapors. Avoid contamination of food.

Personal Protective Equipment (PPE)

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category E on an EPA chemical resistance category selections chart.

WPS Uses: Applicators and other handlers who handle this pesticide for any use covered by the Worker Protection Standard (40 CFR Part 170) – in general, agricultural-plant uses are covered – must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber, or Viton
- Shoes plus socks

Non-WPS Uses: Applicators and other handlers who handle this pesticide for any use NOT covered by the Worker Protection Standard (40 CFR Part 170) – in general, only agricultural-plant uses are covered by the WPS – must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations

Users should:
- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

First Aid

If on skin: Flush skin with plenty of water. Get medical attention if irritation persists.
If swallowed: Do not induce vomiting. Call a physician.

Environmental Hazards

This pesticide is toxic to fish. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

Physical or Chemical Hazards

Do not use or store near heat or open flame. Do not cut or weld container.

Notice: Read the entire label. Use only according to label directions. **Before buying or using this product, read "Warranty Disclaimer" and "Limitation of Remedies" elsewhere on this label.**

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994. If you wish to obtain additional product information, visit our web site at www.dowagro.com.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
Read all Directions for Use carefully before applying.

Do not use for manufacturing or formulating.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber, or Viton
- Shoes plus socks

Storage and Disposal

Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited.

Storage: Store above 28°F or agitate before use.

Pesticide Disposal: Pesticide, spray mixture, or rinse water that cannot be used according to label instructions must be disposed of according to applicable federal, state, or local procedures.

Plastic Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Metal Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Container Disposal for Refillable Containers: Replace the dry disconnect cap, if applicable, and seal all openings which have been opened during use. Return the empty container to a collection site designated by Dow AgroSciences. If the container has been damaged and cannot be returned according to the recommended procedures, contact the Dow AgroSciences Customer Service Center at 1-800-258-1470 to obtain proper handling instructions.

General: Consult federal, state, or local disposal authorities for approved alternative procedures.

General Information

Garlon* 4 herbicide is recommended for the control of unwanted woody plants and annual and perennial broadleaf weeds in forests, and on non-crop areas including industrial manufacturing and storage sites, rights-of-way such as electrical power lines, communication lines, pipelines, roadsides and railroads, fence rows, non-irrigation ditch banks, and around farm buildings. Use on these sites may include application to grazed areas as well as establishment and maintenance of wildlife openings.

General Use Precautions

Agricultural Use Requirements for Forestry Uses: For use of this product on forestry sites, follow PPE and Reentry restrictions in the Agricultural Use Requirements section of this label.

Use Requirements for Non-cropland Areas: No Worker Protection Standard worker entry restrictions or worker notification requirements apply when this product is applied to non-cropland.

In Arizona: The state of Arizona has not approved Garlon 4 for use on plants grown for commercial production; specifically forests grown for commercial timber production, or on designated grazing areas.

Chemigation: Do not apply this product through any type of irrigation system.

Other Precautions:

- When applying this product in tank mix combination, follow all applicable use directions and precautions on each manufacturer's label.
- Do not apply on ditches used to transport irrigation water. Do not apply where runoff or irrigation water may flow onto agricultural land as injury to crops may result.
- Do not apply this product using mist blowers unless a drift control additive, high viscosity inverting system, or equivalent is used to control spray drift.
- Sprays applied directly to Christmas trees may result in conifer injury. When treating unwanted vegetation in Christmas tree plantations, care should be taken to direct sprays away from conifers.
- Do not apply Garlon 4 directly to, or otherwise permit it to come into direct contact with grapes, tobacco, vegetable crops, flowers, or other desirable broadleaf plants and do not permit spray mists containing it to drift onto them.
- It is permissible to treat non-irrigation ditch banks, seasonally dry wetlands, flood plains, deltas, marshes, swamps, bogs, and transitional areas between upland and lowland sites. Do not apply to open water such as lakes, reservoirs, rivers, streams, creeks, salt water bays, or estuaries.

Avoid Injurious Spray Drift

Applications should be made only when there is little or no hazard from spray drift. Very small quantities of spray, which may not be visible may seriously injure susceptible plants. Do not spray when wind is blowing toward susceptible crops or ornamental plants near enough to be injured. It is suggested that a continuous smoke column at or near the spray site or a smoke generator on the spray equipment be used to detect air movement, lapse conditions, or temperature inversions (stable air). If the smoke layers or indicates a potential of hazardous spray drift, do not spray.

Aerial Application (Helicopter Only): For aerial application on rights-of-way or other areas near susceptible crops, use an agriculturally registered spray thickening drift control additive as recommended by the manufacturer or apply through the Microfoil® boom, Thru-Valve boom, or equivalent drift control system. Thickened sprays prepared by using high viscosity invert systems or other drift reducing systems may be utilized if they are made as drift-free as are mixtures containing an agriculturally registered thickening agent or applications made with the Microfoil boom or Thru Valve boom. If a spray thickening agent is used, follow all use recommendations and precautions on the product label. Do not use a thickening agent with the Microfoil boom, Thru Valve boom, or other systems that cannot accommodate thick sprays.

†Reference within this label to a particular piece of equipment produced by or available form other parties is provided without consideration for use by the reader at its discretion and subject to the reader's independent circumstances, evaluation, and expertise. Such reference by Dow AgroSciences is not intended as an endorsement of such equipment, shall not constitute a warranty (express or implied) of such equipment, and is not intended to imply that other equipment is not available and equally suitable. Any discussion of methods of use of such equipment does not imply that the reader should use the equipment other than is advised in directions available from the equipment's manufacturer. The reader is responsible for exercising its own judgment and expertise, or consulting with sources other than Dow AgroSciences, in selecting and determining how to use its equipment.

With aircraft, drift can be lessened by applying a coarse spray; by using a spray boom no longer than 3/4 the rotor length; by spraying only when wind velocities are low; or by using an approved drift control system. Keep operating spray pressures at the lower end of the manufacturer's recommended pressures for the specific nozzle type used. Low pressure nozzles are available from spray equipment manufacturers. Select nozzles and pressures which provide adequate plant coverage, but minimize the production of fine spray particles.

Ground Equipment: To aid in reducing spray drift potential when making ground applications near susceptible crops or other desirable broadleaf plants, Garlon 4 should be applied through large droplet producing equipment, such as the Radiarc sprayer or in thickened spray mixtures using an agriculturally registered drift control additive, or high viscosity invert systems. When using a spray thickening or inverting additive, follow all use directions and precautions on the product label. With ground equipment, spray drift can be reduced by keeping the spray boom as low as possible; by applying 20 gallons or more of spray per acre; and by spraying when wind velocity is low. Do not apply with nozzles that produce a fine droplet spray. Keep operating spray pressures at the lower end of the manufacturer's recommended pressures for the specific nozzle type used. Low pressure nozzles are available from spray equipment manufacturers. Select nozzles and pressures which provide adequate plant coverage, but minimize the production of fine spray particles.

High Volume Leaf-Stem Treatment: To minimize spray drift, keep sprays no higher than brush tops and keep spray pressures low enough to provide coarse spray droplets. A spray thickening agent may be used to reduce spray drift.

Grazing and Haying Restrictions

Grazing or harvesting green forage:

1) Lactating dairy animals
   Two quarts per acre or less: Do not graze or harvest green forage from treated area for 14 days after treatment.
   Greater than 2 to 6 quarts per acre: Do not graze or harvest green forage until the next growing season.
2) Other Livestock
   Two quarts per acre or less: No grazing restrictions.
   Greater than 2 to 6 quarts per acre: Do not graze or harvest green forage from treated area for 14 days after treatment. **Note:** If less than 25% of a grazed area is treated, there is no grazing restriction.

Haying (harvesting of dried forage):

1) Lactating dairy animals
   Do not harvest hay until the next growing season.
2) Other Livestock
   Two quarts per acre or less: Do not harvest hay for 7 days after treatment.
   Greater than 2 to 4 quarts per acre: Do not harvest hay for 14 days after treatment.
   Greater than 4 quarts per acre: Do not harvest hay until the next growing season.

Slaughter Restrictions:
Withdraw livestock from grazing treated grass or consumption of treated hay at least 3 days before slaughter. This restriction applies to grazing during the season following treatment or hay harvested during the season following treatment.

Plants Controlled by Garlon 4

Woody Plants Controlled

alder	chinquapin	madrone	scotch broom
arrowwood	choke cherry	maples	sumac
ash	cottonwood	mulberry	sweetbay magnolia
aspen	Crataegus (hawthorn)	oaks	sweetgum
bear clover (bearmat)	dogwood	persimmon	sycamore
beech	Douglas-fir	pine	tanoak
birch	elderberry	poison ivy	thimbleberry
blackberry	elm	poison oak	tree-of-heaven (*Ailanthus*)†
blackgum	gallberry	poplar	tulip poplar
boxelder†	gorse	salmonberry	wax myrtle
Brazilian pepper	hazel	salt-bush	wild rose
buckthorn	hickory	(*Braccharis* spp.)	willow
cascara	hornbeam	salt-cedar†	winged elm
Ceanothus	kudzu††	sassafras	
cherry	locust		

†For best control, use either a basal bark or cut stump treatment.
††For complete control, retreatment may be necessary.

Annual and Perennial Broadleaf Weeds Controlled

black medic	curly dock	matchweed	sweet clover
bull thistle	dandelion	mustard	vetch
burdock	field bindweed	Oxalis	wild carrot (Queen Anne's lace)
Canada thistle	goldenrod	plantain	wild lettuce
chicory	ground ivy	purple loosestrife	wild violet
clover	lambsquarters	ragweed	yarrow
creeping beggarweed	lespedeza	smartweed	

Table 1 (Maximum Application Rate): The following table is provided as a guide to the user to achieve the proper rate of Garlon 4 without exceeding the maximum use rate of 8 quarts per acre:

Spray Volume Per Acre	Quarts of Garlon 4 Per 100 Gallons of Spray (Not to Exceed 8 qt/Acre)
400	2
300	2.7
200	4
100	8
50	16
20	40
10	80

Approved Uses

Foliar Applications

Use Garlon 4 at rates of 1 to 8 quarts per acre to control broadleaf weeds and woody plants. In all cases use the amount specified in enough water to give uniform and complete coverage of the plants to be controlled. The recommended order of addition to the spray tank is water, spray thickening agent (if used), surfactant (if used), additional herbicide (if used), and Garlon 4. If a standard agricultural surfactant is used, use at a rate of 1 to 2 quarts per acre. Use continuous adequate agitation.

Before using any recommended tank mixtures, read the directions and all precautions on both labels.

For best results applications should be made when woody plants and weeds are actively growing. When hard-to-control species such as ash, blackgum, choke cherry, elm, maples (other than vine or big leaf), oaks, pines, or winged elm are prevalent, and during applications made during late summer when the plants are mature, or during drought conditions, use the higher rates of Garlon 4 alone or in combination with Tordon* 101 Mixture herbicide.

When using Garlon 4 in combination with 3.8 pounds per gallon 2,4-D low volatile ester herbicide generally the higher rates should be used for satisfactory brush control.

Use the higher dosage rates when brush approaches an average of 15 feet in height or when the brush covers more than 60% of the area to be treated. If lower rates are used on hard-to-control species, resprouting may occur the year following treatment.

On sites where easy to control brush species dominate, rates less than those recommended may be effective. Consult state or local extension personnel for such information.

Foliar Treatment With Ground Equipment

High Volume Foliar Treatment
For control of woody plants, use Garlon 4 at the rate of 1 to 3 quarts per 100 gallons of spray mixture, or Garlon 4 at 1 to 3 quarts may be tank mixed with labeled rates of 2,4-D low volatile ester herbicide, Tordon 101 Mixture herbicide, or Tordon K herbicide and diluted to make 100 gallons of spray. Apply at a volume of 100 to 400 gallons of total spray per acre depending on size and density of woody plants. Coverage should be thorough to wet all leaves, stems, and root collars. See Table 1 for relationship between spray volume and maximum application rate. When tank mixing, follow applicable use directions and precautions on each manufacturer's label.

Low Volume Foliar Treatment
To control susceptible woody plants, mix up to 20 quarts of Garlon 4 in 10 to 100 gallons of finished spray. The spray concentration of Garlon 4 and total spray volume per acre should be adjusted according to the size and density of target woody plants and kind of spray equipment used. With low volume sprays, use sufficient spray volume to obtain uniform coverage of target plants including the surfaces of all foliage, stems, and root collars (See General Use Precautions). For best results, a surfactant should be added to all spray mixtures. Match equipment and delivery rate of spray nozzles to height and density of woody plants. When treating tall, dense brush, a truck mounted spray gun with spray tips that deliver up to 2 gallons per minute at 40 to 60 psi may be required. Backpack or other types of specialized spray equipment with spray tips that deliver less than 1 gallon of spray per minute may be appropriate for short, low to moderate density brush. See Table 1 for relationship between mixing rate, spray volume and maximum application rate.

Tank Mixing: As a low volume foliar spray, up to 12 quarts of Garlon 4 may be applied in tank mix combination with labeled rates of Tordon K or Tordon 101 Mixture in 10 to 100 gallons of finished spray.

Broadcast Applications With Ground Equipment

Make application using equipment that will assure thorough and uniform coverage at spray volumes applied.

Woody Plant Control

Foliage Treatment: Use 4 to 8 quarts of Garlon 4 in enough water to make 5 or more gallons per acre of total spray, or Garlon 4 at 1 1/2 to 3 quarts may be combined with labeled rates of 2,4-D low volatile ester, Tordon 101 Mixture, or Tordon K in sufficient water to make 5 or more gallons per acre of total spray.

Broadleaf Weed Control
Use Garlon 4 at rates of 1 to 4 quarts in a total volume of 5 or more gallons per acre as a water spray mixture. Apply at any time weeds are actively growing. Garlon 4 at 0.25 to 3 quarts may be tank mixed with labeled rates of 2,4-D amine or low volatile ester, Tordon K, or Tordon 101 Mixture to improve the spectrum of activity. For thickened (high viscosity) spray mixtures, Garlon 4 can be mixed with diesel oil or other inverting agent. When using an inverting agent, read and follow the use directions and precautions on the product label.

Aerial Application (Helicopter Only)

Aerial sprays should be applied using suitable drift control (See "General Use Precautions").

Foliage Treatment (Utility and Pipeline Rights-of-Way)
Use 4 to 8 quarts of Garlon 4 alone, or 3 to 4 quarts Garlon 4 in a tank mix combination with labeled rates of 2,4-D low volatile ester Tordon 101 Mixture or Tordon K and apply in a total spray volume of 10 to 30 gallons per acre. Use the higher rates and volumes when plants are dense or under drought conditions.

Basal Bark and Dormant Brush Treatments

To control susceptible woody plants in rights-of-way, and other non-crop areas, and in forests, use Garlon 4 in oil or oil-water mixtures prepared and applied as described below. When preparing mixtures, use as oils either a commercially available basal oil, diesel fuel, No. 1 or No. 2 fuel oil, or kerosene. Substitute other oils or diluents only as recommended by the oil or diluent's manufacturer. When mixing with a basal oil or other oils or diluents, read and follow the use directions and precautions on the product label prepared by the oil or diluent's manufacturer.

Oil Mixture Sprays
Add Garlon 4 to the required amount of oil in the spray tank or mixing tank and mix thoroughly. If the mixture stands over 4 hours, reagitation is required.

Oil Mixtures of Garlon 4 and Tordon K: Tordon K and Garlon 4 may be used in tank mix combination for basal bark treatment of woody plants. These herbicides are incompatible and will not form a stable mixture when mixed together directly in oil. Stable tank mixtures for basal bark application can be made if each product is first combined with a compatibility agent prior to final mixing in the desired ratio.
(See product bulletin for mixing instructions.)

Oil-Water Mixture Sprays
First, premix the Garlon 4, oil and surfactant in a separate container. Do not allow any water or mixtures containing water to get into the Garlon 4 or the premix. Fill the spray tank about half full with water, then slowly add the premix with continuous agitation and complete filling the tank with water. Continue moderate agitation.

Note: If the premix is put in the tank without any water, the first water added may form a thick "invert" (water in oil) emulsion which will be hard to break.

Basal Bark Treatment
To control susceptible woody plants with stems less than 6 inches in basal diameter, mix 1 to 5 gallons of Garlon 4 in enough oil to make 100 gallons of spray mixture. Apply with knapsack sprayer or power spraying equipment using low pressure (20-40 psi). Spray the basal parts of brush and tree trunks to a height of 12 to 15 inches from the ground. Thorough wetting of the indicated area is necessary for good control. Spray until runoff at the ground line is noticeable. Old or rough bark requires more spray than smooth young bark. Apply at any time, including the winter months, except when snow or water prevent spraying to the ground line.

Low Volume Basal Bark Treatment
To control susceptible woody plants with stems less than 6 inches in basal diameter, mix 20 to 30 gallons of Garlon 4 in enough oil to make 100 gallons of spray mixture. Apply with a backpack or knapsack sprayer using low pressure and a solid cone or flat fan nozzle. Spray the basal parts of brush and tree trunks in a manner which thoroughly wets the lower stems, including the root collar area, but not to the point of runoff. Herbicide concentration should vary with size and susceptibility of species treated. Apply at any time, including the winter months, except when snow or water prevent spraying to the ground line or when stem surfaces are saturated with water.

Garlon 4 Plus Tordon K in Oil Tank Mix: Garlon 4 and Tordon K may be applied as a low volume basal bark treatment to improve control of certain woody species such as ash, elm, maple, poplar, aspen, hackberry, oak, oceanspray, birch, hickory, pine, tanoak, cherry, locust, sassafras, and multiflora rose. (See product bulletin for mixing instructions.)

Streamline Basal Bark Treatment (Southern States)
To control or suppress susceptible woody plants for conifer release, mix 20 to 30 gallons of Garlon 4 in enough oil to make 100 gallons of spray mixture. Apply with a backpack or knapsack sprayer using equipment which provides a directed straight stream spray. Apply sufficient spray to one side of stems less than 3 inches in basal diameter to form a treated zone that is 6 inches in height. When the optimum amount of spray mixture is applied, the treated zone should widen to encircle the stem within approximately 30 minutes. Treat both sides of stems which are 3 to 4 inches in basal diameter. Direct the spray at bark that is approximately 12 to 24 inches above ground. Pines (loblolly, slash, shortleaf, and Virginia) up to 2 inches in diameter breast height (dbh) can be controlled by directing the spray at a point approximately 4 feet above ground. Vary spray mixture concentration with size and susceptibility of the species being treated. Best results are achieved when applications are made to young vigorously growing stems which have not developed the thicker bark characteristic of slower growing, understory trees in older stands. This technique is not recommended for scrub and live oak species, including blackjack, turkey, post, live, bluejack and laurel oaks, or bigleaf maple. Apply from approximately 6 weeks prior to hardwood leaf expansion in the spring until approximately 2 months after leaf expansion is completed. Do not apply when snow or water prevent spraying at the desired height above ground level.

Low Volume Stem Bark Band Treatment (North Central and Lake States)
To control susceptible woody plants with stems less than 6 inches in basal diameter, mix 20 to 30 gallons of Garlon 4 in enough oil to make 100 gallons of spray mixture. Apply with a backpack or knapsack sprayer using low pressure and a solid cone or flat fan nozzle. Apply the spray in a 6 to 10 inch wide band that completely encircles the stem. Spray in a manner that completely wets the bark, but not to the point of runoff. The treatment band may be positioned at any height up to the first major branch. For best results apply the band as low as possible. Spray mixture concentration should vary with size and susceptibility of species to be treated. Applications may be made at any time, including winter months.

Thinline Basal Bark Treatment
To control susceptible woody plants with stems less than 6 inches in diameter, apply Garlon 4 either undiluted or mixed at 50-75% v/v with oil in a thin stream to all sides of the lower stems. The stream should be directed horizontally to apply a narrow band around each stem or clump. Use a minimum of 2 to 15 milliliters of Garlon 4 or oil mixture with Garlon 4 to treat single stems and from 25 to 100 milliliters to treat clumps of stems. Use an applicator metered or calibrated to deliver the small amounts required.

Dormant Stem Treatment
Dormant stem treatments will control susceptible woody plants and vines with stems less than 2 inches in diameter. Plants with stems greater than 2 inches in diameter may not be controlled and resprouting may occur. This treatment method is best suited for sites with dense, small diameter brush. Dormant stem treatments of Garlon 4 can also be used as a chemical side-trim for controlling lateral branches of larger trees that encroach onto roadside, utility, or other rights-of-way.

Mix 4 to 8 quarts of Garlon 4 in 2 to 3 gallons of crop oil concentrate or other recommended oil and add this mixture to enough water to make 100 gallons of spray solution. Use continuous adequate agitation. Apply with Radiarc, OC or equivalent nozzles, or handgun using 70 to 100 gallons of spray per acre to ensure uniform coverage of stems. Garlon 4 may be mixed with 4 quarts of Weedone 170 herbicide to improve the control of black cherry and broaden the spectrum of herbicidal activity. In western states, apply anytime after woody plants are dormant. In other areas apply anytime within 10 weeks of budbreak, generally February through April. Do not apply to wet or saturated bark as poor control may result.

Cut Stump Treatment
To control resprouting of cut stumps of susceptible species, mix 20 to 30 gallons of Garlon 4 in enough oil to make 100 gallons of spray mixture. Apply with a backpack or knapsack sprayer using low pressures and a solid cone or flat fan nozzle. Spray the root collar area, sides of the stump, and the outer portion of the cut surface including the cambium until thoroughly wet, but not to the point of runoff. Spray mixture concentration should vary with size and susceptibility of species treated. Apply at any time, including in winter months, except when snow or water prevent spraying to the ground line.

Treatment of Cut Stumps in Western States
To control resprouting of salt-cedar and other *Tamarix* species, bigleaf maple, tanoak, Oregon myrtle, and other susceptible species, apply undiluted

Garlon 4 to wet the cambium and adjacent wood around the entire circumference of the cut stump. Treatments may be applied throughout the year; however, control may be reduced with treatment during periods of moisture stress as in late summer. Use an applicator which can be calibrated to deliver the small amounts of material required.

Note: All basal bark and dormant brush treatment methods may be used to treat susceptible woody species on range and permanent pasture land provided that no more than 1.5 quarts of Garlon 4 are applied per acre. Large plants or species requiring higher rates of Garlon 4 may not be completely controlled.

Forest Management Applications

For broadcast applications apply the recommended rate of Garlon 4 in a total spray volume of 5 to 25 gallons per acre by air or 10 to 100 gallons per acre by ground. Use spray volumes sufficient to provide thorough coverage of treated foliage. Use application systems designed to prevent spray drift to off-target sites. Nozzles or additives that produce larger droplets may require higher spray volumes to provide adequate coverage.

Plant Back Interval for Conifers: Conifers planted sooner than 1 month after treatment with Garlon 4 at less than 4 quarts per acre or sooner than 2 months after treatment at 4 to 8 quarts per acre may be injured. When tank mixtures of herbicides are used for forest site preparation, labels for all products in the mixture should be consulted and the longest recommended waiting period observed.

Broadcast Treatments for Forest Site Preparation (Not For Conifer Release)

Southern States Including Alabama, Arkansas, Delaware, Florida, Georgia, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia: To control susceptible woody plants and broadleaf weeds, apply Garlon 4 at a rate of 4 to 8 quarts per acre. To broaden the spectrum of woody plants and broadleaf weeds controlled, apply 2 to 4 quarts per acre of Garlon 4 in tank mix combination with labeled rates of Tordon 101 Mixture or Tordon K. Tordon 101 Mixture and Tordon K are not registered for use in the states of California and Florida. Where grass control is also desired, Garlon 4, alone or in combination with Tordon K or Tordon 101 Mixture, may be tank mixed with labeled rates of other herbicides registered for grass control in forests. Use of tank mix products must be in accordance with the most restrictive of label limitations and precautions. No label application rates should be exceeded. Garlon 4 cannot be tank mixed with any product containing a label prohibition against such mixing.

In Western, Northeastern, North Central, and Lake States (States Not Listed Above As Southern States): To control susceptible woody plants and broadleaf weeds, apply Garlon 4 at a rate of 3 to 6 quarts per acre. To broaden the spectrum of woody plants and broadleaf weeds controlled, apply 1.5 to 3.0 quarts per acre of Garlon 4 in tank mix combination with labeled rates of Tordon 101 Mixture, Tordon K, or 2,4-D low volatile ester. Tordon 101 Mixture and Tordon K are not registered for use in the states of California and Florida. Where grass control is also desired, Garlon 4, alone or in tank mix combination with Tordon 101 Mixture or Tordon K, may be applied with labeled rates of other herbicides registered for grass control in forests. When applying tank mixes, follow applicable use directions and precautions on each product label.

Applications for Site Preparation in Southern Coastal Flatwoods: To control susceptible broadleaf weeds and woody species such as gallberry and wax-myrtle, and for partial control of saw-palmetto, apply 2 to 4 quarts per acre of Garlon 4. To broaden the spectrum of species controlled to include fetterbush, staggerbush, titi, and grasses, apply 2 to 3 quarts per acre of Garlon 4 in tank mix combination with labeled rates of Arsenal Applicator's Concentrate herbicide. Where control of gallberry, wax-myrtle, broadleaf weeds, and grasses is desired, 2 to 3 quarts per acre of Garlon 4 may be applied in tank mix combination with labeled rates of Accord herbicide.

These treatments may be broadcast during site preparation of flat planted or bedded sites or, on bedded sites, applied in bands over the top of beds. For best results, make applications in late summer or fall. Efficacy may not be satisfactory when applications are made in early season prior to August. **Note: Do not apply after planting pines.**

Applications for Conifer Release

Note: Applications for conifer release may cause temporary damage and growth suppression where contact with conifers occurs; however, injured conifers should recover and grow normally. Over-the-top spray applications can kill pines.

Directed Sprays
To release conifers from competing hardwoods and brush such as red maple, sugar maple, striped maple, sweetgum, red and white oaks, ash, hickory, alder, birch, aspen, pin cherry, *Ceanothus* spp., blackberry, chinquapin, and poison oak, mix 4 to 20 quarts of Garlon 4 in enough water to make 100 gallons of spray mixture. This spray should be directed onto foliage of competitive hardwoods using knapsack or backpack sprayers with flat fan nozzles or equivalent any time after the hardwoods and brush have reached full leaf size, but before autumn coloration. The majority of treated hardwoods and brush should be less than 6 feet in height to ensure adequate spray coverage. Care should be taken to direct spray solutions away from conifer foliage, particularly foliage of desirable pines. See Table 1 for relationship between mixing rate, spray volume and maximum application rate.

Broadcast Applications for Mid-Rotation Understory Brush Control in Southern Coastal Flatwoods Pine Stands (Ground Equipment Only)
For control of susceptible species such as gallberry and wax-myrtle and broadleaf weeds, apply 2 to 4 quarts per acre of Garlon 4. To broaden the spectrum of woody plants controlled to include fetterbush, staggerbush, and titi, apply 2 to 3 quarts per acre of Garlon 4 in tank mix combination with labeled rates of Arsenal Applicator's Concentrate. Saw-palmetto will be partially controlled by use of Garlon 4 at 4 quarts per acre or by mixtures of Garlon 4 at 2 to 3 quarts per acre in tank mix combination with either Arsenal Applicator's Concentrate or Escort herbicide.

These mixtures should be broadcast applied over target understory brush species, **but to prevent injury to pines, make applications underneath the foliage of pines.** It is recommended that sprays be applied in 30 or more gallons per acre of total volume. For best results, make applications in late summer or fall. Efficacy may not be satisfactory when applications are made in early season prior to August.

Broadcast Applications for Conifer Release in the Pacific Northwest and California

On Dormant Conifers Before Bud Swell (Excluding Pines): To control or suppress deciduous hardwoods such as vine maple, bigleaf maple, alder, scotch broom, or willow **before leaf-out** or evergreen hardwoods such as madrone, chinquapin, and *Ceanothus* spp., use Garlon 4 at 1 to 2 quarts per acre. Diluents used may be diesel or fuel oil. Or, water plus 1 to 2 gallons per acre of diesel oil or a suitable surfactant or oil substitute at manufacturer's recommended rates may be used.

On Conifer Plantations (Excluding Pines) After Hardwoods Begin Growth and Before Conifer Bud Break ("Early Foliar" Hardwood Stage): Use Garlon 4 at 1.0 to 1.5 quarts alone or plus 2,4-D low volatile ester herbicide in water carrier to provide no more than 3 pounds acid

equivalent per acre from both products. After conifer bud break, these sprays may cause more serious injury to the crop trees. Use of a surfactant may cause unacceptable injury to conifers especially after bud break.

On Conifer Plantations (Excluding Pines) After Conifers Harden Off In Late Summer and While Hardwoods Are Still Growing Actively: Use Garlon 4 at rates of 1.0 to 1.5 quarts per acre alone or plus 2,4-D low volatile ester to provide no more than 3 pounds acid equivalent per acre from both products. Treat as soon after conifer bud hardening as possible so that hardwoods and brush are actively growing. Use of oil, oil substitute, or surfactant may cause unacceptable injury to the conifers.

Broadcast Applications for Conifer Release in the Eastern United States
To release spruce, fir, red pine, and white pine from competing hardwoods such as red maple, sugar maple, striped maple, alder, birch (white, yellow, and grey), aspen, ash, pin cherry, and *Rubus* spp. and perennial and annual broadleaf weeds, use Garlon 4 at rates of 1.5 to 3.0 quarts per acre alone or plus 2,4-D amine or low volatile ester to provide no more than 4 pounds acid equivalent per acre from both products. Applications should be made in late summer or early fall after conifers have formed their overwintering buds and hardwoods are in full leaf and prior to autumn coloration.

Broadcast Applications for Conifer Release in the Lake States Region
To release spruce, fir, and red pine from competing hardwoods such as aspen, birch, maple, cherry, willow, oak, hazel, and *Rubus* spp. and perennial and annual broadleaf weeds, use Garlon 4 at rates of 1.5 to 3.0 quarts per acre. Applications should be made in late summer or early fall after conifers have formed their overwintering buds and hardwoods are in full leaf and prior to autumn coloration.

Warranty Disclaimer

Dow AgroSciences warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. Dow AgroSciences MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

Inherent Risks of Use

It is impossible to eliminate all risks associated with use of this product. Plant injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperature, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of Dow AgroSciences or the seller. All such risks shall be assumed by buyer.

Limitation of Remedies

The exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at Dow AgroSciences' election, one of the following:

1. Refund of purchase price paid by buyer or user for product bought, or
2. Replacement of amount of product used

Dow AgroSciences shall not be liable for losses or damages resulting from handling or use of this product unless Dow AgroSciences is promptly notified of such loss or damage in writing. In no case shall Dow AgroSciences be liable for consequential or incidental damages or losses.

The terms of the "Warranty Disclaimer" above and this "Limitation of Remedies" cannot be varied by any written or verbal statements or agreements. No employee or sales agent of Dow AgroSciences or the seller is authorized to vary or exceed the terms of the "Warranty Disclaimer" or this "Limitation of Remedies" in any manner.

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Dow AgroSciences LLC • Indianapolis, IN 46268 U.S.A.

Label Code: D02-102-023
Replaces Label: D02-102-022

EPA-Accepted 07/22/97

Revisions:
Minor corrections to EPA accepted text dated 7-22-97

ATTACHMENT C2

PATHFINDER II®

Specimen Label

Dow AgroSciences

Pathfinder* II

Specialty Herbicide

*Trademark of Dow AgroSciences LLC

A ready-to-use herbicide for the control of woody plants on:

- **Forests**
- **Non-crop areas including: Industrial manufacturing and storage sites, rights-of-way, non-irrigation ditch banks**
- **Rangeland and permanent pastures**
- **Grazed areas and maintenance of wildlife openings on those sites**

Active Ingredient:	
triclopyr: 3,5,6-trichloro-2-pyridinyloxyacetic acid, butoxyethyl ester	13.6%
Inert Ingredients	86.4%
Total	100.0%

Acid Equivalent: triclopyr – 9.81% – 0.75 lb/gal

EPA Reg. No. 62719-176

Keep Out of Reach of Children

CAUTION PRECAUCION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

Precautionary Statements

Hazards to Humans and Domestic Animals

Harmful If Swallowed, Inhaled Or Absorbed Through The Skin

Avoid contact with skin, eyes or clothing. Avoid breathing vapor or spray mist. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

Personal Protective Equipment (PPE)

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category E on an EPA chemical resistance category selections chart.

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber, or Viton
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

First Aid

If on skin: Wash with plenty of soap and water. Get medical attention.
If inhaled: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.
If swallowed: Call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. Do not induce vomiting or give anything by mouth to an unconscious person.

Environmental Hazards

This pesticide is toxic to fish. Keep out of lakes, ponds or streams. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

Physical or Chemical Hazards

Combustible - Do not use or store near heat or open flame. Do not cut or weld container.

Notice: Read the entire label. Use only according to label directions. **Before buying or using this product, read "Warranty Disclaimer" and "Limitation of Remedies" elsewhere on this label.**

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994. If you wish to obtain additional product information, visit our web site at www.dowagro.com.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
Read all Directions for Use carefully before applying.

Ready-To-Use, No Mixing Required.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber, or Viton
- Shoes plus socks

Storage and Disposal

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited.
Storage: Store above 28°F or agitate before use.
Pesticide Disposal: Pesticide, spray mixture, or rinsate that cannot be used according to label instructions must be disposed of according to applicable federal, state, or local procedures.
Container Disposal: Triple rinse (or equivalent) with 10 drops or more of a liquid hand soap and water or an oil basal product such as kerosene or diesel fuel and spray rinsate on undesirable vegetation, in target area. Offer containers for recycling or reconditioning where allowed, or puncture and dispose of in a sanitary landfill, or by incineration if approved by state and local procedures.
Container Disposal for Refillable Containers: Close all openings which have been opened during use and replace all caps. Return the empty container to a collection site designated by Dow AgroSciences. If the container has been damaged and cannot be returned according to the recommended procedures, contact the Dow AgroSciences Customer Service Center at 1-800-258-1470 to obtain proper handling instructions.
General: Consult federal, state, or local disposal authorities for approved alternative procedures.

General Information

Pathfinder II herbicide is a ready-to-use product which is recommended for the control of unwanted woody plants through the use of basal bark application techniques in forests, rangeland and permanent pastures, and on non-crop areas including industrial manufacturing and storage sites, rights-of-way such as electrical power lines, communication lines, pipelines, road sides and railroads, fence rows, non-irrigation ditch banks and around farm buildings. Use on these sites may include application to grazed areas as well as establishment and maintenance of wildlife openings.

General Use Precautions

The state of Arizona has not approved Pathfinder II for use on plants grown for commercial production; specifically forests grown for commercial timber production, or on designated grazing areas.

Apply this product only as specified on this label.

Do not apply this product through any type of irrigation system.

It is permissible to treat non-irrigation ditch banks, seasonally dry wetlands, flood plains, deltas, marshes, swamps, bogs, and transitional areas between upland and lowland sites. Do not apply to open water (such as lakes, reservoirs, rivers, streams, creeks, salt water bays or estuaries) nor to water present in fresh water wetlands, deltas, marshes, swamps, bogs or potholes, or to salt water marshes below the mean high water mark.

Do not apply Pathfinder II herbicide directly to, or otherwise permit it to come into direct contact with grapes, tobacco, vegetable crops, flowers or other desirable broadleaf plants, and do not permit spray mists containing it to drift onto them.

Avoid Injurious Spray Drift: Applications should be made only when there is little or no hazard from spray drift. Very small quantities of spray, which may not be visible, may seriously injure susceptible plants. Do not spray when wind is blowing toward susceptible crops or ornamental plants near enough to be injured.

With ground equipment, spray drift can be reduced by using spray pressures no greater than are required to obtain adequate coverage; by using large droplet producing nozzle tips; and by spraying when wind velocity is low. Do not apply with nozzles that produce a fine droplet spray. Do not apply with an orchard type mist blower.

Do not apply on snow or frozen ground.

Untreated trees occasionally can be affected by movement of the herbicide through root grafting with the treated trees.

Since this herbicide moves within the treated plant, do not use Pathfinder II on parts of a multiple stem plant if injury to the untreated portions (cut or standing stems) cannot be tolerated.

Do not apply on ditches used to transport irrigation water. Do not apply where runoff or irrigation water may flow onto agricultural land as injury to crops may result.

Be sure that use of this product conforms to all applicable regulations.

Grazing and Haying Restrictions

Grazing or harvesting green forage:

1) Lactating dairy animals
   - 2.5 gallons/acre or less: Do not graze or harvest green forage from treated area for 14 days after treatment.
   - Greater than 2.5 gallons/acre: Do not graze or harvest green forage until the next growing season.
2) Other Livestock
   - 2.5 gallons/acre or less: No grazing restrictions.
   - Greater than 2.5 to 7.5 gallons/acre: Do not graze or harvest green forage from treated area for 14 days after treatment. **Note:** If less than 25% of a grazed area is treated, there is no grazing restriction.

Haying (harvesting of dried forage):

1) Lactating dairy animals
   - Do not harvest hay until the next growing season.

2) Other Livestock
   - 2.5 gallons/acre or less: Do not harvest hay for 7 days after treatment.
   - Greater than 2.5 to 5 gallons/acre: Do not harvest hay for 14 days after treatment.
   - Greater than 5 gallons/acre: Do not harvest hay until the next growing season.

Slaughter Restrictions: Withdraw livestock from grazing treated grass or consumption of treated hay at least 3 days before slaughter. This restriction applies to grazing during the season following treatment or hay harvested during the season following treatment.

Among The Woody Plant Species Controlled Are:

ailanthus	hackberry	oak, water
alder, red	hazel	oak, white
alder, speckled	hercules club	olive, autumn
ash, green	hickory, mockernut	olive, Russian
ash, white	hickory, pignut	persimmon, common
aspen†	honeylocust	pine, jack
Australian pine	hornbeam (blue beach)	pine, loblolly
basswood	locust, black†	pine, ponderosa
beech, American	madrone, Pacific	pine, red
birch, black	manzanita, greenleaf	pine, white
birch, gray	maple, bigleaf†	poison ivy
birch, paper	maple, mountain	poison oak
blackberry	maple, red	poplar, balsam
black locust	maple, silver	redcedar, eastern
blackgum	maple, striped	salt cedar†
boxelder	maple, sugar	sassafras†
Brazilian pepper	maple, vine	sumac, smooth†
cherry, black†	mesquite†/†††	sumac, staghorn†
cherry, choke	mountain-laurel	sweetgum
cherry, pin	oak, black††	sycamore
cottonwood	oak, blackjack††	tamarack
dogwood, flowering	oak, chestnut	tanoak
dogwood, red-osier	oak, post††	walnut
elm, American	tanoak	waxmyrtle
elm, winged†	walnut	willow
gallberry	oak, red	yaupon
guava	oak, scarlet	yellow poplar

† Some resprouting may occur.
†† Not recommended for streamline basal treatment.
††† Suppression only with streamline basal bark treatment.

Approved Uses

Forest Uses

Agricultural Use Requirements for Forest Use: For the following crop and forestry uses, follow PPE and Reentry instructions in the "Agricultural Use Requirements" section of this label.

Non-crop Uses Such As Rights-of-Way, Industrial Sites, Rangeland and Permanent Pastures, Non-irrigation Ditch Banks and Wildlife Openings.

Use Requirements for Non-cropland Areas: No Worker Protection Standard worker entry restrictions or worker notification requirements apply when this product is applied to non-cropland areas.

Low Volume Basal Bark Treatment
To control susceptible woody plants with stems less than 6 inches in basal diameter, apply Pathfinder II with a backpack or knapsack sprayer using low pressure and a solid cone or flat fan nozzle. Spray the basal parts of brush and tree trunks in a manner which thoroughly wets the lower 12 to 15 inches of stems, including the root collar area, but not to the point of runoff. Herbicide concentration should vary with size and susceptibility of species treated. Apply at any time, including the winter months, except when snow or water prevent spraying to the ground line.

Treatment of Cut Stumps
To control resprouting, apply undiluted Pathfinder II to wet the area adjacent to the cambium and bark around the entire circumference and the sides of cut stumps. Sides of stumps should be thoroughly wetted down to the root collar area, but not to the point of runoff. Treatments may be applied throughout the year, except when snow or water prevent spraying to the ground line. Control may be reduced with treatment during periods of moisture stress as in late summer.

Streamline Basal Bark Treatment (Southern States)
To control or suppress susceptible woody plants for conifer release or in rangeland and pasture, apply Pathfinder II with a backpack or knapsack sprayer using equipment which provides a directed straight-stream spray. Apply sufficient spray to one side of stems less than 3 inches in basal diameter to form a treated zone that is 6 inches in height. When the optimum amount of spray mixture is applied, the treated zone should widen to encircle the stem within approximately 30 minutes. Treat both sides of stems which are 3 to 4 inches in basal diameter. Direct the spray at bark that is approximately 12 to 24 inches above ground. Pines (loblolly, slash, shortleaf, and Virginia) up to 2 inches in diameter breast height (dbh) can be controlled by directing the spray at the point approximately 4 feet above ground. Best results are achieved when applications are made to young vigorously growing stems which have not developed the thicker bark characteristic of slower growing, understory trees in older stands. This technique is not recommended for scrub and live oak species, including blackjack, turkey, post, live, bluejack and laurel oaks. Apply from approximately 6 weeks prior to hardwood leaf expansion in the spring until approximately 2 months after leaf expansion is completed. Do not apply when snow or water prevent spraying at the desired height above ground level.

Warranty Disclaimer

Dow AgroSciences warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. Dow AgroSciences MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

Inherent Risks of Use

It is impossible to eliminate all risks associated with use of this product. Plant injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperature, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of Dow AgroSciences or the seller. All such risks shall be assumed by buyer.

Limitation of Remedies

The exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at Dow AgroSciences' election, one of the following:

1. Refund of purchase price paid by buyer or user for product bought, or
2. Replacement of amount of product used

Dow AgroSciences shall not be liable for losses or damages resulting from handling or use of this product unless Dow AgroSciences is promptly notified of such loss or damage in writing. In no case shall Dow AgroSciences be liable for consequential or incidental damages or losses.

The terms of the "Warranty Disclaimer" above and this "Limitation of Remedies" cannot be varied by any written or verbal statements or agreements. No employee or sales agent of Dow AgroSciences or the seller is authorized to vary or exceed the terms of the "Warranty Disclaimer" or this "Limitation of Remedies" in any manner.

*Trademark of Dow AgroSciences LLC
Dow AgroSciences LLC • Indianapolis, IN 46268 U.S.A.

Label Code: D02-104-007
Replaces Label: D02-104-006

EPA Accepted 05/17/94

Revisions:

1. General Use Precautions (The following statement was deleted from this section): "Do not use for manufacturing or formulating."

ATTACHMENT C3

ACCORD®

MATERIAL SAFETY DATA SHEET

Dow AgroSciences

Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

ACCORD* CONCENTRATE HERBICIDE

Effective Date: 3/23/04
Product Code: 84820
MSDS: 006694

1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: Accord* Concentrate Herbicide

COMPANY IDENTIFICATION:
Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, IN 46268-1189

2. COMPOSITION/INFORMATION ON INGREDIENTS:

Glyphosate IPA: N-(phosphono-methyl) glycine, Isopropylamine Salt	CAS # 038641-94-0	53.8%
Balance, Total		46.2%

3. HAZARDOUS IDENTIFICATIONS:

EMERGENCY OVERVIEW

Clear, pale yellow liquid. May cause eye irritation. Slightly toxic to aquatic organisms.
EMERGENCY PHONE NUMBER: 800-992-5994

4. FIRST AID:

EYE: Flush eyes thoroughly with water for several minutes. Remove contact lenses after initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

SKIN: Wash skin with plenty of water.

INGESTION: No emergency medical treatment necessary.

INHALATION: Remove person to fresh air; if effects occur, consult a physician.

NOTE TO PHYSICIAN: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES:

FLASH POINT: >214°F (>101°C)
METHOD USED: Setaflash

FLAMMABLE LIMITS:
LFL: Not applicable
UFL: Not applicable

EXTINGUISHING MEDIA: Foam, CO_2, Dry Chemical

FIRE AND EXPLOSION HAZARDS: Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. Toxic irritating gases may be formed under fire conditions.

FIRE-FIGHTING EQUIPMENT: Use positive-pressure, self-contained breathing apparatus and full protective equipment.

6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS: Absorb small spills with an inert absorbent material such as Hazorb, Zorball, sand, or dirt. Report large spills to Dow AgroSciences on 800-992-5994.

7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep out of reach of children. Do not swallow. Avoid contact with eyes, skin, and clothing. Avoid breathing vapors and spray mist. Handle concentrate in ventilated area. Wash thoroughly with soap and water after handling and before eating, chewing gum, using tobacco, using the toilet or smoking. Keep away from food, feedstuffs, and water supplies. Store in original container with the lid tightly closed. Store above 10°F (-12°C) to keep from crystallizing.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINES: None established

ENGINEERING CONTROLS: Good general ventilation should be sufficient for most conditions. Local exhaust ventilation may be necessary for some operations.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

EYE/FACE PROTECTION: Use safety glasses.

SKIN PROTECTION: No precautions other than clean body-covering clothing should be needed.

RESPIRATORY PROTECTION: For most conditions, no respiratory protection should be needed; however, if discomfort is experienced, use a NIOSH approved air-purifying respirator.

APPLICATIONS AND ALL OTHER HANDLERS: Please refer to the product label for personal protective clothing and equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES:

APPEARANCE: Clear, pale yellow liquid
DENSITY: 10.0 - 10.5 lbs/gal
pH: 4.8 – 5.0
ODOR: None
SOLUBILITY IN WATER: Miscible
SPECIFIC GRAVITY: 1.21 gm/L
FREEZING POINT: -7°F - -10°F (-21°C - -25°C)

10. STABILITY AND REACTIVITY:

STABILITY: (CONDITIONS TO AVOID) Stable under normal storage conditions.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Galvanized or unlined steel (except stainless steel) containers or spray tanks may produce hydrogen gas which may form a highly combustible gas mixture.

HAZARDOUS DECOMPOSITION PRODUCTS: None known.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION:

EYE: May cause slight temporary eye irritation. Corneal injury is unlikely.

SKIN: Essentially non-irritating to skin. Prolonged skin contact is unlikely to result in absorption of harmful amounts. The LD_{50} for skin absorption in rabbits is >5000 mg/kg. Did not cause allergic skin reactions when tested in guinea pigs.

INGESTION: Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts. The oral LD_{50} for rats is >5000 mg/kg.

INHALATION: Brief exposure (minutes) is not likely to cause adverse effects. The aerosol LC_{50} for rats is >6.37 mg/L for 4 hours.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: For a similar material, glyphosate, in animals, effects have been reported on the following organ: liver.

CANCER INFORMATION: A similar material, glyphosate, did not cause cancer in laboratory animals.

TERATOLOGY (BIRTH DEFECTS): For glyphosate IPA, available data are inadequate for evaluation of potential to cause birth defects.

REPRODUCTIVE EFFECTS: For glyphosate IPA, available data are inadequate to determine effects on reproduction.

MUTAGENICITY: For a similar material, glyphosate, in-vitro and animal genetic toxicity studies were negative.

12. ECOLOGICAL INFORMATION:

ENVIRONMENTAL DATA:

ECOTOXICOLOGY:
Material is practically non-toxic to aquatic organisms on an acute basis (LC_{50} or EC_{50} is >100 mg/L in most sensitive species tested).
Acute LC_{50} for rainbow trout *(Oncorhynchus mykiss)* is >2500 mg/L.
Acute immobilization EC_{50} in water flea *(Daphnia magna)* is 918 mg/L.
Material is practically non-toxic to birds on an acute basis (LD_{50} is >2000 mg/kg).
Acute oral LD_{50} in bobwhite *(Colinus virginianus)* is >2000 mg/kg.
The LC_{50} in earthworm Eisenia foetida is >1000 mg/kg.
Acute contact LD_{50} in honey bee *(Apis mellifera)* is >100 µg/bee.
Acute oral LD_{50} in honey bee *(Apis mellifera)* is >100 µg/bee.
Growth inhibition EC_{50} in green alga *(Selenastrum capricornutum)* is 127 mg/L.
Growth inhibition EC_{50} in duckweed *(Lemna sp.)* is 24.4 mg/L.

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities.

MATERIAL SAFETY DATA SHEET

Dow AgroSciences

Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

ACCORD* CONCENTRATE HERBICIDE

Effective Date: 3/23/04
Product Code: 84820
MSDS: 006694

This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

If the material as supplied becomes a waste, follow all applicable regional, national and local laws and regulations.

14. TRANSPORT INFORMATION:

U.S. DEPARTMENT OF TRANSPORTATION (DOT) INFORMATION:

For all package sizes and modes of transportation:
This material is not regulated for transport.

15. REGULATORY INFORMATION:

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

U.S. REGULATIONS

SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Not to have met any hazard category

TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: This product is not known to contain any substances subject to the disclosure requirements of

New Jersey
Pennsylvania

OSHA HAZARD COMMUNICATION STANDARD: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND): To the best of our knowledge, this product contains no chemical subject to reporting under CERCLA.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

CATEGORY	RATING
Health	1
Flammability	1
Reactivity	0

16. OTHER INFORMATION:

MSDS STATUS: Revised Sections: 3,4,11,12,13,14 & 15
Reference: DR-0361-8028
Replaces MSDS Dated: 1/12/00
Document Code: D03-145-002
Replaces Document Code: D03-145-001

The Information Herein Is Given In Good Faith, But No Warranty, Express Or Implied, Is Made. Consult Dow AgroSciences For Further Information.

*Trademark of Dow AgroSciences LLC

ATTACHMENT C4

VELPAR®

The MSDS format adheres to the standards and regulatory requirements of the United States and may not meet regulatory requirements in other countries.

"DuPont" "VELPAR" DF HERBICIDE
M0000325 Revised 25-JUN-2003

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

VELPAR is a registered trademark of DuPont.

"DuPont" is a trademark of DuPont.

Corporate MSDS Number : DU008210

Tradenames and Synonyms

"Velpar" F
"VELPAR" 75WG
DUPONT VELPAR 75WG

Company Identification

MANUFACTURER/DISTRIBUTOR
DuPont
1007 Market Street
Wilmington, DE 19898

PHONE NUMBERS
Product Information : 1-800-441-7515 (outside the U.S. 302-774-1000)
Transport Emergency : CHEMTREC 1-800-424-9300(outside U.S. 703-527-3887)
Medical Emergency : 1-800-441-3637 (outside the U.S. 302-774-1000)

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
*HEXAZINONE (3-cyclohexyl-6-(dimethylamino)-1-methyl-1,3,5-triazine-2,4(1H,3H)-dione)	51235-04-2	75
INERT INGREDIENTS		25

* Disclosure as a toxic chemical is required under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

HAZARDS IDENTIFICATION

Emergency Overview

DANGER Corrosive, causes irreversible eye damage. Harmful if swallowed. Do not get in eyes or on clothing. Avoid contact with skin. Wash thoroughly with soap and water after handling.

Potential Health Effects

HUMAN HEALTH EFFECTS OF OVEREXPOSURE TO HEXAZINONE:

Overexposure to hexazinone by eye contact may initially include eye irritation with discomfort, tearing, or blurring of vision.

Ingestion may include abnormal liver function as detected by laboratory tests.

Significant skin permeation and systemic toxicity after contact appears unlikely. Individuals with preexisting diseases of the liver may have increased susceptability to the toxicity of excessive exposures.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

FIRST AID MEASURES

First Aid

IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

IF SWALLOWED: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

INHALATION: No specific intervention is indicated, as the compound is not likely to be hazardous by inhalation. Consult a physician if necessary.

(FIRST AID MEASURES - Continued)

Notes to Physicians

Probable mucosal damage may contraindicate the use of gastric lavage.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-441-3637 for emergency medical treatment information.

FIRE FIGHTING MEASURES

Flammable Properties

Not a fire or explosion hazard.

Extinguishing Media

Use media appropriate for surrounding material.

Fire Fighting Instructions

Keep personnel removed and upwind of fire. Wear self-contained breathing apparatus. Wear full protective equipment.

If area is exposed to fire and conditions permit, let fire burn itself out. Burning chemicals may produce by-products more toxic than the original material. If product is on fire, wear self-contained breathing apparatus and full protective equipment. Use water spray. Control runoff.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Emergency Response - Chemical resistant coveralls, waterproof gloves, waterproof boots and face/eye protection. If dusting occurs, use NIOSH approved respirator protection.

Initial Containment

Dike spill. Prevent material from entering sewers, waterways, or low areas.

Spill Clean Up

Shovel or sweep up.

HANDLING AND STORAGE

Handling (Personnel)

Do not get in eyes. Avoid breathing dust. Avoid contact with skin. Avoid contact with clothing.

USERS SHOULD: Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

Storage

Store product in original container only. Do not contaminate water, other pesticides, fertilizer, food or feed in storage.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Use only with adequate ventilation.

Personal Protective Equipment

Applicators and other handlers must wear:

Long-sleeved shirt and long pants.
Shoes plus socks.
Protective eye wear

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

Follow manufacturer instructions for cleaning and maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:

- Coveralls.
- Chemical resistant gloves in Category A (such as
- butyl rubber, natural rubber, neoprene rubber, or
- Nitrile rubber) all greater than or equal to 14
- mils.
- Shoes plus socks.
- Protective eyewear.

Exposure Guidelines

Applicable Exposure Limits
HEXAZINONE

PEL	(OSHA)	: None Established
TLV	(ACGIH)	: None Established
AEL *	(DuPont)	: 10 mg/m3, 8 Hr. TWA

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Odor	: Acrid (slight).
Form	: Dry Flowable Granules.
Color	: Tan (light).
pH	: 8.4 (1% wt/wt in water)
Density	: 0.58 g/mL
Solubility in Water¸	: Water Dispersible

STABILITY AND REACTIVITY

Chemical Stability

Stable at normal temperatures and storage conditions.

Incompatibility with Other Materials

Incompatible or can react with strong bases.

Decomposition

Decomposition will not occur.

Polymerization

Polymerization will not occur.

TOXICOLOGICAL INFORMATION

Animal Data

Acute Oral LD50¸: calculated to be 1310 mg/kg in rats.

Acute Dermal LD50¸: > 5000 mg/kg in rabbits.

Inhalation 4 hour LC50¸: > 5.2 mg/L in rats.

Eye Irritation: In tests with rabbits, product caused conjunctival chemosis, conjunctival redness, and corneal opacity. Positive irritant effects were present in 1 rabbit

(TOXICOLOGICAL INFORMATION - Continued)

21 days after treatment.

Skin irritation and Sensitization: According to criteria established by the U.S. EPA this product is considered to be a moderate skin irritant. According to criteria established by EEC Directive 93/21 this product can be classified a non-irritant. Product is not a skin sensitizer in tests on guinea pigs.

OTHER STUDIES - Hexazinone

Oral (rat): In a 2-year feeding study with the 90% powder, the no-observable-effect level (NOEL) was 200 ppm a.i.; nutritional and body weight effects were seen in females at 1000 ppm a.i. and in both sexes at 2500 ppm a.i. Biochemical effects were noted in both sexes at 2500 ppm a.i.

Oral (mouse): In a 2-year feeding study with technical material, the no-observable-effect level (NOEL) was 200 ppm. Decreased body weight gain was observed in both sexes at 2500 ppm and 10000 ppm. This effect was severe at 10000 ppm, the highest level tested. Non-neoplastic liver effects were noted in males at 2500 ppm and in both sexes at 10000 ppm. Based on recent pathology review, hyperplastic liver nodules diagnosed at 10000 ppm when this study was initially conducted have been reclassified as liver adenomas. This effect was only significant among female mice in this dose group. This change reflects the current scientific concensus regarding the classification of this benign lesion in the mouse liver.

Oral (dog): In a 1-year feeding study with technical material, the NOEL was 200 ppm. Reduced food consumption and body weight gains were significant at the high dose, 6000 ppm. These nutritional effects were associated with mild but reversible changes in hematological parameters at the high dose. Increased liver weights and other non-neoplastic liver effects as indicated by histopathology and changes in clinical chemical parameters were observed at 1500 and/or 60000 ppm.

Reproduction (rat): In a 3-generation, 3-litter study with 90% powder, no adverse reproduction or lactation effects were seen at any level; slightly depressed average weanling weights were noted in the second and third litters at the high dose, 2500 ppm. A second rat reproduction study (2-generation, 3-litter study) was conducted at dietary doses from 200 to 5000 ppm. There were no adverse effects on fertility. The NOEL was 200 ppm. Decreased food consumption, parental body weight gain and decreased offspring weights were observed at the higher doses.

Teratogenicity: Not teratogenic or embrryo-fetal toxic to

(TOXICOLOGICAL INFORMATION - Continued)

rats by dietary administration at levels as high as 5000 ppm, the highest dose tested. Administration to rats by oral intubation resulted in a NOEL for maternal and fetal effects of 100 mg/kg body wt./day. Maternal toxicity (reduced food consumption and lower body weights) was observed at 400 and 900 mg/kg. Lower fetal weights and indications of general delayed development associated with maternal toxicity were also observed at these doses. When hexazinone was administered to rabbits via oral intubation, there were no teratogenic or embryo-fetal toxic effects at the highest dose tested, 125 mg/kg/day. Only a transient reduction in maternal food consumption was observed at the high dose. The maternal and fetal NOELs are considered to be 125 mg/kg.

Mutagenicity: Not mutagenic in Ames bacterial assay, Chinese hamster ovary cell point mutation assay, or rat liver DNA repair assay; positive in the in vitro Chinese hamster ovary cell cytogenetic assay but negative in the in vivo rat bone marrow cytogenic assay.

ECOLOGICAL INFORMATION

Ecotoxicological Information

Aquatic Toxicity

For the active ingredient hexazinone:

- 96 Hour LC50, bluegill sunfish: >370 ppm
  96 Hour LC50, rainbow trout : >320 ppm
- 96 hour LC50, fathead minnow : 274 ppm

DISPOSAL CONSIDERATIONS

Waste Disposal

Do not contaminate water, food, or feed by disposal. Waste resulting from the use of this product may be disposed of on the site or at an approved waste disposal facility.

Environmental Hazards
Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.
The active ingredient, hexazinone, in this product is known to leach through soil into ground water under certain conditions as a result of agricultural use. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground-water

(DISPOSAL CONSIDERATIONS - Continued)

contamination.

Container Disposal

For Plastic Containers: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

For Fiber Sacks: Completely empty fiber sack by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into manufacturing or application equipment. Then dispose of sack in a sanitary landfill or by incineration if allowed by State and local authorities.

For Fiber Drums with Liners: Completely empty liners by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into manufacturing or application equipment. Then dispose of liner in a sanitary landfill or by incineration if allowed by State and local authorities. If the drum is contaminated and cannot be reused, dispose of in the same manner.

For Paper and Plastic Bags: Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

TRANSPORTATION INFORMATION

Shipping Information

DOT/IMO
Proper Shipping Name : Not Regulated

REGULATORY INFORMATION

U.S. Federal Regulations

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute : Yes
Chronic : No
Fire : No
Reactivity : No
Pressure : No

(REGULATORY INFORMATION - Continued)

In the United States this product is regulated by the US Environmental Protection Agency under the Federal Insecticide, Fungicide and Rodenticide Act. It is a violation of federal law to use this product in a manner inconsistent with its labeling.

EPA Reg. No. 352-581

OTHER INFORMATION

NFPA, NPCA-HMIS

NFPA Rating
Health : 2
Flammability : 1
Reactivity : 0

NPCA-HMIS Rating
Health : 2
Flammability : 1
Reactivity : 0

Personal Protection rating to be supplied by user depending on use conditions.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS : DuPont Crop Protection
Address : Wilmington, DE 19898
Telephone : 1-888-638-7668

# Indicates updated section.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS

ATTACHMENT C5

HASTEN®

WILBUR-ELLIS
IDEAS TO GROW WITH®
PO BOX 16458 • FRESNO CA 93755

MATERIAL SAFETY DATA SHEET

PRODUCT/TRADE NAME:

HASTEN

I. NAME

PRODUCT/TRADE NAME: HASTEN
EPA REGISTRATION #: NONE
CHEMICAL NAME/COMMON NAME:
Nonionic Surfactant/Nonionic Surfactant

II. HAZARDOUS INGREDIENTS

	CAS#	OSHA PEL	ACGIH TLV
Nonionic Surfactant	Mixture	NE	NE

III. PHYSICAL DATA

SPECIFIC GRAVITY (H2O = 1): .9
MELTING POINT: NA
VAPOR DENSITY (AIR = 1): NE
% VOLATILES BY VOL.: NE
ODOR: Fatty
APPEARANCE: Amber Liquid
FLASH POINT/METHOD: >150 Deg. C
VAPOR PRESSURE (mmHg): NE
SOLUBILITY IN H2O: Emulsifiable

IV. FIRE & EXPLOSION HAZARD

EXTINGUISHING MEDIA: [ ] Water Fog [X] Foam [ ]Alcohol Foam
[X] CO2 [X] Dry Chemical [ ] Other
FIRE FIGHTING PRECAUTIONS & HAZARDS:
Fight fire upwind. Wear positive pressure self-contained breathing apparatus and full protective clothing. Do not breathe smoke or spray mist. Avoid fallout and runoff. Dike to prevent entering drains, sewers, or water courses. Evacuate people downwind from fire.

V. CARCINOGEN STATUS

[ ] OSHA [ ] NTP [ ] IARC [X] No Listing Type

VI. REACTIVITY

[X] Stable HAZARDOUS POLYMERIZATION
[ ] Unstable [ ] May Occur [X] Will Not Occur
AVOID: Strong oxidizers, organic material
HAZARDOUS DECOMPOSITION PRODUCTS: COx

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE OF SPILL: Absorb with inert material and sweep or vacuum into disposal container.
DECONTAMINATION: Treat spill area with detergent and water. Absorb with inert material. Place in disposal container and repeat procedure as necessary until area is clean.
ENVIRONMENTAL HAZARDS: Dike to prevent entering drains, sewers or water courses.
DISPOSAL: Dispose of in accordance with Federal, State and local regulations.

VIII. HEALTH PRECAUTION DATA

INGESTION: Do not ingest. Acute Oral LD50 (Rat) >5000 mg/kg (WECO). Wash thoroughly before eating, drinking or smoking.
INHALATION: No PEL/TLV established for this product. Do not inhale mist. Use proper respiratory protective equipment for the exposures encountered.
SKIN ABSORPTION: Acute Dermal LD50 (Rabbit) >2000 mg/kg (WECO). May cause slight skin irritation. Wear proper personal protective equipment to reduce skin exposure.
EYE EXPOSURE: Keep out of eyes. Minimally irritating to the eyes. If exposed, flush eyes for a minimum of 15 minutes with water. Wear proper eye protection to reduce splash exposure.
EFFECTS OF OVEREXPOSURE: Material is not toxic or irritating to the skin. No known chronic effects. No known preexisting medical conditions will be aggravated by exposure.
FIRST AID: In all cases, get prompt medical attention. If ingested, give several glasses of water and induce vomiting. Do not induce vomiting if person is unconscious. For skin exposure, remove contaminated clothing and wash with soap and water. For eye contact, irrigate for a minimum of 15 minutes with water. If inhaled, remove victim to fresh air, and administer CPR if necessary.

IX. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Use NIOSH/MSHA - approved respirator for organic vapors for the exposures encountered. Positive pressure self-contained breathing apparatus should be used for confined space entry and excessive exposures.
PERSONAL PROTECTIVE EQUIPMENT: Neoprene or rubber gloves and safety goggles.
VENTILATION: General ventilation.

X. SPECIAL PRECAUTIONS

Keep out of the reach of children. Read and follow all label instructions.

XI. REGULATORY DATA

SARA HAZARD CLASS: [X] Acute [ ] Chronic [ ] Flammable
[ ] Pressure [ ] Reactive [ ] None
SARA 313: [ ] Yes [X] No Chemical:
SARA 302: [ ] Yes [X] No Chemical:
TPQ:
CERCLA: [ ] Yes [X] No Chemical:
RQ:
RCRA: [ ] Yes [X] No

NFPA HAZARD RATING:
Health: [1]
Fire: [1]
Reactivity: [0]
Special: [ ]

NFPA HAZARD RATING SCALE:
0 = Minimal 3 = Serious
1 = Slight 4 = Severe
2 = Moderate

HMIS CODES:
Health: [1]
Fire: [1]
Reactivity: [0]

HMIS HAZARD RATING SCALE:
0 = Minimal 3 = Serious
1 = Slight 4 = Severe
2 = Moderate

DATE PREPARED: March 22, 1994
REVISED DATE: July 22, 2005

Notice: This information was developed from information on the constituent materials. No warranty is expressed or implied regarding the completeness or continuing accuracy of the information contained herein, and Wilbur-Ellis disclaims all liability for reliance thereon. The user should satisfy himself that he has all current data relevant to his particular use.

*Technical Material NE - Not Established NA - Not Applicable

24 Hour Emergency Phone Number
CHEMTREC: (800) 424-9300

ATTACHMENT C6

R-11®

WILBUR-ELLIS

IDEAS TO GROW WITH®

PO BOX 16458 • FRESNO CA 93755

MATERIAL SAFETY DATA SHEET

PRODUCT/TRADE NAME:

R-11

I. NAME

PRODUCT/TRADE NAME: R-11
EPA REGISTRATION #: NONE
CHEMICAL NAME/COMMON NAME:
1-Butanol/Butyl Alcohol
Octyl Phenoxy Polyethoxy Ethanol/Nonionic Surfactants

II. HAZARDOUS INGREDIENTS

	CAS#	OSHA PEL	ACGIH TLV
Butyl Alcohol	71-36-3	50 ppm c	50 ppm c
Nonionic Surfactants	Mixture	NE	NE

III. PHYSICAL DATA

SPECIFIC GRAVITY (H2O = 1): 1.02
MELTING POINT: NA
VAPOR DENSITY (AIR = 1): NE
% VOLATILES BY VOL.: NE
ODOR: Alcohol
APPEARANCE: Clear Liquid
FLASH POINT/METHOD: 130 Deg. F TCC
VAPOR PRESSURE (mmHg): NE
SOLUBILITY IN H2O: 10%

IV. FIRE & EXPLOSION HAZARD

EXTINGUISHING MEDIA: [X] Water Fog [X] Foam [ ]Alcohol Foam
[X] CO2 [X] Dry Chemical [ ] Other

FIRE FIGHTING PRECAUTIONS & HAZARDS:
Fight fire upwind. Wear positive pressure self-contained breathing apparatus and full personal protective equipment. Cool exposed containers with water. Dike area to prevent entering drains, sewers or water courses. Evacuate people downwind from fire.

V. CARCINOGEN STATUS

[ ] OSHA [ ] NTP [ ] IARC [X] No Listing Type

VI. REACTIVITY

[X] Stable HAZARDOUS POLYMERIZATION
[ ] Unstable [ ] May Occur [X] Will Not Occur

AVOID: Oxidizers, Liquid chlorine and Concentrated 02
HAZARDOUS DECOMPOSITION PRODUCTS: COx

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE OF SPILL: Wear appropriate respiratory and personal protective equipment. Absorb with inert material and sweep or vacuum into approved disposal container.
DECONTAMINATION: Treat area with detergent and water. Absorb with inert material and place in approved container. Repeat as necessary until area is clean.
ENVIRONMENTAL HAZARDS: Dike to prevent entering drains, sewers or water courses.
DISPOSAL: Place in DOT-approved container and dispose of in an approved disposal site.

VIII. HEALTH PRECAUTION DATA

INGESTION: Acute oral LD50 (rat) Butyl Alcohol 790 mg/kg (SAX*). Wash thoroughly before eating, drinking or smoking. Do not ingest. Do not store near food or feed.
INHALATION: PEL/TLV Butyl Alcohol 100 ppm. Can cause respiratory irritation in high concentrations. Wear appropriate respiratory protection for exposures above the PEL/TLV.
SKIN ABSORPTION: Acute dermal LD50 (rabbit) for Butyl Alcohol 4200 mg/kg (SAX*). Can cause mild skin irritation or dermatitis. Wear proper personal protective equipment to reduce exposure.
EYE EXPOSURE: May be mildly irritating to the eyes. If exposed, flush eyes a minimum of 15 minutes with water. Wear proper eye protection to reduce splash exposure.
EFFECTS OF OVEREXPOSURE: May cause eye irritation and corneal inflammation. High concentrations can cause respiratory irritation. May cause skin irritation, scaling or dermatitis. No known chronic effects. Preexisting medical conditions involving the above symptoms may be aggravated by exposure.
FIRST AID: In all cases, get prompt medical attention. If ingested, give several glasses of water. Do not induce vomiting. For skin exposure, remove contaminated clothing and wash with soap and water. For eye contact, irrigate eyes a minimum of 15 minutes with water. For inhalation, remove victim to fresh air, and administer CPR if necessary.

IX. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Use only NIOSH/MSHA - approved respiratory protection for organic vapors up to 10 times the PEL/TLV. Positive pressure self-contained breathing apparatus should be used for confined space entry and high exposures above 10 times the PEL/TLV.
PERSONAL PROTECTIVE EQUIPMENT: Not normally required for this product. Recommend chemical goggles, long-sleeved coveralls and rubber or neoprene boots, Nitrile gloves.
VENTILATION: Local exhaust ventilation recommended for manufacture and formulation operations.

X. SPECIAL PRECAUTIONS

Keep out of the reach of children. Read and follow all label instructions.
Keep away from open flame, heat or ignition sources.

XI. REGULATORY DATA

SARA HAZARD CLASS: [ ] Acute [ ] Chronic [X] Flammable
[ ] Pressure [ ] Reactive [ ] None
SARA 313: [X] Yes [ ] No Chemical: Butyl Alcohol
SARA 302: [ ] Yes [X] No Chemical:
TPQ:
CERCLA: [X] Yes [ ] No Chemical: Butyl Alcohol
RQ: 1*
RCRA: [X] Yes [ ] No

NFPA HAZARD RATING:
Health: [1]
Fire: [2]
Reactivity: [0]
Special: [0]

HMIS CODES:
Health: [1]
Fire: [2]
Reactivity: [0]

NFPA HAZARD RATING SCALE:
0 = Minimal 3 = Serious
1 = Slight 4 = Severe
2 = Moderate

HMIS HAZARD RATING SCALE:
0 = Minimal 3 = Serious
1 = Slight 4 = Severe
2 = Moderate

DATE PREPARED: May 8, 1985
REVISED DATE: July 21, 2005

Notice: This information was developed from information on the constituent materials. No warranty is expressed or implied regarding the completeness or continuing accuracy of the information contained herein, and Wilbur-Ellis disclaims all liability for reliance thereon. The user should satisfy himself that he has all current data relevant to his particular use.

*Technical Material NE - Not Established NA - Not Applicable

24 Hour Emergency Phone Number
CHEMTREC: (800) 424-9300

ATTACHMENT C7

IN-PLACE®

PRECAUTIONARY STATEMENTS

Causes eye irritation. In case of contact with eyes, immediately flush with water for at least 15 minutes. If irritation persists, get medical attention. May cause skin irritation. Harmful if swallowed. COMBUSTIBLE LIQUID. Keep away from heat, sparks and fire.

Do not cut or weld this container of IN-PLACE™. Combustible. Do not use this container or equipment contaminated with this product as a container for water to be used for domestic purposes, feed or food stuff.

NOTE: When using chemical mixture that has not been used before with IN-PLACE™ always try a small sample mix before making a full batch. Different adjuvants in the chemicals and salt in some water can cause flocking or excess thickening. If this occurs, add ammonia.

Follow mixing procedures, dose rates and cautions on all chemical labels.

Wilbur-Ellis Company warrants that this material conforms to the chemical description on the label and is reasonably fit for use as directed herein.

The use of this product is beyond the control of Wilbur-Ellis Company, therefore, Wilbur-Ellis Company urges that all chemicals be checked with Insist® before full scale use.

Buyer assumes all risks of use, storage and handling of this material not in strict accordance with directions given herewith. Buyer further agrees in event of damage arising from the use of this product to accept a replacement of the product or a refund of the purchase price of the product, at buyer's option, as full discharge of seller's liability.

NOTICE

U.S. Patent numbers, 3, 479, 176 and 4, 115, 098 covers use, other patent pending.

STORAGE AND DISPOSAL

1. PROHIBITIONS: Do not contaminate water, food or feed by storage, disposal or cleaning of equipment.
2. STORAGE: Store in original container only and keep sealed. Store in closed storage areas. Use caution when moving, opening, closing or pouring.
3. PESTICIDE DISPOSAL: Improper disposal of excess spray mixtures or rinsate is a violation of Federal Law. Wastes resulting from use of this product should be disposed of through on-site spray application or at an approved waste disposal facility.
4. CONTAINER DISPOSAL: Triple rinse (or equivalent), then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or other procedures approved by State and local authorities.

CONTENTS 1 U.S. GALLON (3.75 Liters)

WILBUR-ELLIS

IDEAS AT WORK WITH®

IN-PLACE™

DEPOSITION AND RETENTION AGENT

HERBICIDES, INSECTICIDES, FUNGICIDES AND HARVEST AIDS

*DRIFT RETARDANT

PRINCIPAL FUNCTIONING AGENTS	100%
Amine salts of organic acids	
Aromatic Acid	
Aromatic and Aliphatic petroleum distillate	

KEEP OUT OF REACH OF CHILDREN

CAUTION

CA Reg. No. 2935-50169 - WA Reg. No. AW2935-01003

WARRANTY STATEMENT

WILBUR-ELLIS COMPANY warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. It is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials or the manner of use or application, all of which are beyond the control of WILBUR-ELLIS COMPANY. In no case shall WILBUR-ELLIS COMPANY be liable for consequential, special or indirect damages resulting from the use or handling of this product. All such risks shall be assumed by the Buyer. The exclusive remedy of any buyer or user of this product for any and all losses, injuries, or damages resulting from or in any way arising from the use, handling or application of this product, whether in contract, warranty, tort, negligence, strict liability or otherwise, shall not exceed the purchase price paid for this product or at WILBUR-ELLIS COMPANY'S election, the replacement of this product. WILBUR-ELLIS COMPANY MAKES NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ABOVE.

GENERAL INFORMATION

IN-PLACE™ is specially formulated for use with conventional spray mixtures. IN-PLACE™ is a deposition and retention agent which reduces evaporation and drift of chemicals while increasing coverage and adherence on the target area.

GENERAL MIXING PROCEDURE

Mix the IN-PLACE™ and EMULSIFIABLE CONCENTRATE or AQUEOUS SOLUTION together; 1 part IN-PLACE™ to 4 parts chemical. Add to the total volume of water. (If some water is required for mixing with the emulsifiable concentrate or aqueous solution, DO NOT USE OVER 1 quart of water on a per acre basis.)

Mix the WETTABLE POWDER, SOLUBLE POWDER, FLOWABLE or SOLUBLE BAG in the total volume of WATER. Add the IN-PLACE™ last; 2 ozs. IN-PLACE™ to 1 pound or 1 quart of chemical.

Combinations of Emulsifiable Concentrates and/or Aqueous Solutions with Wettable Powders, Soluble Powders, Flowables, and/or Soluble Bags – should be added to the water first and mixed. Mix the IN-PLACE™ and the Emulsifiable Concentrate and/or Aqueous Solution together. Add to the total volume of water and powders. Always try a small sample mix before making a full batch.

When mixing multiple-loads at one time, RE-BLEND BEFORE EACH LOAD IS DRAWN OFF.

Small mixes in closed-systems: Put required IN-PLACE™ in can opener-portion. Add emulsifiable concentrate or aqueous solution to IN-PLACE™ and flush into closed mixing tank.

Large or multiple loads in closed-systems: Keep the initial water to a maximum of 1 quart on a per acre basis in the closed mixing tank. Add all of the emulsifiable concentrates or aqueous solutions to the closed mixing tank, followed by the required IN-PLACE™. BLEND VERY LIGHTLY, and add to the total volume of water. If a thick or lumpy load occurs from over-agitation or the wrong rate of IN-PLACE™, add HOUSEHOLD AMMONIA through the agitation system to break the condition and continue with normal spray activities.

FOR PESTICIDES/HERBICIDES THAT PERMIT USE OF AN ADJUVANT AT A HIGHER RATE, FOLLOW INSTRUCTIONS ON THAT PESTICIDE/HERBICIDE LABEL. HOWEVER, DO NOT ADD THIS PRODUCT AT A RATE WHICH EXCEEDS 5% OF THE FINISHED SPRAY VOLUME.

Use caution at the higher application rates. When applying to a sensitive crop, first treat a small area to determine if there may be adverse effects on the crop.

FOR AQUATIC USE: (EXCEPT IN WASHINGTON) Can be used with labeled aquatic products. Not to exceed 1 quart per surface acre of water.

STANDARD MIXING RATES

Liquid Chemicals - Emulsifiable Concentrates - EC
(Those not available as Wettable Powders)

Chemical Quarts	1	2	3	4	5	6	7	8	9	10	Example: 4 Parts Chemical
Ounces IN-PLACE™	8	16	24	32	40	48	56	64	72	80	1 Part IN-PLACE™

Mix E.C. and IN-PLACE™ together. Add to water

Liquid Chemicals - Flowables
(Those not available as Wettable Powders)

Chemical Quarts	1	2	3	4	5	6	7	8	9	10	Example: 1 Gallon (128 oz.) Chemical
Ounces IN-PLACE™	2	4	6	8	10	12	14	16	18	20	½ Pint (8 oz.) IN-PLACE™

Mix Flowables in the water. Add IN-PLACE™ last.

Wettable Powders

Chemical Pounds	1	2	3	4	5	6	7	8	9	10	Example: 8 Pounds Chemical
Ounces IN-PLACE™	2	4	6	8	10	12	14	16	18	20	1 Pint (16 oz.) IN-PLACE™

Mix Wettable Powders in water. Add IN-PLACE™ last

RATE EXCEPTIONS

ROUNDUP®

Roundup Quarts	1	2	3	4	5	6	7	8	9	10	Example: 4 Quarts (128 oz.) Roundup
Ounces IN-PLACE™	16	32	48	64	80	96	112	128	144	160	2 Quarts (64 oz.) IN-PLACE™

Pyrethroids (Ambush®, Pounce®, Ammo®, Etc.)

Pyrethroids Pints	1	2	3	4	5	6	7	8	9	10	Example: 1 Pint (16 oz.) Pyrethroids
Pints IN-PLACE™	1	2	3	4	5	6	7	8	9	10	1 Pint (16 oz.) IN-PLACE™

Asulox®

Asulox Gallons	1	2	3	4	5	6	7	8	9	10	Example: 1 Gallon (128 oz.) Asulox
Ounces IN-PLACE™	5	10	15	20	25	30	35	40	45	50	5 Ounces IN-PLACE™

Liquid Foliar Fertilizer

Liquid Fertilizer Quarts	1	2	3	4	5	6	7	8	9	10	Example: 8 Quarts (256 oz.) Liquid Fertilizer
Ounces IN-PLACE™	2	4	6	8	10	12	14	16	18	20	1 Pint (16 oz.) IN-PLACE™

Dipel®-4L, Thuricide

Chemical Quarts	1	2	3	4	5	6	7	8	9	10	Example: 4 Quarts (128 oz.) Chemical
Ounces IN-PLACE™	8	16	24	32	40	48	56	64	72	80	1 Quart (32 oz.) IN-PLACE™

Dimilin®

Dimilin Ounces	1	2	3	4	5	6	7	8	9	10	Example: Premix 2 oz. Dimilin per 16 oz. water. Then add proper rate of IN-PLACE™. Add premix to tank at total volume of water.
Ounces IN-PLACE™	1	2	3	4	5	6	7	8	9	10	

Granular Foliar Fertilizer

Granular Fertilizer Pounds	1	2	3	4	5	6	7	8	9	10	Example: 8 Pounds Granular Fertilizer
Ounces IN-PLACE™	2	4	6	8	10	12	14	16	18	20	1 Pint (16 oz.) IN-PLACE™

Zorial®

Zorial Pounds	1	2	3	4	5	6	7	8	9	10	Example: 16 Pounds Zorial
Ounces IN-PLACE™	1	2	3	4	5	6	7	8	9	10	1 Pint (16 oz.) IN-PLACE™

Sulfur Compounds

Sulfur Compounds Pounds	5	10	15	20	25	30	35	40	45	50	Example: 20 Pounds Sulfur
Ounces IN-PLACE™	4	8	12	16	20	24	28	32	36	40	1 Pint (16 oz.) IN-PLACE™

Propanil

Propanil Quarts	1	2	3	4	5	6	7	8	9	10	Example: 4 Quarts (128 oz.) Propanil
Ounces IN-PLACE™	4	8	12	16	20	24	28	32	36	40	1 Pint (16 oz.) IN-PLACE™

Furadan-4F®

Furadan-4F Pints	1	2	3	4	5	6	7	8	9	10	Example: 1 Pint (16 oz.) Furadan-4F
Pints IN-PLACE™	1	2	3	4	5	6	7	8	9	10	1 Pint (16 oz.) IN-PLACE™

Phenoxy Herbicides

Phenoxy Herbicides Pounds	1	2	3	4	5	6	7	8	9	10	Example: 4 Pounds Herbicide
Ounces IN-PLACE™	16	32	48	64	80	96	112	128	144	160	2 Quarts (64 oz.) IN-PLACE™

F-1003

Combinations:
Mix all Flowables and Wettable Powders in the water first.
Mix E.C.'s and IN-PLACE™ together. Add last.

1 Gallon = 4 Quarts = 8 Pints = 128 Fluid Ounces = 3.785 Liters
2 Tablespoons = 1 Fluid Ounce
1 U.S. Pound = 16 Ounces = .454 Kilograms

For more IN-PLACE™ Information Call
1-800-221-6580

Manufactured in the USA by:
WILBUR-ELLIS COMPANY
P.O. Box 16458 – Fresno, California 93755

ATTACHMENT D

USFWS Conservation Guidelines for the Valley Elderberry Longhorn Beetle

United States Department of the Interior

Fish and Wildlife Service

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825

Conservation Guidelines for the Valley Elderberry Longhorn Beetle

Revised July 9, 1999

The following guidelines have been issued by the U.S. Fish and Wildlife Service (Service) to assist Federal agencies and non-federal project applicants needing incidental take authorization through a section 7 consultation or a section 10(a)(1)(B) permit in developing measures to avoid and minimize adverse effects on the valley elderberry longhorn beetle. The Service will revise these guidelines as needed in the future. The most recently issued version of these guidelines should be used in developing all projects and habitat restoration plans. The survey and monitoring procedures described below are designed to avoid any adverse effects to the valley elderberry longhorn beetle. Thus a recovery permit is not needed to survey for the beetle or its habitat or to monitor conservation areas. If you are interested in a recovery permit for research purposes please call the Service's Regional Office at (503) 231-2063.

Background Information

The valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), was listed as a threatened species on August 8, 1980 (Federal Register 45: 52803-52807). This animal is fully protected under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The valley elderberry longhorn beetle (beetle) is completely dependent on its host plant, elderberry (Sambucus species), which is a common component of the remaining riparian forests and adjacent upland habitats of California's Central Valley. Use of the elderberry by the beetle, a wood borer, is rarely apparent. Frequently, the only exterior evidence of the elderberry's use by the beetle is an exit hole created by the larva just prior to the pupal stage. The life cycle takes one or two years to complete. The animal spends most of its life in the larval stage, living within the stems of an elderberry plant. Adult emergence is from late March through June, about the same time the elderberry produces flowers. The adult stage is short-lived. Further information on the life history, ecology, behavior, and distribution of the beetle can be found in a report by Barr (1991) and the recovery plan for the beetle (USFWS 1984).

Surveys

Proposed project sites within the range of the valley elderberry longhorn beetle should be surveyed for the presence of the beetle and its elderberry host plant by a qualified biologist. The beetle's range extends throughout California's Central Valley and associated foothills from about the 3,000-foot elevation contour on the

east and the watershed of the Central Valley on the west (Figure 1). All or portions of 31 counties are included: Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Madera, Mariposa, Merced, Napa, Nevada, Placer, Sacramento, San Benito, San Joaquin, San Luis Obispo, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba.

If elderberry plants with one or more stems measuring 1.0 inch or greater in diameter at ground level occur on or adjacent to the proposed project site, or are otherwise located where they may

be directly or indirectly affected by the proposed action, minimization measures which include planting replacement habitat (conservation planting) are required (Table 1).

All elderberry shrubs with one or more stems measuring 1.0 inch or greater in diameter at ground level that occur on or adjacent to a proposed project site must be thoroughly searched for beetle exit holes (external evidence of beetle presence). In addition, all elderberry stems one inch or greater in diameter at ground level must be tallied by diameter size class (Table 1). As outlined in Table 1, the numbers of elderberry seedlings/cuttings and associated riparian native trees/shrubs to be planted as replacement habitat are determined by stem size class of affected elderberry shrubs, presence or absence of exit holes, and whether a proposed project lies in a riparian or non-riparian area.

Elderberry plants with no stems measuring 1.0 inch or greater in diameter at ground level are unlikely to be habitat for the beetle because of their small size and/or immaturity. Therefore, no minimization measures are required for removal of elderberry plants with no stems measuring 1.0 inch or greater in diameter at ground level with no exit holes. Surveys are valid for a period of two years.

Avoid and Protect Habitat Whenever Possible

Project sites that do not contain beetle habitat are preferred. If suitable habitat for the beetle occurs on the project site, or within close proximity where beetles will be affected by the project, these areas must be designated as avoidance areas and must be protected from disturbance during the construction and operation of the project. When possible, projects should be designed such that avoidance areas are connected with adjacent habitat to prevent fragmentation and isolation of beetle populations. Any beetle habitat that cannot be avoided as described below should be considered impacted and appropriate minimization measures should be proposed as described below.

Avoidance: Establishment and Maintenance of a Buffer Zone

Complete avoidance (i.e., no adverse effects) may be assumed when a 100-foot (or wider) buffer is established and maintained around elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level. Firebreaks may not be included in the buffer zone. In buffer areas construction-

related disturbance should be minimized, and any damaged area should be promptly restored following construction. The Service must be consulted before any disturbances within the buffer area are considered. In addition, the Service must be provided with a map identifying the avoidance area and written details describing avoidance measures.

Protective Measures

1. Fence and flag all areas to be avoided during construction activities. In areas where encroachment on the 100-foot buffer has been approved by the Service, provide a minimum setback of at least 20 feet from the dripline of each elderberry plant.

2. Brief contractors on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements.

3. Erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained for the duration of construction.

4. Instruct work crews about the status of the beetle and the need to protect its elderberry host plant.

Restoration and Maintenance

Restore any damage done to the buffer area (area within 100 feet of elderberry plants) during construction. Provide erosion control and re-vegetate with appropriate native plants.

Buffer areas must continue to be protected after construction from adverse effects of the project. Measures such as fencing, signs, weeding, and trash removal are usually appropriate.

No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant should be used in the buffer areas, or within 100 feet of any elderberry plant with one or more stems measuring 1.0 inch or greater in diameter at ground level.

The applicant must provide a written description of how the buffer areas are to be restored, protected, and maintained after construction is completed.

Mowing of grasses/ground cover may occur from July through April to reduce fire hazard. No mowing should occur within five (5) feet of elderberry plant stems. Mowing must be done in a manner that avoids damaging plants (e.g., stripping away bark through careless use of mowing/trimming equipment).

Transplant Elderberry Plants That Cannot Be Avoided

Elderberry plants must be transplanted if they can not be avoided by the proposed project. All elderberry plants with one or more stems measuring 1.0 inch or greater in diameter at ground level must be transplanted to a conservation area (see below). At the Service's discretion, a plant that is unlikely to survive transplantation because of poor condition or location, or a plant that would be extremely difficult to move because of access problems, may be exempted from transplantation. In cases where transplantation is not possible the minimization ratios in Table 1 may be increased to offset the additional habitat loss.

Trimming of elderberry plants (e.g., pruning along roadways, bike paths, or trails) with one or more stems 1.0 inch or greater in diameter at ground level, may result in take of beetles. Therefore, trimming is subject to appropriate minimization measures as outlined in Table 1.

1. Monitor. A qualified biologist (monitor) must be on-site for the duration of the transplanting of the elderberry plants to insure that no unauthorized take of the valley elderberry longhorn beetle occurs. If unauthorized take occurs, the monitor must have the authority to stop work until corrective measures have been completed. The monitor must immediately report any unauthorized take of the beetle or its habitat to the Service and to the California Department of Fish and Game.

2. Timing. Transplant elderberry plants when the plants are dormant, approximately November through the first two weeks in February, after they have lost their leaves. Transplanting during the non-growing season will reduce shock to the plant and increase transplantation success.

3. Transplanting Procedure.

a. Cut the plant back 3 to 6 feet from the ground or to 50 percent of its height (whichever is taller) by removing branches and stems above this height. The trunk and all stems measuring 1.0 inch or greater in diameter at ground level should be replanted. Any leaves remaining on the plant should be removed.

b. Excavate a hole of adequate size to receive the transplant.

c. Excavate the plant using a Vemeer spade, backhoe, front end loader, or other suitable equipment, taking as much of the root ball as possible, and replant immediately at the conservation area. Move the plant only by the root ball. If the plant is to be moved and transplanted off site, secure the root ball with wire and wrap it with burlap. Dampen the burlap with water, as necessary, to keep the root ball wet. Do not let the roots dry out. Care should be taken to ensure that the soil is not dislodged from around the roots of the transplant. If the site receiving the transplant does not have

adequate soil moisture, pre-wet the soil a day or two before transplantation.

d. The planting area must be at least 1,800 square feet for each elderberry transplant. The root ball should be planted so that its top is level with the existing ground. Compact the soil sufficiently so that settlement does not occur. As many as five (5) additional elderberry plantings (cuttings or seedlings) and up to five (5) associated native species plantings (see below) may also be planted within the 1,800 square foot area with the transplant. The transplant and each new planting should have its own watering basin measuring at least three (3) feet in diameter. Watering basins should have a continuous berm measuring approximately eight (8) inches wide at the base and six (6) inches high.

e. Saturate the soil with water. Do not use fertilizers or other supplements or paint the tips of stems with pruning substances, as the effects of these compounds on the beetle are unknown.

f. Monitor to ascertain if additional watering is necessary. If the soil is sandy and well-drained, plants may need to be watered weekly or twice monthly. If the soil is clayey and poorly-drained, it may not be necessary to water after the initial saturation. However, most transplants require watering through the first summer. A drip watering system and timer is ideal. However, in situations where this is not possible, a water truck or other apparatus may be used.

Plant Additional Seedlings or Cuttings

Each elderberry stem measuring 1.0 inch or greater in diameter at ground level that is adversely affected (i.e., transplanted or destroyed) must be replaced, in the conservation area, with elderberry seedlings or cuttings at a ratio ranging from 1:1 to 8:1 (new plantings to affected stems). Minimization ratios are listed and explained in Table 1. Stock of either seedlings or cuttings should be obtained from local sources. Cuttings may be obtained from the plants to be transplanted if the project site is in the vicinity of the conservation area. If the Service determines that the elderberry plants on the proposed project site are unsuitable candidates for transplanting, the Service may allow the applicant to plant seedlings or cuttings at higher than the stated ratios in Table 1 for each elderberry plant that cannot be transplanted.

Plant Associated Native Species

Studies have found that the beetle is more abundant in dense native plant communities with a mature overstory and a mixed understory. Therefore, a mix of native plants associated with the elderberry plants at the project site or similar sites will be planted at ratios ranging from 1:1 to 2:1 [native tree/plant species to each elderberry seedling or cutting (see Table 1)]. These native plantings must be monitored with the same survival criteria used for the elderberry seedlings

(see below). Stock of saplings, cuttings, and seedlings should be obtained from local sources. If the parent stock is obtained from a distance greater than one mile from the conservation area, approval by the Service of the native plant donor sites must be obtained prior to initiation of the revegetation work. Planting or seeding the conservation area with native herbaceous species is encouraged. Establishing native grasses and forbs may discourage unwanted non-native species from becoming established or persisting at the conservation area. Only stock from local sources should be used.

Examples

Example 1

> The project will adversely affect beetle habitat on a vacant lot on the land side of a river levee. This levee now separates beetle habitat on the vacant lot from extant Great Valley Mixed Riparian Forest (Holland 1986) adjacent to the river. However, it is clear that the beetle habitat located on the vacant lot was part of a more extensive mixed riparian forest ecosystem extending farther from the river's edge prior to agricultural development and levee construction. Therefore, the beetle habitat on site is considered riparian. A total of two elderberry plants with at least one stem measuring 1.0 inch or greater in diameter at ground level will be affected by the proposed action. The two plants have a total of 15 stems measuring over 1.0 inch. No exit holes were found on either plant. Ten of the stems are between 1.0 and 3.0 inches in diameter and five of the stems are greater than 5.0 inches in diameter. The conservation area is suited for riparian forest habitat. Associated natives adjacent to the conservation area are box elder (Acer negundo californica), walnut (Juglans californica var. hindsii), sycamore (Platanus racemosa), cottonwood (Populus fremontii), willow (Salix gooddingii and S. laevigata), white alder (Alnus rhombifolia), ash (Fraxinus latifolia), button willow (Cephalanthus occidentalis), and wild grape (Vitis californica).

Minimization (based on ratios in Table 1):

> • Transplant the two elderberry plants that will be affected to the conservation area.
>
> • Plant 40 elderberry rooted cuttings (10 affected stems compensated at 2:1 ratio and 5 affected stems compensated at 4:1 ratio, cuttings planted:stems affected)
>
> • Plant 40 associated native species (ratio of associated natives to elderberry plantings is 1:1 in areas with no exit holes):
>
> 5 saplings each of box elder, sycamore, and cottonwood
>
> 5 willow seedlings
>
> 5 white alder seedlings

5 saplings each of walnut and ash

3 California button willow

2 wild grape vines

Total: 40 associated native species

• Total area required is a minimum of 1,800 sq. ft. for one to five elderberry seedlings and up to 5 associated natives. Since, a total of 80 plants must be planted (40 elderberries and 40 associated natives), a total of 0.33 acre (14,400 square feet) will be required for conservation plantings. The conservation area will be seeded and planted with native grasses and forbs, and closely monitored and maintained throughout the monitoring period.

Example 2

The project will adversely affect beetle habitat in Blue Oak Woodland (Holland 1986). One elderberry plant with at least one stem measuring 1.0 inch or greater in diameter at ground level will be affected by the proposed action. The plant has a total of 10 stems measuring over 1.0 inch. Exit holes were found on the plant. Five of the stems are between 1.0 and 3.0 inches in diameter and five of the stems are between 3.0 and 5.0 inches in diameter. The conservation area is suited for elderberry savanna (non-riparian habitat). Associated natives adjacent to the conservation area are willow (Salix species), blue oak (Quercus douglasii), interior live oak (Q. wislizenii), sycamore, poison oak (Toxicodendron diversilobum), and wild grape.

Minimization (based on ratios in Table 1):

• Transplant the one elderberry plant that will be affected to the conservation area.

• Plant 30 elderberry seedlings (5 affected stems compensated at 2:1 ratio and 5 affected stems compensated at 4:1 ratio, cuttings planted:stems affected)

• Plant 60 associated native species (ratio of associated natives to elderberry plantings is 2:1 in areas with exit holes):

20 saplings of blue oak, 20 saplings of sycamore, and 20 saplings of willow, and seed and plant with a mixture of native grasses and forbs

• Total area required is a minimum of 1,800 sq. ft. for one to five elderberry seedlings and up to 5 associated natives. Since, a total of 90 plants must be planted (30 elderberries and 60 associated natives), a total of 0.37 acre (16,200 square feet) will be required for conservation plantings. The

conservation area will be seeded and planted with native grasses and forbs, and closely monitored and maintained throughout the monitoring period.

Conservation Area—Provide Habitat for the Beetle in Perpetuity

The conservation area is distinct from the avoidance area (though the two may adjoin), and serves to receive and protect the transplanted elderberry plants and the elderberry and other native plantings. The Service may accept proposals for off-site conservation areas where appropriate.

1. Size. The conservation area must provide at least 1,800 square feet for each transplanted elderberry plant. As many as 10 conservation plantings (i.e., elderberry cuttings or seedlings and/or associated native plants) may be planted within the 1800 square foot area with each transplanted elderberry. An additional 1,800 square feet shall be provided for every additional 10 conservation plants. Each planting should have its own watering basin measuring approximately three feet in diameter. Watering basins should be constructed with a continuous berm measuring approximately eight inches wide at the base and six inches high.

The planting density specified above is primarily for riparian forest habitats or other habitats with naturally dense cover. If the conservation area is an open habitat (i.e., elderberry savanna, oak woodland) more area may be needed for the required plantings. Contact the Service for assistance if the above planting recommendations are not appropriate for the proposed conservation area.

No area to be maintained as a firebreak may be counted as conservation area. Like the avoidance area, the conservation area should connect with adjacent habitat wherever possible, to prevent isolation of beetle populations.

Depending on adjacent land use, a buffer area may also be needed between the conservation area and the adjacent lands. For example, herbicides and pesticides are often used on orchards or vineyards. These chemicals may drift or runoff onto the conservation area if an adequate buffer area is not provided.

2. Long-Term Protection. The conservation area must be protected in perpetuity as habitat for the valley elderberry longhorn beetle. A conservation easement or deed restrictions to protect the conservation area must be arranged. Conservation areas may be transferred to a resource agency or appropriate private organization for long-term management. The Service must be provided with a map and written details identifying the conservation area; and the applicant must receive approval from the Service that the conservation area is acceptable prior to initiating the conservation program. A true, recorded copy of the deed transfer, conservation easement, or deed restrictions protecting the

conservation area in perpetuity must be provided to the Service before project implementation.

Adequate funds must be provided to ensure that the conservation area is managed in perpetuity. The applicant must dedicate an endowment fund for this purpose, and designate the party or entity that will be responsible for long-term management of the conservation area. The Service must be provided with written documentation that funding and management of the conservation area (items 3-8 above) will be provided in perpetuity.

3. Weed Control. Weeds and other plants that are not native to the conservation area must be removed at least once a year, or at the discretion of the Service and the California Department of Fish and Game. Mechanical means should be used; herbicides are prohibited unless approved by the Service.

4. Pesticide and Toxicant Control. Measures must be taken to insure that no pesticides, herbicides, fertilizers, or other chemical agents enter the conservation area. No spraying of these agents must be done within one 100 feet of the area, or if they have the potential to drift, flow, or be washed into the area in the opinion of biologists or law enforcement personnel from the Service or the California Department of Fish and Game.

5. Litter Control. No dumping of trash or other material may occur within the conservation area. Any trash or other foreign material found deposited within the conservation area must be removed within 10 working days of discovery.

6. Fencing. Permanent fencing must be placed completely around the conservation area to prevent unauthorized entry by off-road vehicles, equestrians, and other parties that might damage or destroy the habitat of the beetle, unless approved by the Service. The applicant must receive written approval from the Service that the fencing is acceptable prior to initiation of the conservation program. The fence must be maintained in perpetuity, and must be repaired/replaced within 10 working days if it is found to be damaged. Some conservation areas may be made available to the public for appropriate recreational and educational opportunities with written approval from the Service. In these cases appropriate fencing and signs informing the public of the beetle’s threatened status and its natural history and ecology should be used and maintained in perpetuity.

7. Signs. A minimum of two prominent signs must be placed and maintained in perpetuity at the conservation area, unless otherwise approved by the Service. The signs should note that the site is habitat of the federally threatened valley elderberry longhorn beetle and, if appropriate, include information on the beetle's natural history and ecology. The signs must be

repaired or replaced within 10 working days if they are found to be damaged or destroyed.

Monitoring

The population of valley elderberry longhorn beetles, the general condition of the conservation area, and the condition of the elderberry and associated native plantings in the conservation area must be monitored over a period of either ten (10) consecutive years or for seven (7) years over a 15-year period. The applicant may elect either 10 years of monitoring, with surveys and reports every year; or 15 years of monitoring, with surveys and reports on years 1, 2, 3, 5, 7, 10, and 15. The conservation plan provided by the applicant must state which monitoring schedule will be followed. No change in monitoring schedule will be accepted after the project is initiated. If conservation planting is done in stages (i.e., not all planting is implemented in the same time period), each stage of conservation planting will have a different start date for the required monitoring time.

Surveys. In any survey year, a minimum of two site visits between February 14 and June 30 of each year must be made by a qualified biologist. Surveys must include:

1. A population census of the adult beetles, including the number of beetles observed, their condition, behavior, and their precise locations. Visual counts must be used; mark-recapture or other methods involving handling or harassment must not be used.

2. A census of beetle exit holes in elderberry stems, noting their precise locations and estimated ages.

3. An evaluation of the elderberry plants and associated native plants on the site, and on the conservation area, if disjunct, including the number of plants, their size and condition.

4. An evaluation of the adequacy of the fencing, signs, and weed control efforts in the avoidance and conservation areas.

5. A general assessment of the habitat, including any real or potential threats to the beetle and its host plants, such as erosion, fire, excessive grazing, off-road vehicle use, vandalism, excessive weed growth, etc.

The materials and methods to be used in the monitoring studies must be reviewed and approved by the Service. All appropriate Federal permits must be obtained prior to initiating the field studies.

Reports. A written report, presenting and analyzing the data from the project monitoring, must be prepared by a qualified biologist in each of the years in which a monitoring survey is required. Copies of the report must be submitted by December 31 of the same year to the Service (Chief of Endangered Species, Sacramento Fish and Wildlife Office), and the Department of Fish and Game

(Supervisor, Environmental Services, Department of Fish and Game, 1416 Ninth Street, Sacramento, California 95814; and Staff Zoologist, California Natural Diversity Data Base, Department of Fish and Game, 1220 S Street, Sacramento, California 95814). The report must explicitly address the status and progress of the transplanted and planted elderberry and associated native plants and trees, as well as any failings of the conservation plan and the steps taken to correct them. Any observations of beetles or fresh exit holes must be noted. Copies of original field notes, raw data, and photographs of the conservation area must be included with the report. A vicinity map of the site and maps showing where the individual adult beetles and exit holes were observed must be included. For the elderberry and associated native plants, the survival rate, condition, and size of the plants must be analyzed. Real and likely future threats must be addressed along with suggested remedies and preventative measures (e.g. limiting public access, more frequent removal of invasive non-native vegetation, etc.).

A copy of each monitoring report, along with the original field notes, photographs, correspondence, and all other pertinent material, should be deposited at the California Academy of Sciences (Librarian, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118) by December 31 of the year that monitoring is done and the report is prepared. The Service's Sacramento Fish and Wildlife Office should be provided with a copy of the receipt from the Academy library acknowledging receipt of the material, or the library catalog number assigned to it.

Access. Biologists and law enforcement personnel from the California Department of Fish and Game and the Service must be given complete access to the project site to monitor transplanting activities. Personnel from both these agencies must be given complete access to the project and the conservation area to monitor the beetle and its habitat in perpetuity.

Success Criteria

A minimum survival rate of at least 60 percent of the elderberry plants and 60 percent of the associated native plants must be maintained throughout the monitoring period. Within one year of discovery that survival has dropped below 60 percent, the applicant must replace failed plantings to bring survival above this level. The Service will make any determination as to the applicant's replacement responsibilities arising from circumstances beyond its control, such as plants damaged or killed as a result of severe flooding or vandalism.

Service Contact

These guidelines were prepared by the Endangered Species Division of the Service's Sacramento Fish and Wildlife Office. If you have questions regarding these guidelines or to request a copy of the most recent guidelines, telephone (916) 414-6600, or write to:

U.S. Fish and Wildlife Service
Ecological Services

2800 Cottage Way, W-2605
Sacramento, CA 95825

Literature Cited

Barr, C. B. 1991. The distribution, habitat, and status of the valley elderberry longhorn beetle *Desmocerus californicus dimorphus*. U.S. Fish and Wildlife Service; Sacramento, California.

Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Unpublished Report. State of California, The Resources Agency, Department of Fish and Game, Natural Heritage Division, Sacramento, California.

USFWS. 1980. Listing the valley elderberry longhorn beetle as a threatened species with critical habitat. Federal Register 45:52803-52807.

USFWS. 1984. Recovery plan for the valley elderberry longhorn beetle. U.S. Fish and Wildlife Service, Endangered Species Program; Portland, Oregon.

Table 1: Minimization ratios based on location (riparian vs. non-riparian), stem diameter of affected elderberry plants at ground level, and presence or absence of exit holes.

Location	Stems (maximum diameter at ground level)	Exit Holes on Shrub Y/N (quantify)[1]	Elderberry Seedling Ratio[2]	Associated Native Plant Ratio[3]
non-riparian	stems >=1" & =<3"	No:	1:1	1:1
		Yes:	2:1	2:1
non-riparian	stems >3" & <5"	No:	2:1	1:1
		Yes:	4:1	2:1
non-riparian	stems >=5"	No:	3:1	1:1
		Yes:	6:1	2:1
riparian	stems >=1" & <=3"	No:	2:1	1:1
		Yes:	4:1	2:1
riparian	stems > 3" & < 5"	No:	3:1	1:1
		Yes:	6:1	2:1
riparian	stems >=5"	No:	4:1	1:1
		Yes:	8:1	2:1

1 All stems measuring one inch or greater in diameter at ground level on a single shrub are considered occupied when exit holes are present anywhere on the shrub.

2 Ratios in the Elderberry Seedling Ratio column correspond to the number of cuttings or seedlings to be planted per elderberry stem (one inch or greater in diameter at ground level) affected by a project.

3 Ratios in the Associated Native Plant Ratio column correspond to the number of associated native species to be planted per elderberry (seedling or cutting) planted.

Figure 1: Range of the Valley Elderberry Longhorn Beetle

APPENDIX F

APPLICABLE MADERA COUNTY GENERAL PLAN GOALS AND POLICIES

APPENDIX F. Applicable Madera County General Plan Goals and Policies.

B. FOREST RESOURCES

Goal 5.B: To conserve Madera County's forest resources, enhance the quality and diversity of forest ecosystems, reduce conflicts between forestry and other uses, and encourage a sustained yield of forest products.

Policies

5.B.1. The County shall encourage the sustained productive use of forest land as a means of providing open space and conserving other natural resources.

5.B.2. The County shall discourage development that conflicts with timberland management.

C. WATER RESOURCES

Goal 5.C: To protect and enhance the natural qualities of Madera County's streams, creeks, and groundwater.

Policies

5.C.I. The County shall protect preserve areas with prime percolation capabilities and minimize placement of potential sources of pollution in such areas.

5.C.2. The County shall minimize sedimentation and erosion through control of grading, cutting of trees, removal of vegetation, placement of roads and bridges, and use of off-road vehicles. The County shall discourage grading activities during the rainy season, unless adequately mitigated, to avoid sedimentation of creeks and damage to riparian habitat.

5.C.3. The County shall require new development of facilities near rivers, creeks, reservoirs, or substantial aquifer recharge areas to mitigate any potential impacts of release of pollutants in flood waters, flowing river, stream, creek, or reservoir waters.

5.C.4. The County shall require the use of feasible and practical best management practices (BMPs) to protect streams from the adverse effects of construction activities, and shall encourage the urban storm drainage systems and agricultural activities to use BMPs.

5.C.5. The County shall approve only wastewater disposal facilities that will not contaminate groundwater or surface water.

5.C.6. The County shall require that natural watercourses are integrated into new development in such a way that they are accessible to the public and provide a positive visual element.

5.C.7. The County shall protect groundwater resources from contamination and further overdraft by encouraging water conservation efforts and supporting the use of surface water for urban and agricultural uses wherever feasible.

5.C.8. The County shall support the policies of the San Joaquin River Parkway Plan to protect the San Joaquin River as an aquatic habitat and a water source.

D. WETLAND AND RIPARIAN AREAS

Goal 5.D: To protect wetland communities and related riparian areas throughout Madera County as valuable resources.

Policies

5.D.I. The County shall comply with the wetlands policies of the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the California Department of Fish and Game. Coordination with these agencies at all levels of project review shall continue to ensure that appropriate mitigation measures and the concerns of these agencies are adequately addressed.

5.D.2. The County shall require new development to mitigate wetland loss in both regulated and non-regulated wetlands through any combination of avoidance, minimization, or compensation. The County shall support mitigation banking programs that can provide the opportunity to mitigate impacts to rare, threatened, and endangered species and/or the habitat which supports these species in wetland and riparian areas.

5.D.3. Development should be designed in such a manner that pollutants and siltation will not significantly adversely affect the value or function of wetlands.

5.D.4. The County shall require riparian protection zones around natural watercourses. Riparian protection zones shall include the bed and bank of both low and high flow channels and associated riparian vegetation, the band of riparian vegetation outside the high flow channel, and buffers of 100 feet in width as measured from the top of bank of unvegetated channels and 50 feet in width as measured from the outer edge for the canopy of riparian vegetation. Exceptions may be made in existing developed areas where existing development and lots are located within the setback areas.

5.D.5. The County shall strive to identify and conserve remaining upland habitat areas adjacent to wetlands and riparian areas that are critical to the feeding or nesting of wildlife species associated with these wetland and riparian areas.

5.D.6. The County shall require new private or public developments to preserve and enhance existing native riparian habitat unless public safety concerns require removal of habitat for flood control or other public purposes. In cases where new private or public development results in modification or destruction of riparian habitat for purposes of flood control, the developers shall be responsible for

creating new riparian habitats within or near the project area at a ratio of three acres of new habitat for every acre destroyed.

5.D.7. The County shall support the management of wetland and riparian plant communities for passive recreation, groundwater recharge, nutrient catchment, and wildlife habitats. Such communities shall be restored, where possible.

5.D.8. The County shall support the goals and policies of the San Joaquin River Parkway Plan to preserve existing habitat and maintain, enhance, or restore native vegetation to provide essentially continuous riparian and upland habitat for wildlife along the river between Friant Dam and the Highway 145 crossing.

E. FISH AND WILDLIFE HABITAT

Goal 5.E: To protect, restore, and enhance habitats that support fish and wildlife species so as to maintain populations at viable levels.

Policies

5.E.l. The County shall identify and protect critical nesting and foraging areas, important spawning grounds, migratory routes, waterfowl resting areas, oak woodlands, wildlife movement corridors, and other unique wildlife habitats critical to protecting and sustaining wildlife populations.

5.E.2. The County shall require development in areas known to have particular value for wildlife to be carefully planned and, where possible, located so that the reasonable value of the habitat for wildlife is maintained.

5.E.3. The County shall encourage private landowners to adopt sound wildlife habitat management practices, as recommended by the California Department of Fish and Game officials and the U.S. Fish and Wildlife Service.

5.E.4. The County shall support preservation of the habitats of rare, threatened, endangered, and/or other special-status species. The County shall consider developing a formal habitat conservation plan in consultation with federal and state agencies, as well as other resource conservation organizations. Such a plan would provide a mechanism for the acquisition and management of lands supported by threatened and endangered species.

5.E.5. The County shall support the maintenance of suitable habitats for all indigenous species of wildlife through maintenance of habitat diversity.

5.E.6. The County shall ensure the conservation of sufficiently large, continuous expanses of native vegetation to provide suitable habitat for maintaining abundant and diverse wildlife, if this preservation does not threaten the economic well-being of the county.

5.E.7. The County shall support the preservation or reestablishment of fisheries in the rivers and streams within the county, whenever possible.

5.E.8. The County shall ensure close monitoring of pesticide use in areas adjacent to habitats of special-status plants and animals.

5.E.9. The County shall promote effective methods of ground squirrel control on croplands bordering sensitive habitat that do not place kit foxes and other special-status species at risk.

5.E.10. Prior to approval of discretionary development permits involving parcels within a significant ecological resource area, the County shall require, as part of the environmental review process, a biotic resources evaluation of the sites by a qualified biologist. The evaluation shall be based upon field reconnaissance performed at the appropriate time of year to determine the presence or absence of rare, threatened, or endangered species of plants or animals. Such evaluation will consider the potential for significant impact on these resources and will either identify feasible measures to mitigate such impacts or indicate why mitigation is not feasible.

5.E.11. The County shall provide for a minimum 200-foot wildlife corridor along the San Joaquin River between Friant Dam and the Highway 145 crossing, consistent with the San Joaquin River Parkway Plan. The County shall require a buffer with a minimum width of 150 feet between existing or planned urban or suburban uses. Exceptions may be necessary where the minimum width is infeasible due to topography or other physical constraints. In these instances, an offsetting expansion on the opposite side of the river should be provided.

F. VEGETATION

Goal 5.F: To preserve and protect the valuable vegetation resources of Madera County.

Policies

5.F.1. The County shall encourage landowners and developers to preserve the integrity of existing terrain and natural vegetation in visually-sensitive areas such as hillsides, ridges, and along important transportation corridors.

5.F.2. The County shall require developers to use native and compatible non-native species, especially drought-resistant species, to the extent possible in fulfilling landscaping requirements imposed as conditions of discretionary permit approval or for project mitigation.

5.F.3. The County shall support the preservation of outstanding areas of natural vegetation, including, but not limited to, oak woodlands, riparian areas, and vernal pools.

5.F.4. The County shall ensure that landmark trees are preserved and protected.

5.F.5. The County shall establish procedures for identifying and preserving rare, threatened, and endangered plant species that may be adversely affected by public or private development projects. The County shall consider developing a formal habitat conservation plan in consultation with federal and state agencies, as well as other resource conservation organizations. Such a plan would provide a mechanism for the acquisition and management of land supporting threatened and endangered species

5.F.6. The County shall require that new development preserve natural woodlands to the maximum extent possible.

5.F.7. The County shall require that development on hillsides be limited to maintain valuable natural vegetation, especially forests and open grasslands, and to control erosion.

5.F.8. The County shall support the continued use of prescribed burning to mimic the effects of natural fires to reduce fuel volumes and associated fire hazard to human residents and to enhance the health of biotic communities.

H. OPEN SPACE FOR THE PRESERVATION OF NATURAL RESOURCES

Goal 5.H: To preserve and enhance open space lands to maintain the natural resources of the county.

Policies

5.H.l. The County shall support the preservation and enhancement of natural land forms, natural vegetation, and natural resources as open space. To the extent feasible, the County shall permanently protect as open space areas of natural resource value, including wetlands preserves, riparian corridors, woodlands, and floodplains.

5.H.2. The County shall require that new development be designed and constructed to preserve the following types of areas and features as open space to the maximum extent feasible:

a. High erosion hazard areas;

b. Scenic and trail corridors;

c. Streams and streamside vegetation;

d. Wetlands;

e. Other significant stands of vegetation;

f. Wildlife corridors; and

g. Any areas of special ecological significance.

5.H.3. The County shall support the maintenance of open space and natural areas that are interconnected and of sufficient size to protect biodiversity, accommodate wildlife movement, and sustain ecosystems.

5.H.4. Recognizing the importance of both public and privately-owned open space, the County shall encourage both private and public ownership and maintenance of open space.

5.H.5. The County shall require that significant natural, open space, and cultural resources be identified in advance of development and incorporated into site-specific development project design.

APPENDIX G

APPLICABLE FRESNO COUNTY GENERAL PLAN GOALS AND POLICIES

APPENDIX G. Applicable Fresno County Goals and Policies.

PRODUCTIVE RESOURCES

A. WATER RESOURCES

Goal OS-A To protect and enhance the water quality and quantity in Fresno County's streams, creeks, and groundwater basins.

Policies

General

OS-A.1 The County shall develop, implement, and maintain a plan for achieving water resource sustainability, including a strategy to address overdraft and the needs of anticipated growth.

OS-A.2 The County shall provide active leadership in the regional coordination of water resource management efforts affecting Fresno County and shall continue to monitor and participate in, as appropriate, regional activities affecting water resources, groundwater, and water quality.

OS-A.3 The County shall provide active leadership in efforts to protect, enhance, monitor, and manage groundwater resources within its boundaries.

OS-A.4 The County shall update, implement, and maintain its Groundwater Management Plan.

OS-A.5 The Fresno County Water Advisory Committee shall provide advice to the Board of Supervisors on water resource management issues.

OS-A.6 The County shall support efforts to create additional water storage that benefits Fresno County, and is economically, environmentally, and technically feasible.

OS-A.7 The County shall develop a repository for the collection of County water resource information and shall establish and maintain a centralized water resource database. The database shall incorporate surface and groundwater data and provide for the public dissemination of water resource information.

OS-A.8 The County shall develop and maintain a water budget (i.e., an accounting of all inflows and outflows of water into a specified area) for the County to aid in the determination of existing and future water resource needs. The water budget shall be incorporated into the County Geographic Information System (GIS) and included in the water resource database.

OS-A.9 The County shall develop, implement, and maintain a program for monitoring groundwater quantity and quality within its boundaries. The results of the program shall be reported annually and shall be included in the water resource database.

OS-A.10 The County shall develop and maintain an inventory of sites within the county that are suitable for groundwater recharge. The sites shall be incorporated into the County GIS and included in the water resource database.

OS-A.11 The County shall develop and implement public education programs designed to increase public participation in water conservation and water quality awareness.

OS-A.12 The County shall promote preservation and enhancement of water quality by encouraging landowners to follow the "Fresno County Voluntary Rangeland and Foothill Water Quality Guidelines."

B. FOREST RESOURCES

Goal OS-B To maintain healthy, sustainable forests in Fresno County, conserve forest resources, enhance the quality and diversity of forest ecosystems, reduce conflicts between forestry and other uses, encourage a sustained yield of forest products, protect and conserve lands identified as suitable for commercial timber production within the county, and conserve forest lands that have other resource values including recreation, grazing, watershed, and wildlife habitats.

Policies

OS-B.1 The County shall encourage the sustained productive use of forest land as a means of providing open space and conserving natural resources.

OS-B.2 The County shall work closely with agencies involved in the management of forest ecosystems and shall coordinate with State and Federal agencies, private landowners, and private preservation/conservation groups in habitat preservation and protection of rare, endangered, threatened, and special concern species, to ensure consistency in efforts and to encourage joint planning and development of areas to be preserved. The County shall encourage State and Federal agencies to give notice to and coordinate with the County on any pending, contemplated, or proposed actions affecting local communities and citizens of the County. The County will encourage State and Federal agencies to address adverse impacts on citizens and communities of Fresno County, including environmental, health, safety, private property, and economic impacts.

OS-B.3 The County shall coordinate with agencies involved in the regulation of timber harvest operations to ensure that County conservation goals are achieved.

OS-B.4 The County shall review all proposed timber harvest plans and shall request that the California Department of Forestry and Fire Protection and the U.S. Forest Service amend the plans to address public safety concerns, such as requiring alternate haul routes if use of proposed haul routes would jeopardize public safety or result in damage to public or private roads.

OS-B.5 The County shall encourage and promote the productive use of wood waste generated in the county.

OS-B.6 The County shall encourage and support conservation programs to reforest private timberlands.

OS-B.7 The County shall protect forest resources for the production of timber resources and related activities.

OS-B.8 The County shall discourage the development of land uses that conflict with timberland management.

OS-B.9 The County shall encourage qualified landowners to enroll in the Timberland Production Zone program, pursuant to the Timberland Productivity Act of 1982.

OS-B.10 The County shall maintain Timberland Production designations. Rezonings from the Timberland Production Zone District shall be based on criteria and procedures in accordance with the State Forest Taxation Reform Act and the Fresno County Zoning Ordinance.

OS-B.11 The County shall require parcels removed from the Timberland Production Zone in accordance with the Fresno County Zoning Ordinance to revert to the Resource Conservation Zone District. Removal from the Timberland Production Zone District shall be effective ten (10) years from the date the rezoning is approved or as otherwise specified by the State Forest Taxation Reform Act.

NATURAL RESOURCES

D. WETLAND AND RIPARIAN AREAS

Goal OS-D To conserve the function and values of wetland communities and related riparian areas throughout Fresno County while allowing compatible uses where appropriate. Protection of these resource functions will positively affect aesthetics, water quality, floodplain management, ecological function, and recreation/tourism.

Policies

OS-D.1 The County shall support the “no-net-loss” wetlands policies of the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the California Department of Fish and Game. Coordination with these agencies at all levels of project review shall continue to ensure that appropriate mitigation measures and the concerns of these agencies are adequately addressed.

OS-D.2 The County shall require new development to fully mitigate wetland loss for function and value in regulated wetlands to achieve "no-net-loss" through any combination of avoidance, minimization, or compensation. The County shall support mitigation banking programs that provide the opportunity to mitigate impacts to rare, threatened, and endangered species and/or the habitat which supports these species in wetland and riparian areas.

OS-D.3 The County shall require development to be designed in such a manner that pollutants and siltation do not significantly degrade the area, value, or function of wetlands. The County shall require new developments to implement the use of Best Management Practices (BMPs) to aid in this effort.

OS-D.4 The County shall require riparian protection zones around natural watercourses and shall recognize that these areas provide highly valuable wildlife habitat. Riparian protection zones shall include the bed and bank of both low- and high-flow channels and associated riparian vegetation, the band of riparian vegetation outside the high-flow channel, and buffers of 100 feet in width as measured from the top of the bank of unvegetated channels and 50 feet in width as measured from the outer edge of the dripline of riparian vegetation.

OS-D.5 The County shall strive to identify and conserve remaining upland habitat areas adjacent to wetland and riparian areas that are critical to the feeding, hibernation, or nesting of wildlife species associated with these wetland and riparian areas.

OS-D.6 The County shall require new private or public developments to preserve and enhance existing native riparian habitat unless public safety concerns require removal of habitat for flood control or other purposes. In cases where new private or public development results in modification or destruction of riparian habitat for purposes of flood control, the developers shall be responsible for creating new riparian habitats within or near the project area. Adjacency to the project area shall be defined as being within the same watershed subbasin as the project site. Compensation shall be at a ratio of three (3) acres of new habitat for every one (1) acre destroyed.

OS-D.7 The County shall support the management of wetland and riparian plant communities for passive recreation, groundwater recharge, nutrient storage, and wildlife habitats.

OS-D.8 The County should consider the acquisition of wetland, meadows, and riparian habitat areas for parks limited to passive recreational activities as a method of wildlife conservation.

E. FISH AND WILDLIFE HABITAT

Goal OS-E To help protect, restore, and enhance habitats in Fresno County that support fish and wildlife species so that populations are maintained at viable levels.

Policies

OS-E.1 The County shall support efforts to avoid the "net" loss of important wildlife habitat where practicable. In cases where habitat loss cannot be avoided, the County shall impose adequate mitigation for the loss of wildlife habitat that is critical to supporting special-status species and/or other valuable or unique wildlife resources. Mitigation shall be at sufficient ratios to replace the function, and value of the habitat that was removed or degraded. Mitigation may be achieved through any combination of creation, restoration, conservation easements, and/or mitigation banking. Conservation easements should include provisions for maintenance and management in perpetuity. The County shall recommend coordination with the U.S. Fish and Wildlife Service and the California Department of Fish and Game to ensure that appropriate mitigation measures and the concerns of these agencies are adequately addressed. Important habitat and habitat components include nesting, breeding, and foraging areas, important spawning grounds, migratory routes, migratory stopover areas, oak woodlands, vernal pools, wildlife movement corridors, and other unique wildlife habitats (e.g., alkali scrub) critical to protecting and sustaining wildlife populations.

OS-E.2 The County shall require adequate buffer zones between construction activities and significant wildlife resources, including both onsite habitats that are purposely avoided and significant habitats that are adjacent to the project site, in order to avoid the degradation and disruption of critical life cycle activities such as breeding and feeding. The width of the buffer zone should vary depending on the location, species, etc. A final determination shall be made based on informal consultation with the U.S. Fish and Wildlife Service and/or the California Department of Fish and Game.

OS-E.3 The County shall require development in areas known to have particular value for wildlife to be carefully planned and, where possible, located so that the value of the habitat for wildlife is maintained.

OS-E.4 The County shall encourage private landowners to adopt sound wildlife habitat management practices, as recommended by the California Department of Fish and Game officials and the U.S. Fish and Wildlife Service.

OS-E.5 The County shall support preservation of habitats of rare, threatened, endangered, and/or other special-status species including fisheries. The County shall consider developing a formal Habitat Conservation Plan in consultation with Federal and State agencies, as well as other resource conservation organizations. Such a plan should provide a mechanism for the acquisition and management of lands that support special-status species.

OS-E.6 The County shall ensure the conservation of large, continuous expanses of native vegetation to provide suitable habitat for maintaining abundant and diverse wildlife populations, as long as this preservation does not threaten the economic well-being of the county.

OS-E.7 The County shall continue to closely monitor pesticide use in areas adjacent to habitats of special-status plants and animals.

OS-E.8 The County shall promote effective methods of pest (e.g., ground squirrel) control on croplands bordering sensitive habitat that do not place special-status species at risk, such as the San Joaquin kit fox.

OS-E.9 Prior to approval of discretionary development permits, the County shall require, as part of any required environmental review process, a biological resources evaluation of the project site by a qualified biologist. The evaluation shall be based upon field reconnaissance performed at the appropriate time of year to determine the presence or absence of significant resources and/or special-status plants or animals. Such evaluation will consider the potential for significant impact on these resources and will either identify feasible mitigation measures or indicate why mitigation is not feasible.

OS-E.10 The County shall support State and Federal programs to acquire significant fish and wildlife habitat areas for permanent protection and/or passive recreation use.

OS-E.11 The County shall protect significant aquatic habitats against excessive water withdrawals that could endanger special-status fish and wildlife or would interrupt normal migratory patterns.

OS-E.12 The County shall ensure the protection of fish and wildlife habitats from environmentally-degrading effluents originating from mining and construction activities that are adjacent to aquatic habitats.

OS-E.13 The County should protect to the maximum extent practicable wetlands, riparian habitat, and meadows since they are recognized as essential habitats for birds and wildlife.

OS-E.14 The County shall require a minimum 200-foot-wide wildlife corridor along particular stretches of the San Joaquin River and Kings River, whenever possible. The exact locations for the corridors should be determined based on the results of biological evaluations of these watercourses. Exceptions may be necessary where the minimum width is infeasible due to topography or other physical constraints. In these instances, an offsetting expansion on the opposite side of the river should be considered.

OS-E.15 The County should preserve, to the maximum extent practicable, significant wildlife migration routes such as the North Kings Deer Herd migration corridors and fawn production areas.

OS-E.16 Areas that have unusually high value for fish and wildlife propagation should be preserved in a natural state to the maximum possible extent.

OS-E.17 The County should preserve, to the maximum possible extent, areas defined as habitats for rare or endangered animal and plant species in a natural state consistent with State and Federal endangered species laws.

OS-E.18 The County should preserve areas identified as habitats for rare or endangered plant and animal species primarily through the use of open space easements and appropriate zoning that restrict development in these sensitive areas.

F. VEGETATION

Goal OS-F To preserve and protect the valuable vegetation resources of Fresno County.

Policies

OS-F.1 The County shall encourage landowners and developers to preserve the integrity of existing terrain and natural vegetation in visually-sensitive areas such as hillsides and ridges, and along important transportation corridors, consistent with fire hazard and property line clearing requirements.

OS-F.2 The County shall require developers to use native and compatible non-native plant species, especially drought-resistant species, to the extent possible, in fulfilling landscaping requirements imposed as conditions of discretionary permit approval or for project mitigation.

OS-F.3 The County shall support the preservation of significant areas of natural vegetation, including, but not limited to, oak woodlands, riparian areas, and vernal pools.

OS-F.4 The County shall ensure that landmark trees are preserved and protected whenever possible.

OS-F.5 The County shall establish procedures for identifying and preserving rare, threatened, and endangered plant species that may be adversely affected by public or private development projects. As part of this process, the County shall require, as part of the environmental review process, a biological resources evaluation of the project site by a qualified biologist. The evaluation shall be based on field reconnaissance performed at the appropriate time of year to determine the presence or absence of significant plant resources and/or special-status plant species. Such evaluation shall consider the potential for significant impact on these resources and shall either identify feasible mitigation measures or indicate why mitigation is not feasible.

OS-F.6 The County shall require that development on hillsides be limited to maintain valuable natural vegetation, especially forests and open grasslands, and to control erosion.

OS-F.7 The County shall require developers to take into account a site's natural topography with respect to the design and siting of all physical improvements in order to minimize grading.

OS-F.8 The County should encourage landowners to maintain natural vegetation or plant suitable vegetation along fence lines, drainage and irrigation ditches and on unused or marginal land for the benefit of wildlife.

OS-F.9 The County shall support the continued use of prescribed burning to mimic the effects of natural fires to reduce fuel volumes and associated fire hazards to human residents and to enhance the health of biotic communities.

OS-F.10 The County shall require that new developments preserve natural woodlands to the maximum extent possible.

OS-F.11 The County shall promote the preservation and management of oak woodlands by encouraging landowners to follow the Fresno County Oak Management Guidelines shown below and to prepare an Oak Management Plan for their property.

APPENDIX H

BALD EAGLE MANAGEMENT PLAN

BALD EAGLE MANAGEMENT PLAN

BIG CREEK HYDROELECTRIC SYSTEM

MAMMOTH POOL (FERC Project No. 2085)
BIG CREEK Nos. 1 AND 2 (FERC Project No. 2175)
BIG CREEK Nos. 2A, 8, AND EASTWOOD (FERC Project No. 67)
BIG CREEK No. 3 (FERC Project No. 120)

FEBRUARY 2007

SUBMITTED BY
SOUTHERN CALIFORNIA EDISON COMPANY

TABLE OF CONTENTS

List of Tables

List of Figures

List of Attachments

1.0 INTRODUCTION

This Bald Eagle Management Plan (Plan) has been developed for four of Southern California Edison's (SCE) hydroelectric projects included in the Big Creek Hydroelectric System, located in the Upper San Joaquin River Watershed. The Plan covers the following four Federal Energy Regulatory Commission (Commission or FERC) licensed projects: Mammoth Pool (FERC No. 2085), Big Creek Nos. 1 and 2 (FERC No. 2175), Big Creek Nos. 2A, 8, and Eastwood (FERC No. 67) and Big Creek No. 3 (FERC No. 120). These Projects include seven powerhouses and four major reservoirs, and have a combined dependable operating capacity of about 890 megawatts (MW).

SCE has prepared this Plan in consultation with the U.S. Fish and Wildlife Service (USFWS), U.S. Department of Agriculture-Forest Service (USDA-FS), California Department of Fish and Game (CDFG) and other stakeholders in the Big Creek Alternative Licensing Process (ALP). The Plan was developed to address ongoing maintenance and operations of the four Big Creek Projects and their potential impact to bald eagle in the Projects' vicinity. This Plan, including the specified avoidance, protection, and mitigation measures, will supersede all previous documents developed by SCE for the four Big Creek Projects that address bald eagles. The Plan will be in effect upon FERC approval.

The Draft Bald Eagle Management Plan was submitted to agencies and stakeholders on August 17, 2005. Comments on the plan were received from USFWS, USDA-FS, and CDFG.

2.0 EVALUATION AND IMPLEMENTATION OF MAINTENANCE ACTIVITIES

This section describes the location of bald eagles and their habitat within the vicinity of the four Big Creek Projects and the potential effects/enhancements of ongoing operations and maintenance activities. Additionally, this section identifies the appropriate bald eagle avoidance and protection measures to be implemented for the term of the license(s).

2.1 LOCATION OF BALD EAGLES AND HABITAT IN THE PROJECT AREA

The presence of bald eagles and their habitat (nesting and wintering) in the vicinity of the four Big Creek Projects was determined based on extensive field surveys conducted in the vicinity of the four Big Creek Projects as part of the Big Creek ALP (SCE 2001; 2003; and 2004). The location of known nests, nesting habitat, and wintering habitat are summarized below. Maps of bald eagles nests in the vicinity of the four Big Creek Projects are provided as Figures 1, 1A and 1B.

2.1.1 NESTING AND FORAGING HABITAT

Appropriate nesting habitat within the four Big Creek Projects includes tall (> 100 feet) conifers in uneven-aged, multistoried stands within 0.5 mile of Project reservoirs (i.e.,

Florence Lake, Shaver Lake, Huntington Lake, and Mammoth Pool Reservoir) and the South Fork San Joaquin and San Joaquin rivers. Foraging habitat is the same as nesting habitat except that large forebays (Balsam Creek Forebay, Bear Diversion Forebay, Mono Diversion Forebay, Dam 5 Forebay, and San Joaquin River Dam 6 Forebay) are also considered suitable habitat. Bald eagle occurrences have been recorded in the vicinity of all four Big Creek Projects.

Two bald eagle nests have been confirmed in the vicinity of the Big Creek Projects. This includes a nest on the south shore of Shaver Lake (Big Creek Nos. 2A, 8, and Eastwood), and another near Rancheria Campground (Big Creek Nos. 1 and 2).

The nest at the south shore of Shaver Lake on Kokanee Point was first detected in 1999. In 2000, two chicks were reported, but both chicks died, presumably from a winter storm. In 2001, two chicks successfully fledged. The nest was unsuccessful in 2002, but produced three young in 2003. In 2005, one chick fledged successfully (Byrd, pers. comm., 2005).

A nest was identified at Huntington Lake in 2003, after the breeding season. In 2004, one juvenile was observed that fledged the nest (Smith, pers. comm., 2005). In 2005, this nest produced two fledglings (Sorini-Wilson, pers. comm., 2005).

2.1.2 Wintering Habitat

Wintering habitat elements that are critical to bald eagles include trees or other vantage points of sufficient height, night roosts, and shelter from harsh weather conditions in areas with adequate forage. Wintering habitat in the vicinity of the four Big Creek Projects is the same as nesting habitat, except for elevations above 6,500 feet in elevation because of severe weather and at least partial freezing of rivers and reservoirs. Bald eagles are not known to winter above 6,500 feet in elevation in the vicinity of the four Big Creek Projects. Wintering bald eagles have been reported near Powerhouse 3 facilities and surrounding roads and at Mammoth Pool Reservoir and surrounding Project facilities and roads. Although wintering bald eagles have been documented at these locations, it has not been determined if there are bald eagle winter roosts. Winter roosts are communal night roosting locations, near wintering foraging grounds, in protected locations to minimize energy expenditure. Traditional winter roosts are used regularly on multiple days or consecutive years by numerous eagles in the winter.

2.2 Potential Effects/Enhancements to Bald Eagle

As part of the Big Creek ALP, an analysis of potential effects from ongoing operation and maintenance (O/M) of the four Big Creek Projects was completed. The potential Project impacts are summarized below.

2.2.1 Project Power Lines

Project power lines in the vicinity of the Big Creek Projects were evaluated to determine if they meet the guidelines set forth in the Suggested Practices for Raptor Protection on

Power Lines: The State of the Art in 1996 (Avian Power Line Interaction Committee (APLIC) 1996). Following completion of this analysis, it was determined that four Project power lines do not meet APLIC guidelines for protection of raptors. These Project power lines therefore pose a potential risk for raptor electrocution (including bald eagles). However, no raptor or bald eagle mortalities have been known to occur along these lines and the potential risk is considered small.

Raptors, including bald eagles, may also nest on Project power lines or associated structures during the term of the license(s). If these nests pose a fire or public safety issue, they may require removal or trimming. Removal or trimming of an active nest may be considered an adverse effect.

2.2.2 LAKES AND FOREBAYS

More than 87% of bald eagles in California nest within one mile of water, including reservoirs (Zeiner et al. 1990). Consistent with this, bald eagles are known to nest and forage on reservoirs and forebays in the vicinity of the Big Creek Projects. Florence Lake, Shaver Lake, Huntington Lake, and Mammoth Pool Reservoir represent nesting and foraging habitat for bald eagle.

2.3 AVOIDANCE AND PROTECTION MEASURES

Avoidance and protection (A/P) measures that SCE will implement during the term of the license(s) are provided below.

2.3.1 PROJECT POWER LINES

To avoid and minimize the potential for bald eagles to be electrocuted on Project power lines and to minimize adverse effects to eagles nesting on power poles and towers, SCE will implement Procedures set forth in the Avian Protection (Specific Order) (Attachment A).

Electrocution

If during the term of the license(s) a bald eagle mortality occurs on a Project power line, the mortality shall be reported via telephone to the Northern Hydro Division's Environmental Manager or Safety and Environmental Specialist (SES) within 24 (twenty-four) hours of discovery of a carcass. Either the Environmental Manager or SES will promptly notify SCE's Environment, Health and Safety (EH&S) Division by telephone and will immediately follow up that notification with a written raptor mortality report. The report shall be completed using the Animal/Bird Mortality Reporting Form, provided as Attachment B, or a similar form providing relevant information.

SCE will provide USFWS and CDFG with an annual bald eagle mortality report that includes the date, raptor species, and location of each Project-related mortality. SCE will not provide reports for years in which no Project-related bald eagle mortalities have occurred.

Nest Protection

All vegetation maintenance and work activities involving active or inactive bald eagle nests on Project power lines will be coordinated with the Northern Hydro Division's Environmental Manager, SES, or other qualified personnel.

Active Nests

- SCE will not remove active bald eagle nests (i.e., eggs, young, and incubating adults present) from power poles without close coordination with and any required approval from CDFG and USFWS. All necessary state/federal permits will be obtained by SCE prior to any actions to the nest.

- If imminent danger (fire/electrocution) to the safety of bald eagles or nests exists, or if a threat to human life or property exists, nest material may be trimmed, conductors may be moved away from the nest, or other practices may be implemented to ensure the welfare of the birds, if present. Such activities will be coordinated with the Northern Hydro Division's Environmental Manager, SES, or other qualified personnel. CDFG and USFWS will be notified by telephone or in writing, within one week of any such actions.

Inactive Nests

- Inactive bald eagle nests or nests present in nonbreeding season (September–March) will not be removed unless the presence of the nest creates a threat (i.e., fire or safety) to operations and appropriate permits have been obtained. This removal may include placement of the inactive nest on an artificial nesting platform. Such activities will be coordinated with the Northern Hydro Division's Environmental Manager, SES, or other qualified personnel. USFWS will be contacted prior to nest relocation to obtain necessary permits.

2.4 SCE PROGRAMS

In addition to the above A/P measures, SCE has also established several programs to train personnel on the recognition of special-status resources, including bald eagle. The programs will continue to be implemented during the term of the license(s), and are briefly described below. The programs may be revised from time to time to ensure compliance with new or changed laws, regulations, policies, and operational or business practices. Each program is described briefly below.

2.4.1 ENDANGERED SPECIES ALERT PROGRAM

The Endangered Species Alert Program (ESAP) was developed to provide SCE personnel with a means for identifying when they may be working within an area with the potential for occurrence of legally protected plants and animal species in the SCE Service Territory. This training is conducted on an annual basis. For each of these species within the SCE Service Territory, the ESAP Manual (SCE 2006a) includes a photograph, description, natural history information, and map showing the species'

distribution in relation to SCE facilities. This manual and maps (or Geographic Information System (GIS) database) are reviewed prior to implementing any project that involves ground disturbing activities within the Project area. Should a proposed activity have the potential to conflict with a known sensitive species population, SCE's Northern Hydro Division Environmental Manager, SES, or other qualified personnel will be notified to evaluate the situation and, if needed, coordinate with and obtain appropriate permits from regulatory agencies.

2.4.2 Northern Hydro Special-Status Species Information Program

SCE's Northern Hydro Division has developed a Special-Status Species Information Program (NHSSIP) to provide SCE personnel with a means of identifying when they may be working within an area that could support a Forest Service Sensitive (FSS) species. This Program will require the use of the Environmental Compliance Program described below and will enhance the ESAP described above. This program includes a photograph or line drawing, description, natural history information, and map showing the species' distribution in relation to SCE facilities for all FSS species potentially occurring in the Project vicinity (SCE 2006b).

2.4.3 Avian Protection Program

SCE employees are informed about the SCE Avian Protection Program (APP) through posters, written literature, wallet-sized cards, formal training that discusses pertinent environmental regulations, general raptor identification, reporting procedures for the discovery of a dead raptor, protocols for how to deal with avian nests, and modifications that can be made to power line structures to lower the risk of avian electrocutions. A copy of the SCE's Avian Protection (Specific Order) and the Animal/Bird Mortality Reporting Form are provided as Attachments A and B. This training is conducted annually as part of the ESAP described above.

2.4.4 Environmental Training Program

SCE employees attend environmental training sessions on a regular basis, as well as on an as-needed basis. These training sessions include a review of background material, permit conditions, and instructions on how to avoid impacts to biological resources. Project-specific meetings may also be conducted in the field on a job-specific or activity-specific basis to review appropriate maintenance protocols (A/P measures) in environmentally sensitive areas.

2.4.5 Environmental Compliance Program

SCE will develop a compliance program that includes a process that must be followed prior to implementation of specific O/M activities. This is a program designed to track O/M activities implemented, update resource information, and guide personnel in implementation of O/M activities in compliance with A/P measures developed for the Project. The compliance program consists of three components, the Northern Hydroelectric Environmental Compliance Database, GIS Database, and the Compliance Process, as described below.

Northern Hydroelectric Environmental Compliance Database

The Northern Hydroelectric Environmental Compliance Database (Compliance Database) will be developed and integrated with SCE's existing databases. A component of the database will be designed for tracking the training records of SCE personnel and O/M activities that have been planned and completed. The database will also include all A/P measures associated with this Plan. This database will be queried prior to implementation of specified O/M activities.

Geographic Information System Database

Several studies have been conducted for the Project. The results of these studies, data obtained from the USDA-FS Special-status Species Database, the California Natural Diversity Database (CNDDB), and other biological studies were incorporated into a GIS database. This information includes the locations of special-status species and their habitats in the vicinity of the Project. Because of the sensitive nature of the locations of some special-status species, some GIS data layers are confidential. Therefore, access to these layers will be limited to SCE employees who are trained in the sensitivity and proper use of the information.

Updating GIS Database

The GIS database will be evaluated annually during the term of the license(s) to determine if updates are needed. Prior to updating the database, SCE will contact USDA-FS for the most recent version of its Special-status Species Database. SCE will also contact the USFWS for the current list of Threatened and Endangered Species and obtain any new versions of the CNDDB when they become available. Any new data on the location of resources in the vicinity of the Project that is obtained during implementation of O/M activities, or required species monitoring, will also be incorporated into the database on a regular basis. SCE will contact the agencies and obtain approval to use the newest available data sources if they become available.

Compliance

SCE will review all O/M work activity requests that are determined to be subject to environmental regulation. They will use the Database to determine which A/P measures are appropriate, given the timing and nature of the work to be conducted, and the proximity of special-status biological resources to the work location. SCE will require that contractors comply with all applicable A/P measures.

2.5 RESOURCE MONITORING AND REPORTING

The following section defines the resource monitoring and reporting that will be implemented for the four Big Creek Projects. Additionally, agency consultation is also described.

2.5.1 MONITORING

Two types of surveys will be conducted to monitor the status of bald eagles in the vicinity of the four Big Creek Projects—nesting surveys and wintering surveys. Each of these is described below.

Bald Eagle Nesting Surveys

Protocol-level Surveys

The objective of bald eagle nesting surveys is to monitor the breeding status of existing nests and to locate any new nests during the term of the license(s). Nesting surveys (i.e., searching for new nests and monitoring existing nests) will be completed in appropriate breeding habitat identified in the vicinity of the four Big Creek Projects every five years in accordance with Protocol for Evaluating Bald Eagle Habitat and Populations in California (Jackman and Jenkins 2004). The result of each survey will be reported on the CDFG Bald Eagle Nesting Territory Survey Form provided as an attachment to the CDFG Bald Eagle Breeding Survey Instructions (Attachment C). The first bald eagle nesting survey will be initiated one year following FERC approval of this Plan and every five years thereafter. A brief description of nesting surveys is provided below. Table 1 shows the timing of bald eagle nesting and wintering surveys.

- Determination of New Nests and Occupancy of Existing Nests. Conducted in late February through March (as early in the season as possible, but contingent upon weather conditions) to determine whether the survey area (suitable breeding habitat) is occupied by bald eagles and if so, to determine their breeding status. This shall include observations of old nests, as well as identification of any new nests in the area. Presence or apparent absence of adult bald eagles, courtship behavior, and nest construction will be recorded.

- Determination of Presence of Eggs/Nestlings. Conducted in mid-nesting season, late April through May, to determine the presence of eggs/nestlings in known nests. All nesting sites documented in the initial survey shall be evaluated to determine the presence of adults and number of eggs and/or nestlings.

- Determination of Nest Success. Conducted in late nesting season, early June through early July, to determine nest success. All nesting sites documented as having eggs or nestlings during the second survey shall be revisited a third time to determine the status and breeding success of the nest.

Annual Nest Monitoring Surveys

SCE will contact USDA-FS, CDFG, and USFWS annually to determine if new nests are identified in the Project area. SCE will coordinate with the agencies to verify that each nest is surveyed and that data is collected on the status of the nest (active/inactive) and the number of fledglings produced. If nests are not already scheduled to be surveyed by an agency or local biologists, SCE will conduct the survey. Surveys will consist of

one or two visits to the nest on foot or by boat. Following each survey, SCE will provide a report of findings to USDA-FS, CDFG, and USFWS.

Bald Eagle Wintering Surveys

Wintering surveys consist of two types of surveys, wintering bird surveys and winter roost surveys. Winter surveys will be conducted every five years during the period from November 15 through March 15. Survey methods are based on the Protocol for Evaluating Bald Eagle Habitat and Populations in California (Jackman and Jenkins 2004). The first wintering bald eagle survey will occur within one year of FERC approval of this Plan. Wintering surveys will be completed in appropriate wintering habitat in the vicinity of the four Big Creek Projects. A brief description of wintering bird and winter roost surveys is provided below.

Wintering Bird Surveys

- Single-day surveys will be conducted monthly in the Project area from December through February (three surveys, at least two weeks apart). Unless weather prohibits safe surveys, the January survey will be conducted during the USFWS two-week nationwide bald eagle winter survey to allow comparisons with statewide population trends. Surveys will be completed from a helicopter or boat, depending on weather conditions and accessibility. Data will be recorded on data sheets developed by Zack et al., 1997, as modified by Jackman, et al., 2001 (Attachment D).

Winter Night Roost Surveys

- Winter night roost surveys will be conducted once a month (December through February) in areas where wintering eagles are observed foraging during daylight hours. To find potential night roost areas, bald eagles will be visually observed as they move from foraging habitat to potential night roosts in the late afternoon. The number of eagles entering the potential night roost will be recorded.

- Probable night roost areas will be revisited the following morning for at least two hours beginning one-half hour before sunrise. Eagles observed returning to foraging habitat will be counted. Once a forest stand is identified as a potential night roost, a daytime survey will be conducted to look for evidence of use by bald eagles (feathers, castings) and to Global Positioning System (GPS) or pinpoint the exact location used for roosting.

2.5.2 REPORTING

Within six months of the completion of protocol-level nesting and wintering surveys, SCE will prepare a survey report that includes the following:

- Results of nesting and wintering surveys;

- Map of the location of active nests and winter roosts;

- Survey data sheets;
- Evaluation of operations and maintenance activities potentially affecting any newly identified nest or winter roost;
- Appropriate avoidance and protection measures to minimize any potential effects to bald eagle, if necessary; and
- Completed CNDDB forms.

Within three months of the completion of annual nest monitoring surveys, SCE will provide a letter report of findings to USFWS, USDA-FS, and CDFG.

2.6 AGENCY CONSULTATION

Following the submittal of the completed nesting and wintering survey report to FERC, USDA-FS, CDFG, and USFWS, SCE will review all agency comments and consult with agencies as necessary on the adequacy of any A/P measures to minimize adverse effects on bald eagles.

Additionally, if the bald eagle is delisted during the license(s) term, SCE will consult with agencies and revise this Plan as appropriate.

3.0 LITERATURE CITED AND PERSONAL COMMUNICATIONS

Avian Power Line Interaction Committee (APLIC). 1996. Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996. Edison Electric Institute and the Raptor Research Foundation. Washington, D.C.

Jackman, R.E., and J.M. Jenkins. 2004. Protocol for Evaluating Bald Eagle Habitat and Populations in California.

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Southern California Edison Company (SCE). 2001. Final Technical Study Plan Package for the Big Creek Hydroelectric System Alternative Licensing Process prepared by Southern California Edison. August 3, 2001. *In* SCE's Amended Preliminary Draft Environmental Assessment (APDEA) for the Big Creek Alternative Licensing Process (ALP). Mammoth Pool Project (FERC Project No. 2085), Big Creek Nos. 1 and 2 (FERC Project No. 2175), Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67), and Big Creek No. 3 (FERC Project No. 120). February 2007 (Supporting Document (SD)-B, Volume 4, Books 6 and 21).

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SCE. 2004. 2003 Technical Study Reports (First Distribution) for the Big Creek Hydroelectric System Alternative Licensing Process prepared by Southern California Edison. August 20, 2004. *In* SCE's APDEA for the Big Creek ALP. Mammoth Pool Project (FERC Project No. 2085), Big Creek Nos. 1 and 2 (FERC Project No. 2175), Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67), and Big Creek No. 3 (FERC Project No. 120). February 2007 (SD-D, Volume 4, Books 11-17 and 23).

SCE. 2006a. Endangered Species Alert Program Manual; Species Accounts and Procedures. Environmental Affairs Division. *In* SCE's SCE Response to FERC's Additional Information Request (AIR) No. 6 (Schedule B). August 2006.

SCE. 2006b. Northern Hydro Special-Status Species Information Program. Environmental Affairs Division. *In* SCE's SCE Response to FERC's AIR No. 6 (Schedule B). August 2006.

Zack, S.H., N.N. Cooke, K. Mehl, and J. Wood. 1997. Bald Eagles at Shasta Lake: Ecological and Behavioral Issues Relating to Lake Management and Eagle Productivity. 1997 Summary Report of Field Activities.

Zeiner, D.C, W.F. Loudenslayer Jr, K.E. Mayer, and M. White. 1990. A Guide to California's Wildlife, Volume II, Birds.

Personal Communication

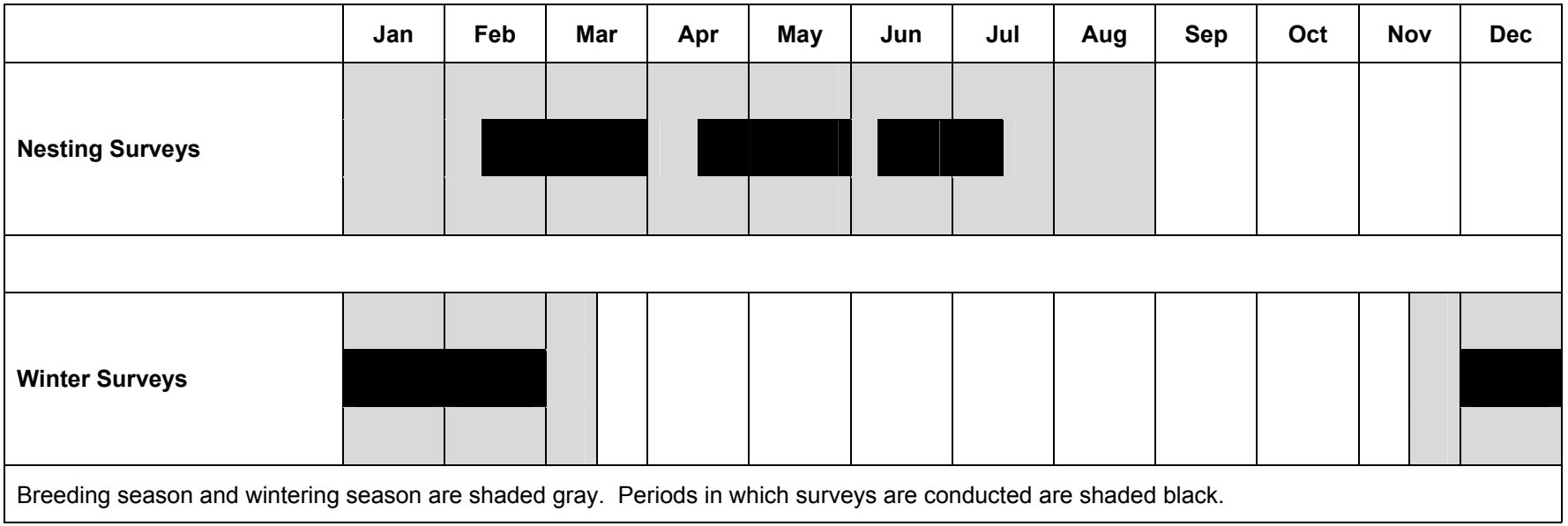
Byrd, Stephen. Wildlife Biologist. Southern California Edison, Shaver Lake, California. October 14, 2005—e-mail to Sara Gillespie of RBI regarding status of Shaver Lake bald eagle nest.

Smith, Michael. Biologist. November 2, 2005—e-mail to Janelle Nolan-Summers of RBI regarding status of Huntington Lake bald eagle nest.

Sorini-Wilson, Kim. Wildlife Biologist. High Sierra Ranger District, Sierra National Forest, Prather, California. October 14, 2005—e-mail to Janelle Nolan-Summers of RBI regarding status of Huntington Lake bald eagle nest.

TABLE

Table 1. Timing of Bald Eagle Nesting and Wintering Surveys.



Source: Jackman and Jenkins 2004

FIGURES

Placeholder for

Figure 1. Big Creek Projects Bald Eagle Overall View

Figures 1A and 1B. Locations of Bald Eagle Nests in the Vicinity of the Four Big Creek Projects

Non-Internet Public Information

These Figures have been removed in accordance with the Commission regulations at 18 CFR Section 388.112.

These Figures are considered Non-Internet Public information and should not be posted on the Internet. This information is provided in Volume 4 of the Application for New License and is identified as "Non-Internet Public" information. This information may be accessed from the FERC's Public Reference Room, but is not expected to be posted on the Commission's electronic library, except as an indexed item.

ATTACHMENT A

AVIAN PROTECTION (SPECIFIC ORDER)

Avian Protection

(Specific Order)

I. PURPOSE

The purpose of this Department Order is to:

- Provide a standard procedure for reporting and monitoring avian mortality or other activities (i.e., nesting) in the vicinity of Power Production Department (PPD) structures;
- Facilitate efficient communication among the PPD Divisions (Eastern and Northern Hydro, Mohave and Mountainview Generating Stations), other entities within SCE [i.e., the Corporate Environment, Health, and Safety Division (EH&S)], and appropriate regulatory agencies;
- Ensure PPD structures are maintained in a manner that reduces adverse effects on bird species in accordance with federal and state regulations, while protecting public health and safety.

II. RAPTOR MORTALITY REPORTING

Raptor electrocutions and power line collisions shall be reported via telephone to the Division's Environmental Manager or Safety and Environmental Specialist (SES) within 24 (twenty-four) hours of discovery of a carcass. Either the Environmental Manager or SES will in turn promptly notify EH&S by telephone and will immediately follow up that notification with a written raptor mortality report. (See Attachment A)

III. RETROFITTING OF EXISTING STRUCTURES

Any PPD structure involved in the electrocution of any raptor, or other endangered/threatened bird species, will be evaluated to determine the feasibility of retrofitting or modifying that structure so that the probability of future bird electrocutions is minimized. Such evaluation of that structure will be performed within 30 (thirty) business days or sooner (for eagles or listed species), and the results of that evaluation will be reported to either the Division's Environmental Manager or SES, and EH&S. If structures of a similar design and in similar habitat are located in the same vicinity of any electrocution, the responsible Manager will determine if these other structures should also be retrofitted to make them more raptor safe. All other electrical structures in any area where clusters of electrocutions have occurred will be examined for possible retrofitting. Each Division, in consultation with EH&S, will identify these clusters and determine which structures may need to be retrofitted and the appropriate retrofit required.

As opportunities arise during routine operation and maintenance activities, field personnel will assess exposed wires and surfaces for possible retrofitting if they are capable of electrocuting raptors and other birds/wildlife. The Division's Environmental Manager or SES must be advised of any retrofitting activity. Retrofits may include, but are not limited to, installing approved bushing covers on transformers, insulator hoods, protective covering on jumper wires or taps, and making other modifications.

IV. NEW CONSTRUCTION

All new or rebuilt structures within Raptor Concentration Areas (RCAs) will be of a raptor-safe construction. An RCA is an area designated by EH&S as likely to have a high concentration of raptors. All new or rebuilt structures on land administered by the federal government (USFS, BLM, etc.) shall be designed to be raptor safe whenever possible. Each new structure installed that has potential to electrocute birds and other wildlife will be evaluated by both the Division and EH&S to determine if the structure can be made raptor-safe. The Division's Environmental Manager or SES will be contacted regarding the replacement of structures.

V. NEST PROTECTION

Protected nests include:

- Active nests (nest contains eggs, young birds or adult birds sitting on the nest) of raptors and other bird species protected by the Migratory Bird Treaty Act;
- Active and inactive nests of all eagles and other threatened or endangered bird species.

All vegetation maintenance and work activities involving protected nests on PPD structures will be coordinated with the Division's Environmental Manager or SES. The Division's Environmental Manager or SES will assess the work activity and, if deemed necessary, coordinate with EH&S and appropriate governmental agencies in accordance with SCE's Federal Fish and Wildlife Permit (See Attachment B).

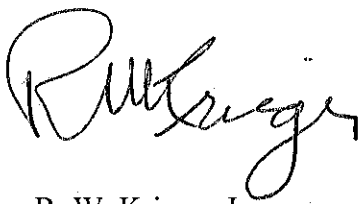
In the event of an emergency (threat to public health or safety, or to the safety of the birds and nests), nesting material and/or nearby trees may be trimmed, conductors or other structures may be moved away from the nest, or other appropriate measures taken as listed in SCE's Federal Fish and Wildlife Permit, to ensure safety of birds and provide safe electrical operations. The Division's Environmental manager or SES shall be contacted before conducting these emergency activities, whenever possible. Contact with the agencies is required before the relocation of any protected bird nest.

All personnel with potential to discover birds injured or killed by SCE facilities or with potential to work near active or inactive nests in the course of their work should carry the current Federal Fish and Wildlife Permit in their possession. A copy of the valid permit is necessary to carry out procedures outlined in this avian protection department order.

VI. TRAINING

All PPD personnel whose jobs may have some involvement with environmental resources such as wildlife habitat or water quality will receive regular training on special-status species, including avian protection issues, at a frequency to be determined by each Division. All contractors will receive training on environmental resource issues depending on the work to be performed, and will have contractual obligations to abide by applicable laws, regulations and SCE permits.

Appropriate personnel will receive guidance on correct measures to take should an encounter with protected nests impact project activities.



R. W. Krieger Jr.
Vice President

Attachment A: Raptor Mortality Report Form
Attachment B: Federal Fish and Wildlife Permit effective 6/1/2006 through 3/31/2009

Prepared by: Michael Murphy, Technical Specialist, Northern Hydro Division, in consultation with Anne M. Gollay, Project Manager, Business Planning & Development and Jill Fariss, Technical Specialist, Corporate Environment, Health and Safety.

ATTACHMENT B

ANIMAL/BIRD MORTALITY REPORTING FORM

Animal/Bird Mortality Report

To: Jill Fariss Date: _____
Biological & Archaeological Resources Group
Corporate EH&S Division, RP&A Department
Quad 3A, G.O.1

From: Name _____
Work Location _____ PAX _____

Describe the species of the Animal or Bird that was mortally injured by SCE facilities (electrocuted/hit by a SCE vehicle, etc.).

_____
_____

Describe how the Animal or Bird was mortally injured by SCE facilities (bird contacted transformer bushings, etc.).

_____
_____
_____
_____

Weather Conditions (e.g. rainy and cold, sunny and warm, etc.)

_____
_____
_____

Circuit Name & Voltage _____

Specific Problem Location (e.g. Pole #/Address/Cross Streets, etc.)

_____
_____
_____

Description of Terrain and Vegetation in Area (e.g. near agriculture area, dense city area, residential housing, etc.)

_____

_____

_____

Please attach picture of the Bird or Animal, if possible.

ATTACHMENT C

CDFG BALD EAGLE BREEDING SURVEY INSTRUCTIONS

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

BALD EAGLE BREEDING SURVEY INSTRUCTIONS

The breeding season of bald eagles in California extends primarily from February through July. Each year, cooperating agencies, organizations, and private individuals participate in a statewide monitoring program to document nesting activities at each nesting territory. In 1997, 160 recently active breeding territories were surveyed, and the number increases yearly.

Annual breeding season surveys are an important part of the population recovery effort. Survey information is used by resource agencies to aid breeding territory management or protection activities. Additionally, population status and trends must be monitored annually to provide the data needed for assessing population recovery.

Specific assignments and scheduling of observer time are usually handled at the agency district or regional office level. In general, agencies are responsible for surveys of territories on or near their own lands, with Department of Fish and Game also surveying on private lands. Field personnel should coordinate their surveys with other agencies or with volunteers to avoid duplication of effort or to arrange for survey help.

The bald eagle breeding population is increasing annually. So, it is important that suspected new nesting territories be adequately checked, especially early in the breeding season.

Territories should be checked at least three times during the nesting season, although more frequent checking is preferred. Emphasis should be placed on checking during incubation and early nestling periods.

1. **Early March** (early incubation) - Territories in northern California should be checked in the first half of March, if possible, or as soon thereafter as road or weather conditions allow. The purpose of the first check is to determine whether the territory is occupied (record presence of adults, courtship behavior, evidence of nest repair or construction, incubation).

2. **Late April or early May** (early nestling period) - This check is needed to confirm that a territory is unoccupied, or if occupied in March, to determine whether the breeding pair is still tending the nest (incubating eggs or tending young nestlings.

3. **Mid June** (late nestling period) - The main purpose of this check is to determine how many nestlings are approaching fledging age.

Survey dates may be modified from these recommended time periods if the territories can be checked more frequently or if particular breeding pairs are known to begin nesting especially early or late in the season.

We recommend that observers report the stage of development of nestlings in accordance with An Illustrated Guide for Identifying Developmental Stages of Bald Eagle Nestlings in the Field, by G. P. Carpenter (April 1990). This booklet is available from the San Francisco Zoological Society, Sloat Blvd. at the Pacific Ocean, San Francisco, CA 94132 (415-753-7080).

SUBMITTAL OF SURVEY FORMS

Please report observations on the **CALIFORNIA BALD EAGLE NESTING TERRITORY SURVEY FORM (REVISED** 3/98).

Please mail all completed forms by September 1 of the survey year to:

Mr. Ronald Jurek
California Department of Fish and Game
Habitat Conservation Planning Branch
1416 Ninth Street
Sacramento, CA 958 14

Forms will be maintained in Department files and annual survey results will be compiled on the basis of these reports. If you have questions or need additional forms, please contact Mr. Jurek at the above address or at Rjurek@dfg.ca.gov, PHONE 916-654-4267, CALNET 464-4267, FAX 916-653-2588.

11/99

California Department of Fish and Game
CALIFORNIA BALD EAGLE

NESTING TERRITORY SURVEY FORM Revised 11/99

County: _____

Survey Year: _____

Property Owner: _____(If USFS: _____ National Forest)

Name (or general location) of territory: _____

Name of nearest water body: _____

Location of nest: T_____ R_____ Sec ____, 1/4_____ 1/16 _____ UTMn_____

No. of nests in territory - Intact:_____, Remnant: _____ UTMe_____

Nest Tree: Species_____ Year last used_____ Nest: Year last used_____

NOTE: Please attach a map showing the location of any newly documented nest tree.

Describe tree and nest condition and size, and any other remarks:

For each visit to the territory, note, in detail, the times, number and age of birds, behavior of birds (lying, perching, etc.), evidence of nesting (nest maintenance, courtship, incubation posture), disturbances, and other pertinent information:

Initials of Observer	Date of Visit	Observations

(Attach additional pages, if necessary)

(Attach additional pages, if necessary)

General Remarks: _____

_____

_____

PLEASE SUMMARIZE OBSERVATIONS:

A. Successful nestings: No. of young known fledged _____ or probably fledged _____

B. If no fledglings were produced this season, please answer the following, if known:

How many adults were seen in the territory? ___ Were adults seen in the nest? Yes No

Number of nestlings observed: _____ Evidence of nest repair or construction? Yes No

Was an adult in incubation posture? Yes No

When did nesting fail?: During incubation ____ or nestling stage _____

Other remarks: _____

_____

Observers names: _____

_____

Affiliation: _____

Address: _____

Phone: ( ) _____ FAX or email: _____

Mail completed forms by **SEPTEMBER 1** of the survey year to:

California Department of Fish and Game
Habitat Conservation Planning Branch
1416 Ninth Street
Sacramento, CA 95814
Attn: Ron Jurek 916-654-4267 FAX 916-653-2588 RJurek@dfg.ca.gov

Territory_____ Year_____ ADDITIONAL OBSERVATIONS

Initials of Observer	Date of Visit	Observations (continued)

ATTACHMENT D

BALD EAGLE OBSERVATION DATA SHEET

BALD EAGLE OBSERVATION DATA SHEET

Pg ___ of ____ **Data Entered:_____** **Reservoir surface elevation_____**
Date:_____Time Start:_____End:_____ Territory:_____Nest Stage:_____
Observer Location:_____ Observers:_____ Temperature (x10°):_____
Weather: (Clear / Partly Cloudy / Overcast / Rain/ Snow) **Wind:** (Calm / Slight Breeze / Breezy / Windy)

Eagle/Osprey	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Time start								
Species/Age/Sex								
Number								
General Location								
UTM northing								
UTM easting								
Activity								
Perch type								
Dist from H2O(m)								
Habitat								
Time End								

Forage	**1F**	**2F**	**3F**	**4F**	**5F**	**6F**	**7F**	**8F**
General Location								
UTM northing								
UTM easting								
Time								
# Attempts								
Attack mode								
Dist. from perch								
Dist. from shore								
Success?								
Prey species								
Prey remains?								
Prey size (mm)								
Prey status								
Aquatic Habitat								

Public user #	**1P**	**2P**	**3P**	**4P**	**5P**	**6P**	**7P**	**8P**
Time								
Type								
Number								
Location								
Shore dist. (m)								
Eagle response								
Dist. to eagle (m)								

Comments on back; plot map points by observation, forage, or public user # (e.g., 1, 1F, 1P).

APPENDIX I

CALIFORNIA RED-LEGGED FROG SITE ASSESSMENT FOR THE BIG CREEK HYDROELECTRIC PROJECTS

USFWS-Approved California Red-legged Frog (*Rana aurora draytonii)* Site Assessment

Big Creek Hydroelectric Project
Alternative Licensing Process

prepared for:

U.S. Fish and Wildlife Service
Sacramento Field Office
2800 Cottage Way
Sacramento, California 95825 -1846

prepared by:

ENTRIX, Inc.
7919 Folsom Boulevard
Sacramento, California 95826
contact:
Janelle Nolan-Summers

916-923-1097

October 3, 2003

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

1.0 INTRODUCTION

This report summarizes the methodology and results of a site assessment conducted for the California red-legged frog (CRLF; *Rana aurora draytonii*) for Southern California Edison's (SCE) Big Creek Alternative Licensing Project (ALP Project). This project involves the relicensing of several hydroelectric facilities in the central Sierra Nevada. This site assessment was prepared in accordance with *Guidance on Site Assessment and Field Surveys for California Red-legged Frogs* (USFWS 1997). The focus of the site assessment is on the Project area within the historic range of the species (i.e., the Project area below 5,000 feet in elevation) and within 5 miles of the Project boundaries, as required by the protocol. The objectives of the site assessment are: (1) to determine whether the Project area is within the range of the CRLF, (2) to determine the known locations of CRLF within the Project area and within 5 miles of the Project boundaries, and (3) to document the upland and aquatic habitats in the Project area and within 1 mile of the Project boundaries. The purpose of the site assessment is to provide the United States Fish and Wildlife Service (USFWS) with sufficient information to make a determination as to whether presence/absence surveys for the federally-listed CRLF would be required for the Project.

On October 3, 2003, through verbal communication with Lourraine Tigas Corcoran of ENTRIX, Inc., Jesse Wild of the USFWS approved this site assessment and stated that no presence/absence surveys would be required for the Project.

1.1 PROJECT DESCRIPTION

SCE is initiating a multi-year collaborative process for the re-licensing of its seven Big Creek hydroelectric projects, located northeast of Fresno, California, in the San Joaquin River watershed in the Sierra Nevada (Figure 1). The seven hydroelectric projects consist of nine powerhouses, 23 generating units, and six large reservoirs and have a combined dependable operating capacity of approximately 1,000 megawatts. Collectively, these hydroelectric projects are referred to as the Big Creek System (BCS). The BCS is operated to meet Federal Energy Regulatory Commission (FERC) license conditions, physical constraints, downstream water rights agreements, and power production needs.

In the Big Creek System, SCE is using both the traditional and alternative licensing processes. The ALP differs from the traditional process in that it encourages greater public involvement. In the ALP, both the licensee and stakeholders jointly design the consultation process for the relicensing effort. In contrast, the traditional re-licensing does not involve a collaborative process. Five of the ALP projects have portions that occur below 5,000 feet in elevation and are therefore included in the site assessment. The ALP is being used for four projects: Big Creek Nos. 1 and 2 (FERC No. 2175), Big Creek Nos. 2A, 8, and Eastwood (FERC No. 67), Big Creek No. 3 (FERC No. 120), and Mammoth Pool (FERC No. 67). The traditional relicensing process is being used for Big Creek No. 4 (FERC 2017), Vermillion Valley (FERC No. 2086), and Portal Powerhouse (FERC No. 2174). Of these projects, only Big Creek Nos. 1 and 2, Big Creek Nos. 2A, 8, and Eastwood, Big Creek No. 3, and Mammoth Pool occur within the historic range of the CRLF.

2.0 METHODS

2.1 LITERATURE REVIEW

As part of the site assessment, a review of CRLF historic and known occurrences within 5 miles of the Project area was completed. This included a review of: (1) *California Natural Diversity Database* (CNDDB; CDFG 2002a), (2) University of California Berkeley's *Museum of Vertebrate Zoology Data Access* (UC Berkeley 2002), (3) California Academy of Sciences' *Herpetology Holdings* (CAS 2002), and (4) other biological information published in scientific journals that is referenced as appropriate throughout the text. Additionally, a previous site assessment completed by the U.S. Forest Service (USDA-FS) in the Jose Basin area in 2000 was reviewed (USDA-FS 2000).

2.2 AGENCY AND EXPERT CONSULTATION

As part of the site assessment, species experts familiar with the CRLF were interviewed to determine the location of CRLF occurrences in the Project vicinity. Experts consulted include Dr. Gary Fellers of the U.S. Geological Survey's (USGS) Biological Resources Division and Dr. Mark Jennings of the California Academy of Sciences' Department of Herpetology. Holly Eddinger of the USDA-FS and Jesse Wild of the USFWS were also contacted for information about CRLF occurrences in the Project vicinity. Information obtained from species experts is included in this report and referenced as appropriate.

2.3 FIELD VISIT

All aquatic habitat in the Project area below 5,000 feet and within one mile were identified and mapped using topographic maps (1:24,000 scale) prepared by the USGS. A field-visit to accessible sites not previously visited during ALP surveys for other special-status amphibians and reptiles in the summer of 2002 was conducted between August 20 and 22, 2002, by biologists from ENTRIX, Inc. Each site was photographed, adjacent upland habitat was described, and each site was evaluated to determine if it contained appropriate habitat to support CRLF.

2.4 CRLF HABITAT

The CRLF historically occurred in aquatic, riparian, and upland habitats throughout much of California and northern Baja California. It currently ranges from sea level to approximately 3,500 feet, although historical sightings have been reported as high as 4,900 feet in the Sierra Nevada (USFWS 2002). Jennings and Hayes (1994) suggested that populations at the upper elevational limit may represent translocations. Numerous populations exist in the Coast Range from Marin County to Santa Barbara County. Despite over 80 historic locations reported for the CRLF in Southern California south of the Tehachapi Mountains, only a few populations remain. In the foothills along the west slope of the Sierra Nevada, 5 isolated populations of CRLF are known, compared to over 60 historic locations reported (USFWS 2002). However, much of the land in the Sierra Nevada foothills is privately owned and has not been surveyed. Therefore, the actual distribution in this region is unknown.

Information on the life history and habitat requirements of the CRLF is relatively limited. Juveniles tend to be active during day and night, whereas adults are primarily nocturnal (Hayes and Tennant 1986). Habitat use by the CRLF varies seasonally and geographically. Hayes and Jennings (1989) report that the CRLF occurr more often at sites that are free of introduced predators such as bullfrog (*Rana catesbeiana)*, mosquito fish (*Gambusia affinis*), green sunfish (*Lepomis cyanellus*), and brown trout (*Salmo trutta*); sites that are influenced by a small drainage area (≤ 20 mi^2); sites that have a low local gradient (≤ 2% gradient); and in streams having a low number stream order. Breeding typically occurs at night from November to May (Storer 1925). Breeding habitat is generally characterized as deep (≥ 2 feet), still or slow-moving water, with cattails (*Typha* spp.), bulrushes (*Scirpus* spp.), and willows (*Salix* spp.) close to water level and shading the water surface (Hayes and Jennings 1989). Tadpoles are typically concealed in submergent vegetation and organic debris in shallow, open aquatic habitat. In summer, adults and juveniles seldom venture from ponds or isolated pools in intermittent streams (Storer 1925). However, adults have been found in streams up to 1.5 miles away from breeding sites, and have been found as far as 100 feet from water in dense riparian vegetation, for up to 77 days (Rathbun et al. 1993). Hayes and Jennings (1989) suggested that the introduction of predators into perennial aquatic habitats may force the CRLF to associate with intermittent aquatic habitats. In streams, this frog is closely associated with plunge pools bordered by willows (Jennings 1988b). If a pond or stream dries during summer, they may be found in cavities under rocks and logs, in small mammal burrows, or under industrial debris. During or following periods of rainfall, adults and juveniles often make overland excursions at night to forage in upland habitats. The manner in which upland habitats are used, amount of time spent in upland habitats, pattern of use, and whether there is differential use by juveniles, sub-adults, and adults is poorly understood and requires further investigation (USFWS 2002).

2.5 CRLF OCCURRENCES IN THE PROJECT AREA AND WITHIN FIVE MILES OF THE PROJECT BOUNDARIES

The Project area is within the historic range, but not within the current known range of the CRLF. The historic range extends through Coast Range drainages from Marin County to northwestern Baja California (USFWS 2002). Its historical range extended inland to foothill drainages along the western slope of the Sierra Nevada. The current range of this frog is primarily restricted to drainages in the Coast Range. Several isolated populations are known to occur in drainages in the foothills of the Sierra Nevada. The nearest to population is in Weber Creek in El Dorado County, approximately 150 miles north of the Project area. The nearest critical habitat is Critical Habitat Unit 5, approximately 50 miles north of the Project area.

The Project area occurs within the Sierra Nevada Foothills and Central Valley Recovery Unit for the CRLF (USFWS 2002). This unit includes the western foothills and Sierra Nevada foothills to approximately 5,000 feet elevation in the Central Valley hydrographic basin. However, the Project area is not within a core recovery area. The nearest core areas to the Project area are East San Francisco Bay, Tuolumne River, and Piney Creek. The East San Francisco Bay core area is approximately 100 miles

west, whereas the Tuloumne River and Piney Creek core areas are approximately 75 miles to the north of the Project area.

A review of electronic databases from academic institutions and government agencies resulted in no current or historic localities of the CRLF in the Project area or within 5 miles of the Project boundaries (CDFG 2002a; CAS 2002; UC Berkeley 2002). Species experts also reported no occurrences in the Project area or within 5 miles of the Project boundaries (G. Fellers, pers. comm.; M. Jennings, pers. comm.). Additionally, there are no localities reported for this species in the Sierra National Forest, which encompasses the entire Project area (H. Eddinger, pers. comm.).

The nearest historical records to the Project area are 30 miles to the south near Minkler and 15 miles to the northwest in Willow Creek near O'Neals. The Minkler record is from 1916. CRLF are presumed extirpated at this site, but no information exists on when they were last detected. The O'Neals records date back to 1951 with CRLF seen as late as 1968. However, they are presumed extirpated (M. Jennings, pers. comm.). The nearest known population of CRLF to the Project area is in Mine Creek (near Mercey Hot Springs), approximately 90 miles to the west in the Coast
Range of Fresno County.

Table 1. University of California Berkeley's Museum of Vertebrate Zoology data access records for the California red-legged frog in Madera and Fresno counties[1].

County	Catalog Number	Accounting Number	Locality	Latitude	Longitude	Date	Collector
Fresno	6211	1136	Minkler, CA	36.716600	-119.464100	7 Oct. 1916	J. S. Dixon
Fresno	77978	10319	3 mi. N Mercey Hot Springs, CA	36.731700	-120.880400	10 Aug. 1963	R.R. Montanucci
Fresno	77979	10319	3 mi. N Mercey Hot Springs, CA	36.731700	-120.880400	10 Aug. 1963	R.R. Montanucci
Fresno	77980	10319	3 mi. N Mercey Hot Springs, CA	36.731700	-120.880400	10 Aug. 1963	R.R. Montanucci
Fresno	77981	10319	3 mi. N Mercey Hot Springs, CA	36.731700	-120.880400	10 Aug. 1963	R.R. Montanucci
Fresno	77982	10319	3 mi. N Mercey Hot Springs, CA	36.731700	-120.880400	10 Aug. 1963	R.R. Montanucci
Fresno	77983	10319	3 mi. N Mercey Hot Springs, CA	36.731700	-120.880400	10 Aug. 1963	R.R. Montanucci
Madera	55515	8558	O'Neals, CA	37.128279	-119.693568	20 Nov. 1951	H.E. Childs Jr.
Madera	55516	8558	O'Neals, CA	37.128279	-119.693568	6 Nov. 1951	H.E. Childs Jr.
Madera	57361	8691	O'Neals, CA	37.128279	-119.693568	15 Aug. 1952	H.E. Childs Jr.
Madera	57362	8691	O'Neals, CA	37.128279	-119.693568	15 Aug. 1952	H.E. Childs Jr.
Madera	57363	8691	O'Neals, CA	37.128279	-119.693568	15 Aug. 1952	H.E. Childs Jr.
Madera	57364	8691	O'Neals, CA	37.128279	-119.693568	15 Aug. 1952	H.E. Childs Jr.
Madera	57365	8691	O'Neals, CA	37.128279	-119.693568	15 Aug. 1952	H.E. Childs Jr.
Madera	57366	8691	O'Neals, CA	37.128279	-119.693568	15 Aug. 1952	H.E. Childs Jr.
Madera	57367	8691	O'Neals, CA	37.128279	-119.693568	15 Aug. 1952	H.E. Childs Jr.
Madera	57368	8691	O'Neals, CA	37.128279	-119.693568	15 Aug. 1952	H.E. Childs Jr.

[1]None of these occurrences is in the Project area or within 5 miles of the Project boundaries.

A review of a previous site assessment conducted in the Jose Basin area in 2000 identified 307.70 acres of potential suitable breeding habitat in Jose Creek south of Jose Basin Road (USDA-FS 2000). Additionally, several ponds, springs, and intermittent drainages south of Jose Basin Road and in the vicinity of Sugarloaf hill were identified as having suitable habitat. However, all potential suitable breeding habitat was considered marginal and occurred more than one mile beyond the Project area.

2.6 HABITATS IN THE PROJECT AREA AND WITHIN ONE MILE OF THE PROJECT BOUNDARIES

Seven vegetation communities occur in the Project area below 5,000 feet elevation. These include forest and woodland vegetation types, chaparral vegetation types, meadow vegetation types, and riparian vegetation types. Forest and woodland vegetation types include blue oak woodland, gray pine-chaparral woodland, westside ponderosa pine forest, and Sierran mixed conifer forest. The chaparral vegetation type in the Project area is mixed montane chaparral. Meadow types in the Project area include dry montane meadow and wet montane meadow.

Forest and Woodland Vegetation Types

Sierran Mixed Conifer Forest

Sierran mixed conifer forest is a lower montane coniferous forest type, typically found between 5,000 and 7,000 feet in elevation. This forest type has several dominant species including ponderosa pine (*Pinus ponderosa*), fir (*Abies* spp.), and sugar pine (*P. lambertiana*). Other species present include incense cedar (*Calocedrus decurrens*), madrone (*Arbutus menziesii*), black oak (*Quercus kelloggii*), Jeffrey pine (*P. jeffrei*), 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.

Blue Oak Woodland

Blue oak woodland is a community dominated by blue oaks (*Quercus douglasii*) but usually consisting of several other oaks as well as gray pine (*Pinus sabiniana*). This community is found in the lower elevations of the Project area, usually occurring below 3,000 – 4,000 feet. It varies from open savannas with grassy understories to fairly dense woodlands with shrubby understories. Some common species found in this vegetation community are California buckeye (*Aesculus californica*), Mariposa manzanita (*Arctostaphylos viscida* spp. *mariposa*), Yerba Santa (*Eriodictyon californicum*), and black oak.

Westside Ponderosa Pine Forest

Westside ponderosa pine forest is a lower montane coniferous forest typically found between 4,500 – 6,500 feet in elevation. This forest is an open forest dominated by ponderosa pine. The understory usually consists of scattered chaparral shrubs and young trees. This community usually occupies coarse, well-drained soils.

Gray Pine-Chaparral Woodland

This vegetation community is dominated by mariposa manzanita, ceanothus, and oak, with scattered gray pine. The shrub layer can vary from a sparse to thick layer. Other common species in this community are California buckeye, California coffeeberry (*Rhamnus californica*), and foothill ash (*Fraxinus dipetala*).

Chaparral Vegetation Types

Chaparral vegetation in the Project area is a mosaic of low to medium shrubs variously dominated by manzanita (*Arctostaphylos* spp.), ceanothus (*Ceanothus* spp.), scrub oaks, and young trees. The same shrubs that are the dominant species of the shrublands also form the understory of adjacent forested areas. Due to the intermingling of the shrub species and the gradations in dominance found within the Project area, all the montane shrub areas have been designated as Mixed Montane Chaparral.

Mixed Montane Chaparral

Mixed montane chaparral is found between elevations of 4,000 and 11,000 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. Mixed montane chaparral is dominated by Sierra chinquapin (*Chrysolepis sempervirens*) and any of several species of manzanita or ceanothus, particularly greenleaf manzanita (*A. patula*), whiteleaf manzanita (*A. viscida*), mountain whitethorn (*C. cordulatus*), and deerbrush (C. *integerrimus*). Herbaceous understory is usually sparse, except in the few years immediately following fire.

Meadow Vegetation Types

Meadows in the Project area are generally wet meadows. However, dry meadows dominated by upland grass species rather than by sedges (*Carex* spp.) and wet meadow grasses are present in a few areas. Wet and Dry Meadow types may occur in the same meadow.

Dry Montane Meadow

Dry montane meadows are found between 3,000 and 9,000 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.), Sierra mousetail (*Ivesia santolinoides*), bluegrasses (*Poa* spp.), and mat muhly (*Muhlenbergia richardsonis*).

Wet Montane Meadow

Wet montane meadows are found between 3,000 and 9,000 feet in elevation in this part of the Sierra Nevada. These meadows are vegetated by a dense growth of sedges and other perennial herbs, including rushes (*Juncus* spp.), mannagrass (*Glyceria* spp.), California corn lily (*Veratrum californicum* var. *californicum*), and spearleaf arnica

(*Arnica longifolia*). Wet montane meadows have soils that remain saturated throughout the year.

Riparian Vegetation Types

Riparian vegetation in the Project area includes 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 the streams and is often separated by rocky, unvegetated reaches. Where the terrain is level and open, the riparian zone is usually wide, and may merge into montane meadows. The most extensive riparian vegetation is Montane Riparian Scrub, generally dominated by white alder (*Alnus rhombifolia*). Willows may be interspersed with alders, or may occasionally form mono-specific stands. Black cottonwood (*Populus trichocarpa*), is found in small, scattered stands from Florence Lake to Redinger Lake.

2.7 AQUATIC HABITAT IN THE PROJECT AREA

Thirty-five sites were identified on topographic maps and aerial photographs as being potentially suitable habitat. Twenty sites (Table 2 and Figures 2 - 4) were visited during the summer of 2002. The location of these sites is illustrated on maps (Figures 2 - 4). Fifteen sites (Table 3 and Figures 2 - 4) identified were not visited because they occur on private property or were otherwise inaccessible. These sites were evaluated to the extent possible using false-color infrared aerial photographs (1-m pixel resolution in NAD83, Zone 11, and Universal Transverse Mercator (UTM) projection), topographic maps, and vegetation community maps.

Table 2. California red-legged frog site assessment results.

Site	Location	Date	Surveyors[1]	Time	Vegetation Community	Water Permanence	Suitable Habitat[2]	ALP Project Reach[3]
Adit 8 Creek	Below Diversion	8/20/02	DD & AN	1530–1600	Sierran Mixed Conifer Forest	Intermittent	No	Yes
Balsam Creek	Confluence with Big Creek to impoundment near Camp Sierra	8/20/02	DD & AN	1630–1700	Gray Pine-Chaparral Woodland	Perennial	No	Yes
Big Creek	From confluence with the San Joaquin River to Powerhouse 1	7/24/02 7/23/02 5/19/02 5/18/02 5/15/02	DD & PF DD & PF SY & AL SY & AL DD & PF	0910 –1200 1400–1630 1215–1315 0935–1405 0858–1501	Gray Pine-Chaparral Woodland	Perennial	No	Yes
Chiquito Creek	From Lake to 5,000 feet elevation	8/21/02	DD & AN	1230–1300	Westside Ponderosa Pine Forest	Perennial	Yes	No
Dalton Creek	From confluence with Mammoth Pool Reservoir to 500 feet upstream	8/21/02	DD & AN	1500–1530	Sierran Mixed Conifer Forest	Intermittent	No	Yes
Ely Creek	500 feet downstream of Diversion	8/20/02 5/14/02	DD & AN DD & PF	1600–1630 0930–1200	Gray Pine-Chaparral Woodland	Intermittent	No	Yes

Site	Location	Date	Surveyors[1]	Time	Vegetation Community	Water Permanence	Suitable Habitat[2]	ALP Project Reach[3]
Fish Creek	From Fish Creek Campground to 500 feet downstream of campground	8/21/02	DD & AN	1030–1100	Sierran Mixed Conifer Forest	Perennial	No	No
Jose Creek	From Italian Bar Road to 2,000 feet upstream of Jose Basin Road	8/20/02 5/11/02 5/10/02	DD & AN DD & SY DD & SY	1200–1230 1035–1332 1100–1410	Blue Oak Woodland	Perennial	Yes	No
Mill Creek	100 feet upstream of confluence with Jose Creek	8/22/02	DD & AN	1000–1030	Blue Oak Woodland	Intermittent	No	No
Rock Creek	From the confluence with San Joaquin River to Diversion.	8/21/02 5/16/02	DD & AN SY &AL	1100–1130 1050–1330	Sierran Mixed Conifer Forest & Gray Pine-Chaparral Woodland	Perennial	No	Yes
Ross Creek	1,500 feet downstream of diversion	8/21/02 5/17/02	DD & AN DD & PF	1550–1620 0835–1012	Gray Pine-Chaparral Woodland	Intermittent	No	Yes
San Joaquin River	1,500 feet segments From near Mammoth Pool Reservoir, confluence with Rock Creek, and near confluence with Ross Creek	8/21/02 7/25/02 6/04/02 5/17/02	DD & AN DD & PF DD & PF SY & AL	0900–0930 1005–1230 1045–1200 0930–1145	Gray Pine-Chaparral Woodland	Perennial	No	Yes
Stevenson Creek	From confluence with San Joaquin River to Shaver Lake Dam	8/22/02 5/13/02 5/12/02	DD & AN DD & SY DD & SY	0900–0930 1045–1356 1012–1318	Sierran Mixed Conifer Forest & Gray Pine-Chaparral Woodland	Perennial	No	Yes
Shakeflat Creek	100 feet upstream of confluence with San Joaquin River	8/21/02	DD & AN	1320–1350	Gray Pine-Chaparral Woodland	Intermittent	No	No
Sheep Thief Creek	500 feet upstream of confluence with Big Creek	7/17/02	DD	0800 – 0830	Gray Pine-Chaparral Woodland	Intermittent	No	No
Mammoth Pool	From Boat launch to Dam Spillway	8/21/02	DD & AN	1430–1500	Gray Pine-Chaparral Woodland	Perennial	No	Yes
Redinger Lake	Drove the road along the shoreline.	8/20/02	DD & AN	1030–1100	Gray Pine-Chaparral Woodland	Perennial	No	Yes
Dawn Meadow	Walked all around meadow	8/20/02	DD & AN	1500–1530	Sierran Mixed Conifer Forest	Intermittent	No	--[4]
Snowslide Creek	100 feet upstream of confluence with Pitman Creek	7/15/02	DD & DC	1400-1415	Sierran Mixed Conifer Forest	Perennial	No	No
Pitman Creek	1,500 feet upstream of Powerhouse 1	7/15/02	DD & DC	1400-1610	Sierran Mixed Conifer Forest	Perennial	Yes	Yes

[1]DD = Darrin Doyle, AN = Allison Nabours, PF = Pierre Fidenci, SY = Sarah Yarnell, AL =Audra Loyal, and DC = Daniel Corcoran.
[2]Suitable habitat criteria include deep pools that will persist through summer, have emergent aquatic vegetation along the shoreline, have gradual sloping banks, and some overhanging canopy.
[3]An ALP Project Reach is a bypass, flow-augmented, or flow-modified reach.
[4]-- means not applicable.

Table 3. Aquatic habitats identified, but not visited.

Site	USGS 7.5 Minute Series Map	Access Issue	Water Permanence[1]	% Slope[2]	ALP Project Reach[3]	Vegetation Community	Presence of Suitable Habitat[4]
Logan Meadow	Mammoth Pool Dam	Private Property	Intermittent	2%	--	Westside Ponderosa Pine Forest	Unlikely
Mill Creek	Mammoth Pool Dam	Remote	Perennial	20%	No	Sierran Mixed conifer Forest	Unlikely
Kaiser Creek	Mammoth Pool Dam	Remote	Perennial	30%	No	Sierran Mixed conifer Forest	Unlikely
Jackass Creek	Mammoth Pool Dam	Remote	Perennial	10%	No	Sierran Mixed conifer Forest	Unlikely
Fuller Meadow	Mammoth Pool Dam	Private Property	Intermittent	2%	--	Sierran Mixed conifer Forest	Unlikely
Aspen Creek	Mammoth Pool Dam	Remote	Intermittent	45%	No	Sierran Mixed conifer Forest	Unlikely
Horse Thief Creek	Mammoth Pool Dam	Remote	Intermittent	40%	No	Gray Pine-Chaparral Woodland	Unlikely
Slot Creek	Mammoth Pool Dam	Remote	Intermittent	45%	No	Gray Pine-Chaparral Woodland	Unlikely
Saddle Creek	Mammoth Pool Dam	Remote	Intermittent	40%	No	Gray Pine-Chaparral Woodland	Unlikely
Camp Creek	Mammoth Pool Dam	Remote	Intermittent	40%	No	Gray Pine-Chaparral Woodland	Unlikely
Douglas Fir Creek	Mammoth Pool Dam	Remote	Intermittent	45%	No	Gray Pine-Chaparral Woodland	Unlikely
Kinsman Flat Pond	Musick Mtn.	Private Property	Perennial	--	No	Gray Pine-Chaparral Woodland	Unlikely
Black Creek	Musick Mtn.	Remote	Intermittent	50%	No	Gray Pine-Chaparral Woodland	Unlikely
Ordinance Creek	Musick Mtn.	Remote	Intermittent	25%	No	Gray Pine-Chaparral Woodland	Unlikely
Hookers Creek	Musick Mtn.	Remote	Intermittent	30%	No	Gray Pine-Chaparral Woodland	Unlikely

[1, 2]Estimated from USGS 7.5-minute series maps.
[3]An ALP Project Reach is a bypass, flow-augmented, or flow-modified reach.
[4]Suitable habitat estimation based on water permanence and slope. Sites listed as unlikely to have suitable habitat are creeks that are likely to be intermittent in summer and have a steep gradient.

Each site visited was photographed (Attachment A) and evaluated for suitable habitat (i.e., a water body that will persist throughout summer, has a gently sloping shoreline, has deep pools with emergent aquatic vegetation for egg attachment, and has some overhanging vegetation to provide shade and cover) for the CRLF. With the exception of small sections in Jose Creek and Chiquito Creek, suitable habitat was not found. In Jose Creek, a large pool approximately 10 feet downstream of the bridge on Italian Bar Road that spans Jose Creek provides suitable habitat. This pool is approximately eight feet deep and surrounded by a dense growth of cattails around 50% of its shoreline. In Chiquito Creek, suitable habitat occurs approximately 50 feet upstream of the bridge

that is adjacent to Mammoth Pool Campground. The shoreline for approximately 100 feet on both sides supported dense cattails. Willows and alders also grow along the shoreline. There were some areas of undercut bank which could provide cover. Water flow in this reach was slow. Water depth where cattails were growing was approximately 1-2 feet deep. Jose Creek and Chiquito Creek are not project reaches (i.e., not bypass, flow-augmented, or flow-modified streams.

The following creeks did not have suitable habitat for the CRLF because they were usually intermittent by late summer, had shallow isolated pools, and had a moderate to steep gradient: Adit 8 Creek, Dalton Creek, Ely Creek, Fish Creek, Shakeflat Creek, Mill Creek (near Jose Creek), Ross Creek, and Snowslide Creek. Balsam Creek and Pitman Creek did not have suitable habitat for the CRLF because they were moderate to high gradient and have deep pools that lack emergent aquatic vegetation for cover and egg attachment. In addition, both of these streams support CRLF predators (e.g., fish species). The following perennial creeks did not have suitable habitat for the CRLF because they were deeply scoured by high flows and had deep pools that lacked aquatic vegetation: Big Creek, San Joaquin River, Rock Creek, and Stevenson Creek. Big Creek and Stevenson Creek are also known to support extensive fish populations. Sheep Thief Creek is perennial, but did not have suitable habitat because it is has a steep gradient, has little to no canopy cover, and lacks deep pools. Mammoth Pool Reservoir did not have suitable habitat. When the reservoir is drawn down, the steep exposed shoreline consists of barren ground that may extend for 100 feet or more to reach the tree-line. Additionally, there is no emergent aquatic vegetation along the shoreline and there is an extensive fish population within the reservoir. Redinger Lake did not have suitable habitat primarily because the shoreline around the lake is mostly bedrock interspersed with oak trees. There were few shallow areas, as the water became deep just a few feet from shore. Redinger Lake also lacked emergent aquatic vegetation along the shoreline and support an extensive fish population. Dawn Meadow did not have suitable habitat. It was dry in summer and the only water present was a concrete water holding tank (2 feet wide by 5 feet long) used by livestock.

Several meadows and streams located within one mile of project facilities were not accessible (i.e., located on private property, remote location, etc.) Meadows that were identified in Table 3, but not visited, are expected to be similar to meadows that are within the project area and accessible and therefore are unlikely to have suitable habitat for the CRLF. However, because these sites were not visited, it is assumed that these meadows represent potential habitat. All of the creeks listed in Table 3 have high stream gradient and do not likely support deep pools with emergent aquatic vegetation. Based on calculations from topographic maps, stream gradient was moderate in Mill Creek (20%) and Jackass Creek (10%). Stream gradient was steep in Kaiser Creek (30%), Aspen Creek (45%), Horse Thief Creek (40%), Slot Creek (45%), Saddle Creek (40%), Camp Creek (40%), Douglas Fir Creek (45%), Black Creek (50%), Ordinance Creek (25%), and Hookers Creek (30%). Because Mill Creek and Jackass Creek have moderate slopes and were not accessible, these creeks are assumed to represent potential habitat for CRLF.

3.0 CONCLUSIONS

The Project area is within the historic range, but not within the current known range, of the CRLF. With the exception of small sections in Jose Creek and Chiquito Creek, the Project area is unsuitable for the CRLF. Jose Creek and Chiquito Creek are not Project reaches (i.e., bypass, flow-augmented, or flow-modified). CRLF is not expected to occupy the Project area due to the lack of suitable habitat and because the Project area is outside of the species' current known range. The CRLF was last reported in this region near O'Neals in 1952, approximately 15 miles northwest of the Project area.

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4.2 PERSONAL COMMUNICATIONS

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FIGURES

Placeholder for Figures

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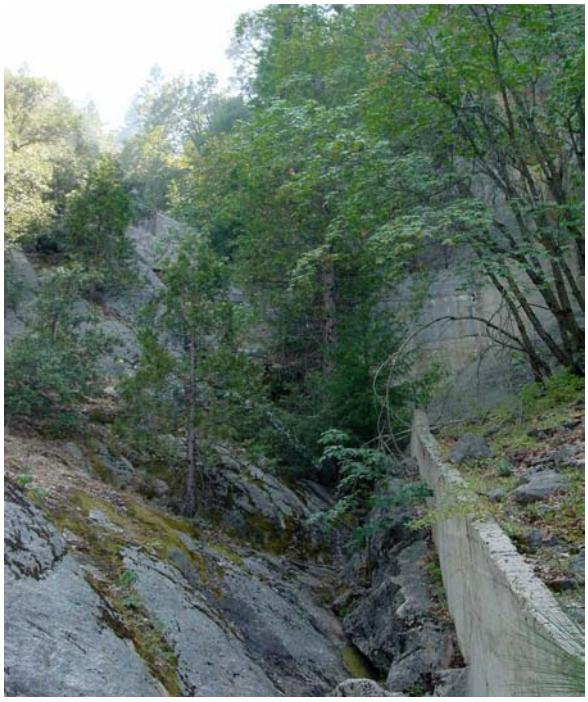
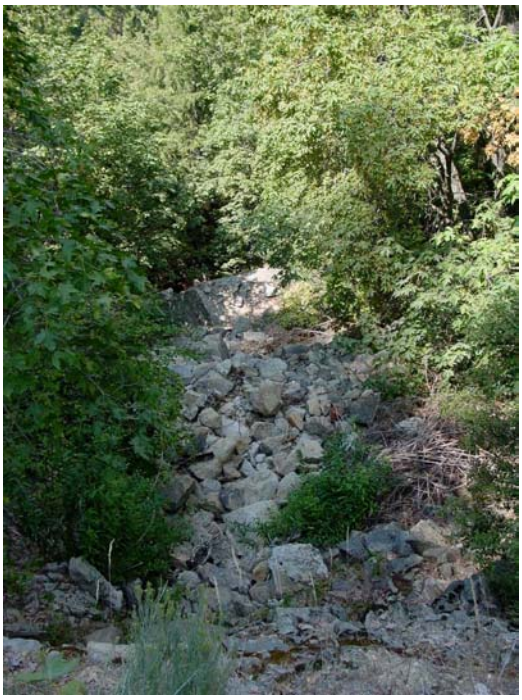
ATTACHMENT A

California Red-legged Frog Site Assessment Photographs



Adit 8 Creek downstream of diversion



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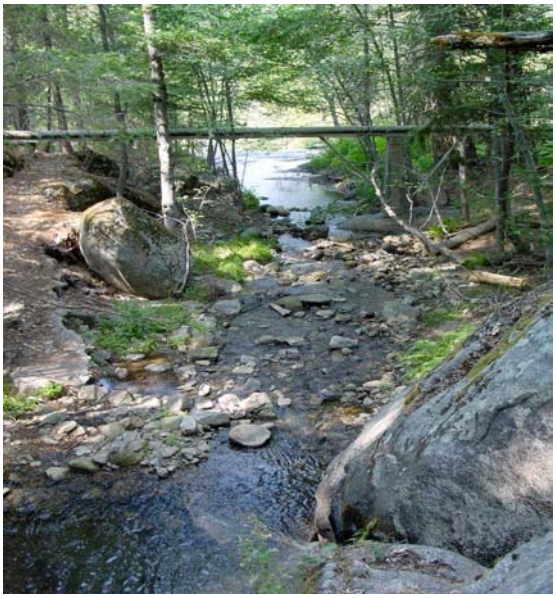


Balsam Creek downstream of diversion

Balsam Creek downstream of diversion

Big Creek downstream of Powerhouse 1

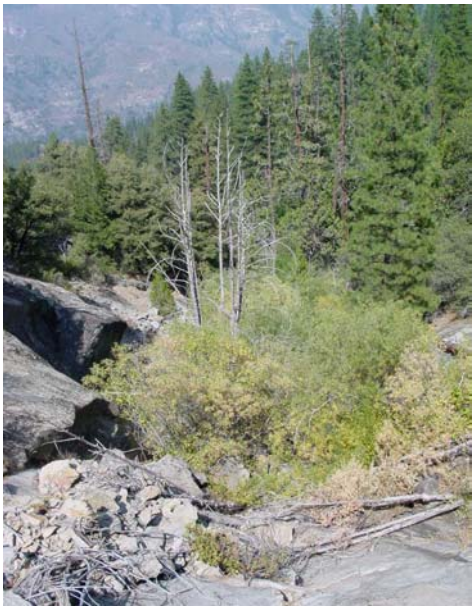
Big Creek downstream of Powerhouse 1

Chiquito Creek near Mammoth Pool Campground
(looking downstream from bridge)

Chiquito Creek near Mammoth Pool Campground
(looking upstream from bridge)

Dalton Creek

Dalton Creek



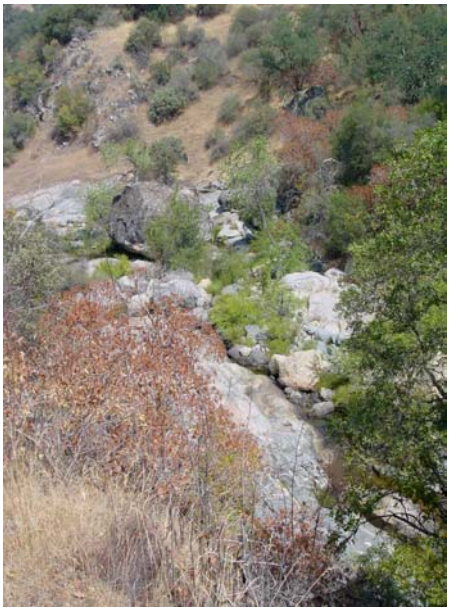
Ely Creek downstream of diversion

Ely Creek at diversion (dry)

Fish Creek at Fish Creek Campground

Fish Creek at Fish Creek Campground

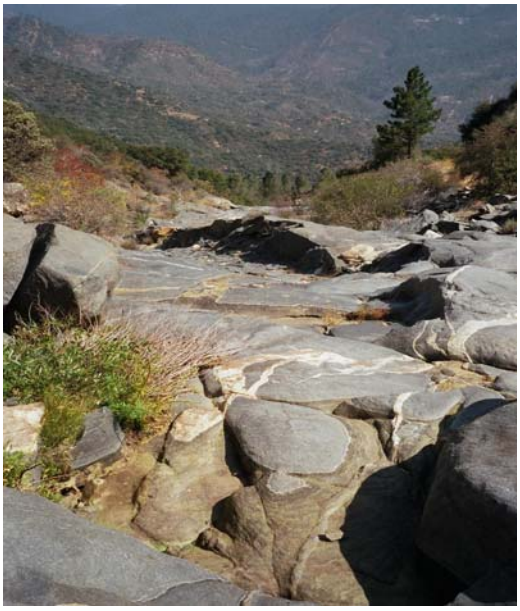
Jose Creek. Pool surrounded by cattails



Jose Creek. Downstream of pool with cattails

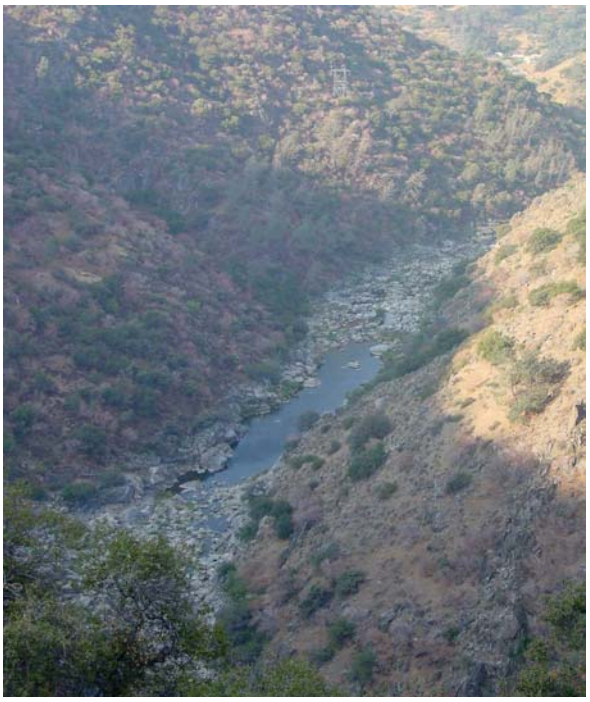
Rock Creek upstream of diversion near Rock Creek Campground

Rock Creek upstream of diversion



Ross Creek at diversion

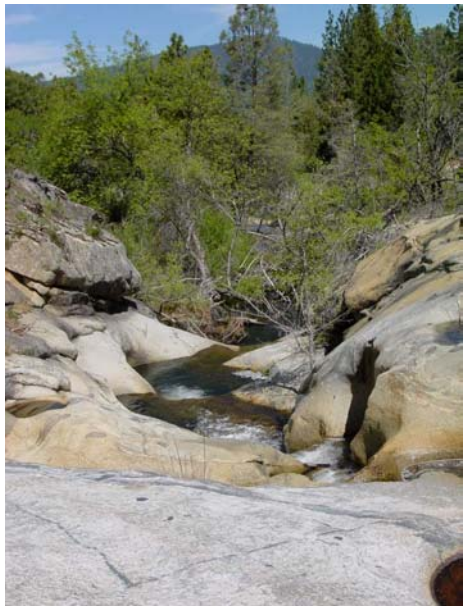
Ross Creek downstream of diversion



San Joaquin River Stevenson Reach

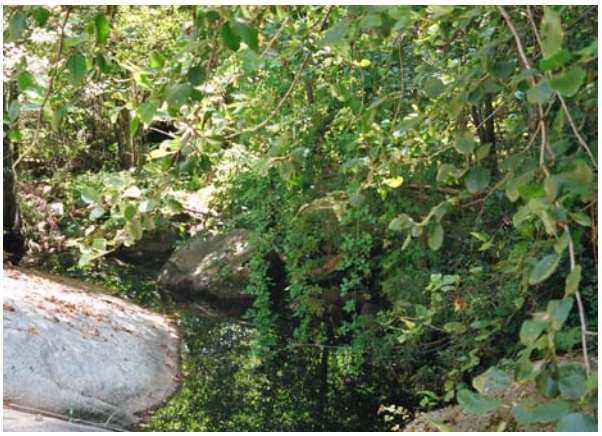
San Joaquin River Mammoth Reach

Stevenson Creek downstream of Shaver Lake



Stevenson Creek downstream of Shaver Lake

Shakeflat Creek



Shakeflat Creek

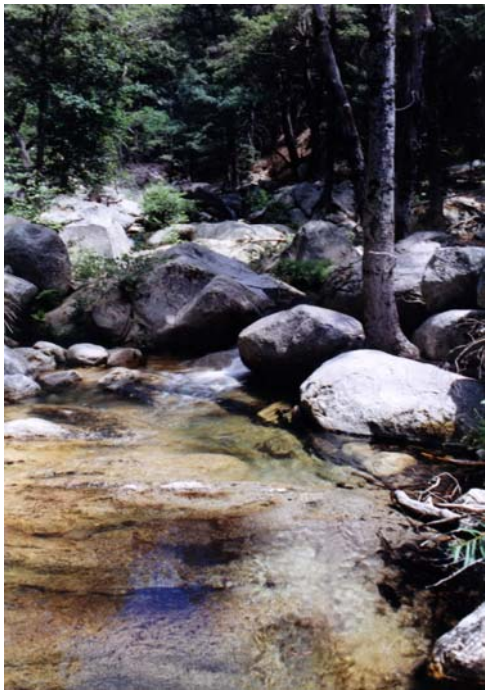
Sheep Thief Creek

Mammoth Pool Reservoir

Redinger Lake

Redinger Lake

Dawn Meadow



Pitman Creek

APPENDIX J

LIFE HISTORIES FOR SPECIAL-STATUS PLANT AND WILDLIFE SPECIES KNOWN OR POTENTIALLY OCCURRING IN THE VICINITY OF THE FOUR BIG CREEK ALP PROJECTS

Appendix J. Life Histories for Special-status Plant and Wildlife Species Known or Potentially Occurring in the Vicinity of the Four Big Creek ALP Projects

Federally Listed Wildlife Species

*Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus; *FT, FPD)*

The VELB was listed as federally threatened by USFWS in 1980 (USFWS 1980). This species is completely dependent on its host plant, elderberry (*Sambucus* spp.) and is associated with various species of elderberry below 3,000 feet in elevation. The VELB generally occurs along waterways and in floodplains that support remnant stands of riparian vegetation. Both larvae and adult VELB feed on elderberries. Larvae feed internally on the pith of the trunk and larger branches, while adult beetles appear to feed externally on elderberry flowers and foliage. Prior to metamorphosing into the adult life stage, VELB larvae chew an exit hole in the elderberry trunk, through which the adult beetle later exits the plant. The life cycle takes one or two years to complete. The animal spends most of its life in the larval stage, living within the stems of the elderberry plant. The largest percentage of specimens has been collected in May. During this period the beetles mate, and the females lay eggs on living elderberry plants.

Historic occurrences of VELB in the vicinity of the study area were identified and mapped. The CNDDB identified three occurrences of VELB in the vicinity of the study area (CDFG 2004). Exit holes were detected in shrubs west of Willow Creek, about ½ mi south of North Fork in 2000 (CDFG 2004). In 1995, beetles and exit holes were detected about 1.3 mi west of Marshall Station, just east of Table Mountain, in the McKenzie Preserve. Exit holes were detected just west of Highway 168 about 2.5 mi southeast of Auberry (CDFG 2004). The USDA-FS database only has one occurrence of VELB in the study area along Jose Basin Road near Powerhouse 3, outside of the FERC project boundary (USDA-FS 2001). Maps showing the locations of known occurrences of presumptive VELB habitat in the vicinity of the study area are provided in Figure 5-2 (Maps 1-20).

*California Red-legged Frog (*Rana aurora draytonii; *FT, CSC)*

On June 24, 1996, the USFWS listing of the California red-legged frog (CRLF) was effective. On March 13, 2001, a final designation of critical habitat was made for the CRLF (USFWS 2001). The primary constituent elements of critical habitat for CRLF are aquatic and upland areas where suitable breeding and non-breeding habitat is interspersed throughout the landscape and is interconnected by unfragmented dispersal habitat. To be considered to possess the primary constituent elements, an area must include two (or more) suitable breeding locations, a permanent water source, associated uplands surrounding these water bodies up to 300 feet from the water's edge, all within 1.25 miles of one another and connected by a barrier free dispersal habitat that is at least 300 feet wide. There is no Critical Habitat for this species in the study area.

The CRLF is threatened by a variety of human activities. These include destruction or degradation of habitat by urbanization, agriculture, construction of reservoirs, mining, livestock grazing, timber harvesting, and off-road vehicle use. Predation by introduced species such as bullfrogs (*Rana catesbeiana*), African clawed frog (*Xenopus laevis*), red swamp crayfish (*Procambarus clarkii*), signal crayfish (*Pacifasticus leniusculus*), catfishes (*Ictalurus* spp.), and mosquitofish (*Gambusia affinis*) (Jennings and Hayes 1994. The CRLF is exposed to contaminants such as insecticides and herbicides used in agriculture, heavy metals from mining activities, and ozone and nitrogen oxides in air pollution. Natural threats to the CRLF are predation by raccoons (*Procyon lotor*), and garter snakes, (*Thamnophis* spp.), and diseases.

The study area is within the historic range, but not within the current known range, of the CRLF. The study area occurs within the Sierra Nevada Foothills and Central Valley Recovery Unit for the CRLF (USFWS 2002a). This unit includes the western foothills and Sierra Nevada foothills to approximately 5,000 feet elevation in the Central Valley hydrographic basin. However, the study area is not within a core area.

A site assessment was prepared in the summer of 2002 (Appendix I). The nearest historical records to the study area are reported 30 miles to the south near Minkler, California and 15 miles to the northwest in Willow Creek near O'Neals, California. The Minkler record dates back to 1916, and CRLF are presumed extirpated at this site. The O'Neals records date back to 1951 with CRLF seen as late as 1968. However, they are currently presumed extirpated. The nearest known extant population of CRLF to the study area is in Mine Creek (near Mercey Hot Springs, CA), approximately 90 miles to the west in the Coast Range foothills in Fresno County. With the exception of small sections in Jose Creek and Chiquito Creek, which are outside of the study area, the study area is unsuitable for the CRLF. None are expected to occupy the study area due to the lack of suitable habitat and because the study area is outside of the species' current known range.

*Mountain Yellow-legged Frog (*Rana muscosa; *FC, FSS, CSC)*

The MYLF is endemic to the Sierra Nevada and Transverse ranges in California (Storer 1925). This species is highly aquatic and is closely associated with low-gradient streams, meadows, ponds, and lakes from 4,500 to 12,000 feet in elevation in the Sierra Nevada. Adults are most active during the daytime and often bask in open areas (Bradford 1984). The MYLF is most often found in lakes and streams with gently sloping banks that are moderately rocky and interspersed with sedges (*Carex* spp.), grasses, and low clumps of willows (*Salix* spp.) (Mullally and Cunningham 1956). The MYLF is a pond-breeding species that associates primarily with lakes and ponds throughout its southern range and with streams throughout its northern range (J. Wild pers. com.). Due to harsh winters and high spring runoff in the higher elevations of the MYLF's range, only large pools and ponds that maintain the low velocities required through metamorphosis are used for breeding. Tadpoles may transform after their second summer, thus the tadpoles require still, deep-water with fine sediments for overwintering. Adults are commonly observed basking at the edge of pools and along

shallow sloped stream margins. Like other pond-breeding frogs and toads, the MYLF is not well adapted to swift flowing water. However, individuals have been noted basking on open, sunny cobbles adjacent to gently flowing riffles during dispersal season.

In the southern Sierra Nevada, adults initially move to breeding sites at thawing lakes and ponds in late spring, and use streams for dispersal to other available aquatic habitats by mid-summer. Population density is greatest at fish-less lakes that are deeper than three feet (important for overwintering) and have warm water habitat along the shore (Pope and Matthews 2001). Adults exhibit a seasonal substrate preference at lakes. Matthews and Pope (1999) reported that adults associate more often with a combination of rock and silt substrates, but associated almost exclusively with rocky habitats in the fall. Other references identify stream segments with rock substrates as preferred (Mullally and Cunningham 1956).

In the northern Sierra Nevada, streams are the preferred habitat for breeding and foraging and are also important for dispersal. However, this species tends to avoid small creeks, perhaps because they are not deep enough to provide adequate habitat for breeding, foraging, and overwintering for adults and tadpoles. In late summer when streams are intermittent, adults often congregate in isolated pools. Stream segments where the bank was less than approximately eight inches in vertical height harbored the most dense population of adults (Mullally and Cunningham 1956). The MYLF often basks in areas with little to moderate canopy to raise their body temperature and elevate their general activity level. Open, sunny reaches with large exposed cobbles, boulders, or bedrock provide ideal basking sites. Due to lower average temperatures at high elevation, reaches with little to no canopy are preferred. Habitats with moderate canopy allow limited sunlight to reach the stream surface, whereas dense canopies virtually block sun penetration.

Mating and egg laying occurs from March to July. Habitat association and activity patterns of tadpoles in lakes and streams have not been investigated. Tadpoles overwinter for two to three years at high elevation sites before metamorphosis is complete (Wright and Wright 1949). In summary, relatively little information is known about the habitat associations of the different life history stages of this high elevation species.

*Yosemite Toad (*Bufo canorus; *FC, FSS, CSC)*

The YT associates with montane meadows, streams, ponds, and lakes in lodgepole pine forests in the Sierra Nevada from 6,400 to 11,300 feet (Camp 1916; Mullally 1956; Sherman and Morton 1993). Along the western slope of the Sierra Nevada, the northernmost limit of this species is Heather Lake in El Dorado County, and the southernmost limit is approximately five miles south of Kaiser Pass in Fresno County (Karlstrom 1962). This species co-exists with its close relative, the western toad (*Bufo boreas*), near Upper Blue Lake in Alpine County (Karlstrom 1962). Excluding this location, both species are thought to be separated by several thousand feet in elevation throughout the remainder of its distribution (Karlstrom 1962). In Fresno County, YT at

Kaiser Peak Meadow (8,000 feet in elevation) and western toads at Huntington Lake (7,000 feet in elevation) are separated by approximately 1,000 feet in elevation. Much of the information on the natural history of this toad is the result of studies conducted at Tioga Pass, Mono County and at Kaiser Peak Meadow, Fresno County.

The preferred habitat of YT is high elevation montane meadows, although individuals do associate with slow flowing, low-gradient stream habitats, such as pools and flatwater, near or adjacent to meadows. Individuals are rarely, if ever, seen in swiftly flowing habitats like cascades or exposed habitats like bedrock sheets. The substrate in streams that meander through montane meadows is predominantly composed of fines occasionally interspersed with sand. Coarse material is rare and probably holds little value for the YT, which breeds in shallow pools in meadows during spring and primarily uses stream habitats during the drier portions of the year. Because YT have a high association with low gradient streams adjacent to meadows, cover types more typical to those habitats were considered to have higher importance in providing refuge sites. Specifically, aquatic and terrestrial vegetation, woody debris, and undercut banks would be more common in meadow-stream complexes and would provide crucial protection from predators.

Adults emerge from winter hibernation in rodent burrows or beneath rocks and willows and move to recently formed snowmelt ponds in late spring (Kagarise Sherman 1980, cited in Davidson 1994). Adults are diurnal and prefer to associate with open areas. Like other amphibians, YT rely primarily on basking in open, sunny areas to elevate their internal body temperature and increase their general activity level. At sunset, they retreat to subterranean rodent burrows (Mullally 1953). Adults are active on the surface for approximately four months.

Breeding occurs from May to mid-August in shallow snowmelt ponds or pools in slow moving streams (Mullally 1953; Karlstrom 1962; Kagarise Sherman 1980, cited in Davidson 1994). In late summer, tadpoles are found on the muddy bottoms of shallow, warm pools, or in small muddy depressions in meadows. Tadpoles exhibit a daily activity pattern similar to that of adults. During daytime, tadpoles associate with the shallow margins of small pools (presumably where water temperature is warmer), but retreat to deeper water at night and remain quiescent on the benthos (Mullally 1953). Metamorphosis generally occurs in early fall, but some tadpoles at higher elevations probably overwinter (Mullally 1956).

*Bald Eagle (*Haliaeetus leucocephalus; *FT, FPD (Proposed delisting on 7/6/99; nesting and wintering), CE, CFP, SNF MIS)*

The breeding range of bald eagles (*Haliaeetus leucocephalus*) formerly included most of the North American Continent, but bald eagles now nest mainly in Alaska, Canada, the Pacific Northwest states, the Great Lake states, Florida, and Chesapeake Bay. The winter range of the bald eagle is similar to the breeding range, but extends mainly from southern Alaska and southern Canada southward (USFWS 1986). Bald eagles are permanent residents and uncommon winter migrants throughout the state of California.

They breed primarily in Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity counties (CDFG 2002B). The breeding range is primarily in mountainous habitats next to reservoirs, in the Central Coast Range, and on Santa Catalina Island. About half of the wintering population is found in the Klamath Basin (CDFG 2002B). Bald eagles forage near large aquatic ecosystems such as lakes, reservoirs, or free flowing rivers. Bald eagle nests are usually located in uneven-aged stands with old-growth components (USFWS 1986). Nesting usually occurs in large trees along shorelines in relatively remote areas. Breeding occurs February through July, with peak activity occurring in March through June. Average clutch size is two. Incubation lasts approximately 35 days and fledging takes place at 11 to 12 weeks of age. Parental care may extend to 11 weeks after fledging. Bald eagles become sexually mature at 4 to 5 years of age.

Bald eagle populations have been on the rise over the past 25 years. There was a ten-fold increase in population from 1963 to 1999. The number of occupied breeding areas in North America increased by 462 percent from 1974 to 1994 (USFWS 1999a). In California, CDFG has coordinated annual statewide breeding surveys of bald eagles which have shown a long term increase in the population and range since surveys began in 1973. The breeding range increased from eight counties in 1981 to 27 counties currently (CDFG 2002B).

In 1940, the Bald Eagle Protection Act (16 U.S.C. 668) was passed. This act led to a partial recovery of the species. In the late 1940's, the species population plummeted due to reproductive failure from the widespread use of DDT, loss of habitat, and disturbances related to human activities. In response to this, bald eagles in the lower 48 states were listed as endangered under the Endangered Species Protection Act of 1966 (16 U.S.C. 668aa-668cc). Populations continued to decline and in 1978 bald eagles were listed as endangered under the Endangered Species Act (16 U.S.C. 1531-1544) (USFWS 1978). The USFWS released a recovery plan in 1986 (USFWS 1986). Because of the increase in the bald eagle population and range, the species was downlisted to threatened status in July of 1995 (50 CFR Part 17) (USFWS 1995). A proposed rule to remove the species from listing status was made in July of 1999 (50 CFR Part 17) (USFWS 1999a). The bald eagle is also protected under the Migratory Bird Treaty Act of 1918 (16 U.S.C. Sections 703-712) and the Bald Eagle Protection Act of 1940 (16 U.S.C. Sections 668-668d).

*American Peregrine Falcon (*Falco peregrinus anatum; *Former FE (Delisted on 8/20/99; nesting), FSS, CE, CFP, SNF MIS)*

The American peregrine falcon breeds in woodlands, forests, coastal habitats, and riparian areas near wetlands, lakes, rivers, or other water on high cliffs, banks, dunes, or mounds. It is a very uncommon breeding resident and uncommon as a migrant in California, with active nesting areas along the coast north of Santa Barbara, in the Sierra Nevada, and in other mountains of northern California. Migrants occur along the coast and in the western Sierra Nevada in spring and fall. Its nest is a scrape on a depression or ledge in an open area, on human-made structures, and occasionally in a

tree or snag cavity or old nest of other raptors. Riparian areas and coastal and inland wetlands are important habitats yearlong, especially in non-breeding seasons. It feeds on a variety of birds and occasionally takes mammals, insects, and fish. Breeding occurs from early March to late August with a clutch size of 3 to 7 eggs. Incubation is approximately 32 days.

The American peregrine falcon was listed as endangered in 1970 under the Endangered Species Conservation Act of 1969 (Public Law 91-135, 83 Stat. 275). Population declines were due to negative impacts of DDT and its metabolites on peregrine falcon reproduction and survival. The American peregrine falcon subspecies were listed as endangered throughout their respective ranges upon passage of the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.). Because of restrictions on the use of organochlorine pesticides in the United States and Canada and because of successful management activities, including the reintroduction of captive-bred and relocated wild hatchling peregrine falcons, the specie's population has increased. In 1999 the USFWS removed the peregrine falcon in North America from the Federal List of Endangered and Threatened Wildlife species (50 CFR Part 17) (USFWS 1999b).

*Pacific Fisher (*Martes pennanti pacifica*; FC, FSS, CSC, SNF MIS)*

The Pacific fisher has been a candidate for federal listing since April 2004. It is among the most habitat-specific mammals in North America (USDA-FS 2001). Forest type is not as important as vegetative and structural habitat aspects. The Pacific fisher occurs in a variety of forest types that are generally mature, dense forest stands with snags and greater than 40% canopy closure. It is known from 3,500 to 8,000 feet elevations in the Sierra National Forest. It requires standing dead trees, downed logs, and rocky areas for denning sites. USDA-FS (2001b) lists the following key habitat features for Pacific fisher resting and denning sites in the southern Sierra:

- Mean den tree dbh of 49" conifer and 27" oak,
- Mean rest site tree dbh of 44" conifer and 26" oak,
- Mean rest site basal area of 273 sq ft/acre,
- Mean den canopy closure of 94%, and
- Mean rest site canopy closure of 93%.

The Pacific fisher dens in cavities and broken treetops and snags from winter to May. The study area is within the Southern Sierra Fisher Conservation Area, which encompasses the known occupied range of the Pacific fisher in the Sierra Nevada—an elevational band from 3,500 to 8,000 feet on the Sierra and Sequoia National Forests.

There are several records of Pacific fisher at Red Top Camp near Dinkey Creek in 1913; near Dinkey Creek in 1974; south of Coon Creek near Huntington Lake in 1989;

and at Marcella Lake 12 miles north of Mono Hot Springs in 1978. Additionally, there are many detections of American fisher throughout the Big Creek System, with a concentration to the south and east of Huntington Lake. No focused surveys have been conducted, and no incidental observations were reported while implementing other studies for the Big Creek ALP Project area.

FSS Plant Species

*Scalloped moonwort (*Botrychium crenulatum*; FSS, CNPS 2.2)*

Scalloped moonwort is a fern found in the adder's tongue family. It occurs in lower montane coniferous forests, bogs, meadows, seeps, marshes, and swamps from 4,900 to 10,765 feet in elevation.

*Bolander's candle moss (*Bruchia bolanderi*; FSS, CNPS 2.2).*

Bolander's candle moss is an ephemeral moss of alpine or high montane meadows (Norris 2001). This species is endemic to meadows of the Sierra Nevada (Clines 2001). It occurs in mixed coniferous forests on vertical banks of streams from 5,000 to 7,500 feet in elevation (Clines 2001).

Mono Hot Springs evening-primrose (Camissonia sierrae ssp. alticola; *FSS, CNPS 1B.2).*

Mono Hot Springs evening-primrose is a slender annual member of the evening primrose family. It occurs on granitic outcrops, sand pans, and gravel within lower and upper montane coniferous forests. It is found from 4,396 to 7,906 feet in elevation and blooms from May to August. This species has been recorded from Fresno County, Madera County, and an unverified record in Mariposa County.

*Flaming trumpet (*Collomia rawsoniana*; FSS, CNPS 1B.2).*

Flaming trumpet is a perennial herb found in the phlox family. It occurs in lower montane coniferous forests in meadows, seeps, and riparian scrub. It blooms from July to August and occurs from 2,559 to 7,217 feet in elevation. This species has been recorded from Madera and Mariposa counties.

*Subalpine fireweed (*Epilobium howellii*; FSS, CNPS 1B.3).*

Subalpine fireweed is a stoloniferous perennial herb found in the evening primrose family. It occurs in meadows and seeps in subalpine coniferous forests from 6,561 to 8,858 feet in elevation and blooms from July to August.

*Short-leaved hulsea (*Hulsea brevifolia*; FSS, CNPS 1B.2).*

Short-leaved hulsea is a perennial herb in the sunflower family. It occurs in granitic, volcanic, gravelly, or sandy soils in openings and under canopy in mixed coniferous and

red fir forests from 4,921 to 10,498 feet in elevation. It blooms from May to August and has been recorded from the following counties: Fresno, Madera, Mariposa, Tulare, and Tuolumne.

*Veined water lichen (*Hydrothyria venosa*; FSS).*

Veined water lichen is a medium-sized gelatinous lichen with cyanobacteria present throughout the thallus (i.e., the vegetative body). It is lead-colored to brownish or blackish, with irregularly cut, fan-shaped lobes. It is the only gelatinous lichen with distinct veins and it appears in dark, ruffled masses (Derr, Date Unknown). It occurs in cold, clear, unpolluted streams in mixed coniferous forests from 4,000 to 8,000 feet in elevation.

*Yosemite lewisia (*Lewisia disepala*; FSS, CNPS 1B.2).*

Yosemite lewisia is a perennial herb in the purslane family. This species occurs in fine gravel on rock outcrops or domes in lower montane coniferous forests, pinyon juniper woodlands, and upper montane coniferous forests. It occurs from 4,396 to 11,482 feet in elevation and blooms from April to June. This species has been recorded from the following counties: Fresno, Kern, Madera, Mariposa, and Tulare.

*Three-ranked hump moss (*Meesia triquetra*; FSS, CNPS 4.2).*

This moss species occurs in acidic montane meadows in coniferous forest, especially in meadows with peat moss, from 6,000 to 8,000 feet in elevation (Clines 2001).

*Broad-nerved hump moss (*Meesia uliginosa; *FSS, CNPS 2.2).*

This moss species occurs in saturated meadows in mixed coniferous forest and red fir/lodgepole pine forests between 7,500 to 9,000 feet in elevation (Clines 2001).

FSS Wildlife Species

*Hardhead (*Mylopharadon conocephalus*; FSS)*

The hardhead is a freshwater fish native to California, with a distribution limited to the Sacramento-San Joaquin river system and the Russian River system (Moyle 1976). The hardhead is now relatively uncommon, but persistent, in the San Joaquin River, having declined in abundance and distribution throughout much of California's western slope Central Sierra watersheds. It is believed that spawning occurs as early as May and may extend to August in the foothill regions of the upper San Joaquin River. Spawning substrate may include sand, gravel, and decomposed granite areas, since most of the larvae were found there. The hardhead is listed as a species of concern (watchlist) in California by the CDFG (Moyle et al. 1995) and has a sensitive species status in Region 5 of the USDA-FS, which includes the SNF. Hardhead may potentially occur in diverted stream reaches associated with FERC Project Nos. 120 and 2085.

*Foothill yellow-legged frog (*Rana boylii*; FSS, CSC)*

The FYLF is a stream-dwelling frog native to California and Oregon (Storer 1925, Zweifel 1955). As a stream obligate species, adult and juvenile FYLF primarily associate with pool and riffle habitats with gently to moderately flowing water. Tadpoles are often found in shallow near-shore habitats such as eddies, backwaters, and other low velocity areas. In eastern California it ranges from the Sierra Nevada foothills to approximately 4,500 feet. Few studies have investigated the natural history of the FYLF. Jennings and Hayes (1985) quantified the habitat associations of this species in the Sierra Nevada. In a survey of 29 streams in the Sierra Nevada, the FYLF was found to be primarily associated with similar habitat, substrate, and canopy as reported for populations in streams and rivers of the Coast Range. However, they are also found in other stream habitats ranging from small, rocky, high gradient streams no more than 1.5 feet wide, to areas where small tributaries connect with large rivers in the Sierra Nevada (Van Wagner 1996).

The FYLF generally associates with low gradient streams with moderate stream flow over coarse substrates. In the Sierra Nevada, individuals have also been observed in steep gradient reaches in habitats such as cascades and bedrock waterfalls. Although such habitats are not optimal for breeding, they may be used in spring while adults migrate downstream to reach breeding habitat near the confluence with larger streams.

The FYLF primarily associates with coarse substrates in streams. Coarse material such as cobbles, boulders, and large woody debris provide suitable sites for oviposition. Larger substrates typically remain stable in spring when stream-flow is high as the winter snowpack melts. During the summer foraging season when flows are low, coarse material protruding above the channel bed provides optimal sites for basking and feeding. Although individuals have been found associated with finer substrates, such as sand and silt near main channel pools or around side channel pools, this association appears to be relatively low compared to coarse substrates. The canopy in streams that support this species is usually semi-open with riparian vegetation creating dappled shade, thus providing cool cover during the hottest part of the day as well as open areas for basking (Van Wagner 1996). Fitch (1938) suggested that this species may be limited by dense canopy and Moyle (1973) reported that individuals were not found at sites with > 90 percent canopy.

Although usually found in perennial streams, adults will inhabit isolated pools when water flow declines in summer (Fitch 1938, cited *in* Hayes and Jennings 1989). The movements of juveniles can be quite extensive in summer and late fall, as foraging drives individuals into diverse habitats (Van Wagner 1996). Therefore, the stream habitat used by FYLF throughout their life cycle is complex. Breeding occurs in early spring near tributary confluences in larger river systems in the Coast Range (Kupferberg 1996) and in shallow, low velocity areas in small streams in the Sierra Nevada (Van Wagner 1996). Mating occurs from March to July and egg laying occurs from April to July. Egg masses are attached to cobbles, boulders, and other instream structures at a depth of 4 to 24 inches and in slow to moderately flowing water as low as 9.8° C (Storer

1925, Zweifel 1955, Lind et al. 1996, Lind unpublished data). Hatching occurs five days to 3 weeks after the eggs are laid depending on water temperature. Tadpole stage occurs from May through September.

*Western pond turtle (*Actinemys marmorata*; FSS, CSC)*

The WPT ranges from Baja California to Washington and inland into western Nevada. In the Sierra Nevada, it historically occurred in most of the major drainages along the western slope. Its elevational distribution is from sea level to approximately 6,000 feet, but most populations occur below 4,000 feet (Holland 1991a). Populations found between 4,500 and 6,000 are expected to be transplants (Jennings and Hayes 1994). This turtle occurs in marshes, perennial and intermittent streams, rivers, canals, ponds, vernal pools, and reservoirs, but also can be found nesting or overwintering in adjacent upland habitats (Storer 1930, Holland 1991a, Reese and Welsh 1997). The presence of WPT in aquatic habitat is dependent upon several factors, including distance to the nearest natural water source with a turtle population, structure of the habitat, degree of habitat disturbance, and the presence of suitable basking sites and refugia (Holland 1991a).

The WPT is almost exclusively found in pool and backwater habitats. Their life history strategy focuses entirely on still water and low velocity conditions, and individuals are not well adapted to swiftly flowing currents. In low gradient stream systems, the WPT is more often observed basking on sediments composed of fines than atop coarse materials. The presence of potential basking sites, such as large woody debris in particular, adjacent to or in deep pools with aquatic vegetation can be used to predict the presence of WPT. As with amphibians, basking is a frequent activity, and adjacent deep pools with underwater cover sites provide protection from predators. Basking is an important behavioral adaptation among reptiles that allows them to raise their body temperature to increase their general activity level. As with other reptiles, the WPT often basks in open, sunny areas. This species occurs in intermittent and perennial streams, but permanent streams support larger populations (Holland 1991a). In California's Trinity River, favorable habitat for the WPT is characterized by warm, deep, slow flowing pools with underwater cover and basking sites (Reese and Welsh 1998). Holland (1991a) reported that this species is often found in quiet backwater habitats in streams. Such habitats provide shelter from predators and offer basking sites for thermoregulation. The WPT is uncommon in high gradient streams perhaps because water temperature, current velocity, food resources, or any combination may limit their local distribution (Holland 1991a).

*Northern Goshawk (*Accipiter gentilis*; FSS, CSC (nesting), SNF MIS)*

The northern goshawk inhabits middle to high elevation mature, dense coniferous forests throughout the east and west sides of the Sierra. It occurs in the foothills during winter, in northern deserts in pinyon-juniper woodland, and in low elevation riparian habitats. Optimal habitat contains trees for nesting, a closed canopy (>50%) for protection and thermal cover, and open spaces allowing maneuverability. In the Sierra

Nevada, nesting occurs from 2,500 feet in ponderosa pine/mixed-conifer habitat to 10,000 feet in red pine and lodgepole pine habitat (USFS 2001). Nest areas, often in trees along drainages, are characterized by dense stands of large diameter trees with interconnected canopies. Nests are usually on north slopes near water in the densest parts of stands, but close to openings and are placed in live trees, but sometimes snags (USFS 2001). Nests in live trees are usually placed at or just below the lower portion of the canopy in a crotch (USFS 2001). Nesting season begins in March. It feeds mostly on birds, using snags and dead treetops as observation platforms.

*Great gray owl (*Strix nebulosa*; FSS, CE (nesting))*

Great gray owls nest in montane mixed conifer and red fir forests, and forage in nearby montane wet meadows, from 2,500 to 8,000 feet in elevation (Beck and Winter 2000). Their distribution includes the Sierra Nevada, Cascade Range, and Modoc Plateau in California, but they are rare throughout California and only isolated populations are known to occur (Beck and Winter 2000). Nesting habitat of the great gray owl consists of mid- or late- succession conifer forests containing large, broken top snags in sufficient numbers to provide nest sites and areas with 60 to 100 percent multi-storied canopy, situated within 300 yards of montane meadows or grass/forb forage types (Beck and Winter 2000). Foraging habitat requires meadows or openings that have sufficient herbaceous cover to support pocket gophers and microtine rodents and that are at least 10 acres in size (Beck and Winter 2000). Foraging habitat includes meadows and meadow complexes consisting of small “stringer” meadows that total at least 10 acres when meadows occur within ½ mile of one another (Beck and Winter 2000). In the Sierra Nevada of California, nesting generally occurs from February to June in low elevations, March to July in middle elevations, and April to August in high elevations. Nesting chronology is dependent upon elevation, with nesting in high elevation sites occurring more than a month after low elevation sites. The courtship and incubation periods are approximately 30 days each. Great gray owls typically lay only two to three eggs per clutch, with usually only one to two chicks successfully fledging. Fledglings leave the nest 26 to 28 days after hatching (Beck and Winter 2000).

*California Spotted Owl (*Strix occidentalis occidentalis*; FSS, CSC, SNF MIS)*

The California spotted owl occurs in dense, old growth, multi-layered mixed conifer, redwood, Douglas fir, and oak woodland habitats, from sea level up to approximately 7,600 feet. In the Sierra National Forest, this species uses foothill riparian/hardwood, ponderosa pine/hardwood, mixed-conifer forest, red fir forest, and east side pine forest (USFS 2001). It prefers large trees and high canopy cover for nesting and foraging areas. Foraging is most common in intermediate to late successional forests with greater than 40 percent canopy cover and a mixture of tree sizes, some larger than 24 inches in dbh (USFS 2001). Nesting habitat contains a dense canopy cover (>70%) with medium to large trees and a multi-storied structure. This species prefers stands with significantly greater canopy cover, total live tree basal (base) area, basal area of hardwoods and conifers, and snag basal area for nesting and roosting (USFS 2001).

Nests are located in cavities or broken treetops. Nesting season occurs from February to September.

*Willow Flycatcher (*Empidonax traillii brewsteri*; FSS, CE (nesting), SNF MIS)*

There is another subspecies of willow flycatcher (*E. traillii extimus*) in California that is federally listed, but this subspecies is not expected to occur in the Project area because it is outside of the subspecies' known range. The willow flycatcher is a rare to locally uncommon, summer resident in wet meadow and foothill and montane riparian habitats from 2,000 to 8,000 feet in the Sierra Nevada and Cascade Range. It occurs in broad, open river valleys or large mountain meadows with lush growth of shrubby willows. Dense willow thickets are required for nesting and roosting. This species is most abundant in areas where extensive thickets of low, dense willows border wet meadows, ponds, or backwaters. It may still nest elsewhere in lowland California, as in San Diego County. It is a common spring (mid-May to early June) and fall (mid-August to early September) migrant at lower elevations, primarily in riparian habitats throughout the state exclusive of the North Coast. An open cup nest is placed in an upright fork of a willow or other shrub, or occasionally on a horizontal limb, at a height of 1.5 to 10 feet. The species is monogamous. Peak egg laying occurs in June, incubation lasts 12 to 13 days, and clutch size averages 3 to 4 eggs. It is probably single-brooded. Both sexes care for altricial young. Fledging age is 13 to 14 days.

*Western red bat (*Lasiurus blossevillii*; FSS).*

Very little research has been done on the western red bat and little is known about this species. Much of the natural history is inferred from what is known about the eastern red bat, although the degree of similarity of the biology of these two species is unknown at present. The western red bat is a solitary, foliage-roosting bat. The western red bat is in the genus *Lasiurus*, the hairy-tailed bats. These bats are adapted for exposed roosting behavior with their hairy tail membrane and small ears. In California, this species is known to roost in cottonwood trees and willows, but is commonly detected in a variety of habitats, including chaparral. Roost heights range from 10 to 50 feet (Pierson and Heady 1997). The range of the western red bat is from British Columbia to Central and South America. Migration occurs throughout its range and bats of Canada move into the coastal lowlands of California, and the California population is thought to winter in Central America (Nagorsen and Brigham 1993). Mating takes place in late summer and fall, sperm is stored over winter, and fertilization occurs in early spring. Gestation period is 80 to 90 days, and one to four young are born in late May to early July. The young are born small, naked, and underdeveloped (Nowak 1994). Females leave the young at the roosting site while foraging, but will carry them when moving to a new roosting site. Young are capable of sustained flight at 6 weeks. Large moths are the primary prey of the western red bat. This bat is a fast flyer, foraging in straight flights or large circles (Nagorsen and Brigham 1993). The echolocation calls are highly variable depending on the terrain. Though variable, these calls are very distinct.

Townsend's big-eared bat (Corynorhinus townsendii; FSS, CSC)

Townsend's big-eared bat is a year-round resident in California, occurring from low desert to mid-elevation montane habitats. It is found primarily in rural settings, from inland deserts to coastal redwoods, oak woodland of the inner Coast Ranges and Sierra Nevada foothills, and low to mid-elevation mixed coniferous-deciduous forests. It typically roosts during the day in caves and mines, but can roost in buildings that offer suitable conditions (Kunz and Martin 1982). Night roosts are in more open settings and include bridges. It hibernates in mixed sex aggregations of a few to several hundred individuals. Hibernation occurs for prolonged periods in colder areas and intermittently in non-freezing areas. Townsend's big-eared bat arouses periodically and moves to alternative roosts, and actively forages and drinks throughout the winter. A single young is born per year between May and July. Females form maternity colonies of 35 to 200 individuals, while males roost individually (Kunz and Martin 1982). Townsend's big-eared bat feeds primarily on small moths that are gleaned from vegetation.

*Pallid bat (*Antrozous pallidus*; FSS, CSC)*

This bat is a year-round resident in California, is found in arid desert areas, grasslands and oak savanna, coastal forested areas, and coniferous forests of the mountain regions of California. Roost sites are typically rock outcroppings, caves, hollow trees, mines, buildings, and bridges (Hermanson and O'Shea 1983). Pallid bats make use of similar structures for night roosting and will use more open sites such as eaves, awnings, and open areas under bridges for feeding roosts. Pallid bats are largely inactive in the winter months, and there is evidence for both hibernation and migration. Hibernation aggregations tend to be much smaller than summer aggregations. Pallid bats have been observed foraging during the winter when prey is available (Hermanson and O'Shea 1983). Copulation occurs in the fall, usually October through December, although in coastal California copulation has been observed as late as February. Females store the sperm, and ovulation occurs the following spring. Parturition timing is determined by local climate, and embryonic development usually takes about nine weeks with birth occurring in May or June. Twins are the norm in northern California, but in other areas the pallid bat is known to have triplets. Maternity colonies range from 20 to 200 individual adult bats. Males roost in much smaller groupings (Hermanson and O'Shea 1983). The pallid bat feeds on large insects (1 to 3 inches in length). Prey is most often caught on the ground. Jerusalem crickets, scorpions, and beetles make up most of the diet of pallid bat in central California.

*American (pine) Marten (*Martes americana*; FSS, SNF MIS)*

The American marten occurs throughout the Sierra Nevada in montane forests from 4,000 to 13,000 feet. Martens prefer coniferous forest with large diameter trees and snags, large downed logs, moderate-to-high canopy closure, and an interspersion of riparian areas and meadows (USDA-FS 2001). Optimal habitats are various mixed evergreen forests with more than 40 percent crown closure and large trees and snags

for den sites. USDA-FS (2001b) provides the following specific habitat components for westside suitable habitat in the marten core elevation range (5,500 to 10,000 feet):

- Canopy cover of ≥ 40 percent for traveling and foraging and of ≥ 70 percent for denning and resting;
- ≥ Six largest live conifers of 24“ dbh per acre for traveling and foraging and ≥ nine for denning and resting;
- Live tree basal area of ≥ 350 sq ft/acre;
- Average of 2.5 largest snags of ≥ 24“ dbh per acre for traveling and foraging and 5 per acre for denning and resting; and
- Coarse woody debris of large logs (≥ 15 ft long) for 5-10 tons/acre in Decay Classes 1-3 for traveling and foraging and in Decay Classes 1-2 for denning and resting.

Denning occurs from late winter through early spring. Dens are located in cavities and are lined with leaves, grass, moss, or other vegetation. Young are born in March and leave their mothers in the fall. The pine marten ranges from the foothills to the higher slopes of the Sierra Nevada, including the Sierra National Forest.

*California Wolverine (*Gulo gulo luteus*; FSS, CT, CFP)*

The California wolverine occurs in a variety of habitat types, mixed conifer, red fir, and lodgepole habitats, and probably sub-alpine conifer, alpine dwarf shrub, wet meadow, and montane riparian habitats. Wolverine denning is restricted to rocky areas free of human disturbance (USDA-FS 2001). It occurs in the Sierra Nevada from 4,300 to 10,800 feet, but usually above 6,400 feet. Scarce sightings range from Del Norte and Trinity counties, east through Siskiyou and Shasta counties, and south through Tulare County. The wolverine feeds primarily on small mammals and carrion. Dens are located in caves, cliffs, hollow logs, cavities in the ground, under rocks, under snow, or in old beaver lodges. Denning occurs from late winter through early spring. The breeding period lasts from January to July.

*Sierra Nevada Red Fox (*Vulpes vulpes necator*; FSS, CT)*

The Sierra Nevada red fox occurs throughout the Sierra Nevada at elevations above 7,000 feet, in forests interspersed with meadows or alpine fell-fields. It is found in the Cascades in Siskiyou County and from Lassen County south to Tulare County. Little is known about the habits of this species. The Sierra Nevada red fox uses open areas for hunting and forested habitats for cover and reproduction. It may be found in a variety of habitats, including alpine dwarf-shrub, wet meadow, subalpine conifer, lodgepole pine, red fir, aspen, montane chaparral, montane riparian, mixed conifer, ponderosa pine, Jeffrey pine, eastside pine, and as ground squirrels and mice. Den sites include rock outcrops, hollow logs, and stumps, and burrows in deep, loose soil. Denning occurs in

late winter and early spring. Mating takes place in late winter (January-March), young are born in early spring (March-May), and pups are dependent on parents until November.

Sierra National Forest Management Indicator Species

*Mule deer (*Odocoileus hemionus; SNF MIS*)*

In the central Sierra, mule deer inhabit winter ranges at elevations of 1,200 to 3,600 feet from early October through mid-May (Holl et al. 1979). In the spring, they remain at their winter ranges at an average elevation of 3,400 feet until mid-May, and then begin a gradual upward movement, depending on snow pack (Loft et al. 1989). During the summer, mule deer are commonly found at 6,000 to 10,000 feet from late May to early November (Holl et al. 1979). The San Joaquin deer herd, the herd in the Big Creek ALP Project vicinity, ranges from about 2,000 feet along the San Joaquin River up to about 12,000 feet along the crest of the Sierra. They are commonly found in the summer from 6,500 to 8000 feet, where optimum habitat occurs. Deer commonly spend winter at 1,500 to 4,500 feet (CDFG 1983). A large number of deer using the summer range in Fresno County, winter on the north side of the San Joaquin River in Madera County. This indicates that at least half of the population must cross the San Joaquin River while migrating between summer and winter ranges (Peabody et al. 1978).

Population estimates for the San Joaquin deer herd ranged from 1,901 to 11,480 from 1953 to 1981. Population estimates were highest during the 1950's and lowest during the early to mid-1970's (CDFG 1983). The San Joaquin deer herd is divided into two population segments: the Huntington and South Fork segments. Population goals for the Huntington segment are to maintain 800 to 1,500 animals, and population goals for the South Fork segment are to maintain a population of 2,000 to 3,000 animals (CDFG 2000). There has been a steady reduction in the number of bucks harvested in the South Fork segment, which may indicate that deer numbers have dropped significantly in this area (CDFG 2000). The Huntington segment appears to be increasing in population (CDFG 2000).

The San Joaquin deer herd falls within the D7 deer hunting zone. The hunting season for this zone begins the third weekend in September and lasts for 44 consecutive days. There were 9,000 available tags in this zone, and the bag and possession limit is one buck with a forked horn or better per tag. CDFG (2002a) estimated hunter success at 10 percent for the D7 zone in 2001. In the South Fork segment, estimated number of bucks killed per year from 1990 to 1999 ranged from 22 to 62, with an average of 44. In the Huntington segment, estimated number of bucks killed per year from 1990 to 1999 ranged from 37 to 90, with an average of 50.

Resident Trout

Detailed life histories for all life stages of resident trout are provided in the CAWG-7, Characterize Fish Populations (2002 TRSP (SCE 2003)).

*Osprey (*Pandion haliaetus*; CSC, SNF MIS).*

The osprey occurs along seacoasts, lakes, and rivers, primarily in ponderosa pine and mixed conifer habitats. It preys mostly on fish at or below the water surface, but will also take small mammals, birds, reptiles, amphibians, and invertebrates. Large snags and open trees near large, clear, open waters are required for foraging. The osprey typically swoops from flight, hovers, or perches to catch prey. The osprey breeds primarily in northern California and typically build nests in large conifers, but may also use artificial platforms as nesting areas. The breeding season is from March to September. Nests are built on platforms of sticks at the top of large snags, dead-topped trees, on cliffs, or on human-made structures. A nest may be as much as 250 feet above ground and is usually within 1,000 feet of fish-producing water. Osprey need tall, open-branched "pilot trees" nearby for landing before approaching the nest and for use by young for flight practice. Typically, this species migrates in October south along the coast and the western slope of the Sierra Nevada to Central and South America.

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