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List of Acronyms

BCC	Birds of Conservation Concern
BLM	Bureau of Land Management
BLMS	Bureau of Land Management Sensitive Species Lists
CALVEG	Classification and Assessment with LANDSAT of Visible Ecological Groupings
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFP	California Fully Protected Species
CFR	Code of Federal Regulations
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
Commission	Federal Energy Regulatory Commission
CRPR	California Rare Plant Ranking
CSC	California Species of Special Concern
CWHR	California Wildlife Habitat Relationships
ESA	Endangered Species Act
FC	Federal Candidate
FE	Federally Endangered
FERC	Federal Energy Regulatory Commission
FPD	Federally Proposed for Delisting
FPE	Federally Proposed Endangered
FPT	Federally Proposed Threatened
FT	Federally Threatened
GIS	Geographic Information System
Inventory	California Invasive Plant Inventory
IPaC	United States Fish and Wildlife Service Information, Planning, and Conservation System
NNIP	Non-Native Invasive Plants
Project	Kaweah Project
SCE	Southern California Edison Company
SE	State Endangered
SNP	Sequoia National Park
SR	State Rare
ST	State Threatened
USACE	United States Army Corps of Engineers
USDA-FS	U.S. Department of Agriculture – Forest Service

List of Acronyms (continued)

USFWS	United States Fish and Wildlife Service
USGS	United States Geological Service

3.6 Botanical and Wildlife Resources

This section describes botanical and wildlife resources in the vicinity of the Kaweah Project (Project). The Federal Energy Regulatory Commission's (FERC or Commission) content requirements for this section are specified in Title 18 of the Code of Federal Regulations (CFR) Chapter I § 5.6 (d)(3)(v). In addition, this section describes rare, threatened, and endangered botanical and wildlife resources in the vicinity of the Project. The FERC content requirements for this information are specified in 18 CFR Chapter 1 § 5.6 (d)(3)(vii). A description of aquatic resources in the Project vicinity (including rare, threatened, and endangered aquatic resources) is included in Section 3.5 Fish and Aquatic Resources.

Information in this section is primarily based on data from resource agency files, reports, and databases; published literature; and applicable field studies published by the Southern California Edison Company (SCE) in 1989.

3.6.1 Information Sources

The following sources were reviewed to obtain information on botanical resources in the Kaweah Project vicinity. Project vicinity is defined to include areas within the FERC Project boundary; or any areas directly adjacent to other facilities or bypass reaches¹ associated with the Project:

- The Bureau of Land Management's (BLM) Environmental Assessment Number CA 160-07-032, Consequences of Managing Vegetation for 3 Year Increments as Proposed by Southern California Edison on Bureau of Land Management Property Associated with the Southern California Edison - FERC 298 - Kaweah Hydroelectric Power Conduit Flowlines #1 and #3 (BLM 2010);
- BLM's Special Status Plants under the Jurisdiction of the Bakersfield Office (Bureau of Land Management [BLM] 2013);
- The California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDDB) (CNDDDB 2015);
- The California Invasive Plant Council's (Cal-IPC's) California Invasive Plant Inventory (Cal-IPC 2015);

¹A bypass reach is a segment of a river downstream of a diversion facility where Project operations result in the diversion of a portion of the water from that reach. The bypass reaches associated with the Project include:

- Kaweah River from the Kaweah No. 2 Diversion to the Kaweah No.2 Powerhouse Tailrace (4.1 miles); and
- East Fork Kaweah River, from the Kaweah No. 1 Diversion to the confluence with the Kaweah River (4.7 miles).

- The California Native Plant Society's (CNPS) Inventory of Rare, Threatened and Endangered Plants (CNPS 2015b);
- FERC's Environmental Assessment, Kaweah Project (FERC Project No. 298) (FERC 1991);
- SCE's Rare, Endangered, and Special Status Plants of the Southern California Edison Kaweah River Hydroelectric Project Area (SCE 1989a);
- SCE's Botanical Survey Report for Kaweah Canal 9 Project (SCE 2000);
- The U.S. Department of Agriculture – Forest Service's (USDA-FS) Classification and Assessment with LANDSAT of Visible Ecological Groupings (CALVEG) mapping and vegetation alliance descriptions (USDA-FS 2014); and
- The U.S. Fish and Wildlife Service's (USFWS) Information, Planning, and Conservation System (IPaC) website (USFWS 2015).

The following sources were reviewed to obtain information on wildlife resources in the Kaweah Project vicinity:

- BLM Environmental Assessment Number CA 160-07-032, Consequences of Managing Vegetation for 3 Year Increments as Proposed by Southern California Edison on Bureau of Land Management Property Associated with the Southern California Edison - FERC 298 - Kaweah Hydroelectric Power Conduit Flowlines #1 and #3 (BLM 2010);
- BLM Special Status Animals in California, Including BLM Designated Sensitive Species (BLM 2006);
- CDFW's CNDDDB (CNDDDB 2015);
- California Wildlife Habitat Relationship (CWHR) System Database, Version 9.0 (CDFW 2015a);
- FERC's Environmental Assessment, Kaweah Project (FERC Project No. 298) (FERC 1991);
- A Guide to Wildlife Habitats of California (Mayer and Laudenslayer 1988);
- SCE's Sensitive Wildlife Species Investigation for the Kaweah Hydroelectric Project (SCE 1989b);
- USFWS Birds of Conservation Concern (USFWS 2008); and
- USFWS IPaC website (USFWS 2015).

3.6.2 Botanical Resources

This section describes botanical resources in the Project vicinity including vegetation alliances and common plants; special-status plants; and non-native invasive plants (NNIP).

3.6.2.1 Vegetation Alliances and Common Plants

Information on vegetation alliances was analyzed to characterize habitat conditions and identify common plant species in the Project vicinity. The term "alliance" corresponds closely to what plant ecologists call a community type and foresters call a forest type or stand. An alliance is characterized by the dominant species of plants (e.g., trees, shrubs, or herbaceous species) that make up the overstory. This usage is consistent with standards developed by the Federal Geographic Data Committee as part of the National Vegetation Classification System.

Information on vegetation alliances in the Project vicinity is based on CALVEG mapping and vegetation alliance descriptions developed by the USDA-FS Region 5. The CALVEG system is used to classify existing vegetation present on federally managed forestlands based on LANDSAT color infrared satellite imagery. Data are verified using soil-vegetation maps and professional guidance from various sources statewide. CALVEG data for the Southern Sierra were updated by USDA-FS in 2014.

Maps of vegetation alliances within 1 mile of the Project were developed using CALVEG Geographic Information System (GIS) data layers for the Southern Sierra ecoregion (USDA-FS 2014) overlain on a map of the Kaweah Project facilities. A 1-mile extent was determined to be the area sufficient to encompass no-disturbance buffers that state and federal agencies use when determining potential impacts to wildlife species. Examples of no-disturbance buffers considered include a 0.25-mile buffer for Swainson's hawk, California spotted owl, and northern goshawk nests; and a 500-foot buffer for other raptor nests. Descriptions of each vegetation alliance present within 1 mile, including descriptions of common plant species found in each alliance, were obtained from the USDA-FS Region 5 website.

In addition, the following Project-specific sources provided additional information on vegetation alliances in the immediate vicinity of the Kaweah Project:

- Botanical Survey Report for Kaweah Canal 9 Project (SCE 2000);
- Environmental Assessment, Kaweah Project (FERC Project No. 298) (FERC 1991); and
- Rare, Endangered, and Special Status Plants of the Southern California Edison Kaweah River Hydroelectric Project Area (SCE 1989a).

There are generally no regulatory protections associated with vegetation alliances. However, riparian habitats are afforded protections under Sections 1600–1607 of the California Fish and Game Code (as administered by CDFW) and under Section 404 of the Clean Water Act (under the jurisdiction of the U.S. Army Corps of Engineers [USACE]).

Refer to Table 3.6-1 for a list of vegetation alliances that occur within 1 mile of the Project. Map 3.6-1 shows the extent of each vegetation alliance within 1 mile of the Project. A

description of each vegetation alliance, including common plant species associated with each alliance, is provided in Appendix 3.6-A.

3.6.2.2 Special-Status Plants

This section describes special-status plants that are known to occur or may potentially occur in the Project vicinity.

For the purposes of this document, a special-status plant is defined as any plant species that is granted protection by a federal or state agency. Federally listed plant species granted status by the USFWS under the Federal Endangered Species Act (ESA) include threatened (FT), endangered (FE), proposed threatened or endangered (FPT, FPE), candidate (FC), or listed species proposed for delisting (FPD).

State of California listed plant species, which are granted status by the CDFW under the California Endangered Species Act (CESA) include state threatened (ST), endangered (SE), rare (SR), and California Species of Special Concern (CSC).

CNPS maintains the California Rare Plant Rank (CRPR), a ranking system for rare, threatened, or endangered plants in California. Under the California Environmental Quality Act (CEQA), special-status plants include the following CRPR:

- 1A (presumed extirpated in California and either rare or extinct elsewhere);
- 1B (rare, threatened, or endangered in California and elsewhere);
- 2A (presumed extirpated in California, but common elsewhere); and
- 2B (rare, threatened, or endangered in California, but common elsewhere).

BLM also maintains lists of sensitive plant species (BLMS) that are designated by the BLM State Director for special management consideration. In California, this includes all plants on BLM lands that are listed as FC, ST, SE, and SR; all plants that have a CRPR of 1B, and any other plants that the State Director has determined to warrant status.

A comprehensive list of special-status plant species was compiled from the following sources:

- BLM maintains a list of special-status plant species potentially occurring in the counties under the jurisdiction of their Bakersfield field office (i.e., Fresno, Tulare, Kern, Santa Barbara, and Ventura counties) (*BLM Special Status Plants under the Jurisdiction of the Bakersfield Office* [BLM 2013]). Only those plant species on the list whose range overlaps with the Kaweah Project were included.
- The CNPS Inventory of Rare, Threatened and Endangered Plants (CNPS 2015b) was queried to generate a list of special-status plants occurring within the nine United States Geological Service (USGS) 7-Minute quadrants surrounding the Kaweah Project.

- The USFWS IPaC website was queried to generate a list of federal endangered and threatened species that occur or may potentially occur within the nine USGS 7-Minute quadrants surrounding the Kaweah Project (USFWS 2015).

This comprehensive list was then evaluated to determine which plant species occur or may potentially occur in the Project vicinity based a review of the following:

- A query of the CNDDDB (2015) to obtain information on known occurrences in the Project vicinity;
- Supplemental information (e.g., habitat descriptions and known occurrences) obtained from a review of the following Project-specific sources:
 - Botanical Survey Report for Kaweah Canal 9 Project (SCE 2000);
 - Environmental Assessment, Kaweah Project (FERC Project No. 298) (FERC 1991);
 - Environmental Assessment Number CA 160-07-032, Consequences of managing vegetation for 3 year increments as proposed by Southern California Edison on Bureau of Land Management property associated with the Southern California Edison - FERC 298 - Kaweah Hydroelectric Power Conduit Flowlines #1 and #3 (BLM 2010); and
 - Rare, Endangered, and Special Status Plants of the Southern California Edison Kaweah River Hydroelectric Project Vicinity (SCE 1989a).
- The geographic location and elevation of the Project and vegetation alliances and other habitat features present to determine those species which may potentially occur.

Plant species on the comprehensive list were then categorized as follows:

- **Known to occur in the Project vicinity:** Special-status plants with recorded populations in the Project vicinity, as determined by CNDDDB or SCE studies;
- **May potentially occur in the Project vicinity:** Special-status plants that may potentially occur in the Project vicinity based on the geographic location and elevation of the Project and vegetation alliances and other habitat features present; and
- **Unlikely to occur in the Project vicinity:** Special-status plants that are unlikely to occur because their range does not overlap the Project; or for which the Project vicinity does not support appropriate habitat.

Table 3.6-2 provides the comprehensive list of special-status plant species evaluated for their potential to occur in the Project vicinity. Species listed in the table are categorized as known to occur; potentially occurring in appropriate habitat; or unlikely to occur. Table 3.6-2 also summarizes pertinent information for each species, including status, blooming period, and preferred habitat, with information on the location of occurrences, if applicable. Map 3.6-2 shows known occurrences based on the results of the CNDDDB

query and literature review. Maps 3.6-3a–d provide detail information on the location of special-status plants in the Project vicinity. Appendix 3.6-B provides life history information for special-status plants categorized in Table 3.6-2 as known to occur or potentially occurring, including information on the location of USFWS-designated Critical Habitat and applicable recovery plans.

Three special-status plant species are known to occur in the Project vicinity. These are:

- Kaweah brodiaea (*Brodiaea insignis*) – BLMS, SE, CRPR 1B.2;
- mouse buckwheat (*Eriogonum nudum* var. *murinum*) – BLMS, CRPR 1B.2; and
- Munz's iris (*Iris munzii*) – BLMS, CRPR 1B.3.

Seventeen species have not been documented in the Project vicinity, but have the potential to occur based on the geographic location and elevation of the Project and vegetation alliances present.

There is no USFWS-designated Critical Habitat for federally listed special-status plants in the Project vicinity; and no recovery plans are in effect.

The majority of the species listed on Table 3.6-2 are considered unlikely to occur, either because the Project is outside the geographic or elevation range of the species, and/or the Project vicinity does not support appropriate habitat for the species.

The CNDDDB query yielded one rare plant community, Big Tree Forest (CNDDDB 2015). This mixed grove of giant sequoia (*Sequoiadendron giganteum*) and other conifers such as Jeffrey pine (*Pinus jeffreyi*), Ponderosa pine (*Pinus ponderosa*), Douglas fir, and incense cedar (*Calocedrus decurrens*) are located within the Sequoia National Park (SNP) between approximately 5,000 and 8,000 feet in elevation. This rare plant community is not found in the Project vicinity.

3.6.2.3 Non-Native Invasive Plants

Information on NNIPs potentially occurring in the Project vicinity was obtained from the California Invasive Plant Inventory (Inventory) (Cal-IPC 2015). Cal-IPC defines NNIPs as plants that 1) are not native to, yet can spread into, wildland ecosystems, and that also 2) displace native species, hybridize with native species, alter biological communities, or alter ecosystem processes (Cal-IPC 2015).

The Inventory categorizes plants as High, Moderate, or Limited, according to the degree of ecological impact in California (Cal-IPC 2015).

- **High** – Severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

- **Moderate** – Substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
- **Limited** – Invasive but ecological impacts are minor on a statewide level (or not enough information to justify a higher score). Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

The Inventory was queried to obtain a list of NNIPs based on two parameters:

- Jepson region: The Inventory uses geographic floristic provinces and subdivisions within California as described by the Jepson Flora Project (2015). The Kaweah Project is within the California Floristic Province and the southern Sierra Nevada foothills subdivision.
- Habitat types: Based on a comparison with vegetation alliances within 1 mile of the Project, three habitat types were selected: grassland, riparian, and woodland habitat.

The query of the Cal-IPC Inventory yielded a list of 69 NNIPs potentially occurring in the Project vicinity. Refer to Table 3.6-3 for a list of these species and the habitat(s) they typically occur in.

3.6.3 Wildlife Resources

This section describes wildlife resources in the Project vicinity, including wildlife habitats and common wildlife species; special-status wildlife; and game species.

3.6.3.1 Wildlife Habitats and Common Wildlife Species

Information on wildlife habitats was obtained to characterize habitat conditions and identify common wildlife species in the Project vicinity. Wildlife habitats present were determined through use of a “crosswalk” between USDA-FS CALVEG alliances and CDFW’s CWHR wildlife habitat classifications. The CALVEG–CWHR crosswalk was developed by USDA-FS and CDFW as a way to determine which wildlife habitats are likely to be present based on existing vegetation communities and forest structural characteristics. A table showing representative common wildlife species potentially occurring within these habitats was then developed based on a review of *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988) and CDFW’s California Wildlife Habitat Relationship System Database, Version 9.0 (CDFW 2015a).

Refer to Table 3.6-1 for a list of the wildlife habitats that occur within 1 mile of the Project. Habitat descriptions, excerpted from *A Guide to Wildlife Habitats of California* (Mayer and

Laudenslayer 1988), are provided in Appendix 3.6-C. Table 3.6-4 provides a list of representative common wildlife species that are found in the wildlife habitats in the Project vicinity.

3.6.3.2 Special-Status Wildlife

This section describes special-status wildlife that occur or may potentially occur in the Project vicinity. This section addresses only special-status terrestrial wildlife species. Aquatic species, including fish and aquatic amphibians and reptiles, are addressed in Section 3.5 Fish and Aquatic Resources.

For the purposes of this document, a special-status wildlife species is defined as any animal species that is granted status by a federal, state, or local agency. Federally listed species granted status by USFWS under the ESA include FT, FE, FPT, FPE, FC, or FPD. Also included are those species listed by USFWS as Birds of Conservation Concern (BCC) which include “species, subspecies, and populations of all migratory nongame birds that, without additional conservation action, are likely to become candidates for listing under the ESA of 1973” (USFWS 2008).

State of California listed wildlife species which are granted status by the CDFW under the CESA include ST, SE, Fully Protected species (CFP), and CSC.

The BLM also maintains lists of BLMS that are not federally listed but that are designated by the BLM State Director for special management consideration.

A comprehensive list of special-status wildlife species was compiled from the following sources:

- BLM maintains a list of special-status wildlife species potentially occurring in California (*BLM Special Status Animals in California, Including BLM Designated Sensitive Species* [BLM 2006]). Only those wildlife species on the list whose range overlaps the Project were included.
- CDFW’s *State and Federally Listed Endangered and Threatened Animals of California* (CDFW 2015d) was reviewed to generate a list of state-listed species potentially occurring in the Project vicinity. Only those state-listed wildlife species on the list whose range overlaps the Project were included.
- List of species considered CFP under the California Fish and Game Code (Sections 3511, 4700, 5050 and 5515) (CDFW 2015). Only those wildlife species on the list whose range overlaps Tulare County were included.
- The USFWS IPaC website was queried to generate a list of federally endangered and threatened species that occur or may potentially occur within the nine USGS 7-Minute quadrants surrounding the Project. (USFWS 2015).
- USFWS’s *Birds of Conservation Concern* (USFWS 2008) was reviewed to obtain a list of BCC birds within the Project vicinity. The Project is within Bird Conservation Region 15 (Sierra Nevada). Therefore, the BCC within this region were included.

This comprehensive list was then evaluated to determine which wildlife species occur or may potentially occur in the Project vicinity based a review of the following:

- A query of the CNDDDB (2015) to obtain information on known occurrences in the Project vicinity;
- Supplemental information (e.g., habitat descriptions and occurrences) obtained from a review of the following Project-specific sources:
 - Environmental Assessment, Kaweah Project (FERC Project No. 298) (FERC 1991); and
 - Sensitive Wildlife Species Investigation for the Kaweah Hydroelectric Project (SCE 1989b).
- The geographic location and elevation of the Project and vegetation alliances and other habitat features present to determine those species which may potentially occur.

Wildlife species on the list were then categorized as follows:

- **Known to occur in the Project vicinity:** Wildlife species with recorded occurrences in the Project vicinity, as determined by CNDDDB or SCE studies;
- **May potentially occur in the Project vicinity:** Wildlife species that “may potentially occur” in the Project vicinity based on the geographic location and elevation of the Project and wildlife habitats present; and
- **Unlikely to occur in the Project vicinity:** Wildlife species that are “unlikely to occur” because their range does not overlap the Project vicinity; or for which the Project vicinity does not support appropriate habitat.

Table 3.6-5 provides a comprehensive list of special-status wildlife species evaluated for their potential to occur in the Project vicinity. Species listed in the table are categorized as known to occur; potentially occurring in appropriate habitat; or unlikely to occur. Table 3.6-5 also summarizes pertinent information for each species, including status and preferred habitat, with information on the location of the occurrence, if applicable. Map 3.6-4 shows the results of the CNDDDB query and literature search conducted for occurrences within 5 miles of the Project. Map 3.6-5 provides a detail map of the location of special-status wildlife that occur in the Project vicinity. Appendix 3.6-D provides life history information for special-status wildlife categorized in Table 3.6-5 as known to occur or potentially occurring, including information on the location of USFWS-designated Critical Habitat and applicable recovery plans.

Two special-status wildlife species, western mastiff bat (*Eumops perotis californicus*) (BLMS, CSC), and fisher (*Pekania pennanti*) (FPT, CSC) are known to occur in the Project vicinity.

Twenty-four species have not been documented in the Project vicinity, but have the potential to occur based on geographic location and elevation of the Project and wildlife habitats present.

There is no USFWS-designated Critical Habitat for special-status wildlife in the vicinity of the Project; and no recovery plans are in effect.

The Project vicinity supports appropriate habitat for one additional species, valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*), which was previously listed as FT. However, on September 17, 2014, USFWS revised the range for this species to exclude Kings, Kern, and Tulare counties. As a result, this species is no longer considered special-status within Tulare County, and will not be considered as special-status in subsequent analyses completed for the Project.

The majority of the species listed on Table 3.6-5 are considered unlikely to occur, either because the Project is outside the known range of the species, and/or the Project vicinity does not support appropriate habitat.

3.6.3.3 Game Species

A game species is an animal that is hunted for sport or pleasure. Information on game species potentially present in the Project vicinity is provided in this section because of their commercial and recreational value. Game species are regulated by CDFW and are defined under the California Fish and Game Code as follows:

- Resident and migratory game birds are defined in California Fish and Game Code §3500. Examples of upland resident game birds listed include blue grouse, wild turkey, mountain quail, and California quail. Upland migratory game birds include (but are not limited to) Wilson's snipe, band-tailed pigeon, and mourning dove.
- Game mammals are defined in California Fish and Game Code §3950(a) to include (but are not limited to) deer, wild pig, black bear, rabbits and hares, and tree squirrels, as game mammals. Note that mountain lions are included in §3950, but are explicitly excluded as a game mammal in §3950.1.

Game species described in the California Fish and Game Code were evaluated for their likelihood to occur based on the geographic and elevation range of the Project and wildlife habitats present. A table was then developed listing each species and its status; followed by a generalized habitat description and a summary of applicable CDFW hunting regulations.

Table 3.6-6 lists the resident and migratory game birds and game mammals that have the potential to occur in the Project vicinity, including their habitat requirements and a summary of state hunting regulations for each species. Hunting of game species is permitted during seasons regulated by the CDFW. However, hunting is not permitted within the SNP.

A brief summary of the game species in the Project vicinity, including resident game birds, migratory game birds and game mammals, is provided below.

Resident and Migratory Game Birds

Upland birds occurring in the Project vicinity that meet the definition of resident game birds (California Fish and Game Code §3500) include (but are not limited to) wild turkey, mountain quail, and California quail. Birds that meet the definition of migratory game birds (California Fish and Game Code §3500) include band-tailed pigeon and mourning dove.

Game Mammals

Provided below is a description of mule deer and other game mammals occurring in the Project vicinity. In addition, information on measures implemented as part of the existing FERC license to prevent or reduce wildlife drownings, and the results of recent monitoring, is provided.

Mule Deer

Mule deer are among the most visible and widespread wildlife species in California. The Project is within Deer Management Unit 460 and Deer Hunt Zone D8 (CDFW 2014b, 2015b). Deer hunting is regulated by California state law through CDFW. A hunting license and a hunting tag are required to take mule deer, and only bucks with antlers with demonstrable forks (or greater) may be taken, except during special hunts. Antlers must be forked on one side in the upper two-thirds section of the antler.

Two herds, the Kaweah Mule Deer Herd and the Southern Sierra Foothill Mule Deer Herd are present in the Project vicinity (CDFW 2014b). The Kaweah Herd is migratory, spending the majority of the year in higher-elevation areas within the SNP. Winter conditions drive the deer into lower elevation areas. Map 3.6-6 provides the location of the Kaweah mule deer herd key areas, winter range, and migratory routes. The Southern Sierra Foothill Herd is a resident, non-migratory herd that occupies the western Sierra Nevada foothills across multiple Deer Management Units. The populations of these herds are stable to declining, although there is an overall decline in population numbers in California (CDFW 2014b). Survival rates of fawns have been low in the past few years, which can be attributed to weather conditions that affect forage production (CDFW 2014b).

Other Game Mammals

Other game mammals occurring in the Project vicinity include, but are not limited to, jackrabbit, western gray squirrel, coyote, black bear, and bobcat. Table 3.6-6 provides the status, habitat requirements, and a summary of state hunting regulations for each of these species.

Wildlife Drownings

Wildlife drownings, primarily of mule deer, were identified by agencies as a resource issue during the previous relicensing (SCE 1989c, FERC 1991). A total of 142 mule deer were reported drowned in the Kaweah No. 2 and Kaweah No. 3 flowlines in the period from 1964 to 1989. Non-deer mortalities included two mountain lion cubs and a bear cub (FERC 1991). Wildlife drownings in the Kaweah No. 1 Flowline are rare (FERC 1991).

The current FERC license includes measures (Articles 408 and 409) to minimize wildlife drowning in the Kaweah No. 2 and Kaweah No. 3 flowlines. The measures included modification, relocation, and/or rebuilding of existing foot and wildlife bridges, constructing new wildlife bridges, and installation of hazers and flashers at existing escape ramps. These improvements were implemented between 1994 and 1996.

In compliance with License Article 410, SCE has monitored wildlife drownings since 1993. During the period from 2005 to 2009, 10 deer, 1 coyote, and 1 bear cub were reported as drowned in the Kaweah No. 2 and 3 flowlines. Non-wildlife animals that were reported as drowned during this period included 2 cows. No deer or other animals were reported as drowned between 2010 and 2014.

3.6.4 References

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TABLES

Table 3.6-1. Vegetation Alliances and Wildlife Habitats Occurring within 1 Mile of the Kaweah Project.

CalVeg Vegetation Alliance ¹	CalVeg Code	CWHR Wildlife Habitat ²
Herb-Dominated Alliances		
Annual Grasses and Forbs Alliance	HG	Annual Grassland
Perennial Grasses and Forbs Alliance	HM	Perennial Grassland
Shrub-Dominated Alliances		
Chamise Alliance	CA	Chamise–Redshank Chaparral
Ceanothus Mixed Chaparral Alliance	CC	Mixed Chaparral
Wedgeleaf Ceanothus Alliance	CL	Mixed Chaparral
Lower Montane Mixed Chaparral Alliance	CQ	Montane Chaparral
Whiteleaf Manzanita Alliance	CW	Mixed Chaparral
Upper Montane Mixed Chaparral	CX	Montane Chaparral
Soft Scrub-Mixed Chaparral Alliance	SQ	Coastal Scrub
Chaparral Yucca Alliance	SY	Mixed Chaparral
Willow (Shrub) Alliance	WL	Montane Riparian / Valley Foothill Riparian
Birchleaf Mountain Mahogany Alliance	WM	Mixed Chaparral
Tree-Dominated Alliances		
Incense Cedar Alliance	MD	Sierran Mixed Conifer
Mixed Conifer–Pine Alliance	MP	Sierran Mixed Conifer
Riparian Mixed Hardwood Alliance	NR	Montane Riparian
Interior Mixed Hardwoods Alliance	NX	Montane Hardwood
Canyon Live Oak Alliance	QC	Montane Hardwood
Blue Oak Alliance	QD	Blue Oak Woodland
White Alder Alliance	QE	Montane Riparian
California Buckeye Alliance	QI	Montane Hardwood
Black Oak Alliance	QK	Montane Hardwood
California Sycamore Alliance	QP	Valley Foothill Riparian
Interior Live Oak Alliance	QW	Montane Hardwood
Non-vegetated Areas		
Barren	BA	Barren

¹ Source U.S. Department of Agriculture – Forest Service (USDA-FS). 2014. CALVEG Geographic Information Systems (GIS) data and vegetation descriptions. South Sierran Ecological Province. Available at: <http://www.fs.usda.gov/detail/r5/landmanagement/resourcemanagement/?cid=stelprdb5347192>.

² Source: CDFW. 2015a. California Wildlife Habitat Relationship System Database, Version 9.0 (CWHR 2015).

Table 3.6-2. Special-Status Plant Species—Potential for Occurrence in the Kaweah Project Vicinity.

Scientific/Common Name	Federal Status	State Status and CRPR Rank	Blooming Period/Fertile	Habitat	Likelihood for Occurrence/Occurrence Notes
Known to Occur In the Project Vicinity					
<p><i>Brodiaea insignis</i> Kaweah brodiaea</p>	<p>BLMS</p>	<p>SE, CRPR 1B.2</p>	<p>April–June</p>	<p>Known only from blue oak woodlands in the Kaweah and Tule River drainages in Tulare County (approx. 400–5,000 feet). Associated with reddish-brown clay loam soils underlain by granitic rock substrates.</p>	<p>Known to occur in the Project Vicinity.</p> <p>A CNDDDB query yielded one occurrences of Kaweah brodiaea adjacent to a Project facility, the Kaweah No. 3 Powerhouse to Three Rivers Substation Transmission Line, near the tap line to Kaweah No. 2 Powerhouse. 95 individuals were observed at this location in 2006 (CNDDDB 2015). As currently mapped, this population does not appear to fall within the FERC Project boundary.</p> <p>The remaining 10 populations are located in the vicinity of the South Fork Kaweah River. The closest of these populations is located approximately 2.5 miles south of the Kaweah No. 2 Powerhouse.</p>

Table 3.6-2. Special-Status Plant Species—Potential for Occurrence in the Kaweah Project Vicinity.

Scientific/Common Name	Federal Status	State Status and CRPR Rank	Blooming Period/Fertile	Habitat	Likelihood for Occurrence/Occurrence Notes
Known to Occur In the Project Vicinity (continued)					
<p><i>Eriogonum nudum var. murinum</i> mouse buckwheat</p>	<p>BLMS</p>	<p>CRPR 1B.2</p>	<p>June–Nov</p>	<p>Sandy soils in chaparral, grassland, or foothill woodland 1,100-3,800 feet. Known only from the Kaweah River drainage. Restricted to marble outcrops, although it may colonize disturbed sites.</p>	<p>Known to occur in the Project Vicinity.</p> <p>A CNDDB query yielded eight occurrences of mouse buckwheat. One population is located adjacent to the Kaweah No. 3 Powerhouse to Three Rivers Substation Transmission Line and the Kaweah No. 2 flowline (but outside the FERC Project boundary). This record is from 1974.</p> <p>The remaining records, dated between 1982 and 1988, are located outside the Project vicinity (listed from north (upstream) to south (downstream)):</p> <ul style="list-style-type: none"> • A population located along the Marble Fork Kaweah River, approximately 2.5 miles upstream of the diversion; • A population along the Marble Fork Kaweah just downstream of the diversion; • A population location along the Middle Fork Kaweah River approximately 1 mile upstream of the diversion; • A population location on the northwest side of the Kaweah River, approximately 1 mile north of the Kaweah No. 3 Powerhouse; • A population located on the southeast side of the Kaweah River, approximately 1.5 mile south of the Kaweah No. 3 Powerhouse; • A population located approximately 3 miles north of the Kaweah No. 2 Powerhouse; and • A population located on the South Fork Kaweah River approximately 1.5 miles upstream of the confluence. <p>The botanical report for the last Kaweah relicensing states that, although several Project facilities are located near to the known populations, this species occurs only on specialized marble outcrops, which are not found within FERC Project boundary in areas that are affected by Project operations and maintenance (SCE 1989).</p>

Table 3.6-2. Special-Status Plant Species—Potential for Occurrence in the Kaweah Project Vicinity.

Scientific/Common Name	Federal Status	State Status and CRPR Rank	Blooming Period/Fertile	Habitat	Likelihood for Occurrence/Occurrence Notes
Known to Occur In the Project Vicinity (continued)					
<i>Iris munzii</i> Munz's iris	BLMS	CRPR 1B.3	April	Wet, grassy sites, open to part shade in foothill woodland habitat from 1,000-2,700 feet.	<p>Known to occur in the Project Vicinity.</p> <p>There are three records for this species. There are two SCE records adjacent to Project facilities that do not appear in CNDDDB:</p> <ul style="list-style-type: none"> • 60 plants adjacent to Kaweah No. 1 flowline 3 miles west of diversion (SCE 1989); and • 300 plants adjacent to Kaweah No. 3 flowline on NPS land, 1 mile east of the NPS Ash Mountain headquarters (SCE 1989). <p>In addition, the CNDDDB query yielded one record, a 1952 occurrence 0.4 Miles northeast of Tunnel Rock on Highway 198 (General's Highway), approximately 1.5 northeast (upstream) of the Kaweah No. 3 Powerhouse</p> <p>SCE notes in their 1989 report that the population along the Kaweah No. 1 flowline responds favorably to SCE maintenance (periodically clearing away woody species near plants) (SCE 1989).</p>
May Potentially Occur In the Project Vicinity					
<i>Brasenia schreberi</i> Watershield	–	CRPR 2B.3	April–October	Ponds and slow streams below 7,200 feet.	May potentially occur in appropriate habitat.
<i>Carex praticola</i> northern meadow sedge	–	CRPR 2B.2	May–July	Perennial herb. Meadows and seeps. To 10,500 feet.	May potentially occur in appropriate habitat.
<i>Caulanthus californicus</i> California jewelflower	FE, BLMS	SE, CRPR 1B.1	February–April	Grasslands in the southern San Joaquin valley. 250 to 3,300 feet. USFWS has not designated critical habitat for this species.	May potentially occur in appropriate habitat.
<i>Clarkia springvillensis</i> Springville clarkia	FT, BLMS	SE, CRPR 1B.2	May–July	Chaparral, grasslands, and woodlands from 800-4,000 feet. USFWS has not designated critical habitat for this species. Known only from the Tulare River Drainage.	<p>May potentially occur in appropriate habitat.</p> <p>The CNDDDB query yielded one occurrence outside the Kaweah Project vicinity. This is a 1980 record from the vicinity of "Craig Ranch, 2.5 miles east of Three Rivers" (approximately 2 miles east of the Kaweah No. 2 Powerhouse). Based on an SCE report, this occurrence is likely the more common <i>Clarkia unguiculata</i> (SCE 2000).</p>
<i>Delphinium purpusii</i> rose-flowered larkspur	BLMS	CRPR 1B.3	March–May	Talus areas and cliffs among chaparral, foothill woodland, and pinyon-juniper woodland 900 to 4,400 feet.	May potentially occur in appropriate habitat.
<i>Delphinium recurvatum</i> recurved larkspur	BLMS	CRPR 1B.2	March–June	Poorly drained, fine, alkaline soils in grassland scrub, and foothill woodland below 2,600 feet.	May potentially occur in appropriate habitat.
<i>Eremalche (=Malvastrum) kernensis</i> Kern mallow	FE, BLMS	CRPR 1B.1	March–May	Found on dry, open sandy to clay soils, often at the edge of balds. In valley and foothill grasslands. USFWS has not designated critical habitat for this species.	May potentially occur in appropriate habitat.

Table 3.6-2. Special-Status Plant Species—Potential for Occurrence in the Kaweah Project Vicinity.

Scientific/Common Name	Federal Status	State Status and CRPR Rank	Blooming Period/Fertile	Habitat	Likelihood for Occurrence/Occurrence Notes
May Potentially Occur In the Project Vicinity (continued)					
<i>Eryngium spinosepalum</i> spiny-sepaled button-celery	–	CRPR 1B.2	April–July	Vernal pools, swales, and roadside ditches in lower foothills and grasslands of Fresno, Stanislaus, and Tulare counties from 200–2,100 feet.	May potentially occur in appropriate habitat. The CNDDDB query yielded four occurrences outside the Kaweah Project vicinity. These four records include (from north (upstream) to south (downstream): <ul style="list-style-type: none"> • A population along the Middle Fork of the Kaweah River, approximately 1 mile upstream of the diversion (record dating from 1914); • A record from 1902 located along the North Fork Kaweah River approximately 2 miles upstream of the confluence. The location for this population is generalized; and • A population along the south bank of the Kaweah River approximately 2.5 miles downstream of the Kaweah No. 2 Powerhouse (record dating from 1990). • A population along the shore of Lake Kaweah, approximately 5 miles downstream of the Kaweah No. 2 Powerhouse (record dating from 1995).
<i>Fritillaria striata</i> striped adobe-lily	BLMS	ST, CRPR 1B.1	Feb–April	Clay soil in valley grassland and foothill woodland below 3,300 feet. Known to occur at one remaining site in Tulare County (Lewis Hill east of Porterville).	May potentially occur in appropriate habitat.
<i>Glyceria grandis</i> American manna grass	–	CRPR 2B.3	June–Aug	Freshwater emergent wetlands, streambanks, and lake margins below 6,500 feet.	May potentially occur in appropriate habitat.
<i>Leptosiphon serrulatus</i> Madera leptosiphon	–	CRPR 1B.2	May–June	Dry slopes in cismontane oak woodland and lower montane coniferous forest. Usually in decomposed granite, one instance on serpentine. 900–4,300 feet.	May potentially occur in appropriate habitat. The CNDDDB query yielded one outside the Kaweah Project vicinity. There is a historical record dated 1928 for this species on the mainstem Kaweah River at least 1 mile downstream of the Kaweah No. 2 Powerhouse. CNDDDB notes the general location as “Three Rivers.”
<i>Mielichhoferia elongata</i> elongate copper moss	–	CRPR 2B.2	N/A	Cismontane woodland, rock with copper/heavy metals. From 1,500 and 4,300 feet in elevation	May potentially occur in appropriate habitat. The CNDDDB query yielded two records outside Kaweah Project vicinity for this species: <ul style="list-style-type: none"> • A 1996 record on the Marble Fork of the Kaweah, immediately upstream of the diversion, and • A 1997 record along the Middle Fork of the Kaweah, approximately 1.5 miles upstream of the diversion.

Table 3.6-2. Special-Status Plant Species—Potential for Occurrence in the Kaweah Project Vicinity.

Scientific/Common Name	Federal Status	State Status and CRPR Rank	Blooming Period/Fertile	Habitat	Likelihood for Occurrence/Occurrence Notes
May Potentially Occur In the Project Vicinity (continued)					
<i>Mimulus norrisii</i> Kaweah monkeyflower	BLMS	CRPR 1B.3	March–May	Marble crevices in chaparral and cismontane woodlands. Known only from the Kaweah and Kings River drainages. 1,100-4,300 feet.	May potentially occur in appropriate habitat. The CNDDDB query yielded five records outside the Kaweah Project vicinity for Kaweah monkeyflower including (from north (upstream) to south (downstream)): <ul style="list-style-type: none"> • A population located on the northwest side of the Marble Fork of the Kaweah River, approximately .5 mile downstream of the diversion (record dated 1988); • Two populations located on the northwest side of the Kaweah River approximately 1 and 2 miles upstream of the Kaweah No. 3 Powerhouse (respectively) (both records dated 1988); and • A 1983 record for a population located on Ash Peaks Ridge, approximately 3 miles north of the Kaweah No. 2 Powerhouse. SCE (1989) notes that this species is associated with specialized marble outcrops with thin layers of beige-colored calcium carbonate on the surface. This substrate is not found within FERC Project boundary or adjacent to Project facilities (SCE 1989).
<i>Mimulus pictus</i> calico monkeyflower	BLMS	CRPR 1B.2	Mar–May	Open sunny areas, around granite outcrops in foothill woodland habitat from 300 to 4,700 feet.	May potentially occur in appropriate habitat.
<i>Pseudobahia peirsonii</i> San Joaquin adobe sunburst	BLMS	SE , CRPR 1B.1	Mar–April	Clay (Cibo, Porterville, or Centerville) soils in grassland and foothill woodland from 200 to 2,700 feet.	May potentially occur in appropriate habitat. SCE (2000) notes an occurrence outside the Kaweah Project vicinity below Kaweah Lake in the vicinity of Lemon Cove (SCE 2000).
<i>Ribes menziesii</i> var. <i>ixoderme</i> aromatic canyon gooseberry	–	CRPR 1B.2	April	Chaparral and montane woodlands to 3,900 feet.	May potentially occur in appropriate habitat. The CNDDDB query yielded one historical record outside the Project vicinity from 1925, along Visalia-Mineral King Road, approximately 1.5 miles upstream of the Kaweah No. 1 Diversion.
<i>Sidalcea keckii</i> Keck's checker-mallow	FE	CRPR 1B.1	April–May	Grassy slopes from 300 to 2,200 feet. USFWS has designated critical habitat for this species.	May potentially occur in appropriate habitat.
Unlikely to Occur In the Project Vicinity					
<i>Agrostis humilis</i> mountain bent grass	–	CRPR 2B.3	July–Sept	Grows in moist to dry locations in subalpine to alpine meadows or slopes at elevations from 8,700 to 10,500 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Allium abramsii</i> Abram's onion	–	CR, CRPR 1B.2	April–July	Granitic sand in lower and upper montane coniferous forest. 2,900 to 10,100 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.

Table 3.6-2. Special-Status Plant Species—Potential for Occurrence in the Kaweah Project Vicinity.

Scientific/Common Name	Federal Status	State Status and CRPR Rank	Blooming Period/Fertile	Habitat	Likelihood for Occurrence/Occurrence Notes
Unlikely to Occur In the Project Vicinity (continued)					
<i>Asplenium septentrionale</i> northern spleenwort	–	CRPR 2B.3	N/A	Crevices in granite within chaparral or conifer forests from 5,200 to 11,000 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Astragalus lentiginosus</i> var. <i>kernensis</i> Kern Plateau milk-vetch	–	CRPR 1B.2	June–July	Sandy areas and meadows in subalpine forests 7,300 to 9,100 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Boechera tularensis</i> Tulare rockcress	–	CRPR 1B.3	June–July	Rocky slopes in montane, subalpine habitats. 5,900 to 11,000 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Botrychium minganense</i> Mingan moonwort	–	CRPR 2B.2	June–July (spores)	Meadows, marshes, bogs, and fens in lower and upper montane conifer forest. 4,500 to 7,200 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Calochortus westonii</i> Shirley Meadows star-tulip	BLMS	CRPR 1B.2	May–June	Meadows and open areas among conifer woodlands above 4,900 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Calyptidium pygmaeum</i> pygmy pussypaws	–	CRPR 1B.2	June–August	Lodgepole, subalpine coniferous forest, and upper montane coniferous forest, in sandy or gravelly soils. 6,400 to 11,500 feet in elevation.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Carlquistia muirii</i> Muir's tarplant	BLMS	CRPR 1B.3	July–August	Chaparral (montane), lower montane coniferous forest, upper montane coniferous forest. Northern distributional limit is in the vicinity of the Wishon Reservoir in the Kings River drainage. 3,000 to 8,200 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Cinna bolanderi</i> Bolander's woodreed	–	CRPR 1B.2	July–September	Meadows and seeps and along stream banks in upper montane coniferous forests. 5,400 to 8,000 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Cryptantha circumscissa</i> var. <i>rosulata</i> rosette cushion cryptantha	–	CRPR 1B.2	July–August	Barren areas of decomposed granite at elevations from 9,600 to 12,000 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Cuscuta jepsonii</i> Jepson's dodder	–	CRPR 1B.2	July–September	Possibly extinct, grows on <i>Ceanothus diversifolius</i> and <i>C. prostratus</i> from 3,900 to 7,600 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Draba cruciata</i> Mineral King draba	–	CRPR 1B.3	June–August	Gravelly soils in subalpine areas from 8,200 to 11,000 feet. Known primarily from the slopes surrounding Mineral King Valley.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Dudleya cymosa</i> ssp. <i>costatifolia</i> Pierpoint Springs dudleya	–	CRPR 1B.2	May–July	Limestone outcrops from 4,700 to –5,300 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Erigeron aequifolius</i> Hall's daisy	–	CRPR 1B.3	July–August	Broad-leaved upland forest, lower and upper montane coniferous forest, pinyon–juniper woodland, rocky soils. 4,900 to 8,100 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.

Table 3.6-2. Special-Status Plant Species—Potential for Occurrence in the Kaweah Project Vicinity.

Scientific/Common Name	Federal Status	State Status and CRPR Rank	Blooming Period/Fertile	Habitat	Likelihood for Occurrence/Occurrence Notes
Unlikely to Occur In the Project Vicinity (continued)					
<i>Erigeron multiceps</i> Kern River daisy	–	CRPR 1B.2	June–Sept	Meadows, riverbanks, sandy flats, and openings in Joshua tree or aspen woodlands and conifer forest from 4,900 to 8,300.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Erythronium pusaterii</i> Kaweah fawn lily	–	CRPR 1B.3	May–July	Meadows and rocky ledges from 6,800 to 9,200 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Hosackia oblongifolia</i> var. <i>cuprea</i> copper-flowered bird's-foot trefoil	–	CRPR 1B.3	June–Aug	Meadows and openings in conifer woodlands from 7,800 to 9,100 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Hulsea vestita</i> ssp. <i>pygmaea</i> pygmy hulsea	–	CRPR 1B.3	June–Oct	Gravel soils in alpine barrens and open slopes within subalpine forest from 9,300 to 13,000 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Ivesia campestris</i> field ivesia	–	CRPR 1B.2	July–Sept	Meadow edges from 6,400 to 11,200 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Lupinus lepidus</i> var. <i>culbertsonii</i> Hockett Meadows lupine	–	CRPR 1B.3	July–Aug	Meadows and rocky slopes among conifer forests from 8,000 to -9,900 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Minuartia stricta</i> bog sandwort	–	CRPR 2B.3	July–Sept	Wet areas of decomposed granite or sandy soils in meadows or alpine areas from 8,000 to 13,000 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Myurella julacea</i> small mousetail moss	–	CRPR 2B.3	N/A	Rich soil amongst rocks or in crevices from 8,800 to 9,900 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Oreonana purpurascens</i> purple mountain-parsley	–	CRPR 1B.2	May–June	Ridgetops, usually metamorphic rocks in conifer forests from 7,800 to 9,400 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Orthotrichum holzingeri</i> Holzinger's orthotrichum moss	–	CRPR 1B.3	N/A	Periodically inundated rock surfaces near streams in dry, montane forests from 2,300 to 5,900 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Petrophytum caespitosum</i> ssp. <i>acuminatum</i> marble rockmat	–	CRPR 1B.3	June–Sept	Limestone cliffs from 3,900 to 7,600 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Phacelia orogenes</i> Mountain phacelia	–	4.3	June–August	Rock moist slopes in subalpine forests from 9,250 to 9,400 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Ribes tulareense</i> Sequoia gooseberry	BLMS	CRPR 1B.3	May	Conifer forests from 5,400 to 5,800 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Sidalcea multifida</i> cut-leaf checkerbloom	–	CRPR 2B.3	March–Sept	Dry areas among sagebrush scrub and conifer forest from 5,700 to 9,200 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.

Table 3.6-2. Special-Status Plant Species—Potential for Occurrence in the Kaweah Project Vicinity.

Scientific/Common Name	Federal Status	State Status and CRPR Rank	Blooming Period/Fertile	Habitat	Likelihood for Occurrence/Occurrence Notes
Unlikely to Occur In the Project Vicinity (continued)					
<i>Streptanthus gracilis</i> alpine jewel-flower	–	CRPR 1B.3	July–Aug	Rocky slopes in subalpine conifer forests from 9,100 to 11,500 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Triglochin palustris</i> marsh arrow-grass	–	CRPR 2B.3	July–Aug	Wet areas in subalpine to alpine habitats from 7,400 to 12,200 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Utricularia intermedia</i> flat-leaved bladderwort	–	CRPR 2B.2	July–August	Annual aquatic herb. Shallow waters within bogs, fens, swamps, and wet meadows. 3,900 to 8,900 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Viola pinetorum</i> var. <i>grisea</i> grey-leaved violet	–	CRPR 1B.3	April–July	Dry peaks and slopes in subalpine conifer forest and upper montane conifer forest. 4,500 to 12,100 feet.	Unlikely to occur. The Project area is outside the elevation range of and does not support appropriate habitat for this species.
<i>Orcuttia inaequalis</i> San Joaquin Valley Orcutt grass	FT, BLMS	SE, CRPR 1B.1	April–September	Vernal pools. Below 2,700 feet. USFWS has designated critical habitat for this species.	Unlikely to occur. The Project does not support vernal pool habitat.
<i>Tuctoria</i> (= <i>Orcuttia</i>) <i>greenei</i> Greene's tuctoria	FE	SR, CRPR 1B.1	May–July	Vernal pools below 3,600 feet.	Unlikely to occur. The Project does not support vernal pool habitat.

LEGEND:

State Status

- ST = California Threatened
- SE = California Endangered
- SR = California Rare
- CSC = California Species of Special Concern

CRPR = California Native Plant Society Rare Plant Rank

CRPR 1B = rare, threatened or endangered in California and elsewhere

CRPR 2B = rare in California but more common elsewhere

3 = need more information

4 = plants of limited distribution; a watch list

_.1 = Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)

_.2 = Moderately threatened in California (20–80% occurrences threatened)

_.3 = Not very threatened in California (<20% of occurrences threatened or no current threats known)

Federal Status

- FT = Federal Threatened
- FE = Federal Endangered
- FPT, FPE = Federal Proposed Threatened/Endangered
- FC = Federal Candidate Species
- FPD = Federal Proposed for Delisting
- BLMS = BLM Sensitive

Table 3.6-3. Non-Native Invasive Plants Potentially Occurring in the Kaweah Project Vicinity.

Scientific Name	Common Name(s)	Cal-IPC Rating¹	Habitat in Which Species Typically Occurs²		
			Grassland	Riparian	Woodland
<i>Aegilops triuncialis</i>	barb goatgrass	High	X		
<i>Ailanthus altissima</i>	tree-of-heaven, Chinese sumac	Moderate		X	
<i>Anthoxanthum odoratum</i>	sweet vernal grass, vanilla grass	Moderate	X		
<i>Arundo donax</i>	giant reed	High			X
<i>Avena barbata</i>	slender oat	Moderate	X		
<i>Avena fatua</i>	wild oats	Moderate	X		
<i>Brachypodium distachyon</i>	annual false-brome, false brome	Moderate	X		X
<i>Brassica nigra</i>	black mustard	Moderate	X		
<i>Briza maxima</i>	big quakinggrass, rattlesnake grass	Limited	X		
<i>Bromus diandrus</i>	ripgut brome, great brome	Moderate	X	X	X
<i>Bromus hordaceus</i>	soft brome, soft chess	Limited	X		X
<i>Bromus japonicus</i>	Japanese brome, Japanese chess	Limited	X		X
<i>Bromus madritensis ssp. rubens</i>	red brome, foxtail chess	High	X	X	X
<i>Bromus tectorum</i>	cheatgrass, downy brome	High	X		
<i>Cardaria (=Lepidium) draba</i>	(heart podded) hoary cress, white-top	Moderate	X		
<i>Carduus pycnocephalus</i>	Italian thistle	Moderate			X
<i>Centaurea melitensis</i>	Malta starthistle, tocalote	Moderate	X	X	
<i>Centaurea solstitialis</i>	yellow starthistle	High	X	X	
<i>Centaurea virgata var. squarrosa</i>	squarrose knapweed	Moderate	X		
<i>Cirsium arvense</i>	Canada thistle	Moderate	X		
<i>Cirsium vulgare</i>	bull thistle	Moderate	X		

Table 3.6-3. Non-Native Invasive Plants Potentially Occurring in the Kaweah Project Vicinity.

Scientific Name	Common Name(s)	Cal-IPC Rating¹	Habitat in Which Species Typically Occurs²		
			Grassland	Riparian	Woodland
<i>Conium maculatum</i>	poison-hemlock	Moderate		X	
<i>Cortaderia jubata</i>	jubatagrass, pampasgrass	High	X		
<i>Cortaderia selloana</i>	pampasgrass, white pampasgrass	High	X		
<i>Cynosurus echinatus</i>	annual dogtail, bristly dogtail grass	Moderate	X		X
<i>Cytisus scoparius</i>	Scotch broom, English broom	High			X
<i>Dipsacus fullonum</i>	common teasel, wild teasel	Moderate	X		
<i>Dipsacus sativus</i>	Fullers teasel	Moderate	X		
<i>Elymus caput-medusae</i>	medusahead	High	X		X
<i>Erodium cicutarium</i>	filaree, redstem filaree	Limited	X		X
<i>Festuca arundinacea</i>	alta fescue, coarse fescue	Moderate	X		
<i>Festuca perennis</i>	Italian ryegrass	Moderate	X	X	X
<i>Ficus carica</i>	edible fig	Moderate	X	X	
<i>Foeniculum vulgare</i>	fennel, sweet fennel	High	X		
<i>Geranium dissectum</i>	cutleaf geranium	Limited	X	X	X
<i>Glyceria declinata</i>	mannagrass, sweetgrass	Moderate	X		
<i>Halogeton glomeratus</i>	Halogeton	Moderate	X		
<i>Hedera species</i>	English ivy and Algerian ivy	High		X	X
<i>Hirschfeldia incana</i>	Mediterranean mustard, short-pod mustard	Moderate	X		
<i>Holcus lanatus</i>	common velvet grass, Yorkshire fog	Moderate	X		
<i>Hordeum marinum, H. murinum</i>	Mediterranean barley, hare barley	Moderate	X		X
<i>Hypericum perforatum</i>	St. John's wort, klamathweed	Moderate	X		X

Table 3.6-3. Non-Native Invasive Plants Potentially Occurring in the Kaweah Project Vicinity.

Scientific Name	Common Name(s)	Cal-IPC Rating ¹	Habitat in Which Species Typically Occurs ²		
			Grassland	Riparian	Woodland
<i>Hypochaeris glabra</i>	smooth cat's-ear	Limited		X	X
<i>Hypochaeris radicata</i>	Common (rough) cat's-ear	Moderate	X	X	
<i>Isatis tinctoria</i>	dyer's woad	Moderate	X		
<i>Lepidium latifolium</i>	perennial pepperweed, tall whitetop	High	X	X	
<i>Leucanthemum vulgare</i>	ox-eye daisy, dog daisy	Moderate	X		
<i>Lythrum hyssopifolium</i>	hyssop loosestrife, grass poly	Limited	X		
<i>Marrubium vulgare</i>	horehound, white horehound	Limited	X		
<i>Medicago polymorpha</i>	burr medic, California burclover	Limited	X		X
<i>Mentha pulegium</i>	pennyroyal, European pennyroyal	Moderate	X	X	
<i>Onopordum acanthium</i>	scotch thistle, cotton thistle	High	X		
<i>Parentucellia viscosa</i>	yellow glandweed, sticky parentucellia	Limited	X		
<i>Picris (=Helminthotheca) echioides</i>	bristly ox-tongue, bugloss	Limited	X		
<i>Poa pratensis</i>	Kentucky bluegrass, smooth meadowgrass	Limited	X		
<i>Pyracantha species</i>	narrowleaf firethorn, scarlet firethorn	Limited	X	X	
<i>Ranunculus repens</i>	creeping buttercup	Limited		X	
<i>Rubus armeniacus</i>	Himalayan blackberry	High	X	X	X
<i>Rumex acetosella</i>	sheep sorrel	Moderate		X	
<i>Rumex crispus</i>	curly dock	Limited	X		
<i>Saponaria officinalis</i>	bouncing-bet, bouncing betty	Limited		X	
<i>Silybum marianum</i>	milk thistle, variegated thistle	Limited	X		
<i>Sisymbrium irio</i>	London rocket	Moderate	X		

Table 3.6-3. Non-Native Invasive Plants Potentially Occurring in the Kaweah Project Vicinity.

Scientific Name	Common Name(s)	Cal-IPC Rating ¹	Habitat in Which Species Typically Occurs ²		
			Grassland	Riparian	Woodland
<i>Tamarix parviflora</i>	smallflower tamarisk	High		X	
<i>Tamarix species</i>	saltcedar, tamarisk	High		X	
<i>Torilis arvensis</i>	hedgearsley, spreading hedgearsley	Moderate	X	X	X
<i>Trifolium hirtum</i>	rose clover	Limited	X		X
<i>Verbascum thapsus</i>	common mullein, wooly mullein	Limited		X	X
<i>Vulpia (=Festuca) myuros</i>	rat-tail fescue, red-tailed fescue	Moderate	X		X

¹The Cal-IPC Invasive Plant Inventory categorizes plants as High, Moderate, or Limited, according to the degree of ecological impact in California (Cal-IPC 2015).

- **High** – Severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
- **Moderate** – Substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

²The Cal-IPC Invasive Plant Inventory creates a query based on generalized habitat types. There is no crosswalk available between Cal-IPC habitat types and CALVEG alliances. Therefore, the habitat types that most closely matched CALVEG vegetation alliances in the Project vicinity were selected. These included the following: 1) grassland, vernal pools, meadows, and other herb communities; 2) riparian and bottomland habitat; and 3) woodland habitat.

Table 3.6-4. Common Wildlife Species and CWHR Wildlife Habitats.

Common Wildlife		CWHR Wildlife Habitats										
Common Name	Scientific Name	Herb-Dominated Habitats		Shrub-Dominated Habitats			Tree-Dominated Habitats					Other
		Annual Grassland	Perennial Grassland	Chamise-Redshank Chaparral	Mixed Chaparral	Montane Chaparral	Montane Riparian	Valley Foothill Riparian	Blue Oak Woodland	Montane Hardwood	Sierran Mixed Conifer	Barren
Amphibians												
Western toad	<i>Anaxyrus boreas</i>	X	X	X	X	X	X	X	X	X	X	
Pacific tree frog	<i>Pseudacris regilla</i>	X	X	X	X	X	X	X	X	X	X	
American bullfrog	<i>Rana catesbeiana</i>	X	X	X	X	X	X	X	X	X	X	
California newt	<i>Taricha torosa</i>	X			X	X		X	X		X	
Reptiles												
Northern alligator lizard	<i>Elgaria coerulea</i>	X	X			X	X		X	X	X	
Western fence lizard	<i>Sceloporus occidentalis</i>	X	X	X	X	X	X	X	X	X	X	
common gartersnake	<i>Thamnophis sirtalis</i>	X	X	X	X	X	X	X	X	X	X	
gophersnake	<i>Pituophis catenifer</i>	X	X	X	X	X	X	X	X	X	X	
Western rattlesnake	<i>Crotalus viridis</i>	X	X	X	X	X	X	X	X	X	X	
Birds												
turkey vulture	<i>Cathartes aura</i>	X	X	X	X	X	X	X	X	X	X	X
Canada goose	<i>Branta canadensis</i>	X	X									
mallard	<i>Anas platyrhynchos</i>	X	X				X	X				
cinnamon teal	<i>Anas cyanoptera</i>	X	X				X	X				

Table 3.6-4. Common Wildlife Species and CWHR Wildlife Habitats.

Common Wildlife		CWHR Wildlife Habitats										
Common Name	Scientific Name	Herb-Dominated Habitats		Shrub-Dominated Habitats			Tree-Dominated Habitats					Other
		Annual Grassland	Perennial Grassland	Chamise-Redshank Chaparral	Mixed Chaparral	Montane Chaparral	Montane Riparian	Valley Foothill Riparian	Blue Oak Woodland	Montane Hardwood	Sierran Mixed Conifer	Barren
Birds (continued)												
Cooper's hawk	<i>Accipiter cooperi</i>	X	X	X	X	X	X	X	X	X	X	
red-shouldered hawk	<i>Buteo lineatus</i>	X	X				X	X	X	X		
American kestrel	<i>Falco sparverius</i>	X	X	X	X	X	X	X	X	X	X	X
ring-neck pheasant	<i>Phasianus colchicus</i>	X	X		X			X				
wild turkey	<i>Meleagris gallopavo</i>	X	X	X	X	X	X	X	X	X	X	
California quail	<i>Callipepla californica</i>	X	X	X	X	X	X	X	X	X	X	
mourning dove	<i>Zenaida macroura</i>	X	X	X	X	X	X	X	X	X	X	
barn owl	<i>Tyto alba</i>	X	X	X	X	X	X	X	X	X	X	X
great horned owl	<i>Bubo virginianus</i>	X	X	X	X	X	X	X	X	X	X	X
Anna's hummingbird	<i>Calypte anna</i>	X		X	X	X	X	X	X	X		
acorn woodpecker	<i>Melanerpes formicivorus</i>	X					X	X	X	X		
Western scrub-jay	<i>Aphelocoma californica</i>			X	X	X	X	X	X	X		
American crow	<i>Corvus americanus</i>	X	X				X	X	X	X	X	
common raven	<i>Corvus corax</i>	X	X	X	X	X	X	X	X	X	X	X
oak titmouse	<i>Baeolophus inornatus</i>			X	X	X		X	X	X		

Table 3.6-4. Common Wildlife Species and CWHR Wildlife Habitats.

Common Wildlife		CWHR Wildlife Habitats										
Common Name	Scientific Name	Herb-Dominated Habitats		Shrub-Dominated Habitats			Tree-Dominated Habitats					Other
		Annual Grassland	Perennial Grassland	Chamise-Redshank Chaparral	Mixed Chaparral	Montane Chaparral	Montane Riparian	Valley Foothill Riparian	Blue Oak Woodland	Montane Hardwood	Sierran Mixed Conifer	Barren
Birds (continued)												
white-breasted nuthatch	<i>Sitta carolinensis</i>						X	X	X	X	X	
Western bluebird	<i>Sialia mexicana</i>	X	X	X	X	X	X	X	X	X	X	
American robin	<i>Turdus americanus</i>	X	X	X	X	X	X	X	X	X	X	
yellow-rumped warbler	<i>Setiphaga coronata</i>	X	X	X	X	X	X	X	X	X	X	
white-crowned sparrow	<i>Zonotrichia leucophrys</i>	X	X	X	X	X	X	X	X	X	X	
dark-eyed junco	<i>Junco hyemalis</i>			X	X	X	X	X	X	X	X	
lesser goldfinch	<i>Spinus psaltria</i>	X	X	X	X	X	X	X	X	X	X	
Mammals												
Virginia opossum	<i>Didelphis virginiana</i>	X			X	X	X	X	X	X	X	
Yuma myotis	<i>Myotis yumanensis</i>	X	X	X	X	X	X	X	X	X	X	
big brown bat	<i>Eptesicus fuscus</i>	X	X	X	X	X	X	X	X	X	X	X
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>	X	X	X	X	X	X	X	X	X	X	X
black-tailed jackrabbit	<i>Lepus californica</i>	X	X	X	X	X	X	X	X	X	X	
deer mouse	<i>Peromyscus spp.</i>	X	X	X	X	X	X	X	X	X	X	X
Western gray squirrel	<i>Sciurus griseus</i>				X	X	X	X	X	X	X	

Table 3.6-4. Common Wildlife Species and CWHR Wildlife Habitats.

Common Wildlife		CWHR Wildlife Habitats										
Common Name	Scientific Name	Herb-Dominated Habitats		Shrub-Dominated Habitats			Tree-Dominated Habitats					Other
		Annual Grassland	Perennial Grassland	Chamise-Redshank Chaparral	Mixed Chaparral	Montane Chaparral	Montane Riparian	Valley Foothill Riparian	Blue Oak Woodland	Montane Hardwood	Sierran Mixed Conifer	Barren
Mammals (continued)												
California ground squirrel	<i>Otospermophilus beecheyi</i>	X	X	X	X	X	X	X	X	X	X	X
American beaver	<i>Castor canadensis</i>	X	X			X	X	X	X	X		
coyote	<i>Canis latrans</i>	X	X	X	X	X	X	X	X	X	X	X
gray fox	<i>Urocyon cinereoargenteus</i>	X	X	X	X	X	X	X	X	X	X	
black bear	<i>Ursus americanus</i>	X	X	X	X	X	X	X		X	X	
ringtail	<i>Bassariscus astutus</i>	X	X	X	X	X	X	X	X	X	X	X
raccoon	<i>Procyon lotor</i>	X	X	X	X	X	X	X	X	X	X	
striped skunk	<i>Mephitis mephitis</i>	X	X	X	X	X	X	X	X	X	X	
bobcat	<i>Lynx rufus</i>	X	X	X	X	X	X	X	X	X	X	
mountain lion	<i>Puma concolor</i>	X	X	X	X	X	X	X	X	X	X	
northern river otter	<i>Lutrus canadensis</i>						X	X				
mule deer	<i>Odocoileus hemionus</i>	X	X	X	X	X	X	X	X	X	X	
wild pig	<i>Sus scrofa</i>	X	X	X	X	X	X	X	X	X		

Table 3.6-5. Special-Status Wildlife Species—Potential for Occurrence in the Kaweah Project Vicinity.

Scientific/Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/Occurrence Notes
Known to Occur In the Project Vicinity				
<p><i>Eumops perotis californicus</i> Western mastiff bat</p>	<p>BLMS</p>	<p>CSC</p>	<p>Found in variety of habitats including desert scrub, chaparral, oak woodland, ponderosa pine, meadows and mixed conifer forests up to 4,600 feet in elevation. Distribution is likely limited by availability of significant rock features offering suitable roosting habitat.</p>	<p>Known to occur in the Project vicinity.</p> <p>The CNDDDB query yielded two records for this species adjacent to Project facilities:</p> <ul style="list-style-type: none"> • A 1994 detection approximately 0.5 mile to the north of the Kaweah No. 3 Powerhouse; • A 1994 detection approximately 0.5 mile to the south of the Kaweah No. 3 Powerhouse; <p>There are two additional CNDDDB records outside the Project vicinity, including:</p> <ul style="list-style-type: none"> • A 1995 detection along the Kaweah River approximately 2 miles downstream of the Kaweah No. 2 Powerhouse; and • A 1995 detection along the North Fork Kaweah River approximately 2.5 miles upstream of its confluence with the mainstem Kaweah River, approximately 2.5 miles to the northwest of the Kaweah No. 2 Powerhouse.

Table 3.6-5. Special-Status Wildlife Species—Potential for Occurrence in the Kaweah Project Vicinity.

Scientific/Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/Occurrence Notes
Known to Occur In the Project Vicinity (continued)				
<i>Pekania pennanti</i> Fisher	FPT	CSC	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 elevations of 4,000 to 8,000 feet.	<p>Known to occur in the Project Vicinity.</p> <p>The CNDDDB query yielded one record for this species adjacent to Project facilities. This record is dated from 1968 and is a circular (non-specific) record which covers the Kaweah No. 2 facilities including the powerhouse and the diversion.</p> <p>There are 10 additional CNDDDB records outside the Project vicinity listed from north (upstream) to south (downstream)), including:</p> <ul style="list-style-type: none"> • Multiple detections (1942 to 1980) at a location along Crystal Cave Road, in the mountains to the northwest above the Marble Fork, approximately 4 miles north of the Kaweah No. 3 Powerhouse; • A 2003 track plate detection along the Marble Fork River, approximately 4 miles upstream of the Kaweah No. 3 Powerhouse; • A 2003 roadkill collection along the General's Highway near the Marble Fork River, approximately 5 miles north of the Kaweah No. 3 Powerhouse; • A 2003 track plate detection in the mountains south of the Kaweah River, approximately 5 miles west of the Kaweah No. 3 Powerhouse; • A 1935 record in the mountains between the Kaweah River and East Fork Kaweah River, approximately 6 miles west of the Kaweah No. 3 Powerhouse; • A 1937 record in the mountains between the Kaweah River and East Fork Kaweah River, approximately 3.5 miles west of the Kaweah No. 3 Powerhouse; • A 2003 detection at a mesocarnivore photo station, 1 mile south of Oak Grove and the East Fork Kaweah River (approximately 1 mile south of the Kaweah No. 1 diversion); • A 2002 detection at a mesocarnivore photo station, 4 miles southeast of Hammond (approximately 3 miles south of the Kaweah No. 1 diversion); and • A 2002 detection at a mesocarnivore photo station at Case Mountain (approximately 3 miles south of the Kaweah No. 1 diversion).
May Potentially Occur In the Project Vicinity				
<i>Gambelia (=Crotaphytus) sila</i> blunt-nosed leopard lizard	FE	SE, CFP	Found in sparsely vegetated alkali scrub and desert habitats below 2,400 feet in the San Joaquin Valley and adjacent foothills. USFWS has not designated critical habitat for this species.	May potentially occur in appropriate habitat.
<i>Accipiter gentilis</i> northern goshawk	BLMS	CSC (nesting)	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.	May potentially occur in appropriate habitat.

Table 3.6-5. Special-Status Wildlife Species—Potential for Occurrence in the Kaweah Project Vicinity.

Scientific/Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/Occurrence Notes
May Potentially Occur In the Project Vicinity (continued)				
<i>Gymnogyps californianus</i> California condor	FE	SE, CFP	Found mostly below 9,000 feet in open rangelands in the mountain ranges surrounding the southern San Joaquin Valley. Nests in caves, crevices, or sandstone ledges, typically at elevations below 6,500 feet.	May potentially occur in appropriate habitat. The CNDDDB query yielded one record outside the Project vicinity, which documents a condor roosting area located at Blue Ridge, approximately 4.5 miles to the southwest of the Kaweah No. 2 Powerhouse. Condors roost between April and September. USFWS has designated critical habitat for this species. The closest critical habitat is located along the Kaweah River downstream of the Project area, including a portion of Kaweah Lake.
<i>Aquila chrysaetos</i> golden eagle	Eagle Act BLMS, BCC	CFP (nesting and wintering)	Grasslands and early successional stages of forest and shrub habitats for foraging at elevations up to 11,500 feet. Secluded cliffs with overhanging ledges or large trees in open areas with unobstructed view for nesting.	May potentially occur in appropriate habitat.
<i>Buteo swainsoni</i> Swainson's hawk	BLMS, BCC	ST (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.	May potentially occur in appropriate habitat.
<i>Circus cyaneus</i> northern harrier	—	CSC (nesting)	Occurs in a variety of habitats at elevations up to 10,000 feet. Forages in open areas such as meadows, wetlands, and grasslands. Breeding habitat is up to 5,700 feet in the Sierra Nevada, in areas with shrubby vegetation near foraging habitat.	May potentially occur in appropriate habitat.
<i>Haliaeetus leucocephalus</i> bald eagle	FD (Former FT, delisted on 7/09/07), Eagle Act, BCC BLMS	SE, CFP	Year-round resident in ice-free regions of California. Foraging areas include regulated and unregulated rivers, reservoirs, lakes, estuaries, and coastal marine ecosystems. Majority of bald eagles in California breed near reservoirs and nests are usually located within 1 mile of foraging habitat.	May potentially occur in appropriate habitat. This species could potentially forage along the Kaweah River. There is no appropriate breeding habitat within the FERC project boundary.
<i>Pandion haliaeetus</i> osprey	—	WL	Uncommon migratory raptor that builds large perennial nests in dead trees or other prominent supports near open water. Foraging areas include regulated and unregulated rivers, reservoirs, lakes, estuaries, and coastal marine ecosystems	May potentially occur in appropriate habitat. This species could potentially forage along the Kaweah River. There is no appropriate breeding habitat within the FERC project boundary.
<i>Falco mexicanus</i> prairie falcon	—	WL (nesting)	Found in lower elevations in the Sierra Nevada, primarily in perennial grassland, savannah, rangeland, and desert scrub habitats.	May potentially occur in appropriate habitat.
<i>Falco peregrinus anatum</i> American peregrine falcon	FD (Former FE , delisted on 8/25/99) (nesting), BCC	SD (Former SE, delisted on 8/6/09) , 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.	May potentially occur in appropriate habitat.

Table 3.6-5. Special-Status Wildlife Species—Potential for Occurrence in the Kaweah Project Vicinity.

Scientific/Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/Occurrence Notes
May Potentially Occur In the Project Vicinity (continued)				
<i>Asio flammeus</i> short-eared owl	—	CSC (nesting)	Open areas with few trees, such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, saline and fresh emergent wetlands. Needs elevated sites for perching and dense vegetation for roosting.	May potentially occur in appropriate habitat.
<i>Strix occidentalis occidentalis</i> California spotted owl	BCC BLMS	CSC	Dense, old growth, multi-layered mixed conifer, redwood, Douglas fir, and oak woodland habitats, from sea level to elevations of approximately 7,600 feet.	May potentially occur in appropriate habitat.
<i>Cypseloides niger</i> black swift	BCC	CSC (nesting)	Nests in moist crevices or caves, or on cliffs near waterfalls in deep canyons at elevations ranging from 6,000 to 11,000 feet. Forages widely over many habitats; seems to avoid arid regions. Known from the high elevations of the Sierra National Forest.	May potentially occur in appropriate habitat. The CNDDDB query yielded one historic (1935) record for this species outside the Project vicinity along the Marble Fork, approximately 3 miles upstream of the Kaweah No. 3 Powerhouse.
<i>Melanerpes lewis</i> Lewis' woodpecker	BCC	—	Breeds east of the Sierra Nevada crest in cavity excavated in sycamore, cottonwood, oak, or conifer trees. Winter resident in open oak savannas, broken deciduous and coniferous habitats with sufficient supply of acorns and insects.	May potentially occur in appropriate habitat.
<i>Empidonax traillii extimus</i> southwestern willow flycatcher	FE	SE (nesting)	Wet meadow and montane riparian habitats at elevations ranging from 2,000 to 8,500 feet in elevation. Most often occurs in broad, open river valleys or large mountain meadows with lush growth of shrubby willows.	May potentially occur in appropriate habitat. The Kaweah Project is located outside the breeding range for this species. However, individuals may be present during the non-breeding season. USFWS has designated critical habitat for this species. The closest designated critical habitat is in Kern County.
<i>Dendroica petechia brewsteri</i> yellow warbler	BCC	CSC (nesting)	Breeds in riparian woodlands from coastal and desert lowlands at elevations 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.	May potentially occur in appropriate habitat.
<i>Antrozous pallidus</i> Pallid bat	BLMS	CSC	Grasslands, shrublands, woodlands, and forests from sea level to 10,000 feet in elevation. Typically roosts in caves, crevices, or mines. Requires open habitat for foraging.	May potentially occur in appropriate habitat.
<i>Corynorhinus townsendii</i> Townsend's western big-eared bat	BLMS	SCT	Found in all but alpine and subalpine habitats; most abundant in mesic habitats up to 6,000 feet in elevation. Requires caves, mines, tunnels, buildings, or other man-made structures for roosting. Extremely sensitive to disturbance and may abandon a roost if disturbed.	May potentially occur in appropriate habitat.
<i>Euderma maculatum</i> Spotted bat	BLMS	CSC	Ranges from arid deserts and grasslands through mixed conifer forests up to elevations of 10,600 feet in southern California. Prefers sites with adequate roosting habitat, such as cliffs. Often limited by the availability of cliff habitat. Feeds over water and along marshes.	May potentially occur in appropriate habitat. The CNDDDB query yielded one record for this species outside the Project vicinity (1995) in Sequoia National Park, approximately 4 miles northeast of the Kaweah No. 3 Facilities.
<i>Myotis thysanodes</i> Fringed myotis	BLMS	—	Optimal habitats are pinyon-juniper, valley foothill hardwood and hardwood-conifer, generally at 4,000–7,000 ft. Roosts in caves, mines, buildings, and crevices. Separate day and night roosts may be used. Uses open habitats, early successional stages, streams, lakes, and ponds as foraging areas. This species is migratory, making relatively short, local movements to suitable hibernacula.	May potentially occur in appropriate habitat. The CNDDDB query yielded one 2001 record for this species outside the Project vicinity in the vicinity of Case Mountain, approximately 3 miles from the Kaweah No. 1 Diversion. Two individuals were detected.

Table 3.6-5. Special-Status Wildlife Species—Potential for Occurrence in the Kaweah Project Vicinity.

Scientific/Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/Occurrence Notes
May Potentially Occur In the Project Vicinity (continued)				
<i>Myotis evotis</i> Long-eared myotis	BLMS	—	Endemic to the west, ranging from southwestern Canada, south through California into Baja, eastward through northern Arizona and New Mexico and north into the Dakotas. They are found predominantly in coniferous forests, typically only at higher elevations in southern areas (between 7,000 and 8,500 feet). They roost in tree cavities and beneath exfoliating bark in both living trees and dead snags.	May potentially occur in appropriate habitat. The CNDDDB query yielded one record for this species outside the Project vicinity. Two females were captured in the vicinity of Case Mountain in 2001, approximately 3 miles from the Kaweah No. 1 Diversion.
<i>Myotis yumanensis</i> Yuma myotis	BLMS	—	Occasionally roosting in mines or caves, these bats are most often found in buildings or bridges. Bachelors also sometimes roost in abandoned cliff swallow nests, but tree cavities were probably the original sites for most nursery roosts. These bats typically forage over water in forested areas.	May potentially occur in appropriate habitat.
<i>Taxidea taxus</i> American badger	—	CSC	Occurs throughout most of the state in areas with dry, friable soils. It is most abundant in drier open stages of most shrub, forest, and herbaceous habitats up to 12,000 feet in elevation.	May potentially occur in appropriate habitat.
<i>Bassariscus astutus</i> Ringtail	—	CFP	Found in most forest and shrub habitats in close association with rock and/or riparian areas, usually not more than .6 miles from water. Dens in hollow trees, snags, or other cavities.	May potentially occur in appropriate habitat.
Unlikely to Occur In the Project Vicinity				
<i>Thamnophis gigas</i> giant garter snake	FT	ST	Uses a wide variety of habitats including forests, mixed woodlands, grasslands, chaparral, and agricultural lands. The species often occurs near aquatic habitat including ponds, marshes, and streams where it freely enters and retreats to when alarmed.	Unlikely to occur. The Project area is outside the geographic range of this species.
<i>Coccyzus americanus occidentalis</i> Western yellow-billed cuckoo	FT, BLMS, BCC	SE	Breeds and forages in riparian areas with low woody vegetation in lowland California, especially willow-cottonwood habitat. This species was listed on 10/3/14 (Final Rule). Critical habitat has been proposed for this species.	Unlikely to occur. The Project is outside the geographic range of this species.
<i>Otus flammeolus</i> flammulated owl	BCC	—	Summer resident in coniferous habitats from ponderosa pine to red fir forests from 6,000 to 10,000 feet in elevation; prefers low to intermediate canopy closure. Breeds in the North Coast and Klamath Ranges, Sierra Nevada, and in suitable habitats in mountains in southern California.	Unlikely to occur. Project is outside the elevation range of this species.
<i>Strix nebulosa</i> great gray owl	—	SE (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 in elevation.	Unlikely to occur. Project is outside the elevation range of this species.
<i>Stellula calliope</i> calliope hummingbird	BCC	—	Prefers coniferous forests and mountain meadow habitats for breeding. In the Sierra Nevada, it typically nests above 4,000 feet elevation. Nests almost always in a lodgepole pine or aspen, immediately beneath live branches, and typically in riparian area. Migrates and spend winter in central and southern Mexico.	Unlikely to occur. Project is outside the elevation range of this species.

Table 3.6-5. Special-Status Wildlife Species—Potential for Occurrence in the Kaweah Project Vicinity.

Scientific/Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/Occurrence Notes
Unlikely to Occur In the Project Vicinity (continued)				
<i>Sphyrapicus thyroideus</i> Williamson's sapsucker	BCC	—	Uncommon to fairly common, summer resident in coniferous forests from approximately 5,500 to 9,500 feet in elevation throughout California. Preferred nesting habitat is lodgepole pine.	Unlikely to occur. Project is outside the elevation range of this species.
<i>Contopus borealis</i> olive-sided flycatcher	BCC	—	Uncommon to common, summer resident in a wide variety of forest and woodland habitats. Nesting habitats include mixed conifer, montane hardwood-conifer, Douglas-fir, redwood, red fir, and lodgepole pine forests from 3,000 to 7,000 feet in elevation.	Unlikely to occur. Project is outside the elevation range of this species.
<i>Carpodacus cassinii</i> Cassin's finch	BCC	—	A common montane resident from 4,200 to 8,000 feet in elevation. Prefers tall, open coniferous forests, in lodgepole pine, red fir, and subalpine conifer habitats, especially for breeding. Most numerous near wet meadows and grassy openings; also frequents semi-arid forests.	Unlikely to occur. Project is outside the elevation range of this species.
<i>Vireo bellii pusillus</i> Least Bell's vireo	FE	SE	Breeds in riparian habitats (typically in dense willows) in the southwestern U.S. Winters in Baja California. Its distribution includes cismontane southern California (most breeding pairs occur in San Diego county) extending north up to the Owens Valley and east into Death Valley National Park.	Unlikely to occur. The Project area is outside the geographic range of the species.
<i>Dipodomys ingens</i> Giant kangaroo rat	FE	SE	Large (6-inch) kangaroo rat that lives on dry, sandy grasslands. It currently is found only in isolated areas west of the San Joaquin Valley, including the Carrizo Plain, Elkhorn Plain, and Kettleman Hills.	Unlikely to occur. The Project area is outside the known geographic range of the species.
<i>Dipodomys nitraroides exilis</i> Fresno kangaroo rat	FE	SE	The range of this species encompasses arid grasslands (with friable, sandy soils) in the San Joaquin and adjacent valleys, from the valley floor in Merced County, south of the Merced and San Joaquin rivers, to the southern edge of the valley, and the Panoche Valley (eastern San Benito County), the Carrizo Plain (San Luis Obispo County), and the upper Cuyama Valley (San Luis Obispo and Santa Barbara counties), at elevations of 100-2,700 feet.	Unlikely to occur. The Project area is (just) outside the geographic range of the species. USFWS has designated critical habitat for this species. The closest critical habitat designated for this species is in Fresno County.
<i>Dipodomys nitratoides nitratoides</i> Tipton kangaroo rat	FE	SE	Tipton kangaroo rats are limited to arid-land communities occupying the Valley floor of the Tulare Basin in level or nearly level terrain. They are currently found in scattered, isolated areas clustered in low-elevation valleys of Tulare and Kern County.	Unlikely to occur. The Project area is (just) outside the geographic range of the species. USFWS has not designated critical habitat for this species.
<i>Aplodontia rufa</i> Sierra Nevada sewellel (mountain beaver)	—	CSC	Dense riparian and open brushy stages of most forest types at elevations ranging from 3,900 to 10,100 feet in elevation. Deep, friable soils are required for burrowing along cool, moist microclimates. Line in burrows located in or near deep soils near streams and springs. Typical habitat in the Sierra is montane riparian.	Unlikely to occur. Project is outside the elevation range of this species.
<i>Vulpes macrotis mutica</i> San Joaquin kit fox	FE	ST	Grasslands and shrubland areas in the San Joaquin Valley with friable soils for building underground dens. Denning begins around September, mating occurs from December to March, and pups are born February through April.	Unlikely to occur. The Project is outside the elevation range of this species.

Table 3.6-5. Special-Status Wildlife Species—Potential for Occurrence in the Kaweah Project Vicinity.

Scientific/Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/Occurrence Notes
Unlikely to Occur In the Project Vicinity (continued)				
<i>Vulpes necator</i> Sierra Nevada red fox	—	ST	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.	Unlikely to occur. Project is outside the elevation range of this species.
<i>Gulo luscus</i> California wolverine	—	ST, 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 at elevations ranging from 4,300 to 10,800 feet. Majority of recorded sightings are found above 8,000 feet in elevation.	Unlikely to occur. Project is outside the elevation range of this species.
<i>Ovis canadensis sierrae</i> Sierra Nevada bighorn sheep	FE	SE, CFP	Lives on steep, rugged slopes in the high Sierra Nevada in shrub, grassland, montane chaparral, subalpine conifer, or riparian habitats.	Unlikely to occur. Project is outside the elevation range of this species.

LEGEND:**State Status**

ST = California Threatened

SE = California Endangered

CFP = California Fully Protected

CSC = California Species of Special Concern

SCT, SCE = State Candidate Threatened/Endangered

Federal Status

FT = Federal Threatened

FE = Federal Endangered

FPT, FPE = Federal Proposed Threatened/Endangered

FC = Federal Candidate Species

FPD = Federal Proposed for Delisting

BLMS = BLM Sensitive

Table 3.6-6. Game Species Potentially Occurring in the Kaweah Project Vicinity.

Species	Status	Habitat	General Season	Bag Limit	Possession Limit	Hunting Restrictions
Resident Game Birds						
Ring-necked Pheasant (<i>Phasianus colchicus</i>)	—	Common to uncommon introduced species. Occurs in scattered locations throughout the state, centered in the Central Valley. Dependent on crop lands with adjacent herbaceous and woody cover; also in perennial grasslands with sufficient cover.	Nov 8 – Dec 21	2 males per day for first two days of the season; 3 males per day after the first two days of the season.	Triple the daily bag limit	Hunting license is required.
Blue grouse (<i>Dendragapus obscurus</i>)	—	Uncommon to common permanent resident at middle to high elevations. Occurs in open, medium to mature aged stands of fir, Douglas-fir, and other conifer habitats, interspersed with medium to large openings, and available water.	The second Saturday in September extending for 31 consecutive days	2 blue grouse per day	Triple the daily bag limit	Hunting license is required. No use of motor vehicles to drive birds toward target. No use of mammal (or imitation) as blind. No take of nests or eggs. No use of practice dogs on birds outside of season. Must use ten-gauge shotgun or smaller, and no shot size larger than BB.
Wild turkey (<i>Meleagris gallopavo</i>)	—	Found mostly in deciduous riparian, oak, and conifer-oak woodlands. Prefers rugged, hilly terrain with low to intermediate canopy, interspersed with numerous grass/forb openings, near water.	Fall season – November 8 – December 7 Spring Season - the last Saturday in March extending for 37 consecutive days	Fall Season: 1 either-sex turkey per day. Spring Season: 1 bearded turkey per day	Fall Season: 1 per season Spring Season: 3 per season	Hunting license is required. No use of motor vehicles to drive birds toward target. No use of mammal (or imitation) as blind. No take of nests or eggs. No use of practice dogs on birds outside of season. Must use ten-gauge shotgun or smaller, and no shot size larger than No. 2.
Mountain quail (<i>Oreotyx pictus</i>)	—	Common to uncommon resident, found typically in most major montane habitats of the state. Found seasonally in open, brushy stands of conifer and deciduous forest, woodland, and chaparral.	Zones Q1 and Q3: October 18 – January 25	10 per day	Triple the daily bag limit	Hunting license is required. No use of motor vehicles to drive birds toward target. No use of mammal (or imitation) as blind. No take of nests or eggs. No use practice dogs on birds outside of season. Must use ten-gauge shotgun or smaller, and no shot size larger than BB.
California Quail (<i>Callipepla californica</i>)	—	Common, permanent resident of low and middle elevations. Found in shrub, scrub, and brush, open stages of conifer and deciduous habitats, and margins of grasslands and croplands.				
Migratory Game Birds						
Common snipe (<i>Gallinago gallinago</i>)	—	Fairly common winter visitor from October to April on wet meadow and short, emergent wetland habitats throughout much of California.	The third Saturday in October extending for 107 days	8 per day	Triple the daily bag limit	Hunting license and state duck tag are required. No use of motor vehicles to drive birds toward target. No use of mammal (or imitation) as blind. No take of nests or eggs. No use practice dogs on birds outside of season. Must use ten-gauge shotgun or smaller, and no shot size larger than BB.
Band-tailed pigeon (<i>Columba fasciata</i>)	—	Common resident in hardwood and hardwood-conifer habitats. Inhabits lower slopes of major mountain ranges of the state.	The third Saturday in December extending for 9 consecutive days	2 per day	Triple the daily bag limit	Hunting license and state duck tag are required. No use of motor vehicles to drive birds toward target. No use of mammal (or imitation) as blind. No take of nests or eggs. No use of practice dogs on birds outside of season. Must use ten-gauge shotgun or smaller, and no shot size larger than BB.

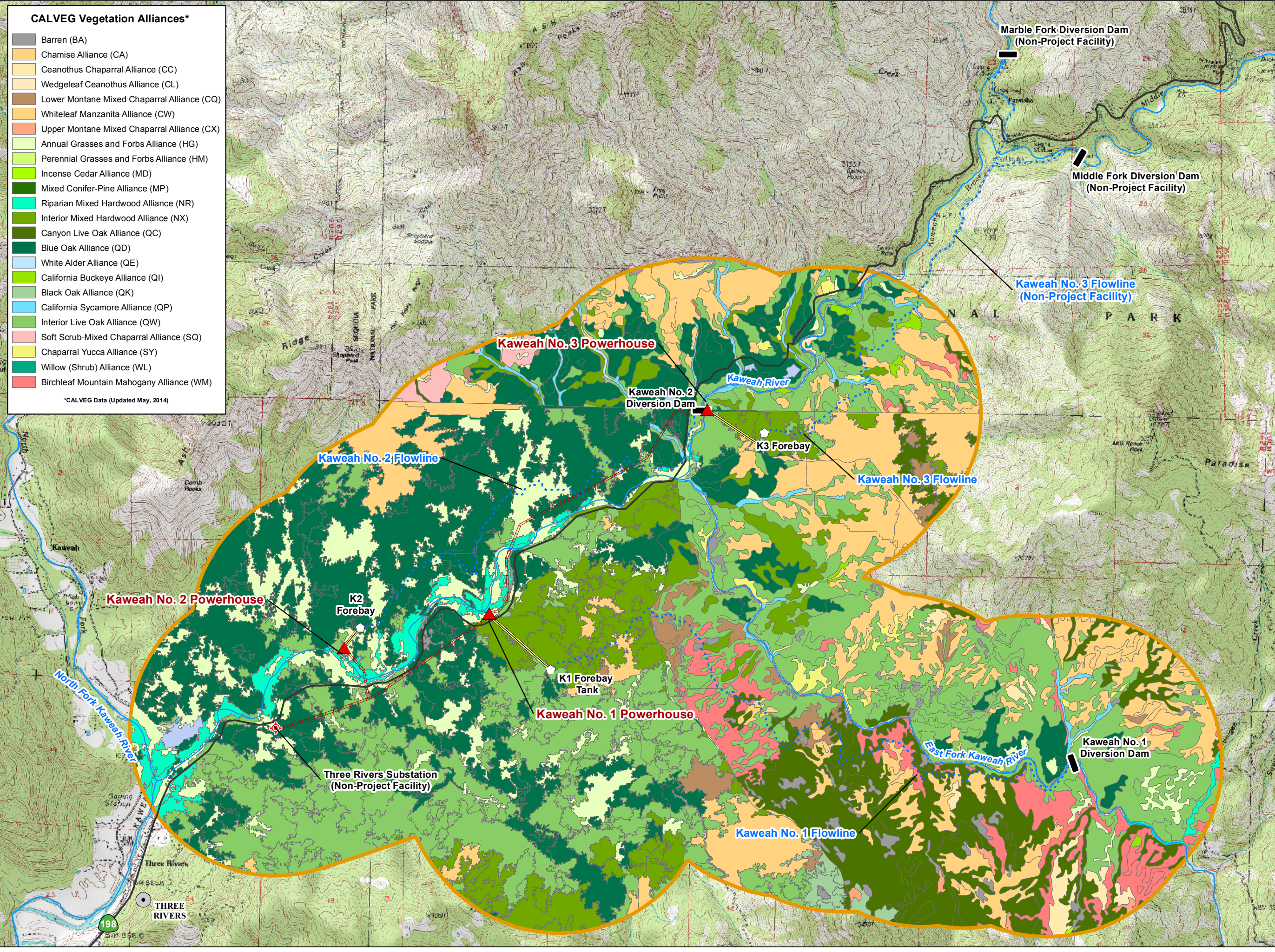
Table 3.6-6. Game Species Potentially Occurring in the Kaweah Project Vicinity.

Species	Status	Habitat	General Season	Bag Limit	Possession Limit	Hunting Restrictions
Migratory Game Birds (continued)						
Mourning dove (<i>Zenaida macroura</i>)	—	Open woodlands, grasslands, croplands, open hardwood, hardwood-conifer, riparian, low elevation conifer, and deserts all provide adequate habitat. Requires a nearby water source.	Sept. 1-15 and from the second Saturday in November extending for an additional 45 days	15 doves, up to 10 may be white winged	Triple the daily bag limit	Hunting license and state duck tag are required. No use of motor vehicles to drive birds toward target. No use of mammal (or imitation) as blind. No take of nests or eggs. No use of practice dogs on birds outside of season. Must use ten-gauge shotgun or smaller, and no shot size larger than BB.
Mammals						
Long-tailed weasel (<i>Mustela frenata</i>)	—	This species is considered a non-game mammal under the California Fish and Wildlife Code. Common to uncommon, permanent resident of most habitats, except xeric brush, shrub, and scrub in the Mojave and Colorado deserts. Mostly uses intermediate cover stages of conifer and deciduous habitats, interspersed with lower seral stages and open forest, woodland areas and shrubs, from sea level to alpine meadows.	All Year	No limit	No limit	Hunting license is required. May use firearms, bow and arrow, poison under special permit, and approved traps with trapping permit. Dogs permitted.
Wild pig (<i>Sus scrofa</i>)	—	This species is considered a big game mammal under the California Fish and Wildlife Code. Wild pigs currently exist in 56 of the state's 58 counties and can be found in a variety of habitats ranging from woodland, chaparral, meadow and grasslands. Wild pigs are omnivorous, consuming both plant and animal matter. In general, wild pigs feed on: grasses and forbs in the spring; mast and fruits in the summer and fall; and roots, tubers and invertebrates throughout the year.	All Year	No limit	No limit	Methods of take within the California condor range. Except as otherwise provided, it is unlawful to use or possess projectiles containing more than one percent lead by weight while taking or attempting to take any big game (as defined in Section 350, Title 14, CCR) in those areas described in Section 3004.5, Fish and Game Code.
Black bear (<i>Ursus americanus</i>)	—	This species is considered a big game mammal under the California Fish and Wildlife Code. Widespread, common to uncommon resident occurring from sea level to high mountain regions. Occurs in fairly dense, mature stands of many forest habitats, and feeds in a variety of habitats including brushy stands of forest, valley foothill riparian, and wet meadow.	Opening day of deer season through the last Sunday in December	1 adult/season/tag	1 adult/season/tag	Requires hunting license and hunting tags. May use approved rifles, bow and arrow, and approved shotguns. Cubs and females accompanied by cubs may not be taken. Methods of take within the California condor range. Except as otherwise provided, it is unlawful to use or possess projectiles containing more than one percent lead by weight while taking or attempting to take any big game (as defined in Section 350, Title 14, CCR) in those areas described in Section 3004.5, Fish and Game Code.

Table 3.6-6. Game Species Potentially Occurring in the Kaweah Project Vicinity.


Species	Status	Habitat	General Season	Bag Limit	Possession Limit	Hunting Restrictions
Mammals (continued)						
Mule deer (<i>Odocoileus hemionus</i>)	—	This species is considered a big game mammal under the California Fish and Wildlife Code. Common to abundant, yearlong resident or elevational migrant with a widespread distribution throughout most of California, except in deserts and intensively farmed areas without cover. Prefer a mosaic of vegetation, providing an interspersed of herbaceous openings, dense brush or tree thickets, riparian areas, and abundant edge.	The season in Zone D-8 shall open on the fourth Saturday in September and extend for 30 consecutive days.	1 buck/ tag	1 buck/ tag	Requires hunting license and hunting tags. May use approved rifles, bow and arrow, approved shotguns, and crossbows. Only bucks with antlers with demonstrable forks (or greater) may be taken. <i>Methods of take within the California condor range:</i> Except as otherwise provided, it is unlawful to use or possess projectiles containing more than one percent lead by weight while taking or attempting to take any big game (as defined in Section 350, Title 14, CCR) in those areas described in Section 3004.5, Fish and Game Code.
Gray fox (<i>Urocyon cinereoargenteus</i>)	—	This species is considered a furbearing mammal under the California Fish and Wildlife Code. Uncommon to common permanent resident of low to middle elevations throughout most of the state. Frequents most shrublands, valley foothill riparian, montane riparian, and brush stages of many deciduous and conifer forest and woodland habitats. Also found in meadows and cropland areas. Suitable habitat consists of shrublands, brushy and open-canopied forests, interspersed with riparian areas, providing water.	Nov. 24 - the last day of Feb.	no limit	no limit	Hunting license is required. May use firearms, bow and arrow, poison under special permit, and approved traps with trapping permit. Dogs permitted.
Raccoon (<i>Procyon lotor</i>)	—	This species is considered a furbearing mammal under the California Fish and Wildlife Code. Widespread, common to uncommon permanent resident throughout most of the state. Occurs in all habitats except alpine, and desert types without water; marginal in Great Basin shrub types. Most abundant in riparian and wetland areas at low to middle elevations.	Nov. 16 - Mar. 31	no limit	no limit	Hunting license is required. May use firearms, bow and arrow, poison under special permit, and approved traps with trapping permit. Dogs permitted. When taking raccoon after dark, pistols and rifles not larger than .22 caliber rimfire and shotguns using shot no larger than No. BB may be used
American mink (<i>Mustela vison</i>)	—	This species is considered a furbearing mammal under the California Fish and Wildlife Code. Uncommon permanent resident, generally occurring in the northern half of the state. Semiaquatic, inhabiting most aquatic habitats, including some coastal areas. Occurs at elevations up to about 2700 m (9000 ft).	Nov. 16 - Mar. 31	no limit	no limit	Hunting license is required. May use firearms, bow and arrow, poison under special permit, and approved traps with trapping permit. Dogs permitted.
Western gray squirrel (<i>Sciurus griseus</i>)	—	This species is considered resident small game under the California Fish and Wildlife Code. Fairly common locally in mature stands of most conifer, hardwood, and mixed hardwood-conifer habitats in the Klamath, Cascade, Transverse, Peninsular, and Sierra Nevada Ranges. Dependent upon mature stands of mixed conifer and oak habitats. Closely associated with oaks. Require large trees, mast, and snags.	The second Saturday in September through the last Sunday in January	4 per day	4 in possession	Hunting license is required. Must use ten-gauge shotgun or smaller, and no shot size larger than BB.

MAPS




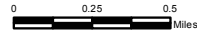
- CALVEG Vegetation Alliances***
- Barren (BA)
 - Chamise Alliance (CA)
 - Ceanothus Chaparral Alliance (CC)
 - Wedgeleaf Ceanothus Alliance (CL)
 - Lower Montane Mixed Chaparral Alliance (CQ)
 - Whiteleaf Manzanita Alliance (CW)
 - Upper Montane Mixed Chaparral Alliance (CX)
 - Annual Grasses and Forbs Alliance (HG)
 - Perennial Grasses and Forbs Alliance (HM)
 - Incense Cedar Alliance (MD)
 - Mixed Conifer-Pine Alliance (MP)
 - Riparian Mixed Hardwood Alliance (NR)
 - Interior Mixed Hardwood Alliance (NX)
 - Canyon Live Oak Alliance (QC)
 - Blue Oak Alliance (QD)
 - White Alder Alliance (QE)
 - California Buckeye Alliance (QI)
 - Black Oak Alliance (QK)
 - California Sycamore Alliance (QP)
 - Interior Live Oak Alliance (QW)
 - Soft Scrub-Mixed Chaparral Alliance (SQ)
 - Chaparral Yucca Alliance (SY)
 - Willow (Shrub) Alliance (WL)
 - Birchleaf Mountain Mahogany Alliance (WM)
- *CALVEG Data (Updated May, 2014)

- Facilities**
- Powerhouse
 - Diversion
 - Dam
 - Utility
 - Forebay
 - Flowline
 - Penstock
 - Transmission Line
- Other Features**
- City/Town
 - Highway/Road
 - Watercourse
 - Water Body
 - 1-mile buffer around FERC Boundary


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Eastern Hydro Generation
Map 3.6-1
CALVEG Vegetation Alliances
Occurring within 1 Mile of the
Kaweah Project


 Date: 7/31/2015


 Projection: UTM Zone 11
 Datum: NAD 83

Southern California Edison (SCE) has no reason to believe that there are any inaccuracies or defects with information incorporated in this work and make no representations of any kind, including, but not limited to, the warranties of merchantability or fitness for a particular use, nor are any such warranties to be implied, with respect to the information or data, furnished herein. No part of this map may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording system, except as expressly permitted in writing by SCE.

CONFIDENTIAL**MAPS**

- Map 3.6-2. Occurrences of Special-Status Plant Species within 5 Miles of the Kaweah Project Facilities.
- Map 3.6-3a–d. Special-Status Plant Populations Known to Occur in the Kaweah Project Vicinity.
- Map 3.6-4. Occurrences of Special-Status Wildlife Species within 5 Miles of the Kaweah Project Facilities.
- Map 3.6-5. Special-Status Wildlife Populations Occurring in the Kaweah Project Vicinity.
- Map 3.6-6. Kaweah Mule Deer Herd Key Areas, Winter Range, and Migratory Routes.

These maps contain information about the specific location(s) of special-status biological resources which is considered “confidential”. Pursuant to 18 CFR § 385.1112, these maps have been removed from this document. Confidential information will not be made available to the public or posted on the Internet.

To request copies of confidential information, please contact David Moore at 626-302-9494 or david.moore@sce.com.

APPENDIX 3.6-A

Vegetation Alliances within 1 Mile of the Kaweah FERC Project Boundary

The following vegetation alliance descriptions are excerpted from *Vegetation Descriptions, South Sierran Ecological Province, CALVEG Zone 4* (U.S. Department of Agriculture – Forest Service, Region 5; April 27, 2009).

Herb-Dominated Alliances

Annual Grasses and Forbs Alliance (HG)

Throughout the low elevations of the western slopes of the southern Sierra Nevada, annual grasses such as Bromes (*Bromus* spp.), Needlegrass (*Achnatherum* spp.) and Wild Oats (*Avena* spp.) may dominate rolling hills. Dominant forbs in this Alliance include Owl's Clover (*Orthocarpus* spp.), Fiddleneck (*Amsinckia intermedia*) and Stork's Bill (*Erodium* spp.). They may occur in pure stands or contain an overstory of scattered oaks (*Quercus* spp.) or California Buckeye (*Aesculus californica*). Associated westside species include hardwoods growing in sheltered areas and conifers such as Gray Pine (*Pinus sabiniana*) or Ponderosa Pine (*P. ponderosa*) in the Upper Foothills Metamorphic Belt and Lower Batholith Subsections. In some areas, this Alliance may dominate a vast array of slopes and aspects due to wildfires, xeric conditions and other factors; on eastside slopes in the Eastern Slopes and Kern Plateau Subsections, recent wildfires have created large grass patches at elevations up to 8000 feet (ft) (2440 meter [m]) or more. Great Basin species such as Big Sagebrush (*Artemisia tridentata*), Rabbitbrush (*Chrysothamnus* spp.), Singleleaf Pinyon Pine (*P. monophylla*) and Jeffrey Pine (*P. jeffreyi*) are often found adjacent to these patches.

Perennial Grasses/Forbs Alliance (HM)

Perennial grasses and forbs in moist sites have been mapped in widespread areas of the southern Sierra Nevada Mountains within ten subsections. The elevations of these sites generally are within about 6400–12,000 ft (1952–3660 m), spanning the mid-montane to alpine regions. Upper elevations are often associated with subalpine conifers such as Whitebark Pine (*Pinus albicaulis*), Lodgepole Pine (*P. contorta* ssp. *murrayana*) and Red Fir (*Abies magnifica*). The Perennial Grasses and Forbs Alliance is a form of dry to moist grassland or meadows in which it is difficult to determine species composition and to separate it from the Wet Meadows and Alpine Grasses and Forbs types. At lower altitudes, some of these areas are currently being used for livestock pasture and are a mix of perennial and annual grasses and legumes that vary according to management practices. Perennial bunchgrasses introduced from Eurasia such as Desert Crested, Tall and Intermediate Wheatgrasses (*Agropyron desertortum*, *Elytrigia pontica* and *Elytrigia intermedia*), in addition to Tall Fescue (*Festuca arundinacea*), Clover (*Trifolium* spp.), Needlegrass (*Achnatherum* spp.), Squirreltail (*Elymus elymoides*), Rockcress (*Arabis* spp.), Monardella (*Monardella* spp.), Buckwheat (*Eriogonum* spp.), Cheatgrass (*Bromus tectorum*) and others may be included in the mixture. Mules-ears (*Wyethia* spp.) are a common component on some eastside locations. Sites may have other grass or grasslike indicators such as Sedges of various species (*Carex* spp.), Barley (*Hordeum brachyantherum*) and forbs such as Groundsel (*Senecio* spp.), Aster (*Aster alpigenus*), Beardtongue (*Penstemon heterodoxus*), and others in the alpine herbaceous type.

Shrub-Dominated Alliances

Chamise Alliance (CA)

Chamise (*Adenostoma fasciculatum*) is a dominant shrub of lower elevation, xeric slopes and ridges of the western Sierra Nevada Mountains between about 1200–4800 ft (366–1464 m). This alliance has been mapped most frequently in the westside Upper Foothills Metamorphic Belt Subsection, and more sparsely in the Lower Batholith Subsection. Associated minor species of this Alliance include shrubs of the Lower Mixed Chaparral Alliance such as Birchleaf Mountain Mahogany (*Cercocarpus betuloides*) and Whiteleaf Manzanita (*Arctostaphylos viscida*). California Buckwheat (*Eriogonum fasciculatum* var. *polifolium*) and, especially towards the eastside, the grass Squirreltail (*Elymus elymoides*) may also be present in this type. Interior Live Oak (*Quercus wislizenii*), Canyon Live Oak (*Q. chrysolepis*), Gray Pine (*Pinus sabiniana*) and Ponderosa Pine (*P. ponderosa*) may occur in close proximity to the Chamise Alliance.

Ceanothus Mixed Chaparral Alliance (CC)

An Alliance of Ceanothus species has been mapped sparsely and well scattered in the Tehachapi – Piute Mountains, Kern Plateau, Lower Batholith and the Upper Batholith and Volcanic Flows Subsections at elevations in the general range of about 3000–8000 ft (915–2440 m). Within the higher ranges of the Tehachapi Mountains, the mixture is more likely to contain prominent Mountain Whitethorn (*C. cordulatus*), Mojave Ceanothus (*C. greggii* var. *vestitus*) and/or Deerbrush (*C. integerrimus*), where its main associates are White Fir (*Abies concolor*), Black Oak (*Quercus kelloggii*) and other shrubs in the Great Basin – Mixed Chaparral Transition Alliance. Areas lower and further west, such as in the Lower Batholith Subsection, are more likely to include conspicuous Wedgeleaf Ceanothus (*C. cuneatus*), Chaparral Whitethorn (*C. leucodermis*) and/or Woolyleaf Ceanothus (*C. tomentosus*) in the mixture. Snowbrush (*C. velutinus*) may appear more prominently in northern areas, such as in the Upper Batholith and Volcanic Flows Subsection.

Wedgeleaf Ceanothus Alliance (CL)

This Alliance is dominated by Wedgeleaf Ceanothus (*Ceanothus cuneatus*) and occurs prominently in the Tehachapi – Piute Mountains, Lower Batholith and Eastern Slopes Subsections and less commonly in several other subsections. Elevations are generally in the 3000–6000 ft (914–1830 m) range. These stands are in close proximity to other shrubs of the Lower Montane Chaparral Alliance such as Birchleaf Mountain Mahogany (*Cercocarpus betuloides*) as well as lower elevation trees such as Canyon and Interior Live Oaks (*Quercus chrysolepis*, *Q. wislizenii*) and Gray and Ponderosa Pines (*Pinus sabiniana*, *P. ponderosa*). California Buckwheat (*Eriogonum fasciculatum*) may also be associated with it on drier or more disturbed sites.

Lower Montane Mixed Chaparral Alliance (CQ)

The Lower Montane Mixed Chaparral Alliance is very common in the southern Sierra Nevada Mountains at elevations below about 5800 ft (1372 m) on the westside and higher in the Tehachapi – Piute Mountains Subsection. The Alliance has been mapped in nine subsections and may contain mixtures of Ceanothus species, Whiteleaf and Common Manzanitas (*Arctostaphylos viscida*, *A. manzanita*), Chamise (*Adenostoma fasciculatum*), Fremont or Wavyleaf Silk-tassel (*Garrya fremontii*, *G. elliptica*), Flannelbush (*Fremontodendron californicum*), Birchleaf Mountain Mahogany (*Cercocarpus betuloides*), Poison Oak (*Toxicodendron diversilobum*), Shrub Oaks (*Quercus* spp.) and other lower elevation shrub species. Foothill Ash (*Fraxinus dipetala*) and Bush Poppy (*Dendromecon rigida*) may occasionally be part of this mixture as well. Individual sites may support pure stands of these shrubs such as in the Wedgeleaf Ceanothus (*C. cuneatus*) Alliance. Associated trees often include Canyon and Interior Live Oaks (*Quercus chrysolepis*, *Q. wislizenii*) adjacent to these sites and often Ponderosa Pine (*Pinus ponderosa*) as well.

Whiteleaf Manzanita Alliance (CW)

Two forms of Whiteleaf Manzanita (*Arctostaphylos viscida* var. *viscida*) and Mariposa Manzanita (*Arctostaphylos viscida* var. *mariposa*) assume dominance on dry slopes in the same elevation range as Ponderosa Pine and the Mixed Conifer - Pine Alliances in the southern Sierra Nevada. These varieties are merged in the Whiteleaf Manzanita Alliance, which occurs more prominently toward the west (Central Valley Calveg Zone) and less commonly in this zone. The Alliance has been mapped in scattered locations of five subsections, chiefly between about 2600–5400 ft (792–1646 m). The species is usually found on south and west aspects or on rocky or infertile soils in association with Chamise (*Adenostoma fasciculatum*) and other lower elevation shrubs and Canyon Live Oak (*Quercus chrysolepis*).

Upper Montane Mixed Chaparral Alliance (CX)

The Lower Montane Mixed Chaparral Alliance is very common in the southern Sierra Nevada Mountains at elevations below about 5800 ft (1372 m) on the westside and higher in the Tehachapi – Piute Mountains Subsection. The Alliance has been mapped in nine subsections and may contain mixtures of Ceanothus species, Whiteleaf and Common Manzanitas (*Arctostaphylos viscida*, *A. manzanita*), Chamise (*Adenostoma fasciculatum*), Fremont or Wavyleaf Silk-tassel (*Garrya fremontii*, *G. elliptica*), Flannelbush (*Fremontodendron californicum*), Birchleaf Mountain Mahogany (*Cercocarpus betuloides*), Poison Oak (*Toxicodendron diversilobum*), Shrub Oaks (*Quercus* spp.) and other lower elevation shrub species. Foothill Ash (*Fraxinus dipetala*) and Bush Poppy (*Dendromecon rigida*) may occasionally be part of this mixture as well. Individual sites may support pure stands of these shrubs such as in the Wedgeleaf Ceanothus (*C. cuneatus*) Alliance. Associated trees often include Canyon and Interior Live Oaks (*Quercus chrysolepis*, *Q. wislizenii*) adjacent to these sites and often Ponderosa Pine (*Pinus ponderosa*) as well.

Soft Scrub-Mixed Chaparral Alliance (SQ)

Ground disturbances such as fire and urban development often initiate the development of this short-lived shrub Alliance. It has been mapped in areas of disturbance where woody chaparral species comprise less than half of the shrub cover in areas transitional between the California Sagebrush and Lower Montane Mixed Chaparral Alliances. These sites are typically at elevations below 2600 ft (792 m) on moderately steep to steep slopes in the Paso Robles Hills and Valleys, Interior Santa Lucia Range Subsections (Ranges Section) and South Coastal Santa Lucia Range and Santa Maria Valley Subsections of the Coast Section. Indicator species in the general area include California Sagebrush (*Artemisia californica*), Scrub Oaks (*Quercus spp.*), Deerweed (*Lotus scoparius*), Coyote Brush (*Baccharis pilularis*), Bush Monkeyflower (*Mimulus aurantiacus*), Bush Poppy (*Dendromecon rigida*), Yerba Santa (*Eriodictyon spp.*) and Goldenbush (*Ericameria spp.*) in mixture with minor amounts of Ceanothus spp., Sumacs (*Rhus spp. or Malosma laurina*), and Chamise (*Adenostoma fasciculatum*). (Source: *Vegetation Descriptions, Central Coast and Montane Ecological Province Calveg Zone 6*, U.S. Department of Agriculture – Forest Service; March 19, 2009)

Chaparral Yucca Alliance (SY)

Chaparral Yucca (*Yucca whipplei*) occurs as individual shrubs and in several subspecies in a variety of habitats, but will occasionally dominate harsher sites such as those having shallow, rocky or porous soils in the southern Sierras. It also may sprout vigorously from basal leaves after light fires, increasing its dominance over small areas. The Chaparral Yucca Alliance has been mapped sparsely in western areas of the Tehachapi - Piute Mountains Subsection, mainly at elevations between about 2200–6000 ft (670–1830 m). On these dry sites, it occurs in the vicinity of Chamise (*Adenostoma fasciculatum*), Canyon and Interior Live Oaks (*Quercus chrysolepis*, *Q. wislizenii*) and in proximity to the Annual Grasses and Forbs Alliance.

Willow (Shrub) Alliance (WL)

Shrub Willows (*Salix spp.*) may dominate stretches of low to high elevation streams, springs and seeps in the southern Sierras. Depending on location and elevation, species may include Geyer's (*S. geyeriana*), Gray-leaved Sierra (*S. orestera*), Lemmon's (*S. lemmonii*), Narrow-leaved (*S. exigua*), Shining (*S. lucida*), Yellow (*S. lutea*), or other Willows. This type has been mapped extensively over ten subsections, most frequently in the Glaciated Batholith, Eastern Slopes, Glaciated Batholith and Volcanic Flows, and Upper Batholith Subsections. On the eastside, it is often found adjacent to upland Great Basin types such as Low, Mountain and Big Sagebrushes (*Artemisia arbuscula*, *A. tridentata var. vaseyana*, *A. tridentata*), subalpine and upper montane trees such as Lodgepole Pine (*Pinus contorta ssp. murrayana*), Western White Pine (*P. monticola*), Red Fir (*Abies magnifica*), Whitebark Pine (*P. albicaulis*), Mountain Hemlock (*Tsuga mertensiana*) and Quaking Aspen (*Populus tremuloides*). Mesic shrubs of these elevations, such as Huckleberry Oak (*Quercus vaccinifolia*) also are often found near the Shrub Willow Alliance. As this type may occupy the wettest upland sites,

the Wet Meadows Alliance is very frequently associated with it, as are riparian shrubs such as Blue Elderberry (*Sambucus mexicana*), White-stemmed Gooseberry (*Ribes inerme*) and California Blackberry (*Rubus ursinus*). The mapped elevation range of this alliance is extremely broad, ranging from about 3000–12,000 ft (915–3660 m).

Birchleaf Mountain Mahogany Alliance (WM)

Birchleaf Mountain Mahogany (*Cercocarpus betuloides*, also called *C. montanus*) may occasionally occur in pure stands on xeric, semi-desert, cliff or even moist sites to the exclusion of other species. The Birchleaf Mountain Mahogany Alliance, where it is the dominant shrub, has been mapped infrequently on slopes in the southern Sierras within the Lower Batholith, Tehachapi – Piute Mountains, Eastern Slopes and Upper Foothills Metamorphic Belt Subsections. Elevations of these sites are within the range from about 2000–6200 ft (610–1890 m). Canyon and Interior Live Oaks (*Quercus chrysolepis*, *Q. wislizenii*), and other Lower Montane Chaparral shrubs such as Chamise (*Adenostoma fasciculatum*) are associated with this type in this region.

Tree-Dominated Alliances

Incense Cedar Alliance (MD)

Incense Cedar (*Calocedrus decurrens*) is a wide-ranging species that competes well on a variety of sites. It has been mapped sparsely as a dominant conifer in five subsections in the southern Sierras. The Incense Cedar Alliance is typically found in the elevation range 3000–4000 ft (915–1952 m), but this conifer is typically a component of the Mixed Conifer – Pine Alliance and associates with trees such as White Fir (*Abies concolor*), Ponderosa Pine (*Pinus ponderosa*) and Canyon Live and Black Oaks (*Quercus chrysolepis*, *Q. kelloggii*).

Mixed Conifer–Pine Alliance (MP)

Ponderosa Pine (*Pinus ponderosa*) and Sugar Pine (*P. lambertiana*) are important components of the Mixed Conifer - Pine Alliance, the most commonly mapped conifer alliance in the southern Sierras. It has been mapped abundantly in the Batholith and Volcanic Flows (westside), Upper Foothills Metamorphic Belt and Upper Batholith Subsections and less commonly in five others in this zone. White Fir (*Abies concolor*), Incense Cedar (*Calocedrus decurrens*), Knobcone Pine (*P. attenuata*) and 4 several hardwoods such as Black Oak (*Quercus kelloggii*) may be present in varying amounts in the mixture. The Mixed Conifer – Pine Alliance is generally found at elevations between about 3200–6400 ft (976–1952 m), although scattered sites have been mapped at higher and lower altitudes. This Alliance is usually found on mesic soils between the higher Mixed Conifer - Fir and the lower Ponderosa Pine Alliances. Understory shrubs include Mountain Misery (*Chamaebatia foliosa*), Mountain Whitethorn (*Ceanothus cordulatus*), Mariposa (Whiteleaf) Manzanita (*Arctostaphylos viscida* ssp. *mariposa*), and at higher elevations, Greenleaf Manzanita (*A. patula*).

Riparian Mixed Hardwoods Alliance (NR)

A mixture of two or more non-dominant hardwoods found in shaded drainages, riparian and seep sites has been mapped in scattered pockets of seven subsections in the southern Sierras zone such as in the Upper Foothills Metamorphic Belt, Tehachapi – Piute Mountains, and Lower Batholith Subsections. Elevations range from below 1000 ft (305 m) up to about 9600 feet (2928 m), reflecting a variety of hardwoods such as Bigleaf Maple (*Acer macrophyllum*), California Bay (*Umbellularia californica*), Mountain Dogwood (*Cornus nuttallii*), Fremont or Black Cottonwoods (*Populus fremontii*, *P. balsamifera* ssp. *trichocarpa*) and Oregon Ash (*Fraxinus latifolia*). Tree Willows (*Salix* spp.), White Alder (*Alnus rhombifolia*) also commonly occur, with California Sycamore (*Platanus racemosa*) occasionally towards the west part of this zone. Upland 7 trees such as Interior Live Oak (*Quercus wislizenii*) and Canyon Live Oak (*Q. chrysolepis*) occasionally occur on these sites. Quaking Aspen (*Populus tremuloides*) and Water Birch (*Betula occidentalis*) are more prevalent in this type in the Eastern Slopes Subsection and an occasional Valley Oak (*Q. lobata*) is more likely to occur in the Kern Plateau Subsection.

Interior Mixed Hardwoods Alliance (NX)

A mixture of upland hardwoods with no clearly dominant species occurs very commonly in the Lower Batholith and Tehachapi - Piute Mountains Subsections and more rarely in five other subsections. This type has been mapped most often in the elevation range of about 1000–6000 ft (305–1830 m). The mixture includes any combination of Interior Live Oak (*Quercus wislizenii*), Canyon Live Oak (*Q. chrysolepis*), Blue Oak (*Q. douglasii*), and/or California Buckeye (*Aesculus californica*), with Valley Oak (*Q. lobata*) or Black Oak (*Q. kelloggii*) occurring less frequently. The occasional overstory conifers may include Gray Pine (*Pinus sabiniana*) or Ponderosa Pine (*P. ponderosa*). Lower-elevation shrubs in canopy openings such as Wedgeleaf Ceanothus (*Ceanothus cuneatus*) and Birchleaf Mountain Mahogany (*Cercocarpus betuloides*) may also be present onsite or in the vicinity.

Canyon Live Oak Alliance (QC)

Canyon Live Oak (*Quercus chrysolepis*) in pure stands generally occurs above the Lower Montane Mixed Chaparral Alliance and below the Black Oak (*Q. kelloggii*) and Ponderosa Pine (*Pinus ponderosa*) Alliances on droughty sites. The Canyon Live Oak Alliance is the most frequently mapped hardwood type in the southern Sierras, being present in eight subsections, most abundantly in the Lower Batholith Subsection. These sites are often found on shallow colluvial soils in steep canyons generally between about 1600 feet (488 m) and 8400 feet (2562 m) in the Southern Sierras, the higher elevations in the east. The Alliance is occasionally also associated with the Mixed Conifer – Pine and Interior Live Oak (*Q. wislizenii*) Alliances, usually on rock outcrops and ridge tops. Shrubs such as Deerbrush (*Ceanothus integerrimus*) and Whiteleaf Manzanita (*Arctostaphylos viscida*) may occur in the understory, as well as annual grasses and forbs. In the Tehachapi – Piute Mountains Subsection, this type is

frequently found adjacent to the Singleleaf Pinyon Pine, California Buckwheat, Scrub Oak and Great Basin – Mixed Chaparral Transition Alliances.

Blue Oak Alliance (QD)

The Blue Oak (*Quercus douglasii*) Alliance occurs on shallow upland soils in foothill savannas adjacent to the western slopes of the Sierra Nevada. It has been mapped in five ecological units, most commonly in the Tehachapi – Piute Mountains, Lower Batholith and Upper Foothills Metamorphic Belt Subsections. Elevations where mapped are often in the 1000–5800 ft (305–1768 m) range, highest towards the south. Blue Oak naturally occurs in an oak-grass association on well drained, gentle slopes. Gray Pine (*Pinus sabiniana*) is the most common tree associate in this hillside type; Interior Live Oak (*Q. wislizenii*) may also be a major hardwood occurring in close proximity to this type. Non-stump sprouting chaparral shrubs such as Wedgeleaf Ceanothus (*Ceanothus cuneatus*), Manzanitas (*Arctostaphylos* spp.), Coffeeberry (*Rhamnus* spp.), California Buckwheat (*Eriogonum fasciculatum*) and Poison Oak (*Toxicodendron diversilobum*) are scattered throughout this Alliance and Chamise (*Adenostoma fasciculatum*) often occurs adjacent to these sites.

White Alder Alliance (QE)

White Alder (*Alnus rhombifolia*) is the major dominant hardwood in this Alliance, although Oregon Ash (*Fraxinus latifolia*), Water Birch (*Betula occidentalis*) and Black Cottonwood (*Populus balsamifera* ssp. *trichocarpa*) are often present. The White Alder Alliance occurs in riparian areas at mid-montane elevations throughout the southern Sierra Nevada on both eastside and westside slopes, and has been mapped to a limited extent in seven subsections. Elevations are in the range of about 2600–6400 ft (792–1952 m). Upland associated types include the Lower Montane Mixed Chaparral, Ponderosa Pine and Mixed Conifer – Pine Alliances.

California Buckeye Alliance (QI)

California Buckeye (*Aesculus californica*) has been mapped on occasion in pure stands in three subsections of the southern Sierras, occurring most often in the western sectors of the Lower Batholith Subsection at elevations between 1600–4800 ft (488–1464 m). These areas are adjacent to hardwoods such as Interior and Canyon Live Oaks (*Quercus wislizenii*, *Q. chrysolepis*) and Blue Oak (*Q. douglasii*). Sites on which California Buckeye occur tend to be xeric in this zone, but often moister in areas of other zones further north and west.

Black Oak Alliance (QK)

Black Oak (*Quercus kelloggii*) occurs in pure stands or associates with Ponderosa Pine (*Pinus ponderosa*), generally below about 8200 feet (2501 m) on westside slopes of the southern Sierra Nevada. This occasionally sprouting hardwood out-competes the pine on poorly drained or somewhat shallow soils. In other mixed stands, Black Oak is more commonly associated with the Mixed Conifer – Pine and Mixed Conifer – Fir Alliances. It

has been mapped in nine subsections, most often in the Upper Foothills Metamorphic Belt, Lower Batholith, Tehachapi – Piute Mountains, Upper Batholith, and Batholith and Volcanic Flows Subsections. Shrubs of the Lower and Upper Montane Mixed Chaparral Alliances may be found adjacent to this type.

California Sycamore Alliance (QP)

Riparian areas dominated by California Sycamore (*Platanus racemosa*) have been mapped in one area of the Lower Batholith Subsection at elevations between about 1800–4400 ft (548–1342 m). Other riparian or mesic site hardwoods may be present in this alliance in minor amounts, such as Fremont Cottonwood (*Populus fremontii*), Bigleaf Maple (*Acer macrophyllum*) and Willows (*Salix* spp.).

Interior Live Oak Alliance (QW)

Interior Live Oak (*Quercus wislizenii*) occurs as a hardwood dominant in semi-open or closed stands in this Alliance, and was mapped broadly and widespread along the western borders and some interior locations of six subsections of the southern Sierra Nevadas. It is most abundant in the Lower Batholith, Upper Foothills Metamorphic Belt and Tehachapi – Piute Mountains, and Batholith and Volcanic Flows Subsections, generally at elevations between about 1200–6400 ft (366–1952 m). Canyon Live Oak (*Q. chrysolepis*) or Black Oak (*Q. kelloggii*) may become associated with the Interior Live Oak Alliance at higher elevations, grading into the Interior Mixed Hardwoods Alliance, especially in the Tehachapi – Piute Mountains Subsection. Ponderosa Pine (*Pinus ponderosa*) commonly occurs with Interior Live Oak in mixed stands. On drier sites or lower elevations, Gray Pine (*P. sabiniana*), Blue Oak (*Q. douglasii*) and Buckeye (*Aesculus californica*) are associated trees. In most areas, shrub associates are chiefly those in the Lower Montane Mixed Chaparral type, such as Chamise (*Adenostoma fasciculatum*) and Wedgeleaf Ceanothus (*Ceanothus cuneatus*). However, shrubs such as California Buckwheat (*Eriogonum fasciculatum*), Scrub Oak (*Q. berberidifolia*) and Big Sagebrush (*Artemisia tridentata*) are more likely to be within and adjacent to this Alliance in the Tehachapi – Piute Mountains Subsection.

Non-Vegetated Areas

Barren (BA)

Landscapes generally devoid of vegetation as seen from a high-altitude image source such as aerial photography, are labeled as Barren. This category includes mappable landscape units in which surface lithology is dominant, such as exposed bedrock, cliffs, interior sandy or gypsum areas, and the like. It does not include areas considered as modified or developed, as in urban areas, but may include quarries and mine sites.

APPENDIX 3.6-B

**Life History Information for Special-Status Plant Species Known
or Potentially Occurring in the Kaweah Project Vicinity**

Known to Occur in the Kaweah Project Vicinity

Kaweah brodiaea (*Brodiaea insignis*) – Bureau of Land Management Sensitive (BLMS), State Endangered (SE), California Rare Plant Ranking (CRPR) 1B.2

Kaweah brodiaea, a monocot, is a perennial herb (bulb) that is native to California and is endemic (limited) to California. This species is known only from blue oak woodlands in the Kaweah and Tule River drainages in Tulare County (approx. 400–5,000 feet). Associated with reddish-brown clay loam soils underlain by granitic rock substrates.

mouse buckwheat (*Eriogonum nudum var. murinum*) – BLMS, CRPR 1B.2

Mouse buckwheat is a perennial shrub of the wild buckwheat genus. This species is found in sandy soils in chaparral, grassland, or foothill woodland at 1,100-3,800 feet. This species is known only from the Kaweah River drainage. Restricted to marble outcrops, although it may colonize disturbed sites.

Munz's iris (*Iris munzii*) – BLMS, CRPR 1B.3

Munz's iris, a monocot, is a perennial herb (rhizomatous) that is native to California and is endemic (limited) to California. This species is found in wet, grassy sites, open to part shade in foothill woodland habitat from 1,000-2,700 feet.

May Potentially Occur in the Kaweah Project Vicinity

watershield (*Brasenia schreberi*) – CRPR 2B.3

Watershield is a perennial herb found in ponds and slow streams below 7,200 feet.

northern meadow sedge (*Carex praticola*) – CRPR 2B.2

Northern meadow sedge, a monocot, is a perennial grass that is native to California. This species is found in meadows and seeps to 10,500 feet.

California jewelflower (*Caulanthus californicus*) – Federal Endangered (FE), BLMS, SE, CRPR 1B.1

California jewelflower, a dicot, is an annual herb that is native to California and is endemic (limited) to California. This species is found in grasslands in the southern San Joaquin valley at 250 to 3,300 feet.

The U.S. Fish and Wildlife Service (USFWS) has not designated critical habitat for this species. This species is included in the Recovery Plan for Upland Species of the San Joaquin Valley, California (USFWS 1998). The Kaweah Project is not within the planning area for the recovery plan.

Springville clarkia (*Clarkia springvillensis*) – Federal Threatened (FT), BLMS, SE CRPR 1B.2

Springville clarkia, a dicot, is an annual herb that is native to California and is endemic (limited) to California. This species is found in chaparral, grasslands, and woodlands from 800-4,000 feet. This species is known only from the Tulare River Drainage.

USFWS has not designated critical habitat for this species. There is no recovery plan for this species.

rose-flowered larkspur (*Delphinium purpusii*) – BLMS, CRPR 1B.3

Rose-flowered larkspur is a perennial herb endemic to California where it is known only from Kern and Tulare Counties in the region where the Sierra Nevada meets the Mojave Desert. This species is found in talus areas and cliffs among chaparral, foothill woodland, and pinyon-juniper woodland from 900 to 4,400 feet.

recurved larkspur (*Delphinium recurvatum*) – BLMS, CRPR 1B.2

Recurved larkspur a dicot, is a perennial herb that is native to California and is endemic (limited) to California. This species is found in poorly drained, fine, alkaline soils in grassland scrub, and foothill woodland below 2,600 feet.

Kern mallow (*Eremalche (=Malvastrum) kernensis*) – FE, BLMS, CRPR 1B.1

Kern mallow, a dicot, is an annual herb that is native to California and is endemic (limited) to California. This species is found on dry, open sandy to clay soils, often at the edge of balds. In valley and foothill grasslands.

USFWS has not designated critical habitat for this species. This species is included in the Recovery Plan for Upland Species of the San Joaquin Valley, California (USFWS 1998). The Kaweah Project is not within the planning area for the recovery plan.

spiny-sepaled button-celery (*Eryngium spinosepalum*) – CRPR 1B.2

Spiny-sepaled button-celery, a dicot, is an annual or perennial herb that is native to California Vernal pools, swales, and roadside ditches in lower foothills and grasslands of Fresno, Stanislaus, and Tulare counties from 200–2,100 feet.

striped adobe-lily (*Fritillaria striata*) – BLMS, ST, CRPR 1B.1

Striped adobe-lily, a monocot, is a perennial herb (bulb) that is native to California and is endemic (limited) to California. This species is found in clay soil in valley grassland and foothill woodland below 3,300 feet. This species is known to occur at one remaining site in Tulare County (Lewis Hill east of Porterville).

American manna grass (*Glyceria grandis*) – CRPR 2B.3

American manna grass is a perennial monocot found in freshwater emergent wetlands, streambanks, and lake margins below 6,500 feet.

Madera leptosiphon (*Leptosiphon serrulatus*) – CRPR 1B.2

Madera leptosiphon, a dicot, is an annual herb that is native to California and is endemic (limited) to California. This species is found in dry slopes in cismontane oak woodland and lower montane coniferous forest. Usually in decomposed granite, one instance on serpentine. 900–4,300 feet.

elongate copper moss (*Mielichhoferia elongate*) – CRPR 2B.2

Elongate copper moss, a bryophyte, is a moss that is native to California. This species is found in cismontane woodland, rock with copper/heavy metals from 1,500 and 4,300 feet in elevation.

Kaweah monkeyflower (*Mimulus norrisii*) – BLMS, CRPR 1B.3

Kaweah monkeyflower, a dicot, is an annual herb that is native to California and is endemic (limited) to California. This species is found in marble crevices in chaparral and cismontane woodlands. This species is known only from the Kaweah and Kings River drainages. This species is found in elevations from 1,100-4,300 feet.

calico monkeyflower (*Mimulus pictus*) – BLMS, CRPR 1B.2

Calico monkeyflower, a dicot, is an annual herb that is native to California and is endemic (limited) to California. This species is found in open sunny areas, around granite outcrops in foothill woodland habitat from 300 to 4,700 feet.

San Joaquin adobe sunburst (*Pseudobahia peirsonii*) – BLMS, SE, CRPR 1B.1

San Joaquin adobe sunburst, a dicot, is an annual herb that is native to California and is endemic (limited) to California. This species is found in clay (Cibo, Porterville, or Centerville) soils in grassland and foothill woodland from 200 to 2,700 feet.

aromatic canyon gooseberry (*Ribes menziesii* var. *ixoderme*) – CRPR 1B.2

Aromatic canyon gooseberry, a dicot, is a shrub that is native to California and is endemic (limited) to California. This species is found in chaparral and montane woodlands to 3,900 feet.

Keck's checker-mallow (*Sidalcea keckii*) – FE, CRPR 1B.1

Keck's checker-mallow, a dicot, is an annual herb that is native to California and is endemic (limited) to California. This species is found in grassy slopes from 300 to 2,200 feet.

USFWS has designated Critical Habitat for this species, however, there is no Critical Habitat in the Project vicinity. There is no USFWS recovery plan for this species.

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APPENDIX 3.6-C

Wildlife Habitats Occurring within 1 Mile of the Kaweah Project

The following wildlife habitat descriptions are excerpted from *A Guide to Wildlife Habitats of California* (Kenneth E. Mayer and William F. Laudenslayer, Jr.; State of California, Resources Agency, Department of Fish and Game. 1988).

**California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group**

Annual Grassland

John G. Kie

Updated by: CWHR Staff, April 2005

Vegetation

Structure. Annual Grassland habitats are open grasslands composed primarily of annual plant species. Many of these species also occur as understory plants in Valley Oak Woodland (VOW) and other habitats. Structure in Annual Grassland depends largely on weather patterns and livestock grazing. Dramatic differences in physiognomy, both between seasons and between years, are characteristic of this habitat. Fall rains cause germination of annual plant seeds. Plants grow slowly during the cool winter months, remaining low in stature until spring, when temperatures increase and stimulate more rapid growth. Large amounts of standing dead plant material can be found during summer in years of abundant rainfall and light to moderate grazing pressure. Heavy spring grazing favors the growth of summer-annual forbs, such as tarweed and turkey mullein, and reduces the amount of standing dead material. On good sites, herbage yield may be as high as 4900 kg/ha (4400 lb/ac) (Garrison et al. 1977).

Composition. Introduced annual grasses are the dominant plant species in this habitat. These include wild oats, soft chess, ripgut brome, red brome, wild barley, and foxtail fescue. Common forbs include broadleaf filaree, redstem filaree, turkey mullein, true clovers, bur clover, popcorn flower, and many others. California poppy, the State flower, is found in this habitat. Perennial grasses, found in moist, lightly grazed, or relic prairie areas, include purple needlegrass and Idaho fescue. Vernal pools, found in small depressions with a hardpan soil layer, support downingia, meadowfoam, and other species (Parker and Matyas 1981). Species composition is also related to precipitation (Bartolome et al. 1980). Perennial grasses are more common on northern sites with mean annual rainfall greater than 150 cm (60 in). Soft chess and broadleaf filaree are common in areas with 65-100 cm (25-40 in) of rainfall, and red brome and redstem filaree are common on southern sites with less than 25 cm (10 in) of precipitation (Bartolome et al. 1980).

Other Classifications. Annual Grassland habitat has been described as Valley Grassland (Munz and Keck 1959, Heady 1977), Valley and Foothill Grassland (Cheatham and Haller 1975), California Prairie (Küchler 1977), Annual Grasslands Ecosystem (Garrison et al. 1977), Brome grass, Fescue, Needlegrass, and Wild Oats series (Paysen et al. 1980), and Annual Grass-Forb series (Parker and Matyas 1981).

Habitat Stages

Vegetation Changes 1-2:S-D. Annual Grassland habitats occupy what was once a pristine native grassland. The native grassland likely consisted of climax stands of perennial bunchgrasses, such as purple needlegrass, on wetter sites (Bartolome 1981, Bartolome and Gemmill 1981), with annual species existing as climax communities on drier alluvial plains (Webster 1981). Today, plant succession in the classical sense does not occur in Annual Grassland habitats. However, species composition is greatly influenced by seasonal and annual fluctuations in weather patterns. Annual plants germinate with the first fall rains that exceed about 15 mm (0.6 in), growing slowly during winter and more rapidly in spring (Heady 1977). Botanical composition changes throughout the growing season because of differences in plant phenology (Heady 1958). Most annuals mature between April and June (Heady 1977), although some species, such as tarweed and turkey mullein, continue to grow into summer. Fall rains that encourage germination, followed by an extended dry period, favor the growth of deep-rooted forbs (Duncan and Woodmansee 1975), but continuing rainfall favors rapidly growing grasses (Pitt and Heady 1978). Livestock grazing favors the growth of low-stature, spring-maturing forbs, such as filaree (Freckman et al. 1979), and summer annuals, such as turkey mullein (Duncan 1976). Because these are important food plants for many wildlife species, proper levels of livestock grazing are generally beneficial in this habitat. In the absence of livestock, Annual Grassland habitats are often dominated by tall, dense stands of grasses such as ripgut brome (Freckman et al. 1979) and wild oats.

Duration of Stages-- Although Annual Grassland habitats consist largely of non-native annuals, these effectively prevent the reestablishment of native perennials over large areas and now comprise climax communities (Heady 1977). Introduced annuals should be considered naturalized plant species and so managed, rather than as invading species characteristic of poor range sites.

Biological Setting

Habitat. Annual Grassland habitat is found just above or surrounding Valley Foothill Riparian (VRI), Alkali Desert Scrub (ASC), Fresh Emergent Wetland (FEW), Pasture (PAS) and all agricultural habitat types, and below Valley Oak Woodland (VOW), Blue Oak Woodland (BOW), Blue Oak-Foothill Pine (BOP), Chamise-Redshank (CRC), and Mixed Chaparral (MCH) habitats. Annual Grassland habitat also borders Coast Oak Woodland (COW), Closed Cone-Pine-Cypress (CPC), Coastal Scrub (CSC), and Eucalyptus (EUC) habitats.

Wildlife Considerations. Many wildlife species use Annual Grasslands for foraging, but some require special habitat features such as cliffs, caves, ponds, or habitats with woody plants for breeding, resting, and escape cover. Characteristic reptiles that breed in Annual Grassland habitats include the western fence lizard, common garter snake, and western rattlesnake (Basey and Sinclear 1980). Mammals typically found in this habitat

include the black-tailed jackrabbit, California ground squirrel, Botta's pocket gopher, western harvest mouse, California vole, badger, and coyote (White et al.1980). The endangered San Joaquin kit fox is also found in and adjacent to this habitat (U.S. Fish and Wildlife Service 1983). Common birds known to breed in Annual Grasslands include the burrowing owl, short-eared owl, horned lark, and western meadowlark (Verner et al. 1980). This habitat also provides important foraging habitat for the turkey vulture, northern harrier, American kestrel, black-shouldered kite, and prairie falcon.

Physical Setting

Annual Grassland habitat occurs mostly on flat plains to gently rolling foothills. Common soil orders include Entisols and Alfisols (Garrison et al.1977). Entisols are often found at lower elevations on flood plains and swales that receive periodic deposits of alluvium (U.S. Soil Conservation Service1975), and are characterized by little or no pedogenic horizon development. Alfisols occur at higher elevations above the valley floor (Garrison et al.1977). Some Annual Grassland habitats can be found in the drier portion of the southern San Joaquin Valley on Aridisols (Garrison et al. 1977). Climatic conditions are typically Mediterranean, with cool, wet winters and dry, hot summers. The length of the frost free season averages 250 to 300 days (18 to 21 fortnights) (Garrison et al. 1977). Annual precipitation is highest in the north (Redding, 960 mm (38 in)) and north coast (Ukiah, 909 mm (36 in)), decreasing to the south (Sacramento, 430 mm (17 in); Stockton, 339 mm (13 in); Fresno, 259 mm (10 in)), and reaching a minimum in the southern San Joaquin Valley (Bakersfield, 150 mm (6 in)) (Major 1977).

Distribution

Annual Grassland habitat occurs in patches of various sizes throughout the state

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California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group

Perennial Grassland

John G. Kie

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Vegetation

Structure. Perennial Grassland habitats, as defined here, occur in two forms in California: coastal prairie, found in areas of northern California under maritime influence, and relics in habitats now dominated by annual grasses and forbs. The coastal prairie form is described here. Relic perennial grasslands are discussed in the chapter on Annual Grassland habitats (AGS). Species of perennial grasses are also common in Wet Meadow (WTM) and other habitats. Structure in Perennial Grassland habitat is dependent upon the mix of plant species at any particular site. For example, sites with western bracken fern exhibit a taller (to 1.5 m (5 fl)), more vertically diverse structure than those dominated by shorter grasses such as silver hairgrass (10-30 cm (0.3-1.0 ft)). Grazing by domestic livestock or wild herbivores such as Roosevelt elk can substantially alter habitat structure through reduction in plant height and removal of biomass. Average herbaceous production on nine soil series in Humboldt County was estimated to be 170013,000 kg/ha (1500-11,600 lb/ac) (Cooper and Heady 1964).

Composition. Perennial Grassland habitats are dominated by perennial grass species such as California oatgrass, Pacific hairgrass, and sweet vernalgrass. On northern sites near the ocean in Del Norte and Humboldt Counties, common species include California oatgrass, American dunegrass, goldfields, Kentucky bluegrass, and western bracken fern (Heady et al. 1977). Further inland, common species include redtop, silver hairgrass, sweet vernalgrass, English daisy, soft chess, coast carex, orchardgrass, California oatgrass, Idaho fescue, red fescue, Douglas iris, western bracken fern and red clover (Heady et al. 1977). To the south, at Point Lobos State Reserve in Monterey County, dominant species include silver hairgrass, coronaria brodiaea, soft chess, California oatgrass, Pacific hairgrass, snakeroot, gumweed, toad rush, poverty rush, common wood-rush, squawroot, and fiddle dock (Heady et al. 1977).

Other Classifications. Other classifications of Perennial Grassland are Coastal Prairie (Munz and Keck 1959, Cheatham and Haller 1975), Coastal Prairie-Scrub Mosaic (Küchler 1977), and Festuca-Danthonia grassland (Heady et al. 1977). Further, CALVEG (Parker and Matyas 1981) describes perennial grass in the North Interior, South Sierran and Southern Interior Ecological provinces. Perennial grass in each of these regions are more associated with the Wet Meadow (WTM) and Fresh Emergent Wetland (FEW) habitats in the North Interior; WTM, FEW, Lodgepole Pine (LPN), Eastside Pine (EPN), and Jeffrey Pine (JPN) in the South Sierran, and Joshua Tree (JST) and Desert Scrub

(DSC) in the South Interior. If perennial grass is encountered in any of these regions of the State, refer to the appropriate habitat description.

Habitat Stages

Vegetation Changes 1-2.S-D. Historically, factors that have affected Perennial Grassland habitats on the north coast include the introduction of non-native annual plant species, increased grazing pressure, elimination of frequent fires, and cultivation (Heady et al. 1977). Vegetation changes influenced by increased grazing, such as the spread of introduced annuals, were slower to occur on the north coast than in the central valley. Spanish missions did not extend north of Sonoma County, and the Russian settlements at Fort Ross and elsewhere on the north coast maintained few cattle and sheep. However, heavy grazing by Roosevelt elk and frequent use of fire by local Indian tribes may have influenced the successional stages of many Perennial Grassland habitats (Heady et al. 1977).

Duration of Stages. Heavily grazed Perennial Grassland habitat dominated by annual plant species returns to perennial species under reduction in grazing pressure. Heady et al. (1977) suggest a successional sequence of annual forbs, followed by annual grasses and perennial forbs, then by perennial grasses such as hairy oatgrass and common velvetgrass, and ending in a climax community dominated by sweet vernalgrass and Pacific oatgrass. On some sites, Perennial Grassland habitat may give way to Coastal Scrub habitat (CSC) dominated by coyotebush and lupine (Heady et al. 1977). Where Perennial Grassland habitat occurs on sites formerly supporting Douglas-fir (DFR), the establishment of perennial grasses may in some cases prevent succession back to the original forest cover (Gordon Huntington, pers. comm.).

Biological Setting

Habitat. Perennial Grassland habitat in the coastal prairie can be found adjacent to Douglas-fir (DFR), Redwood (RDW), Coastal Oak Woodland (COW), Closed Cone-Pine Cypress (CPC), Coastal Scrub (CSC), Saline Emergent Wildland (SEW), Estuarine (EST), Marine (MAR), Fresh Emergent Wetland (FEW), Valley-Foothill Riparian (VRI), Pasture (PAS), and all agricultural habitats.

Wildlife Considerations. Perennial Grassland provides optimum habitat for many species, including the common garter snake, western terrestrial garter snake (Houck 1979), northern harrier, barn owl, burrowing owl, western kingbird, Say's phoebe, barn swallow, western meadowlark, savannah sparrow, grasshopper sparrow (Harris and Harris 1979), Townsend mole, coast mole, Botta's pocket gopher, western harvest mouse, California vole, long-tailed vole, and Oregon vole (Mossman 1979). In addition, Perennial Grassland often serves as feeding habitat for the turkey vulture, red-tailed hawk, American kestrel, peregrine falcon, western bluebird (Harris and Harris 1979), fringe-tailed bat, big brown bat, striped skunk, coyote, black-tailed jackrabbit, brush

rabbit, Roosevelt elk, and black-tailed deer (Mossman 1979).

Physical Setting

Perennial Grassland habitat typically occurs on ridges and south-facing slopes, alternating with forest and scrub in the valleys and on north-facing slopes (Heady et al. 1977). Perennial Grassland habitats are most often found on Mollisols. These soils may grade into Inceptisols to the north, with higher precipitation allowing for leaching of the mollic horizon, and into Alfisols to the south, under drier conditions. On the north coast, Perennial Grassland habitat may occasionally be found on Ultisols which formerly supported Douglas-fir (DFR) habitats, but which have been cleared by humans (Gordon Huntington, pers. comm.).

Climatic conditions are under strong maritime influence. Crescent City in Del Norte County has one of the wettest, coolest, most vegetatively productive climates in California (Major 1977). On the north coast, the length of the frost-free season in adjacent Douglas-fir (DFR) habitat is about 200 days (14 fortnights) (Garrison et al. 1977). Annual precipitation is highest in the north (Crescent City 1777 mm (70 in)), and lower to the south (Point Reyes, 497 mm (20 in); Monterey, 465 mm (18 in)) and inland (Davis, 418 mm (16in)) (Major 1977). Fog, which is common, reduces evapotranspiration, and greatly influences potential natural vegetation.

Distribution

Perennial Grassland habitat of the coastal prairie form occurs along the California coast from Monterey County northward (Küchler 1977). It is found below 1000 m (3280 ft) in elevation and seldom more than 100 km (62 mi) from the coast (Heady et al. 1977). Relic perennial grasses within annual grassland habitat occur in patches throughout the state.

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California Department of Fish and Game
California Interagency Wildlife Task Group**

Chamise-Redshank Chaparral

A. Sidney England

Vegetation

Structure-- Fire occurs regularly in Chamise-Redshank Chaparral and influences habitat structure. Mature Chamise-Redshank Chaparral is single layered, generally lacking well-developed herbaceous ground cover and overstory trees. Shrub canopies frequently overlap, producing a nearly impenetrable canopy of interwoven branches. Chamise-dominated stands average 1 to 2 m (3.3 to 6.6 ft) in height, but can reach 3 m (9.8 ft) (Horton 1960, Cheatham and Haller 1975, Hanes 1977). Total shrub cover frequently exceeds 80 percent, but may be considerably lower on extremely xeric sites with poor soils (Minnich 1976, Vogl 1976, Hanes 1977). Redshank stands are slightly taller, averaging 2 to 4 m (6.6 to 13.1 ft) but occasionally reaching 6 m (19.7 ft) (Hanes 1965, 1977, Cheatham and Haller 1975). Mature redshank frequently is more open than chamise and can have sparse herbaceous cover between shrubs (Hanes 1965, 1977, Paysen et al. 1980).

Composition-- Chamise-Redshank Chaparral may consist of nearly pure stands of chamise or redshank, a mixture of both, or with other shrubs. The purest stands of chamise occur on xeric, south-facing slopes (Hanes 1976). Toyon, sugar sumac, poison oak, redberry, and California buckthorn are commonly found in drainage channels and on other relatively mesic sites (Vogl 1976). At upper elevations or on more mesic exposures, chamise mixes with ceanothus, manzanita, scrub oak, and laurel sumac (Horton 1960, Hanes 1976, Parker and Matyas 1981). Ceanothus and sugar sumac are common associates of redshank (Hanes 1965, 1977). In southern California, white sage, black sage, and California buckwheat are common at lower elevations and on recently disturbed sites (Hanes 1965, 1977). Distinguishing Chamise-Redshank Chaparral from Mixed Chaparral (MCH) and Coastal Scrub (CSC) is a subjective interpretation based on percent cover by chamise and redshank and time since last burn. Paysen et al. (1980) classify chaparral as chamise or redshank if either species is "dominant". Hanes (1977) considers a stand to be chamise if it comprises 50 to 100 percent of total cover and redshank if it comprises 20 to 50 percent of total cover. For purposes of this description and the WHR model (Salwasser and Laudenslayer 1982), a more complex definition is needed which reflects changes in species composition that occur during post-fire recovery and aging. A stand of brush is classified as Chamise-Redshank Chaparral, as opposed to Mixed Chaparral, if any of the following criteria are fulfilled.

1. Any stand with greater than 60 percent relative shrub cover by chamise and redshank.
2. Young stands recovering from fire with greater than 20 percent absolute shrub cover

by chamise and redshank, and greater than 75 percent relative shrub cover by these species and relatively short-lived subshrubs such as yerba santa.

3. Any stand with at least 50 percent relative shrub cover by chamise and redshank and greater than 75 percent relative shrub cover by these species and shrubs of intermediate life span such as several species of ceanothus.

Other Classifications-- Most plant ecologists treat stands dominated by chamise and redshank as distinct types (Cheatham and Haller 1975, Thorne 1976, Hanes 1977, Paysen et al. 1980, Parker and Matyas 1981). Horton (1960) further divides chamise into "pure chamise" and "chamise-ceanothus" to reflect the frequent occurrence of mixtures of these shrubs. The Californian mixed chaparral of Cheatham and Haller (1975) includes many stands of Chamise-Redshank Chaparral that also support a significant component of ceanothus and other shrubs.

Habitat Stages

Vegetation Changes-- 1;24:S-D. Fire is the primary disturbance initiating secondary succession in Chamise-Redshank Chaparral. Annuals, perennial herbs, and subshrubs are abundant for several years after a fire. Shrubs begin to appear either as seedlings or root-crown sprouts beginning the first growing season after burning (Hanes 1971). As the habitat matures, shrub cover and height increase and herbaceous cover declines (Hanes 1971). Relatively short-lived shrubs and subshrubs, such as California buckwheat, common deerweed, and most species of ceanothus, may be absent or rare in older stands (Horton and Kraebel 1955, Hanes 1977). After each fire, populations of these species and post-fire herbs regenerate quickly from the seed bank in the soil (Sweeney 1956). In old unburned stands, species diversity is low, growth rates are slow, long-lived shrubs accumulate dead material, and some shrubs may die (Hanes 1971, Rundel and Parsons 1979).

Duration of Stages-- The general schedule of post-fire recovery in chaparral is described by Menke and Villaseñor (1977) and Zedler (1977). Herbaceous cover is dominant for 1 to 3 years. Long- and short-lived shrubs increase in height and cover but canopies generally do not overlap for 3 to 15 years after fire. From 10 to 30+ years, short-lived shrubs die, shrub cover increases, the canopy closes, and dead material begins to accumulate. Rundel and Parsons (1979) found that, in the Sierra Nevada, chamise growth rates declined and accumulation of dead material began after 16 years. Time to senescence is dependent on local site characteristics. In southern California, Hanes (1977) considers chamise older than 60 years to be senescent, but this may occur in 20 to 25 years in northern California (Sampson 1944). Horton (1960) states that pure chamise in the San Bernardino Mountains reaches 25 percent cover in 10 years, 50 percent in 40 years, and 70 percent in 55 years. However, recovery rates and peak cover vary with soil type, climatic regime, and slope. For example, most mesic sites supporting chamise and ceanothus reach 50 percent cover in 10 years and 90 percent cover in 25 years. Some sites may reach 90 percent cover in 10 years (T. E. Paysen, pers. comm.). At 50 years, shrub cover in mixed stands of chamise and ceanothus may decline to 80 percent total

shrub cover as ceanothus dies (Hanes 1977).

Biological Setting

Habitat-- Chamise-Redshank Chaparral generally occurs below and grades into Mixed Chaparral (MCH). On some sites, Chamise-Redshank Chaparral may form an ecotone with Ponderosa Pine (PPN), Coastal Oak Woodland (COW), or mixed conifer types. In northern California, the lower boundary is with Annual Grassland (AGS) and Blue Oak-Foothill Pine (BOP). In southern California, Coastal Scrub (CSC) may form a broad mosaic with Chamise-Redshank Chaparral. Location of the boundary can depend on fire frequency (Hanes 1971). On desert exposures, redshank stands may occur above either Mixed Chaparral (MPC) or Desert Succulent Scrub (DSC) and either above or below Pinyon-Juniper (PJN).

Wildlife Considerations-- Wildlife species found in this habitat type also are found in either Mixed Chaparral (MCH), Montane Chaparral (MCP), Coastal Scrub (CSC) or Sagebrush (SGB) and in shrubs beneath several woodland and forest types. The primary land management consideration is selection of alternative fire management treatments. Long-term fire suppression can lead to stand senescence (Vogl 1977) and declines in deer (Biswell et al. 1952), small mammals (Quinn 1979), birds (Wirtz 1979), and reptiles (Simovich 1979). Most animal populations reach peak densities in the first two or three decades, frequently 1 to 15 years, after a fire. Repeated fires at short intervals could favor crown-sprouting shrubs over obligate seed sprouters (Vogl 1977). Either management extreme could have long-term impacts on wildlife through changes in nutrient availability, soil quality or vegetation composition, structure, and recovery time. Prescribed burning can be an effective management tool, but the effects vary with season of burn (Rundel 1982). Post-fire herbs may be important in immobilizing nitrogen within the chaparral system (Rundel and Parsons 1980). Protecting these herbs from grazing may be important for effective long-term habitat maintenance (Rundel 1982). Populations of most small vertebrates decline sharply or are eliminated when chaparral is converted to grassland (Lillywhite 1977). Active and passive chaparral management programs must tailor management prescriptions to specific site characteristics and project goals.

Physical Setting

Chamise-dominated stands are most common on south- and west-facing slopes; redshank is found on all aspects (Hanes 1965, 1977, Cheatham and Haller 1975). Soils usually are thin with little accumulation of organic material (Cheatham and Haller 1975). Chamise may be a dominant shrub on some serpentine sites (Parker and Matyas 1981). Chamise-Redshank Chaparral is found in a mediterranean climate; rainfall is 38 to 63 cm (15 to 25 in), less than 20 percent of total precipitation falls in summer, and winters are mild (Oruduff 1974). The predominant land forms are steep slopes and ridges (Thorne 1976).

Distribution

Hanes (1977) provides a good description of "chamise" and "redshank" chaparral distributions in California. This habitat is usually found below 1200 m (4000 ft) on mountain ranges outside the deserts (Cheatham and Haller 1975, Vogl 1976, Minnich 1976, Hanes 1977, Parker and Matyas 1981). Large nearly pure areas of redshank-dominated chaparral occur in the interior valleys of the peninsular mountain ranges of Riverside and San Diego counties; isolated stands are found in the Santa Monica Mountains and in northern Santa Barbara and San Luis Obispo counties (Cheatham and Haller 1975, Hanes 1977). Chamise is the dominant shrub of this habitat type throughout the rest of the state. Nearly mature stands of chamise cover large areas in the peninsular and transverse ranges and Tehachapi Mountains of southern California. To the north, chamise more frequently mixes with other shrubs, especially several species of ceanothus. This type of vegetation covers large areas in the central coast ranges and on the eastern exposures of the north coast ranges; as isolated stands in the Cascade and Klamath ranges and the Siskiyou Mountains; and in a broken band on the western slope of the Sierra Nevada (Hanes 1977, Parker and Matyas 1981).

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Coastal Scrub

Sally de Becker

Vegetation

Structure-- Structure of the plant associations that comprise Coastal Scrub is typified by low to moderate-sized shrubs with mesophytic leaves, flexible branches, semi-woody stems growing from a woody base, and a shallow root system (Harrison et al. 1971, Bakker 1972). Structure differs among stands, mostly along a gradient that parallels the Pacific coastline. Northern Coastal Scrub, from Humboldt County to the San Francisco Bay Area, ranges from a patchy oceanside cover of nearly prostrate subshrubs surrounded by grassland to a dense and continuous cover of two layers: an overstory of shrubs up to 2 m (7 ft) tall and a perennial herb/subshrub understory up to 0.3 m (1 ft) tall. The southern sage scrub form, typical of inland central (around Mt. Diablo) and most southern stands, is made up of a shrub layer up to 2.0 m (7 ft) tall. Canopy cover usually approaches 100 percent in these stands (Mooney 1977), although bare areas are sometimes present. Sufficient light penetrates through the canopy to support an herbaceous understory. Bare zones about 1 m (3 ft) wide may extend from stands dominated by sage species into surrounding annual grasslands (Halligan 1973, Mooney 1977, Westman 1981 a).

Composition-- No single species is typical of all Coastal Scrub stands. As with structure, composition changes most markedly with progressively more xeric conditions from north to south along the coast. With the change from mesic to xeric sites, dominance appears to shift from evergreen species in the north to drought-deciduous species in the south. Variation in coastal influence at a given latitude produces less pronounced composition changes. Two types of northern Coastal Scrub are usually recognized. The first type (limited in range) occurs as low-growing patches of bush lupine and many-colored lupine at exposed, oceanside sites. The second and more common type of northern Coastal Scrub usually occurs at less exposed sites. Here coyotebush dominates the overstory. Other common overstory species are blue blossom ceanothus, coffeeberry, salal, bush monkeyflower, blackberry, poison-oak and wooly sunflower. Bracken fern and swordfern are dominant in the understory; common cowparsnip, Indian paintbrush, yerba buena and California oatgrass are typically present (Heady et al. 1977). Around Half Moon Bay, western hazelnut, Pacific bayberry, and sagebrush are also present (Mayfield and Shadle 1983).

Southern sage scrub, occurring intermittently over a larger area than the two northern Coastal Scrub types, is subdivided into three main types. Differences in composition of these three types correspond mostly to available moisture. A fairly common species in all

three types is California sagebrush. The most mesic area, from Mt. Diablo south to Santa Barbara, is dominated by black sage and California buckwheat. In the less mesic region from Santa Barbara south to Orange County, purple sage and California buckwheat join black sage in importance. Golden yarrow, isocoma, rolled leaf monkeyflower, and California encelia are typical. Chaparral yucca is found on the slightly drier sites within the region, especially in Ventura County (Kirkpatrick and Hutchinson 1977, Mooney 1977, Westman 1981b, Gray 1982). The southernmost stands are the most xeric of the form. Composition here is characterized by succulent species and a distinct Baja California influence. In addition to the California sagebrush, California buckwheat, and woolly sunflower typical of the stands farther north, California adolphia, coastal agave, and cunyado are present south of San Diego (Mooney 1977, Westman 1981a).

Other Classifications-- The following vegetation types and plant communities defined in the literature fall into WHR's Coastal Scrub habitat: Coyote Brush, Lupine, Salal, Sumac, Ragweed, California Sagebrush, Encelia, Buckwheat and Sage described by Parker and Matyas (1981); the *Opuntia* series of succulent shrub subformation and the Coastal Sagebrush, Encelia, *Baccharis*, *Salvia*, Lupine, and California Buckwheat series of the soft chaparral subformation described by Paysen et al. (1980); Coastal Strand, Northern Coastal Scrub, Coastal Sage Scrub, and Coastal Sagebrush described by Munz and Keck (1973); Coastal Sagebrush, Northern Seashore Communities (Northern Dune Scrub), Southern Seashore Communities (Central Dune Scrub, Southern Dune Scrub), and Coastal Prairie - Scrub Mosaic described by Küchler (1977); and the Northern Coastal Dune Scrub subdivision of Partially Stabilized and Stabilized Coastal Dunes, Coastal Bluff Scrub, Coastal Scrub, and Maritime Cactus Scrub described by Cheatham and Haller (1975).

Habitat Stages

Vegetation Changes-- 1;24:S-D Only tentative conclusions can be drawn from the relatively few studies of vegetation change in Coastal Scrub. Stands in some areas are considered seral stages. But most phases of Coastal Scrub probably change little in composition after the first 10 years following fire or if subjected only to natural, moderate disturbance. In contrast, major or human-caused disturbances often permit Coastal Scrub to invade new areas, or permit invasion by other habitats.

The lupine phase of northern Coastal Scrub appears to be replaced by grasslands under grazing pressure, returning if grazing is halted; when undisturbed, the lupine phase appears to persist in a dynamic equilibrium, patches dying out while new ones become established (Davidson and Barbour 1977). The coyotebush stands in the north have been considered a seral stage in a progression from grassland to forest, though evidence is inconclusive. Elliott and Wehausen (1974) found no significant increase of scrub in a Pt. Reyes coastal prairie grassland/northern Coastal Scrub mosaic when cattle were excluded for six years. Coyotebush was replaced by forest in the Berkeley Hills (by mixed evergreen forest, coast live oak forest and California bay forest) (McBride and Heady 1968, McBride 1974), but this replacement pattern was not observed on the nearby Pt.

Reyes Peninsula (Grams et al. 1977).

Southern Coastal Scrub on some sites is replaced by chaparral types (Mooney 1977, Gray 1983) but the usual trend of vegetation change in undisturbed or naturally disturbed stands is towards shrubs of various ages and size classes. Composition remains constant because recruitment is continual. Seeds germinate and young plants survive and grow under the canopy of mature plants. Southern Coastal Scrub is fire-adapted and most species sprout readily from crowns after burning. Thus, fire temporarily creates an even-aged stand, but reproduction by seed occurs within the second year after fire (Westman 1982).

Disturbances such as road cuts or landslides create areas often invaded by both northern and southern Coastal Scrub. Light, wind-dispersed seed and tolerance of xeric conditions allow Coastal Scrub to establish itself in disturbed areas (Harrison et al. 1971, Malanson and O'Leary 1982). Disturbance caused by oxidants in air pollution may have caused reduced cover by native Coastal Scrub species at certain sites in southern California (Westman 1979).

Duration of Stages-- As discussed, most Coastal Scrub types can probably exist indefinitely and will not change greatly in the absence of disturbance, or when affected only by natural perturbations. Bradbury (1978) observed southern sage scrub surrounded by chaparral types that endured for over 45 years; Westman (1981a) observed healthy stands that had not burned in over 60 years. McBride (1974) estimates that invasion by chamise, chaparral, forest or woodland types would take 50 years.

Biological Setting

Habitat-- At its lowest elevations, Coastal Scrub is associated with Coastal Dunes, Coastal Prairie/Perennial Grassland (PGS), Cropland (CRP) and Pasture (PAS). At its central and highest elevations, it is associated with annual grassland (AGS), Douglas fir-Hardwood (DFR), Coastal Oak Woodland (COW), Montane Hardwood (MHW), Closed-Cone Pine Cypress (CPC), Chamise-Redshank Chaparral (CRC) and Mixed Chaparral (MCH).

Wildlife Considerations-- Little is known about the importance of Coastal Scrub habitat to wildlife. Though vegetation productivity is lower in Coastal Scrub than in adjacent chaparral habitats associated with it (Gray 1982), Coastal Scrub appears to support numbers of vertebrate species roughly equivalent to those in surrounding habitats (Stebbins 1978). The Federal and State listed endangered peregrine falcon, Morro Bay kangaroo rat and the Santa Cruz long-toed salamander all occur in Coastal Scrub (Jones & Stokes 1981), though not exclusively. A subspecies of the black-tailed gnatcatcher, a California Department of Fish and Game Species of Special Concern (Remsen 1978), is found exclusively in southern sage scrub.

Physical Setting

Coastal Scrub seems to tolerate drier conditions than its associated habitats. It is typical of areas with steep, south-facing slopes; sandy, mudstone or shale soils; and average annual rainfall of less than 30 cm (12 in). However, it also regularly occurs on stabilized dunes, flat terraces, and moderate slopes of all aspects where average annual rainfall is up to 60 cm (24 in). Stand composition and structure differ markedly in response to these physiographic features (Harrison et al. 1971, Bakker 1972, Mooney 1977, Cole 1980, Kirkpatrick and Hutchinson 1980, Parker and Matyas 1981, Westman 1981b).

Distribution

Coastal Scrub occurs discontinuously in a narrow strip throughout the length of California. Latitude ranges from about 32° to 42° N and longitude ranges between 117 and 124°. Coastal Scrub usually occurs within about 45 km (20 mi) of the ocean; in Riverside County, it extends at least 110 km (50 mi) inland (see map). Elevation ranges from sea level to about 900 m (3000 ft).

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Mixed Chaparral

A. Sidney England

Vegetation

Structure-- Mixed Chaparral (MCH) is a structurally homogeneous brushland type dominated by shrubs with thick, stiff, heavily cutinized evergreen leaves. Shrub height and crown cover vary considerably with age since last burn, precipitation regime (cismontane vs. transmontane), aspect, and soil type (Hanes 1977). At maturity, cismontane Mixed Chaparral typically is a dense, nearly impenetrable thicket with greater than 80 percent absolute shrub cover. Canopy height ranges from 1 to 4 m (3.3 to 13.1 fl), occasionally to 6 m (19.6 fl) (Horton 1960, Cheatham and Haller 1975, Hanes 1977). On poor sites, serpentine soils or transmontane slopes, shrub cover may be only 30 to 60 percent and shrubs may be shorter, 0.5 to 3.0 m (1.6 to 9.8 fl) (Cheatham and Haller 1975, Hanes 1976, 1977). Considerable leaf litter and standing dead material may accumulate in stands that have not burned for several decades.

Composition-- Mixed Chaparral is a floristically rich type that supports approximately 240 species of woody plants (Oruduff 1974). Composition changes between northern and southern California and with precipitation regime, aspect, and soil type. Dominant species in cismontane Mixed Chaparral include scrub oak, chaparral oak, and several species of ceanothus and manzanita. Individual sites may support pure stands of these shrubs or diverse mixtures of several species. Commonly associated shrubs include chamise, birchleaf mountain mahogany, silk-tassel, toyon, yerba-santa, California buckeye, poison-oak, sumac, California buckthorn, hollyleaf cherry, Montana chaparral-pea, and California fremontia. Some of these species may be locally dominant. Leather oak and interior silktassel are widely distributed on cismontane serpentine soils, and chamise and toyon may be abundant on these soils. Shrubs such as Jepson, coyote, and dwarf ceanothus and serpentine manzanita are local serpentine endemics (Cheatham and Haller 1975, Thorne 1976, Hanes 1977). Incense-cedar, knobcone pine, Coulter pine, and foothill pine frequently are found in Mixed Chaparral on serpentine soils (Thorne 1976).

Shrub live oak, desert ceanothus, and desert bitterbrush are examples of shrubs found in Mixed Chaparral only on transmontane slopes (Cheatham and Haller 1975, Thorne 1976, Hanes 1977, and Zabriskie 1979). However, many species found in cismontane stands are also common on desert-facing slopes. Examples include bigberry manzanita, chamise, birchleaf mountain mahogany, California fremontia, and several species of ceanothus.

Other Classifications-- Most authors divide Mixed Chaparral into several types based on the dominant floristic component, soil type or location. Cheatham and Haller (1975) recognize Californian mixed, south coastal, semi-desert, and serpentine chaparrals. Thorne (1976) identifies mixed chaparral but separates serpentine and desert transition chaparral as distinct types. Paysen et al. (1980) subdivide this type into 7 series (ceanothus, mountain mahogany, scrub oak, prunus, sumac, manzanita, and toyon) based on the dominant or codominant shrub components. Hanes (1977) gives a good review and description of 6 Mixed Chaparral types (ceanothus, scrub oak, manzanita, serpentine, desert, and woodland) .

Habitat Stages

Vegetation Changes-- 1;24.S-D. Post-fire recovery of Mixed Chaparral begins with a cover of subshrubs, annuals, and perennial herbs. However, shrubs that will be dominant in mature chaparral are present as seedlings and root-crown sprouts. As shrub cover and height increase with age, herbaceous cover declines. Long-lived seeds remaining in the soil produce the herbaceous cover following the next fire (Sweeney 1956). Shrub species composition also may change as the stand ages. Yerba-santa, common deerweed, and many ceanothus are examples of relatively short-lived (< 40 years) shrubs and subshrubs that disappear from stands that have not been burned for decades (Horton and Kraebel 1955, Hanes 1971, 1977). Long-lived shrubs in very old stands become senescent, accumulating standing dead material, and some individual may die.

Some authors (e.g., Thorne 1976) have suggested that Mixed Chaparral might succeed to an oak woodland if protected from fire for extremely long periods. Others (e.g., Minnich 1976) have failed to find evidence to support this notion. Hanes (1977) suggests that confusion may result from inadequate distinction among vegetation types with different species compositions, soil qualities, slopes, aspects, and precipitation regimes.

Duration of Stages-- Menke and Villaseñor (1977) and Zedler (1977) give good descriptions of the chaparral post-fire recovery schedule. For the first 1 to 3 years, cover is dominated by short-lived herbs and subshrubs; shrubs are present as seedlings and root-crown sprouts. From 3 to 15 years, herbaceous species disappear as shrubs and subshrubs enlarge, but shrub canopies generally do not touch. From approximately 10 to 30+ years after a burn, shrub cover increases, canopies begin to overlap, relatively short-lived shrubs begin to die, and dead material accumulates. Stands more than 25 to 35 years old eventually can become senescent. The post-fire recovery schedule varies with species composition, slope, aspect, elevation, and soil type. Shrub regeneration is quicker on more mesic sites. In southern California, stands dominated by manzanita, ceanothus, and scrub oak reach 50 to 60 percent cover in 10 years and 80+ percent cover in 25 to 30 years (Horton 1960, Vogl 1976, Pase 1982b). Recovery time usually is shorter in northern California. Stands of Chamise-Redshank Chaparral (CRC) can become extremely senescent in 60 to 90 years; some Mixed Chaparral types may take 2 to 3 times longer (Hanes 1982).

Biological Setting

Habitat-- Mixed and Chamise-Redshank Chaparral (CRC) occur as a mosaic on low to middle elevation slopes below several woodland and forest types. Compared to Chamise-Redshank Chaparral, Mixed Chaparral generally occupies more mesic sites at higher elevations or on north-facing slopes. In southern California, Coastal Scrub (CSC) may form the lower chaparral boundary (Hanes 1977). In northern California, Mixed Chaparral merges with Annual Grassland (AGS) and Blue Oak-Foothill Pine (BOP) at lower elevations. Chaparral shrubs form the understory of many Blue Oak-Foothill Pine stands. At upper elevations, Mixed Chaparral grades into Coastal Oak Woodland (COW), Ponderosa Pine (PPN) or mixed conifer types and frequently forms the understory of these habitats. On desert exposures, Desert Scrub (DSC), Desert Succulent Scrub (DSS) or Joshua Tree (JST) may be found below Mixed Chaparral. Jeffrey Pine (JPN), Pinyon-Juniper (PJN) or Juniper (JUN) habitats occur above Mixed Chaparral.

Wildlife Considerations-- No wildlife species are restricted to Mixed Chaparral. Most species are found in other shrub-dominated types including Chamise-Redshank Chaparral (CRC), Montane Chaparral (MCP), Coastal Scrub (CSC), and Sagebrush (SGB), or the shrubs beneath several woodland and forest types. Wildlife management considerations usually focus on selecting alternative fire management treatments. Potential impacts of management actions in Mixed Chaparral generally are similar to Chamise-Redshank Chaparral.

Physical Setting

Mixed Chaparral occurs on all aspects, but at lower elevations, it generally is found on north-facing slopes. This pattern is especially true in southern California. Generally, it occurs on steep slopes and ridges with relatively thin, well-drained soils (Oruduff 1974, Cheatham and Haller 1975). Soils can be rocky, sandy, gravelly or heavy (Cheatham and Haller 1975, Thorne 1976). Mixed Chaparral occurs on sites with deeper and more mesic soils than Chamise-Redshank Chaparral (Cheatham and Haller 1975). Serpentine soils are high in several potentially toxic substances, such as iron and magnesium, and low in required nutrients, including calcium (Whittaker 1975). The mediterranean climate is characterized by cool, wet winters and hot, dry summers. Total rainfall is 38 to 63 cm (15 to 25 in) with less than 20 percent falling during the summer (Oruduff 1974).

Distribution

Mixed Chaparral generally occurs below 1520 m (5000 ft) on mountain ranges throughout California except in the deserts (Cheatham and Haller 1975, Parker and Matyas 1981). Upper and lower elevational limits vary considerably with precipitation regime, aspect, and soil type. Mixed Chaparral occurs throughout the transverse, peninsular, and central coast ranges and the Tehachapi Mountains. In the Sierra Nevada, this type is a broken band along middle and lower elevations of the western slope. It also

occupies large areas in the north coast ranges, especially on interior slopes, and is found as large discontinuous patches in the Siskiyou Mountains and Cascade and Klamath Ranges (Cheatham and Haller 1975, Hanes 1977).

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**California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group**

Montane Chaparral

Roland J. Risser and Michael E. Fry

Vegetation

Structure-- The growth form of montane chaparral species can vary from treelike (up to 3 meters) to prostrate. When mature, it is often impenetrable to large mammals. Its structure is affected by site quality, history of disturbance (e.g., fire, erosion, logging) and the influence of browsing animals. For example, on shallow granitic soils in the Sierra Nevada, low dense growths of pinemat manzanita and huckleberry oak characterize an edaphic climax community, associated with scattered conifers and much exposed granite. Following fire in the mixed conifer forest habitat type, whitethorn ceanothus-dominated chaparral may persist as a subclimax community for many years. Montane chaparral is characterized by evergreen species; however, deciduous or partially deciduous species may also be present. Understory vegetation in the mature chaparral is largely absent. Conifer and oak trees may occur in sparse stands or as scattered individuals within the chaparral type.

Composition-- Montane chaparral varies markedly throughout California. Species composition changes with elevational and geographical range, soil type, and aspect. One or more of the following species usually characterize montane chaparral communities: whitethorn ceanothus, snowbrush ceanothus, greenleaf manzanita, pinemat manzanita, hoary manzanita, bitter cherry, huckleberry oak, sierra chinquapin, juneberry, fremont silktassel, Greene goldenweed, mountain mahogany, toyon, sumac and California buckthorn. As one or more of these species become dominant under various environmental regimes, further subclassification of the montane chaparral series is possible (Krebs 1972, McNaughton 1968).

Other Classifications-- Montane chaparral has been broadly described as chaparral (Munz and Keck 1973, (Küchler 1977) or mountain shrub (USDA 1977). Subclassifications based upon predominant species composition have also been described as montane mixed shrub series, huckleberry oak/pinemat manzanita series, bush chinquapin series, greenleaf manzanita series, tobacco brush series, mountain whitethorn series (Parker and Matyas 1981); upper montane chaparral, lower montane chaparral (Cheatham and Haller 1975).

Habitat Stages

Vegetation Changes-- 1;2-4:S-D. Montane chaparral in California occurs in

gradations between two characteristic successional sequences: The first sequence is associated with poorer, typically shallow soils (in early stages of development), often overlying fractured bedrock. Here, chaparral species may predominate to form an edaphic climax community.

In the second sequence, chaparral is a secondary succession following disturbance on deeper forest soils. After disturbance (logging, fire, erosion) chaparral proliferates and may exclude conifers and other vegetation for many years. However, chaparral may facilitate the germination of red fir seedlings (Barbour 1984) and other shade tolerant conifers by providing a protective cover, moderating microclimate, and improving soil conditions. Chaparral shrubs may be an essential link in forest succession by building up soil nutrient levels, especially nitrogen, to the point where trees can survive (Zavitovski and Newton 1968). In mature timber stands, chaparral species may senesce due to insufficient light through the canopy and are only present as a sparse understory. Thus, silvicultural practices have a strong influence on the structure of montane chaparral.

Most montane chaparral species are fire adapted. Mature plants sprout back from the root crown. Some species require scarification of the seed for germination and may produce numerous seedlings after a fire (Gratkowski 1961). However, if fires are too frequent, these species may be eliminated (Biswell 1969) changing the subsequent structure of the community. Deer and livestock foraging on sprouting chaparral may also have a significant effect on its rate of development, structure, and ultimate species composition (Biswell and Gilman 1961, Davis 1967). The forage yields of most sprouting shrubs are reduced for the first few years after a fire, but rapidly regain their original status. Burned areas commonly produce new shrub growth high in protein and are a preferred food source for herbivores (Einarsen 1946, Swank 1956).

Duration of Stages-- Following fire, herbaceous plants may dominate for up to 5 years. Usually within 7 to 9 years the brush overstory is fully developed (Sweeney 1956, Sampson 1944). Chaparral may persist for up to 50 years or longer before conifer development begins to significantly reduce the shrub growth through shading (Lyon 1969, Sweeney 1968). Where chaparral types occur as an edaphic climax (i.e., on poor, rocky soils, fractured bedrock or lava caps), growth rates may be rather slow, growth form is usually small and stunted, and individuals may be quite old. Development of montane chaparral at high elevations is often slowed by cold temperatures, snow cover and a short growing season (Barbour and Major 1977). However, at lower elevations, burned or logged areas may sprout new growth by the next growing season.

Biological Setting

Habitat-- Montane chaparral adjoins a variety of other wildlife habitats, including montane riparian (MRI), mixed chaparral (MCH), and perennial grassland (PGS). It becomes established in disturbed coniferous habits such as ponderosa pine (PPN), mixed conifer (SMC), Jeffrey pine (JPN), red fir (RFR) and lodgepole pine (LPN). At high elevations in the southern Sierra, it may occur with a sparse juniper overstory. At the lower extent of its elevational range, montane chaparral may intergrade with mixed

chaparral, a very similar habitat type.

Wildlife Considerations-- Montane chaparral provides habitat for a wide variety of wildlife. Numerous rodents inhabit chaparral (Wirtz 1974). Deer and other herbivores often make extensive use of chaparral. Throughout the west slope of the Sierra and south through the Transverse Range, deer are strongly associated with chaparral communities. Montane chaparral provides critical summer range foraging areas, escape cover and fawning habitat. In the Sierra, fawning areas are frequently found where the chaparral lies adjacent to or contains an interspersed area of perennial grass or meadow-riparian habitat (Ashcraft 1975, Dasmann, 1971, Ashcraft 1976, Pacific Gas and Electric 1981). Some small herbivores use chaparral species in fall and winter when grasses are not in abundance. Rabbits and hares eat twigs, evergreen leaves and bark from chaparral. Shrubs are important to many mammals as shade during hot weather, and moderate temperature and wind velocity in the winter (Loveless 1967). Many birds find a variety of habitat needs in the montane chaparral. It provides seeds, fruits, insects, protection from predators and climate, as well as singing, roosting and nesting sites (Verner and Boss 1980), Storer and Usinger 1970).

Physical Setting

Montane chaparral can be found on shallow to deep soils, on all exposures, and from gentle to relatively steep slopes. It may dominate on more xeric sites, but occurs locally throughout the coniferous forest zone. Generally, climate is like that associated with the coniferous forest zone, cold winter temperatures with substantial precipitation. Summers are typically hot and dry (Barbour and Major 1977). In the northern portion of the state, montane chaparral is found between 914 to 2743 m (3000-9000 ft). In southern California this type occurs above 2134 m (7000 ft).

Distribution

Montane chaparral is associated with mountainous terrain from mid to high elevation at 914 to 3047 m (3000-10,000 ft). It occurs in southern California above 2134 m (7000 ft) in the Transverse Range of Los Angeles, and in San Bernardino, Riverside and San Diego counties; from Siskiyou to Kern counties in the Cascade and Sierra Nevada mountains; as a minor type from Tehama to Lake counties; and in Del Norte, Siskiyou, Trinity, and Shasta counties in the North Coast Ranges and Klamath mountains (Barbour and Major 1977). As a successional stage following disturbance, its distribution coincides with the ponderosa pine and mixed coniferous forest habitat types (Barbour and Major 1977).

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Blue Oak Woodland

Lyman V. Ritter

Vegetation

Structure-- Generally these woodlands have an overstory of scattered trees, although the canopy can be nearly closed on better quality sites (Pillsbury and De Lasaux 1983). The density of blue oaks on slopes with shallow soils is directly related to water stress (Griffin 1973). The canopy is dominated by broad-leaved trees 5 to 15 m (16 to 50 ft) tall, commonly forming open savanna-like stands on dry ridges and gentle slopes. Blue oaks may reach 25 m (82 ft) in height (McDonald 1985); the tallest tree, found in Alameda County, measured 28.7 m (94 ft) high and had a crown spread of 14.6 m (48 ft) (Pardo 1978). Shrubs are often present but rarely extensive, often occurring on rock outcrops. Typical understory is composed of an extension of Annual Grassland vegetation.

Composition-- Blue oak is the dominant species, comprising 85 to 100 percent of the trees present. Common associates in the canopy are coast live oak in the Coast Range, interior live oak in the Sierra Nevada, valley oak where deep soil has formed, and western juniper in the Cascade Range. In the Tehachapi and Paiute Ranges in Kern County, this habitat mixes with species from east of the mountains California juniper and single-leaf pinyon. In interior sections of the southern Coast Range, as in San Luis Obispo County, it mixes with California juniper (V. L. Holland, pers. comm.). Associated shrub species include poison-oak, California coffeeberry, buckbrush, redberry, California buckeye, and manzanita spp. The ground cover is comprised mainly of annuals, such as brome grass, wild oats, foxtail, needlegrass, filaree, fiddleneck, and others. Comprehensive descriptions of different BOW's can be found in White (1966), Griffin (1977), Baker et al. (1981), and Pillsbury and De Lasaux (1983).

Other Classifications-- The habitat is referred to as Foothill Woodland by Munz and Keck (1959), Blue Oak Phase of the Foothill Woodlands by Griffin (1977), Blue Oak Series by Paysen et al. (1980), Blue Oak Savanna by Verner and Boss (1980), and Blue Oak Community by Parker and Matyas (1981). BOW's and Blue Oak-Foothill Pine Woodlands are considered a single habitat in Küchler's (1977) Blue Oak-Foothill Pine Forest (25) and in the Blue Oak-Foothill Pine (250) type of the Society of American Foresters (Eyre 1980).

Habitat Stages

Vegetation Changes-- 1;2-5:S-D. Details of successional trends in this habitat type are poorly known. Succession presumably proceeds directly from annual grasslands to tree stages. Most stands of BOW exist as medium or large tree stages with few or no young blue oaks present (White 1966, Holland 1976, Griffin 1977, Baker et al. 1981). Therefore, only structural classes 3-5:S-D are likely to be found. Few areas can be found in California where successful recruitment of blue oaks has occurred since the turn of the century (Holland 1976). This may be due to changes in land use; increased consumption or damage of acorns and seedlings by insects, livestock, and native animals; competition between seedlings and introduced annuals for available soil nutrients and moisture; and the absence of appropriate climatic conditions. Where germination of acorns occurs, survival and growth of the seedlings typically fail. Probably in the drier savanna-like stands, the grassland openings will simply become larger as older trees die. Griffin (1977) suggests that live oaks may replace deciduous oaks in some areas, because their seedlings are more browse resistant. Many authorities question whether conditions will ever again support the recruitment of blue oaks needed to maintain these important woodlands.

Duration of Stages-- Valid generalizations about the duration of various successional stages leading to mature stands of BOW are not possible, because adequate quantitative studies have never been done. The successional sequence probably takes at least 50 years, even on good sites. Age studies in the Coast Range (White 1966, Pillsbury and De Lasaux 1983) and the southern Sierra Nevada (Brooks 1969) indicate that most blue oak stands are currently 80 to 120 years in age. Blue oaks are relatively slow-growing, long-lived trees. Large blue oaks range in age from 153 to 390 years (White 1966). Estimation of tree age based on dbh measurements is risky, however, because the dbh relationship varies tremendously depending on site quality. Moreover, height growth is extremely slow or even ceases after trees reach 65 cm (26 in) in dbh (McDonald 1985).

Biological Setting

Habitat-- This type usually intergrades with Annual Grasslands or Valley Oak Woodlands at lower elevations and Blue Oak-Foothill Pine woodlands at higher elevations.

Wildlife Considerations-- The importance of oak habitats to wildlife in California has recently been reviewed by Barrett (1980) and Verner (1980a.), but they give few details relevant specifically to BOW's. Verner and Boss (1980) give data on wildlife use in blue oak savannahs of the western Sierra Nevada. They indicate that 29 species of amphibians and reptiles, 57 species of birds, and 10 species of mammals find mature stages of this type suitable or optimum for breeding, assuming that other special habitat requirements are met. Griffin (1971) concluded that acorns buried by scrub jays, yellow-billed magpies, western gray squirrels and California ground squirrels are more likely to germinate because they root better and are less likely to be eaten. Although many wildlife species benefit from the use of oaks and even enhance oak germination,

additional information is needed on many aspects of oak-wildlife relationships before this habitat can be properly managed.

Physical Setting

BOW's are usually associated with shallow, rocky, infertile, well-drained soils from a variety of parent materials (McDonald 1985). Blue oaks are well adapted to dry, hilly terrain where the water table is usually unavailable (Griffin 1973). The climate is Mediterranean, with mild wet winters and hot dry summers. Climatic extremes are relatively great in these woodlands, because they have a considerable geographic and elevational range. Average annual precipitation varies from 51 to 102 cm (20 to 40 in) over most of the blue oak's range, although extremes are noted from 25 cm (10 in) in Kern County to 152 cm (60 in) in Shasta County (McDonald 1985). Blue oaks have an unusual tolerance of severe drought, even shedding their leaves during periods of extreme moisture stress. This survival trait contributes to its pattern of distribution, as it competes most successfully with other tree species on drier sites (McDonald 1985). Mean maximum temperatures are from 24 to 36 C (75 to 96 F) in summer, and minima are from 2 to 6 C (29 to 42 F) in winter. The growing season ranges from 6 months in the north to the entire year in the south, with 175 to 365 frost-free days (Burcham 1975).

Distribution

BOW's occur along the western foothills of the Sierra Nevada-Cascade Ranges, the Tehachapi Mountains, and in the eastern foothills of the Coast Range, forming a nearly continuous ring around the Central Valley. The habitat is discontinuous in the valleys and on lower slopes of the interior and western foothills of the Coast Range from Mendocino County to Ventura County. It is generally found at elevations from 152 to 610 m (500 to 2000 ft) at the northern end of its range and on the western slopes of the Sierra Nevada, from 76 to 915 m (250 to 3000 ft) in the central Coast Range, and from 168 to 1370 m (550 to 4500 ft) in the Transverse and Peninsular Ranges (Sudworth 1908).

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Montane Hardwood

Philip M. McDonald

Vegetation

Structure-- A typical montane hardwood habitat is composed of a pronounced hardwood tree layer, with an infrequent and poorly developed shrub stratum, and a sparse herbaceous layer. On better sites, individual trees or clumps of trees may be only 3 to 4 m (10 to 13 ft) apart. On poorer sites, spacing increases to 8 to 10 m (26 to 33 ft). Where trees are closely spaced, crowns may close but seldom overlap. Living crowns on mature canyon live oaks occupy about 60 percent of the bole on typical sites and up to 80 percent on poor sites. Tree heights tend to be uniform at most ages in mature stands where hardwoods occur, but subordinate to conifers. Mature oaks on better sites and in canyons range between 17 and 30 m (56 and 98 ft) tall and up to 150 cm (59 in) dbh. On poorer sites, mature trees typically are 10 to 15 m (33 to 49 ft) tall with boles up to 65 cm (26 in) in dbh, with dome-shaped crowns almost as wide as the trees are tall. On rocky summits, canyon live oak is a shrub of small diameter, usually less than 4 m (13 ft) in height. Snags and downed woody material generally are sparse throughout the montane hardwood habitat.

Composition-- In the Coast Range and Klamath Mountains, canyon live oak often forms pure stands on steep canyon slopes and rocky ridge tops. It is replaced at higher elevations by huckleberry oak (Parker and Matyas 1980)(No 1980 Lit Cite only 1979 and 1981.). At higher elevations, it is scattered in the overstory among ponderosa pine, Coulter pine, California white fir, and Jeffrey pine, the latter on serpentine and peridotite outcrops. Middle elevation associates are Douglas-fir, tanoak, Pacific madrone, California-laurel, California black oak, and bristlecone fir. Knobcone pine, foothill pine, Oregon white oak, and coast live oak are abundant at lower elevations. Understory vegetation is mostly scattered woody shrubs (manzanita, mountain-mahogany, poison-oak) and a few forbs.

In the Transverse and Peninsular ranges of southern California, overstory associates at middle and higher elevations are Jeffrey pine, ponderosa pine, sugar pine, incense-cedar, California white fir, bigcone Douglas-fir, California black oak, and Coulter pine. At lower elevations, associates are white alder, coast live oak, bigleaf maple, California-laurel, bigcone Douglas-fir, and occasionally valley oak, foothill pine, and blue oak (Cheatham and Haller 1975, McDonald and Littrell 1976). Understory shrub species are manzanita, poison-oak, coffeeberry, currant, and ceanothus.

In the southern Cascade and Sierra Nevada ranges, steep, rocky south slopes of major river canyons often are clothed extensively by canyon live oak and scattered old-growth Douglas-fir. Elsewhere, higher elevation overstory associates are typical mixed conifer and California black oak; lower elevation associates are foothill pine, knobcone pine, tanoak, Pacific madrone, and scrubby California-laurel. Associated understory vegetation includes Oregon-grape, currant, wood rose, snowberry, manzanita, poison-oak, and a few forbs and grasses.

Other Classifications-- In southwest Oregon, the species is part of the mixed evergreen (*Pseudotsuga-sclerophyll*) zone and to a lesser extent the conifer forest zone on drier areas (Franklin and Dryness 1969). These classifications are pertinent to California as well. In California, canyon live oak occurs in 12 of the 17 forest communities described by Munz and Keck (1968)(No Munz and Keck 1968 in Hab Lit Cite.), in 8 dominance types in the Sierra Nevada (Myatt 1980), and in 6 ecological provinces (Parker and Matyas 1980). Cheatham and Haller (1975) place canyon live oak in 8 minor subdivisions of 2 habitat types. Canyon live oak is recognized as a forest cover type by the Society of American Foresters and is an associate species in eight other types (Eyre 1980).

Habitat Stages

Vegetation Changes-- 1;2-5:S-D. Initial establishment of canyon live oak is by acorns, most of which do not move far from beneath tree crowns. Wider dissemination of acorns and seeds of associate species is by birds and mammals. After establishment, canyon live oak sprouts vigorously from the root crown. Most hardwood associates also sprout prolifically. Rapid sprout growth enables the hardwoods to capture most of the favorable micro sites, forcing the conifers to invade harsher sites, or those made harsh by hardwood roots below ground and hardwood shade above. Delayed establishment, slow growth, and sparse or clumpy distribution of conifers often results. In most instances, succession is slow. Seldom is canyon live oak a pioneer species, but occasionally it invades and becomes established on alluvial soils (Heady and Zinke 1978). Canyon live oak has loose, dead, flaky bark that catches fire readily and burns intensely (Plumb 1980). Occasional fire often changes a stand of canyon live oak to live oak chaparral, but without fire for sufficient time, trees again develop. Where fire is frequent, this oak becomes scarce or even drops out of the montane hardwood community.

Duration of Stages-- A type more stable than Montane Hard wood is difficult to envision. The large number of species in the type, both conifer and hardwood, allow it to occupy and persist in a wide range of environments. Good soils and poor, steep slopes and slight, frequently disturbed and pristine all are at least adequate habitats for one or more species. Longevity (at least 300 years for some species), and large size help to ensure dominance. Seed and sprout reproductive modes assure both wide spread and stationary reproduction, and consequently several age and size classes usually are present in most areas. Growth of most hardwoods, especially canyon live oak, generally

is slow and depends on depth and rockiness of soil, slope, and possibly length of time for roots to reach groundwater (Myatt 1980)

Biological Setting

Habitat-- At lower elevations, neighboring habitats are Valley foothill Hardwood-conifer (VHC) and, to a lesser extent, Closed cone Pine Cypress (CPC). At low and middle elevations, Mixed Chaparral (MCH) interfaces with Montane Hardwood. Wildlife habitats at middle elevations, often overlapping above and below, are Montane Hardwood-conifer (MHC), Mixed Conifer (MCN), Douglas-fir (DFR) and, to a lesser degree, Pine-juniper (PJN). At higher elevations, Montane Hardwood is neighbor to Eastside Pine (EPN), Jeffrey Pine (JPN), and Montane Chaparral (MCP).

Wildlife Considerations-- Bird and animal species characteristic of the Montane Hardwood habitat include disseminators of acorns (scrub and Steller's jays, acorn woodpecker, and western gray squirrel) plus those that utilize acorns as a major food source wild turkey, mountain quail, band-tailed pigeon, California ground squirrel, dusky-footed woodrat, black bear, and mule deer. Deer also use the foliage of several hardwoods to a moderate extent. Many amphibians and reptiles are found on the forest floor in the Montane Hardwood habitat. Among them are Mount Lyell salamander, ensatina, relictual slender salamander, western fence lizard, and sagebrush lizard. Snakes include rubber boa, western rattlesnake, California mountain kingsnake, and sharp tailed snake.

Physical Setting

Canyon live oak and associates are found on a wide range of slopes, especially those that are moderate to steep. Soils are for the most part rocky, alluvial, coarse textured, poorly developed, and well drained. Soil depth classes range from shallow to deep. Canyon live oak, incense-cedar, and a few other associates are also found on ultrabasic soils. Mean summer temperatures in the Montane Hardwood habitat vary between 20 and 25 C (68 and 77 F) and mean winter temperatures between 3 and 7 C (37 and 45 F). Frost-free days range from 160 to 230 (Thornburgh 1986)(No Thornburgh 1986 in Habitat Lit Cite.). Annual precipitation varies from 2794 mm (110 in) in the northern Coast Range to 914 mm (36 in) in the mountains of southern California.

Distribution

The Montane Hardwood habitat ranges throughout California mostly west of the Cascade-Sierra Nevada crest. East of the crest, it is found in localized areas of Placer, El Dorado, Alpine and San Bernardino Counties. Elevations range from 100 m (300 ft) near the Pacific Ocean to 2745 m (9000 ft) in southern California

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Montane Riparian

William E. Grenfell Jr.

Vegetation

Structure-- The vegetation of montane riparian (MRI) zones is quite variable and often structurally diverse (Marcot 1979). Usually, the montane riparian zone occurs as a narrow, often dense grove of broad-leaved, winter deciduous trees up to 30 m (98 ft) tall with a sparse understory. At high mountain elevations, MRI is usually less than 15 m (49 ft) high with more shrubs in the understory. At high elevations, MRI may not be well developed or may occur in the shrub stage only.

Composition-- In northwest California along streams west of the Klamath Mountains, black cottonwood is a dominant hardwood. In some areas, it is codominant with bigleaf maple. In either case, black cottonwood can occur in association with dogwood and boxelder. At high elevations black cottonwood occurs with quaking aspen and white alder (Parker and Matyas 1979). In northeastern California, black cottonwood, white alder and thinleaf alder dominate the montane riparian zone. Oregon ash, willow and a high diversity of forbs are common associates. In the Sierra Nevada, characteristic species include thinleaf alder, aspen, black cottonwood, dogwood, wild azalea, willow and water birch (southern Sierra east of the crest), white alder and dogwood (north Sierra). In the southern Coast Range as well as Transverse and Peninsular ranges, bigleaf maple and California bay are typical dominants of montane riparian habitat. Fremont cottonwood is the most important cottonwood in the Sierra below 1524 m (5000 ft), much of the Coast Ranges and the Transverse and Peninsular ranges.

MRI habitats can occur as alder or willow stringers along streams of seeps. In other situations an overstory of Fremont cottonwood, black cottonwood and/or white alder may be present.

Other Classifications-- Montane riparian habitats are also described as riparian (Laudenslayer 1982), riparian deciduous (Verner and Boss 1980, Marcot 1979), bigleaf maple, alder, maple-alder-dogwood, white alder, willow and alder-willow series (Parker and Matyas 1979), mixed riparian woodland -6.21, willow thickets - 6.24 and red alder groves - 6.22 (Cheatham and Haller 1975)

Habitat Stages

Vegetation Changes-- 1;2-5:S-D;6. Definite successional stages are not described in

the literature. Many montane riparian stages may prevail indefinitely, climax or subclimax. Shrub-type stages should be evaluated as size/age class 1 or 2. Overstory trees such as cottonwood, maple and alder may range up to size/age class 6.

Duration of Stages-- Montane riparian habitats within given watersheds tend to maintain the same mosaic of stages. However, the location of these stages may vary as a result of periodic torrential flows. Riparian Systems can be damaged by debris, sedimentation, or uprooting of entire plants which are redeposited further downstream (Campbell and Green 1968).

Biological Setting

Habitat-- The transition between MRI and adjacent non-riparian vegetation is often abrupt, especially where the topography is steep. This habitat intergrades with montane chaparral, montane hardwood, montane hardwood/conifer, lodgepole pine, red fir and wet meadow habitats.

Wildlife Considerations-- All riparian habitats have an exceptionally high value for many wildlife species (Thomas 1979, Marcot 1979, Sands 1977). Such areas provide water, thermal cover, migration corridors and diverse nesting and feeding opportunities. The shape of many riparian zones, particularly the linear nature of streams, maximizes the development of edge which is so highly productive for wildlife (Thomas 1979).

The range of wildlife that uses the MRI habitat for food, cover and reproduction include amphibians, reptiles, birds and mammals. The southern rubber boa and Sierra Nevada red fox are among the rare, threatened or endangered wildlife that use MRI habitats during their life cycles.

Physical Setting

Riparian areas are found associated with montane lakes, ponds, seeps, bogs and meadows as well as rivers, streams and springs. Water may be permanent or ephemeral (Marcot 1979). The growing season extends from spring until late fall, becoming shorter at higher elevations. Most tree species flower in early spring before leafing out.

Distribution

Montane riparian habitats are found in the Klamath, Coast and Cascade ranges and in the Sierra Nevada south to about Kern and northern Santa Barbara Counties, usually below 2440 m (8000 ft). The Peninsular and transverse ranges of southern California from about southern Santa Barbara to San Diego Counties also include MRI habitat. MRI subtype, consisting mostly of red alder, is found from northern San Luis Obispo to Del Norte Counties along the immediate coast (Cheatham and Haller 1975).

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California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group

Sierran Mixed Conifer

Barbara H. Allen

Updated by: CWHR Staff, April 2005

Vegetation

Structure. The Sierran mixed conifer habitat is an assemblage of conifer and hardwood species that forms a multilayered forest. Historically, burning and logging have caused wide variability in stand structure, resulting in both even-aged and uneven-aged stands (Rundel et al. 1977). Virgin old-growth stands where fire has been excluded are often two-storied, with the overstory comprised of mixed conifer and the understory white fir and incense-cedar (Tappeiner 1980).

Forested stands form closed, multilayered canopies with nearly 100 percent overlapping cover (Rundel et al. 1977). When openings occur, shrubs are common in the understory (Kosco 1980). Closed canopy stand distribution is both extensive and patchy depending on scale, site, slope, soils, microclimate, and history.

At maturity, the dominant conifers range from 30 to 60 m (100 to 200 ft) tall with a highly variable basal areas of about 17 to 26 sq m (180 - 280 sq ft). Diameter breast height at maturity for pines and Douglas-fir is commonly greater than 1 m (40 in); white fir greater than 0.9 m (35 in) is common (Laake and Fiske 1983b). Fuel loading in stands heavy with pine may reach 27,000 kg/ha (70 to 80 t/ac) in natural stands; whereas fuel loading in stands heavy with fir may reach 16,000 kg/ha (40 to 50 t/ac).

Composition. Five conifers and one hardwood typify the mixed conifer forest white fir, Douglas-fir, ponderosa pine, sugar pine, incense-cedar, and California black oak. White fir tends to be the most ubiquitous species (though most often a minor overstory component) because it tolerates shade and has the ability to survive long periods of suppression in brush fields Douglas-fir dominates the species mix in the north, but is absent south of the Merced River (Tappeiner 1980). Ponderosa pine dominates at lower elevations and on south slopes. Jeffrey pine commonly replaces ponderosa pine at high elevations, on cold sites, or on ultramafic soils (Rundel et al. 1977). Red fir is a minor associate at the highest elevations. Sugar pine is found throughout the mixed conifer type. Black oak is a minor, but widespread, component in mixed conifer stands. Though black oak does best on open sites, it is maintained under adverse conditions such as shade, ridge tops, and south slopes where conifers may regenerate in its shade (Tappeiner 1980). In the central and particularly southern Sierra Nevada, giant sequoia is a striking associate of the mixed conifer type (Rundel et al. 1977). White fir, incense-cedar and sugar pine are associated with the mesic giant sequoia sites (Tappeiner 1980).

Deerbrush, manzanita, chinquapin, tan oak, bitter cherry, squawcarpet, mountain whitethorn, gooseberry, rose, and mountain misery are common shrub species in the mixed conifer understory (Kosco and Bartolome 1983). Grasses and forbs associated with

this type include mountain brome, *Carex*, bull thistle, iris, *Juncus*, and needlegrass. In all, over 100 species of grasses, forbs and shrubs contribute to the flora of the mixed conifer habitat (Tappeiner 1980).

Other Classifications.- Other names for the Sierran mixed conifer habitat include yellow pine forest (Munz 1973). Parker and Matyas (1981) divide Sierran mixed conifer into five series: mixed conifer-fir, mixed conifer-pine, ponderosa pine, white fir and Jeffrey pine. Rundel et al. (1977) describes the mixed conifer as part of a White fir-mixed conifer forest and Cheatham and Haller (1975) call this habitat Sierran coniferous forest (8.42), a major subdivision of the lower montane coniferous forest habitat (8.4). Sierran mixed conifer is SAF type 243 (Tappeiner 1980). Where ponderosa pine or Douglas-fir predominates without significant amounts of white fir or incense-cedar, the forest is typed as Pacific ponderosa pine or Pacific ponderosa pine-Douglas-fir (SAF types 245 and 244, respectively) (McDonald 1980).

Habitat Stages

Vegetation Changes 1;2-5:S-D;6. After logging or burning, succession proceeds from an ephemeral herb to perennial grass-herb, through a shrub-perennial grass stage, to conifers (Burcham 1964). In many areas, however, shrubs appear in the first year after disturbance (Kosco 1980). The habitat stages are stage 1, grass-forb, with bedstraw, plantain, mountain brome, and needlegrass as common early succession species; stage 2, shrub-seedling-sapling, characterized by manzanita, *Ceanothus*, cherry, gooseberry, and mountain misery. In the seedling tree stage through the sapling tree, pole tree, small tree, and medium/large tree stages, the five conifers gain dominance of the site.

Duration of Stages. Stage duration has been described by Verner (1980). The grass-forb stage, generally is short-lived (less than 2 years). The shrub-seedling-sapling stage is usually evident by yr 2 and lasts 10 to 40 yr; this stage is a mixture of shrubs and saplings up to 6 m (20 ft) tall depending on the site, degree, and type of disturbance. If tall shrubs capture the site, it may take 10 to 15 plus yr for trees to dominate the site. The pole-medium tree stage supports trees up to 15 m (50 ft) tall and may last from 15 to 90 yr on poor sites. The mature and overmature stages include stands greater than about 30 m (100 ft) in height.

Biological Setting

Habitat. The type adjoins Ponderosa Pine (PPN) at lower elevations and drier slopes, and White Fir (WFR) and Red Fir (RFR) at higher elevations. Wet Meadow (WTM) and Montane Riparian (MRI) are found within the Sierran Mixed Conifer type. Blue Oak - Foothill Pine (BOP) and Mixed Chaparral (MCH) may adjoin this type at drier, and lower, elevations.

Wildlife Considerations. The mixed conifer forest supports some 355 species of animals (Verner and Boss 1980). Sensitive species inhabiting mixed conifer include spotted owl, fisher and pine marten. Endangered species include bald eagle and peregrine

falcon (Verner and Boss 1980). Variety in plant species composition provides diversity in food and cover. Black oak acorns, berries from a variety of shrubs (e.g., deerbrush), and a great number of grasses and forbs provide the forage resource essential for wildlife (Kosco and Bartolome 1983).

Physical Setting

Soils supporting the Sierran mixed conifer habitat are varied, derived primarily from Mesozoic granitic, Paleozoic sedimentary and volcanic rocks, and Cenozoic volcanic rocks. Serpentine soils, found primarily in the northern mixed conifer zone, support a number of endemic plants. Soils are deep to shallow. Fissures and cracks in granitic parent material often support forest growth, even where soil development is shallow. Temperatures range from 24 to 58 C (40 to 96 F) in summer and 4 to 36 C (10 to 60 F) in winter and decrease with elevation (Major 1977). The growing season ranges between 90 and 330 days in the north with 40 to 200 frost-free days, and 180 to 365 days in the south with 180 frost-free days. Precipitation ranges from 76 to 229 cm (30 to 90 in) per year, from October to May, with increasing snowfall as elevation increases.

Distribution

The Sierran mixed conifer habitat generally forms a vegetation band ranging 770 to 1230 m (2500 to 4000 ft) in the north to 1230 to 3076 m (4000 to 10,000 ft) in the southern Sierra Nevada (Griffin and Critchfield 1972). The Sierra Nevada mixed conifer forest occupies between 1.8 to 3.2 million ha (4.5 to 7.8 million ac) in southern Oregon and California, dominating western middle elevation slopes of the Sierra Nevada. Disjunct populations of mixed conifer are found in the Peninsular, Transverse, and Coast ranges of California.

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Valley Foothill Riparian

William E. Grenfell Jr.

Vegetation

Structure-- Canopy height is approximately 30 m (98 ft) in a mature riparian forest, with a canopy cover of 20 to 80 percent. Most trees are winter deciduous. There is a subcanopy tree layer and an understory shrub layer. Lianas (usually wild grape) frequently provide 30 to 50 percent of the ground cover and festoon trees to heights of 20 to 30 m (65 to 98 ft). Herbaceous vegetation constitutes about one percent of the cover, except in openings where tall forbs and shade-tolerant grasses occur (Conard et al. 1977). Generally, the understory is impenetrable and includes fallen limbs and other debris.

Composition-- Dominant species in the canopy layer are cottonwood, California sycamore and valley oak. Subcanopy trees are white alder, boxelder and Oregon ash. Typical understory shrub layer plants include wild grape, wild rose, California blackberry, blue elderberry, poison oak, buttonbrush, and willows. The herbaceous layer consists of sedges, rushes, grasses, miner's lettuce, Douglas sagewort, poison-hemlock, and hoary nettle.

Other Classifications-- Other classification schemes that describe VRI habitats are Cottonwood and California Sycamore (Parker and Matyas 1981), Central Valley Bottomland Woodland 6.11, Southern Alluvial Woodland - 6.31 (Cheatham and Haller 1975), Wild Rose Alder, Cottonwood, Sycamore, Willow (Paysen et al. 1980), Riparian Forest - 28 (Küchler 1977) and Forested Wetland -61 (Anderson et al. 1976).

Habitat Stages

Vegetation Changes-- 1;2-5:S-D. Cottonwoods grow rapidly and can reach WHR size/age class 5 in about 20 to 25 years. One specimen measuring 92 cm (36 in) (inside the bark) showed an age of 29 years (Sudworth 1908). This secondary succession to climax could occur as rapidly as 25 to 30 years in VRI habitats dominated by cottonwood. One valley oak tree 54 cm (21 in) in diameter (WHR size/age class 4) showed an age of 57 years. Valley oak dominated riparian systems would probably take 75+ years to reach climax/maturity. Some VRI types consisting of only a shrub layer (VRI 1;2: S-D) (willows, wild rose, blackberry) may persist indefinitely.

Duration of Stages-- Shrubby riparian willow thickets may last 15-20 years before being overtopped and shaded out by cottonwoods. Cottonwood or willow tree

habitats close to river channels that receive a good silt infusion, without major disruptive flows, tend to be self-perpetuating (R. Holland pers. comm.).

Biological Setting

Habitat-- Transition to adjacent non-riparian vegetation is usually abrupt, especially near agriculture (Cheatham and Haller 1975). The Valley-Foothill Riparian habitat is found in association with Riverine (RIV), Grassland (AGS, PGS), Oak Woodland (VFH) and Agriculture (PAS, CRP). It may intergrade upstream with Montane Riparian.

Wildlife Considerations-- Valley-foothill riparian habitats provide food, water, migration and dispersal corridors, and escape, nesting, and thermal cover for an abundance of wildlife. At least 50 amphibians and reptiles occur in lowland riparian systems. Many are permanent residents, others are transient or temporal visitors (Brode and Bury 1985). In one study conducted on the Sacramento River, 147 bird species were recorded as nesters or winter visitants (Laymon 1985). Additionally, 55 species of mammals are known to use California's Central Valley riparian communities (Trapp et al. 1985). (No 1985 cites for Brode and Bury, Laymon, and Trapp et al. in habitat Lit Cite. I used 1984 cites for all 3 in Lit Cite at end.)

Physical Setting

Valley-foothill riparian habitats are found in valleys bordered by sloping alluvial fans, slightly dissected terraces, lower foothills, and coastal plains. They are generally associated with low velocity flows, flood plains, and gentle topography. Valleys provide deep alluvial soils and a high water table. The substrate is coarse, gravelly or rocky soils more or less permanently moist, but probably well aerated (Cheatham and Haller 1975). Average precipitation ranges from 15 to 76 cm (6-30 in), with little or no snow. The growing season is 7 to 11 months. Frost and short periods of freezing occur in winter (200 to 350 frost-free days). Mean summer maximum temperatures are 24 to 39 C (75 to 102 F), mean winter minima are 2 to 7 C (29 to 44 F) (Munz and Keck 1973). VRI habitats are characterized by hot, dry summers, mild and wet winters. Coastal areas have a more moderate climate than the interior and receive some summer moisture from fog (Bailey 1980). Potential evaporation during the warmest months is often greater than precipitation. Low rainfall and streamflow result in water scarcity in many parts of the area.

Distribution

Valley-foothill riparian habitats occur in the Central Valley and the lower foothills of the Cascade, Sierra Nevada and Coast ranges. They are also found in lower slopes at the bases of the Peninsular and Transverse ranges. A few lower elevation

locations are on the desert side of the southern California mountains. VRI habitats range from sea level to 1000 m (3000 ft), fingering upward to 1550 m (5000 ft) on south-facing slopes.

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BARREN

Monica D. Parisi

Vegetation

Structure and Composition-- Barren habitat is defined by the absence of vegetation. Any habitat with <2% total vegetation cover by herbaceous, desert, or non-wildland species and <10% cover by tree or shrub species is defined this way. Structure and composition of the substrate is largely determined by the region of the state and surrounding environment. In the marine and estuarine environment, barren habitat includes rocky outcroppings in the intertidal and subtidal zones, open sandy beaches and mudflats. Along rivers, it includes vertical river banks and canyon walls. Desert habitats may be defined as barren when vegetation is widely spaced. Alpine barren habitat includes exposed parent rock, glacial moraines, talus slopes and any surface permanently covered with snow or ice. Urban settings covered in pavement and buildings may be classified as barren as long as vegetation, including non-native landscaping, does not reach the % cover thresholds for vegetated habitats.

Other Classifications-- Most vegetation classification systems do not include a barren category. Sparsely vegetated substrate is assumed to be a component of the surrounding vegetation type. CALVEG (1981) defines a Barren and a Snow/Ice type. UNESCO (1996) includes a Barren type.

Habitat Stages

No stages are defined for this type. Many barren types will remain so during the time frame of consideration for management actions. An example is exposed rock in alpine settings, where the combined actions of freezing and thawing, wind and water erosion, and chemical breakdown caused by colonizing lichens eventually creates enough organic material to support higher plants. However, the time period for primary succession to a vegetated habitat type may be thousands of years.

Seasonal changes and management regimes may render some habitats barren for short periods of time. Alpine meadows may be seasonally covered with snow or ice. Disked or plowed agricultural fields will be barren for a few months until resowed. In an urban setting, newly-graded suburban sites converted from other habitat types may be barren for up to two years -- usually until trees, shrubs, lawns or other ground covers have been planted.

Biological Setting

Habitat-- Barren habitat may be found in juxtaposition with many different habitats, depending on the region of the state. Along the coast, barren mudflats are found with marine and estuarine habitats and fresh and saline emergent wetlands. Sandy beaches and sand dunes with less than 2% vegetative cover are themselves classified as barren. In the Central Valley, bluffs above river corridors covered with valley oak woodland, valley foothill-riparian or annual grassland habitat may drop sharply into steep barren riverbanks of loose soils. In an alpine setting, exposed parent rock is associated with subalpine conifer, red fir, lodgepole pine, pinyon-juniper, aspen, montane riparian, and montane chaparral habitats and, above timberline, with alpine dwarf shrub and wet meadow habitats. In the desert regions, palm oasis, Joshua tree, desert wash, desert succulent shrub, desert scrub and alkali desert scrub may all give way to a barren classification if conditions become extreme enough.

Wildlife Considerations-- Where there is little or no vegetation, structure of the non-vegetated substrate becomes a critical component of the habitat. Cormorants and many hawks and falcons nest on rock ledges. Plovers, stilts, avocets, several gulls and terns, nighthawks and poorwills rely on open ground covered with sand or gravel for constructing small scrape nests. Bank swallows use barren vertical cliffs of friable soils along river corridors to dig holes for nesting and cover. Rocky river canyon walls above open water are preferred foraging habitat for many bats. In the desert, open sandy soil is critical as burrowing and egg-laying substrate for horned lizards and fringe-toed lizards. Among alpine habitats, ground-dwelling mammals such as pika and marmots rely on talus slopes for cover.

Physical Setting

The physical settings for permanently barren habitat represent extreme environments for vegetation. An extremely hot or cold climate, a near-vertical slope, an impermeable substrate, constant disturbance by either human or natural forces, or a soil either lacking in organic matter or excessively saline can each contribute to a habitat being inhospitable to plants.

Distribution

Barren habitat occurs throughout the state at every elevation.

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APPENDIX 3.6-D

**Life History Information for Special-Status Wildlife Species Known
to Occur or Potentially Occurring in the Kaweah Project Vicinity**

Known to Occur in the Kaweah Project Vicinity

Western mastiff bat (*Eumops perotis californicus*) – Bureau of Land Management Sensitive (BLMS), California Species of Special Concern (CSC)

The Western mastiff bat occurs in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban. Catches and feeds on insects in flight. Ross (1961) found that it fed primarily (58%) on night-flying hymenopterous insects. The insects consumed were relatively small, low-flying and weak-flying forms, and he concluded that the bats were feeding from ground to tree-level. However, over rugged terrain these bats typically forage at much greater heights (60 meters (m), 195 feet (ft)) above the ground (Kruttsch 1955, Vaughan 1959, Cockrum 1960). Crevices in cliff faces, high buildings, trees, and tunnels are required for roosting (Howell 1920, Dalquest 1946, Barbour and Davis 1969). When roosting in rock crevices, needs vertical faces to drop off to take flight. Nursery roosts described as tight rock crevices at least 90 cm (35 inches (in)) deep and 5 cm (2 in) wide, or crevices in buildings (Howell and Little 1924). Suitable habitat consists of extensive open areas with abundant roost locations provided by crevices in rock outcrops and buildings.

fisher (*Pekania pennanti*) – Federal Proposed Threatened (FPT)

The fisher is an uncommon permanent resident of the Sierra Nevada, Cascades, and Klamath Mountains, and also found in a few areas in the North Coast Ranges (Grinnell et al. 1937). Occurs in intermediate to large-tree stages of coniferous forests and deciduous-riparian habitats with a high percent canopy closure (Schempf and White 1977). Fishers are largely carnivorous. They eat rabbits and hares, especially snowshoe hares, and rodents (mice, porcupines, squirrels, mountain beavers), shrews, birds, fruits, and carrion. They prey on the ground surface and in trees. Fishers are opportunistic; they search for small mammals, and pounce on, or chase prey. They are also known to dig out prey. Grenfell (1979) reported that the most important food item in the stomachs of 8 fishers was false truffle, a subterranean fungus. Fishers use cavities in large trees, snags, logs, rock areas, or shelters provided by slash or brush piles. Dense, mature stands of trees also provide cover, especially in winter. Fishers den in a variety of protected cavities, brush piles, logs, or under an upturned tree. Hollow logs, trees, and snags are especially important. Suitable habitat for fishers consists of large areas of mature, dense forest stands with snags and greater than 50% canopy closure.

May Potentially Occur in the Kaweah Project Vicinity

blunt-nosed leopard lizard (*Gambelia [=Crotaphytus] sila*) – Federal Endangered (FE), State Endangered (SE), California Fully Protected (CFP)

The blunt-nosed leopard lizard is a scarce resident of sparsely vegetated alkali and desert scrub habitats. Distribution has been extensively reduced by conversion of habitat to cropland. They currently occur at scattered sites in the San Joaquin Valley and adjacent

foothills and are found at elevations of 30 to 730 m (100 to 2400 ft) (Stebbins 1985) on alkali flats, large washes, arroyos, canyons, and low foothills. Blunt-nosed leopard lizards are carnivorous. They are opportunistic foragers that hunt on the ground, catching grasshoppers, cicadas and small lizards (including smaller leopard lizards). They commonly forage by slowly stalking prey, then rapidly dashing in to capture it. Shade for leopard lizards is provided by mammal burrows, shrubs or structures such as fence posts. Apparently leopard lizards do not excavate their own burrows. Females sometimes excavate nests by altering vacated mammal burrows (e.g., kangaroo rats, California ground squirrels) to form a closed chamber approximately 50 cm (20 in) below the soil surface. Suitable habitat for leopard lizards is characterized by sparsely vegetated scrub and grassland habitats in areas of low topographic relief. In areas of high relief, distribution is usually confined to broad sandy washes. They do not appear to use slopes greater than 30-40 degrees (Germano and Williams 1992).

USFWS has not designated Critical Habitat for this species. This species is included in the Recovery Plan for Upland Species of the San Joaquin Valley, California (USFWS 1998). The Kaweah Project is not within the planning area for the recovery plan.

northern goshawk (*Accipiter gentilis*) – BLMS, CSC (nesting)

The northern goshawk breeds in North Coast Ranges through Sierra Nevada, Klamath, Cascade, and Warner Mountains, in Mt. Pinos and San Jacinto, San Bernardino, and White Mountains. They remain yearlong in breeding areas as an uncommon resident. This species prefers middle and higher elevations, and mature, dense conifer forests. They are casual in winter along the north coast, throughout foothills, and in northern deserts, where they may be found in pinyon-juniper and low-elevation riparian habitats. The northern goshawk hunts in wooded areas and uses snags and dead-topped trees for observation and prey-plucking perches. The species feeds mostly on birds, from robin to grouse in size. Small mammals, of squirrel and rabbit size, are often taken. They rarely eat carrion and insects. Prey is caught in air, on ground, or in vegetation, using fast, searching flight, or rapid dash from a perch. Uses mature and old-growth stands of conifer and deciduous habitats. Usually nests on north slopes, near water, in densest parts of stands, but close to openings (Jackman and Scott 1975). Uses old nests, and maintains alternate sites. There usually is a water source within territory. Young have been reported bathing (Bond 1942, Brown and Amadon 1968). Dense, mature conifer and deciduous forest, interspersed with meadows, other openings, and riparian areas required. Nesting habitat includes north-facing slopes near water. Begins breeding in April in southern California, and by mid-June in the north. Female lays eggs in 3-day intervals for average clutch of 3 (range 1-5). Female incubates 36-41 days while male provides food. After hatching, female feeds brood 8-10 days, then male helps feed them. Young may leave nest to perch at about 40 days; usually fledge by 45 days. Young begin to hunt by 50 days, and often independent by 70 days.

California condor (*Gymnogyps californianus*) – FE, SE, CFP

Endangered, permanent resident of the semi-arid, rugged mountain ranges surrounding the southern San Joaquin Valley, including the Coast Ranges from Santa Clara County south to Los Angeles County, the Transverse Ranges, Tehachapi Mountains, and southern Sierra Nevada. Forages over wide areas of open rangelands, roosts on cliffs and in large trees and snags. Occurs mostly between sea-level and 2700 m (0-9000 ft), and nests from 610-1372 m (2000-6500 ft). Nonbreeding individuals move north to Kern and Tulare counties in April, often returning south in September to winter in Tehachapi Mountains, Mt. Pinos, and Ventura and Santa Barbara counties. Total population in early 1980's estimated to be fewer than 20, and declining (Ogden 1982). Occurrence in the wild now in question. Two U.S. Forest Service sanctuaries set aside within the Los Padres National Forest, primarily for nesting and roosting protection. Strictly a scavenger, eating carrion such as cattle, sheep, deer, and ground squirrel carcasses. Dead cattle have provided the most important food source in recent decades. Requires about 1 kg (2.2 lb) of food per day. Can convert food to fat rapidly after gorging; thus, can remain for several days without feeding (Wilbur 1978). Searches for food while soaring and gliding. Food must be in open areas to enable landing and take-off (Koford 1953). Often forages over areas 7.3 to 30 km² (2.8 to 11.6 mi²), or larger. May fly 56 km (35 mi), or more, from roost to feeding sites (Koford 1953). Traditional roosting sites are ledges or cavities on cliffs. Also uses old-growth Douglas-fir, ponderosa pine, and snags, in undisturbed areas. Nests in caves, crevices, behind rock slabs, or on large ledges on high sandstone cliffs. Nest often surrounded by dense brush. A nest is not constructed; egg laid on bare surface. Nesting occurs within the Coast and Transverse Ranges of Ventura and Santa Barbara counties. Requires vast expanses of open savannah, grasslands, and foothill chaparral, with cliffs, large trees, and snags for roosting and nesting.

USFWS has designated Critical Habitat for the California condor. However, the Project does not intersect with any designated Critical Habitat. The closest Critical Habitat is located along the Kaweah River approximately 5 miles southwest of the Project area.

This species is covered under the Recovery Plan for the California Condor (USFWS 1996). Recovery efforts are focused on the Kaweah plains, located to the west of Lake Kaweah (i.e., coinciding with Critical Habitat), approximately 5 miles southwest of the Project.

golden eagle (*Aquila chrysaetos*) – Eagle Act, BLMS, Bird of Conservation Concern (BCC), CFP (nesting and wintering)

Uncommon permanent resident and migrant throughout California, except center of Central Valley. Perhaps more common in southern California than in north. Ranges from sea level up to 3833 m (0-11,500 ft) (Grinnell and Miller 1944). Habitat typically rolling foothills, mountain areas, sage-juniper flats, desert. Eats mostly lagomorphs and rodents; also takes other mammals, birds, reptiles, and some carrion. Diet most varied in nonbreeding season. Needs open terrain for hunting; grasslands, deserts, savannahs, and early successional stages of forest and shrub habitats. Soars 30-90 m (98-297 ft)

above ground in search of prey, or makes low, quartering flights, often 7-8 m (23-26 ft) above ground. Occasionally searches from a perch and flies directly to prey (Carnie 1954). Sometimes pirates food from other predators. Hunting in pairs apparently common. Secluded cliffs with overhanging ledges and large trees used for cover. Nests on cliffs of all heights and in large trees in open areas. Alternative nest sites are maintained, and old nests are reused. Builds large platform nest, often 3 m (10 ft) across and 1 m (3 ft) high, of sticks, twigs, and greenery. Rugged, open habitats with canyons and escarpments used most frequently for nesting. Water needs probably met from prey. Uses rolling foothills and mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, and cliffs and rock outcrops. Breeds from late January through August; peak in March through July. Clutch size 1-3, usually 2. Eggs laid early February to mid-May. Incubation 43-45 days (Beebe 1974), and nestling period usually 65-70 days.

Swainson's hawk (*Buteo swainsoni*) – BLMS, BCC, State Threatened (ST) (nesting)

Uncommon breeding resident and migrant in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen County, and Mojave Desert. Very limited breeding reported from Lanfair Valley, Owens Valley, Fish Lake Valley, and Antelope Valley (Bloom 1980, Garrett and Dunn 1981). Breeds in stands with few trees in juniper-sage flats, riparian areas, and in oak savannah in the Central Valley. Forages in adjacent grasslands or suitable grain or alfalfa fields, or livestock pastures. Bloom (1980) estimated 110 nesting pairs, and a total population of 375 pairs, in California. In southern California, now mostly limited to spring and fall transient. Formerly abundant in California with wider breeding range (Grinnell and Miller 1944, Bloom 1980, Garrett and Dunn 1981). Decline resulted in part from loss of nesting habitat. Eats mice, gophers, ground squirrels, rabbits, large arthropods, amphibians, reptiles, birds, and, rarely, fish (Brown and Amadon 1968, Dunkle 1977). Soars at low and high levels in search of prey. Also may walk on ground to catch invertebrates and other prey. Catches insects and bats in flight. Roosts in large trees, but will roost on ground if none available. Nests on a platform of sticks, bark, and fresh leaves in a tree, bush, or utility pole from 1.3 to 30 m (4-100 ft) above ground. Nests in open riparian habitat, in scattered trees or small groves in sparsely vegetated flatlands (Bloom 1980). Usually found near water in the Central Valley, but also nests in arid regions. Water needs probably met from prey. Typical habitat is open desert, grassland, or cropland containing scattered, large trees or small groves. Breeding occurs late March to late August, with peak activity late May through July. Clutch size 2-4, usually 2 or 3 eggs. Incubates 25-28 days (Beebe 1974). Craighead and Craighead (1956) reported fledging success of 0.6 young per pair.

northern harrier (*Circus cyaneus*) – CSC (nesting)

Occurs from annual grassland up to lodgepole pine and alpine meadow habitats, as high as 3000 m (10,000 ft). Breeds from sea level to 1700 m (0-5700 ft) in the Central Valley and Sierra Nevada, and up to 800 m (3600 ft) in northeastern California. Frequents meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands; seldom found in wooded areas. Permanent resident of the northeastern plateau

and coastal areas; less common resident of the Central Valley. Widespread winter resident and migrant in suitable habitat. California population has decreased in recent decades (Grinnell and Miller 1944, Remsen 1978), but can be locally abundant where suitable habitat remains free of disturbance, especially from intensive agriculture. Breeding population much reduced, especially in southern coastal district. Destruction of wetland habitat, native grassland, and moist meadows, and burning and plowing of nesting areas during early stages of breeding cycle, are major reasons for the decline (Remsen 1978). Feeds mostly on voles and other small mammals, birds, frogs, small reptiles, crustaceans, insects, and, rarely on fish. Makes low, quartering flights 1-9 m (3-30 ft) above open ground. Dives from flight or hover; rarely perches and pounces on prey. Uses tall grasses and forbs in wetland, or at wetland/field border, for cover; roosts on ground. Nests on ground in shrubby vegetation, usually at marsh edge (Brown and Amadon 1968). Nest built of a large mound of sticks on wet areas, and a smaller cup of grasses on dry sites. Mostly nests in emergent wetland or along rivers or lakes, but may nest in grasslands, grain fields, or on sagebrush flats several miles from water. Home range usually includes fresh water. Mostly found in flat, or hummocky, open areas of tall, dense grasses, moist or dry shrubs, and edges for nesting, cover, and feeding. Breeds April to September, with peak activity June through July. Single-brooded; clutch averages 5 eggs, range 3-12. Female incubates while male provides food. Nestling period lasts about 53 days (Craighead and Craighead 1956). Breeding pair and juveniles may roost communally in late autumn and winter.

bald eagle (*Haliaeetus leucocephalus*) – Federal Delisted (FD), Eagle Act, BLMS, BCC, SE, CFP

Permanent resident, and uncommon winter migrant, now restricted to breeding mostly in Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity counties. About half of the wintering population is in the Klamath Basin. More common at lower elevations; not found in the high Sierra Nevada. Fairly common as a local winter migrant at a few favored inland waters in southern California. Largest numbers occur at Big Bear Lake, Cachuma Lake, Lake Mathews, Nacimiento Reservoir, San Antonio Reservoir, and along the Colorado River. Requires large bodies of water, or free flowing rivers with abundant fish, and adjacent snags or other perches. Swoops from hunting perches, or soaring flight, to pluck fish from water. Will wade into shallow water to pursue fish. Pounces on, or chases, injured or ice-bound water birds. In flooded fields, occasionally pounces on displaced voles, or other small mammals. Groups may feed gregariously, especially on spawning fish. Scavenges dead fish, water birds, and mammals. Open, easily approached hunting perches and feeding areas used most frequently. Perches high in large, stoutly limbed trees, on snags or broken-topped trees, or on rocks near water. Roosts communally in winter in dense, sheltered, remote conifer stands. In Klamath National Forest, winter roosts were 16-19 km (10-12 mi) from feeding areas (Spencer 1976b). Nests in large, old-growth, or dominant live tree with open branchwork, especially ponderosa pine. Nests most frequently in stands with less than 40% canopy, but usually some foliage shading the nest (Call 1978). Often chooses largest tree in a stand on which to build stick platform nest. Nest located 16-61 m (50-200 ft) above ground, usually below tree crown. Species of tree apparently not so important as height and size. Nest usually located near a

permanent water source. In California, 87% of nest sites were within 1.6 km (1 mi) of water. Requires large, old-growth trees or snags in remote, mixed stands near water. No Critical Habitat rules have been published for the Bald eagle in the lower 48 States.

osprey (*Pandion haliaeetus*) – Watch List (WL)

Breeds in northern California from Cascade Ranges south to Lake Tahoe, and along the coast south to Marin County Regular breeding sites include Shasta Lake, Eagle Lake, Lake Almanor, other inland lakes and reservoirs, and northwest river systems. Breeding population estimated in 1975 at 350-400 pairs in northern California (Henny et al. 1978); numbers apparently increasing in recent years. An uncommon breeder along southern Colorado River, and uncommon winter visitor along the coast of southern California (Garrett and Dunn 1981). Associated strictly with large, fish-bearing waters, primarily in ponderosa pine through mixed conifer habitats. Preys mostly on fish; also takes a few mammals, birds, reptiles, amphibians, and invertebrates. Requires open, clear waters for foraging. Uses rivers, lakes, reservoirs, bays, estuaries, and surf zones. Swoops from flight, hovers, or perches to catch fish near surface of water. Uses large trees, snags, and dead-topped trees in open forest habitats for cover and nesting. Nests on platform of sticks at the top of large snags, dead-topped trees, on cliffs, or on human made structures. Nest may be as much as 71 m (250 ft) above ground. Occasionally nests on ground. Nest usually within 400 m (1312 ft) of fish-producing water, but may nest up to 1.6 km (1 mi) from water (Airola and Shubert 1981). Needs tall, open-branched "pilot trees" nearby for landing before approaching the nest, and for use by young for flight practice. Nest tree averaged 172 cm (68 in) dbh (range 76-206 cm; 30-81 in dbh) in northern California. Nest height averaged 41 m (135 ft) (Airola and Shubert 1981). Clear, open waters required for foraging. Some individuals bathe (Bent 1937). Uses large snags and open trees near large bodies of water.

prairie falcon (*Falco mexicanus*) – WL (nesting)

Uncommon permanent resident that ranges from southeastern deserts northwest throughout the Central Valley and along the inner Coast Ranges and Sierra Nevada. Distributed from annual grasslands to alpine meadows, but associated primarily with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas. Mostly absent from northern coastal fog belt. Not found in upper elevations of Sierra Nevada. Eats mostly small mammals, some small birds, and reptiles. Catches prey in air and on ground in open areas. Dives from a perch with rapid pursuit, or dives from searching flight 15-90 m (50-300 ft) above ground. Requires sheltered cliff ledges for cover. Usually nests in a scrape on a sheltered ledge of a cliff overlooking a large, open area. Sometimes nests on old raven or eagle stick nest on cliff, bluff, or rock outcrop. Aerial courtship display occurs near nest site. Southeast-facing nest site apparently preferred, but height and orientation secondary to nature and character of the ledge. Denton (1975) reported 76% of eyries had water within 0.4 km (0.25 mi). Reported bathing (Skinner 1983a). Captive individuals drink irregularly (Steenhof, 1998). Uses open terrain for foraging; nests in open terrain with canyons, cliffs, escarpments, and rock outcrops. Breeds from mid-February through mid-September, with peak April to early August.

Clutch size 3-6 eggs, average 5. Mean laying date for 280 records 1900-1977 was April 4-11 (Walton 1977). Fledging success over 5 yr for 135 nests averaged 3.2 young, ranging 0-5; 19% of the nests had 5 young (Walton 1977). Young begin to disperse in June and July. May live as long as 13-20 yr (Enderson 1969, Denton 1975).

American peregrine falcon (*Falco peregrinus anatum*) – FD, BCC, State Delisted (SD), CFP

The habitat of the Peregrine Falcon includes many terrestrial biomes in North America. Most often, breeding Peregrine Falcons utilize habitats containing cliffs and almost always nest near water (Wheeler 2003, White et al. 2002). Peregrine Falcons generally utilize open habitats for foraging. Non-breeding Peregrine Falcons may also occur in open areas without cliffs. Many artificial habitats like towers, bridges and buildings are also utilized by Peregrine Falcons (White et al. 2002). Peregrine Falcons prey on a select group of species in regional and local areas, and their selections may vary seasonally. Their prey mainly consists of birds ranging from small passerines to mid-sized waterfowl. They may also feed on bats. Juveniles primarily feed on large flying insects (Wheeler 2003). Peregrine Falcons are active throughout the day from dawn to dusk and can even be nocturnal. They usually hunt in the morning and late evening (Wheeler 2003). Peregrine Falcons are aerial and perching hunters that rarely scavenge. From perches, Peregrines dive quickly to capture prey. In an aerial attack, Peregrine Falcons will dive at high speed while gliding, soaring or kiting at a low altitude. Prey is often eaten while soaring, gliding or kiting (Wheeler 2003). The breeding range of the Peregrine Falcon is significantly diminished from its original range due to the impacts of DDT and other chemical poisons; and is local and spotty throughout most of North America. Areas where the range is particularly diminished are the mid-western and eastern United States, where most of the distribution is urban, but reportedly growing quickly. Areas of Alaska and the western United States including Utah, Arizona, western Colorado and northern California are where the Peregrine Falcon is most widely found (White et al. 2002). The Peregrine Falcon is a long-distance migrant that travels one of the longest distances of any raptor and may undertake long water crossings. It is a leap-frog migrant that commonly follows leading and diversion lines and that travels alone or in small groups of 10-20 individuals. Peregrine Falcons hunt during migration and may stay as long as eight days at stopovers for this purpose. Satellite tracked individuals have been shown to migrate distances of between 87-124 miles per day. Migration for Peregrine Falcons occurs mostly from morning through late afternoon. Migration movements can be broad front or narrow front in form. The Peregrine Falcon is known to migrate at heights at or below 2,953 ft. The Peregrine has clear migration routes which either occur along leading lines or coastal areas with ideal habitat on the Eastern and Gulf Coasts and Eastern Mexico such as Chincoteague and Assateague Island in MD and VA and Padre Island, TX and Veracruz, MexiCounty. Peregrines also migrate in lesser concentrations along shores of the Great Lakes, the West Coast of the U.S., western Mexico, and the eastern front of the Rocky Mountains (Goodrich and Smith 2008). Peregrine Falcons build their nests in substrates on ledges of cliffs ranging from 8-400 m in height. The male creates a depression in the substrate by scraping it with his feet. Most Peregrine Falcons will use ledges used by other Peregrines in previous years. Peregrines arrive at nest sites around April or May

and egg laying may begin from two weeks to two months later depending on the latitude. Critical habitat has been designated for the American peregrine falcon.

short-eared owl (*Asio flammeus*) – CSC (nesting)

Formerly a resident locally the length of the state, excluding higher mountains. A widespread winter migrant, found primarily in the Central Valley, in the western Sierra Nevada foothills, and along the coastline. An uncommon winter migrant in southern California, including the Channel Islands (Garrett and Dunn 1981). Usually found in open areas with few trees, such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, and saline and fresh emergent wetlands. Occasionally still breeds in northern California (McCaskie et al. 1988). Breeding range includes coastal areas in Del Norte and Humboldt counties, the San Francisco Bay Delta, northeastern Modoc plateau, the east side of the Sierra from Lake Tahoe south to Inyo county, and the San Joaquin valley. Numbers have declined over most of the range in recent decades because of destruction and fragmentation of grassland and wetland habitats, and grazing (Remsen 1978). Increased levels of predation on this ground nester may also contribute to its decline (Holt and Leasure 1993). Feeds primarily on voles and other small mammals (Bent 1938, Earhart and Johnson 1970). Birds are an important food source in coastal wintering areas, and in nesting season. Also eats reptiles, amphibians, and arthropods. Frequently searches in low, gliding flight 1-6 m (3.3 to 20 ft) above the ground; swoops and pounces; also hunts from a perch. Commonly found in treeless areas using fence posts and small mounds as perches. Requires dense vegetation; tall grasses, brush, ditches, and wetlands are used for resting and roosting cover (Grinnell and Miller 1944). Nests on dry ground in a depression concealed in vegetation, and lined with grasses, forbs, sticks, and feathers; occasionally nests in a burrow. One record nest recorded on bare soil with no nest material (Holt 1992). Has been observed drinking in the wild (Dixon and Bond 1937) and in captivity (Clark 1975), but not known if water is essential. Found in open, treeless areas with elevated sites for perches, and dense vegetation for roosting and nesting. Nests on dry ground in a depression concealed in vegetation, and lined with grasses, forbs, sticks, and feathers; occasionally nests in a burrow. One record nest recorded on bare soil with no nest material (Holt 1992).

California spotted owl (*Strix occidentalis occidentalis*) – BCC, BLMS, CSC

An uncommon, permanent resident in suitable habitat. In northern California, resides in dense, old-growth, multi-layered mixed conifer, redwood, and Douglas-fir habitats, from sea level up to approximately 2300 m (0-7600 ft). In southern California, nearly always associated with oak and oak-conifer habitats (Garrett and Dunn 1981). Breeding range extends west of the Cascade Range through the North Coast Ranges, the Sierra Nevada, and in more localized areas of the Transverse and Peninsular Ranges. May move downslope in winter along the eastern and western slopes of the Sierra Nevada, and in other areas. Feeds in forest habitats upon a variety of small mammals, including flying squirrels, woodrats, mice and voles, and a few rabbits. Also eats small birds, bats, and large arthropods. Usually searches from a perch and swoops or pounces on prey in vegetation or on the ground. May cache excess food. Uses dense, multi-layered canopy

cover for roost seclusion. Roost selection appears to be related closely to thermoregulatory needs; intolerant of high temperatures. Roosts in dense overhead canopy on north-facing slopes in summer. In winter, roosts in oak habitats. In northern regions of the state, daytime roosts averaged 165 m (549 ft) from water; in southern regions, daytime roosts averaged only 51 m (173 ft) from water (Barrows and Barrows 1978). Usually nests in tree or snag cavity, or in broken top of large tree. Less frequently nests in large mistletoe clump, abandoned raptor or raven nest, in cave or crevice, on cliff or ground (Call 1978). Mature, multi-layered forest stands are required for breeding (Remsen 1978). Nest usually placed 9-55 m (30-180 ft) above the ground. Probably requires a permanent water source. May reduce heat stress by bathing (Barrows and Barrows 1978, Barrows 1981). Drinks freely in captivity. Requires blocks of 40-240 ha (100-600 ac) of mature forest with permanent water and suitable nesting trees and snags (Forsman 1976). In northern California, apparently prefers narrow, steep-sided canyons with north-facing slopes.

black swift (*Cypseloides niger*) – BCC, CSC (nesting)

Breeds very locally in the Sierra Nevada and Cascade Range, the San Gabriel, San Bernardino, and San Jacinto Mountains, and in coastal bluffs and mountains from San Mateo County south probably to San Luis Obispo County. Nests in moist crevice or cave on sea cliffs above the surf, or on cliffs behind, or adjacent to, waterfalls in deep canyons. Forages widely over many habitats. In migration, rare and irregular outside the breeding range; does not winter in the state (Grinnell and Miller 1944, Remsen 1978, McCaskie et al. 1979, Garrett and Dunn 1981). Feeds exclusively on flying insects, captured in sustained, long-distance foraging flights, usually high in the air. Often pursues insects in updrafts associated with cliffs or storm fronts. Apparently the only regular resting places are on steep, rocky, often moist, cliffs such as those used for nesting (Bent 1940). Builds nest in moist location on sea cliff above surf, or on cliff behind, or adjacent to, waterfall in deep canyon. Nest constructed of mud mixed with moss, ferns, seaweed, or other plant materials; located in deep, dark crevice, in cave, or under overhang (Bent 1940). Nests in colony of a few pairs. Nest usually kept moist by mist from the surf or waterfall. Required at nest, as described above, and possibly at roost, but it is not known whether drinking water is required. If there are suitable nest sites for breeding, will forage over almost any terrain and habitat. Seems to avoid arid regions, however, such as the Great Basin, southern deserts, and Central Valley. Breeding season lasts from early June to late August. Usually nests in small colony. Lays only 1 large egg per yr (Harrison 1978). Incubation lasts 24–27 days. Altricial young leave the nest at about 45 days (Hunter and Baldwin 1962), but nestling period probably highly variable as in other swifts. Young can go without food for long periods (Terres 1980).

Lewis' woodpecker (*Melanerpes lewis*) – BCC

An uncommon, local winter resident occurring in open oak savannahs, broken deciduous, and coniferous habitats. Found along eastern slopes of the Coast Ranges south to San Luis Obispo County. Also winters in the Central Valley, Modoc Plateau, and the Transverse and other Ranges in southern California. Breeds locally along eastern slopes

of the Coast Ranges, and in the Sierra Nevada, Warner Mountains, Klamath Mountains, and in the Cascade Range. Forages primarily on insects in spring and summer. In summer, 60% of feeding time was spent hawking insects, 30% foraging on ground and in brush, and 10% gleaning insects from trunks and branches of trees (Bock 1970). In late summer and fall, fruits and berries eaten frequently. Winter food mostly cached acorns, other nuts and seeds, and emerging insects. Caches acorns and other nuts in crevices and holes for use in nonbreeding season. Requires open habitats with scattered trees and snags with cavities. Cover provided by cavities and foliage of trees and shrubs. Excavates nest cavity in snag or dead part of live tree, usually 1.5 to 24 m (5-80 ft) above ground (Bock 1970, Raphael and White 1984). Usually nests in sycamore, cottonwood, oak, or conifer. May nest near other pairs. Suitable habitat includes open, deciduous and conifer habitats with brushy understory, and scattered snags and live trees for nesting and perching (Bock 1970). Uses logged and burned areas. Prefers oaks and acorns in winter.

southwestern willow flycatcher (*Empidonax traillii extimus*) – FE, SE (nesting)

Present in California from late April to September (Biosystems Analysis 1989). Elevational range extends from near sea level to over 2,600 meters; the majority of territories are below 1,600 meters (Durst et al. 2008). Spring migration peaks in mid-May; fall migration extends from mid-August to early September (Biosystems Analysis 1989). Habitat includes riparian and wetland thickets, generally of willow, tamarisk, or both, sometimes boxelder or Russian olive (USFWS 2013). Habitat patches comprising mostly native vegetation account for fewer than half (44 percent) of the known flycatcher territories (Durst et al. 2008). Habitat patches as small as 0.5 hectares can support one or two nesting pairs (USFWS 1993). Nests are typically placed in trees where the plant growth is most dense, where trees and shrubs have vegetation near ground level, and where there is a low-density canopy (USFWS 2013). Many migrants occur in riparian habitats or patches (small areas of riparian vegetation) that would be unsuitable for nest placement (the vegetation structure is too short or sparse, or the patch of vegetation is too small). In these drainages, migrating flycatchers may use a variety of riparian habitats, including ones dominated by native or exotic plant species, or mixtures of both (USFWS 2013). Eats mainly insects caught in flight, sometimes gleans insects from foliage; occasionally eats berries. In breeding range, forages within and occasionally above dense riparian vegetation. Arrives on breeding grounds in late April to early May. Nesting begins in late May and early June, with fledging from late June to mid-August. Typically lay 3-4 eggs per clutch, laid at one day intervals and are incubated by the female for about 12 days. Young birds fledge 12-13 days after hatching. Typically only raise one brood per year; however some pairs will raise a second brood, or re-nest after a nest failure.

USFWS Critical Habitat has been designated for the southwestern willow flycatcher, however, there is no Critical Habitat in the Project vicinity. In California, the Critical Habitat is located on a combination of Federal, State, tribal, and private lands in Inyo, Kern, Los Angeles, Riverside, Santa Barbara, San Bernardino, San Diego, and Ventura Counties (USFWS 2013).

Recovery efforts for this species are described in the Final Recovery Plan for Southwestern Willow Flycatcher (USFWS 2002). There are no Recovery Management Units in Tulare County.

yellow warbler (*Dendroica petechia brewsteri*) – BCC, CSC (nesting)

Breeding distribution includes from the coast range in Del Norte County, east to Modoc plateau, south along coast range to Santa Barbara and Ventura counties and along western slope of Sierra Nevada south to Kern County. Also breeds along eastern side of California from the Lake Tahoe area south through Inyo County. Also breeds in several southern California mountain ranges and throughout most of San Diego County. Winters in Imperial and Colorado River valleys. Breeds in riparian woodlands from coastal and desert lowlands up to 2500 m (8000 ft) in Sierra Nevada. Also breeds in montane chaparral, and in open ponderosa pine and mixed conifer habitats with substantial amounts of brush. Numbers of breeding pairs have declined dramatically in recent decades in many lowland areas (southern coast, Colorado River, San Joaquin and Sacramento valleys). Now rare to uncommon in many lowland areas where formerly common (McCaskie et al. 1979, Garrett and Dunn 1981). A common migrant on Channel and Farallon Islands in spring and fall (DeSante and Ainley 1980, Garrett and Dunn 1981). Mostly eats insects and spiders. Gleans and hovers in upper canopy of deciduous trees and shrubs. Occasionally hawks insects from air, or eats berries (Bent 1953, Ehrlich et al. 1988). Usually found in riparian deciduous habitats in summer: cottonwoods, willows, alders, and other small trees and shrubs typical of low, open-canopy riparian woodland. Also breeds in montane shrubbery in open conifer forests; perhaps a recent phenomenon (Gaines 1977b). In migration, visits woodland, forest, and shrub habitats. Nest is an open cup placed 0.6 to 5 m (2-16 ft) above ground in a deciduous sapling or shrub. Territory often includes tall trees for singing and foraging and a heavy brush understory for nesting (Ficken and Ficken 1966). Frequents open to medium-density woodlands and forests with a heavy brush understory in breeding season. In migration, found in a variety of sparse to dense woodland and forest habitats. Breeds from mid-April into early August with peak activity in June. Pair breeds solitarily. Lays 3-6 eggs (usually 4 or 5); incubated by female for 11 days. Altricial young tended by both parents until fledging at 9-12 days (Harrison 1978). Young breed the following year.

pallid bat (*Antrozous pallidus*) – BLMS, CSC

The pallid bat is a locally common species of low elevations in California. It occurs throughout California except for the high Sierra Nevada from Shasta to Kern counties, and the northwestern corner of the state from Del Norte and western Siskiyou counties to northern Mendocino County. A wide variety of habitats is occupied, including grasslands, shrublands, woodlands, and forests from sea level up through mixed conifer forests. The species is most common in open, dry habitats with rocky areas for roosting. A yearlong resident in most of the range. Takes a wide variety of insects and arachnids, including beetles, orthopterans, homopterans, moths, spiders, scorpions, solpugids, and Jerusalem crickets. The stout skull and dentition of this species allows it to take large, hard-shelled prey. Forages over open ground, usually 0.5-2.5 m (1.6-8 ft) above ground

level. Foraging flight is slow and maneuverable with frequent dips, swoops, and short glides. Many prey are taken on the ground. Gleaning is frequently used, and a few prey are taken aerially. Can maneuver well on the ground. May carry large prey to a perch or night roost for consumption. Ingestion of fruit in one study (Howell 1980) was a result of feeding on frugivorous moths. Uses echolocation for obstacle avoidance; possibly utilizes prey-produced sounds while foraging. Day roosts are in caves, crevices, mines, and occasionally in hollow trees and buildings. Roost must protect bats from high temperatures. Bats move deeper into cover if temperatures rise. Night roosts may be in more open sites, such as porches and open buildings. Few hibernation sites are known, but probably uses rock crevices. Maternity colonies form in early April, and may have a dozen to 100 individuals. Males may roost separately or in the nursery colony. Prefers rocky outcrops, cliffs, and crevices with access to open habitats for foraging

Townsend's big-eared bat (*Corynorhinus townsendii*) – BLMS, State Candidate Threatened (SCT)

Townsend's big-eared bat is found throughout California, but the details of its distribution are not well known. This species is found in all but subalpine and alpine habitats, and may be found at any season throughout its range. Once considered common, Townsend's big-eared bat now is considered uncommon in California. It is most abundant in mesic habitats. Small moths are the principal food of this species. Beetles and a variety of soft-bodied insects also are taken. Captures their prey in flight using echolocation, or by gleaning from foliage. Flight is slow and maneuverable. Capable of hovering. Requires caves, mines, tunnels, buildings, or other human-made structures for roosting. May use separate sites for night, day, hibernation, or maternity roosts. Hibernation sites are cold, but not below freezing. Individuals may move within the hibernaculum to find suitable temperatures. Maternity roosts are warm. Roosting sites are the most important limiting resource. Maternity roosts are found in caves, tunnels, mines, and buildings. Small clusters or groups (usually fewer than 100 individuals) of females and young form the maternity colony. Maternity roosts are in relatively warm sites. Prefers mesic habitats. Gleans from brush or trees or feeds along habitat edges.(CDFW 2014)

spotted bat (*Euderma maculatum*) – BLMS, CSC

The spotted bat has been found at a small number of localities, mostly in the foothills, mountains and desert regions of southern California (Watkins 1977). A study in California from 1992 to 1997 added 23 more localities to the 14 known prior to 1992 (Black and Cosgriff 1999). Habitats occupied include arid deserts, grasslands and mixed conifer forests. Elevational range extends from below sea level in California to above 3000 m (10000 ft) in New Mexico (Black and Cosgriff 1999). Moths are the principal food. There is some evidence of beetle consumption. Feeds in flight, over water, and near the ground, using echolocation to find prey. Prefers to roost in rock crevices. Occasionally found in caves and buildings. Cliffs provide optimal roosting habitat. Probably uses rock crevices. Prefers sites with adequate roosting habitat, such as cliffs. Feeds over water and along washes. May move from forests to lowlands in autumn.

fringed myotis (*Myotis thysanodes*) – BLMS

The fringed myotis is widespread in California, occurring in all but the Central Valley and Colorado and Mojave deserts. Its abundance appears to be irregular; it may be common locally. It occurs in a wide variety of habitats; records range in elevation from sea level to 2850 m (9350 ft) in New Mexico (Barbour and Davis 1969). Optimal habitats are pinyon-juniper, valley foothill hardwood and hardwood-conifer, generally at 1300-2200 m (4000-7000 ft). Feeds mostly on beetles, and also on moths, arachnids, and orthopterans (Black 1974). Foraging flight is slow and maneuverable, and capture may utilize wing and tail membranes. This species is capable of hovering, and occasionally may land on the ground. Feeds over water, over open habitats, and by gleaning from foliage. The fringed myotis roosts in caves, mines, buildings, and crevices. Separate day and night roosts may be used. Adults and subadults generally form separate groups in the roost. Maternity colonies of up to 200 individuals are located in caves, mines, buildings, or crevices. Adult males are absent from maternity colonies, which are occupied from late April through September. Maternity group members may remain together during hibernation. Uses open habitats, early successional stages, streams, lakes, and ponds as foraging areas.

Long-eared myotis (*Myotis evotis*) – BLMS

The long-eared myotis is widespread in California, but generally is believed to be uncommon in most of its range. It avoids the arid Central Valley and hot deserts, occurring along the entire coast and in the Sierra Nevada, Cascades, and Great Basin from the Oregon border south through the Tehachapi Mountains to the Coast Ranges. This species has been found in nearly all brush, woodland, and forest habitats, from sea level to at least 2700 m (9000 ft), but coniferous woodlands and forests seem to be preferred. The long-eared myotis feeds on a variety of arthropods including beetles, moths, flies, and spiders. It takes more beetles than other myotis species, and there is some evidence that it takes more beetles when it is sympatric with *M. auriculus* (Black 1974, Husar 1976). Insects are caught in flight, gleaned from foliage, or occasionally taken from the ground. Foraging flight is slow and maneuverable. This species is capable of hovering. It forages among trees, over water, and over shrubs. Usually less than 12 m (40 ft) above the ground. This species roosts in buildings, crevices, spaces under bark, and snags. Caves are used primarily as night roosts. The long-eared myotis roosts singly, or is found in fairly small groups. Nursery colonies of 12-30 individuals are found in buildings, crevices, snags, and behind bark. Feeds along habitat edges, in open habitats, and over water

Yuma myotis (*Myotis yumanensis*) – BLMS

The Yuma myotis is common and widespread in California. It is uncommon in the Mojave and Colorado Desert regions, except for the mountain ranges bordering the Colorado River Valley. Found in a wide variety of habitats ranging from sea level to 3300 m (11,000 ft), but it is uncommon to rare above 2560 m (8000 ft). Optimal habitats are open forests and woodlands with sources of water over which to feed. Feeds on a wide variety of small flying insects found by echolocation. This species usually feeds over water sources such as ponds, streams, and stock tanks. Prey includes moths, midges, flies, termites, ants,

homopterans, and caddisflies (Easterla and Whitaker 1972, Black 1974, Whitaker et al. 1977, 1981). The Yuma myotis is an efficient forager, sometimes returning to the roost with a full stomach 15 min after dusk (Barbour and Davis 1969). These bats respond to temporary patches of prey, such as ant swarms (Vaughan 1980), although many authors report that regular foraging routes are followed. The Yuma myotis roosts in buildings, mines, caves, or crevices. The species also has been seen roosting in abandoned swallow nests and under bridges. Separate, often more open, night roosts may be used. Maternity colonies of several thousand females and young may be found in buildings, caves, mines, and under bridges. Warm, dark sites are preferred. Individuals are clustered tightly in the warmest sites when temperatures are low. If temperatures exceed 40°C, bats seek cooler locations, and individuals roost farther apart. Distribution is closely tied to bodies of water, which it uses as foraging sites and sources of drinking water. Open forests and woodlands are optimal habitat.

American badger (*Taxidea taxus*) – CSC

Uncommon, permanent resident found throughout most of the state, except in the northern North Coast area (Grinnell et al. 1937). Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Badgers are carnivorous. They eat fossorial rodents: rats, mice, chipmunks, and especially ground squirrels and pocket gophers. Also eat some reptiles, insects, earthworms, eggs, birds, and carrion. Diet shifts seasonally and yearly in response to availability of prey. Badgers dig burrows in friable soil for cover. Frequently reuse old burrows, although some may dig a new den each night, especially in summer (Messick and Hornocker 1981). Young are born in burrows dug in relatively dry, often sandy, soil, usually in areas with sparse overstory cover. Suitable habitat for badgers is characterized by herbaceous, shrub, and open stages of most habitats with dry, friable soils.

Ringtail (*Bassariscus astutus*) – CFP

Widely distributed, common to uncommon permanent resident. Occurs in various riparian habitats, and in brush stands of most forest and shrub habitats, at low to middle elevations. Little information available on distribution and relative abundance among habitats (Grinnell et al. 1937, Schempf and White 1977). Primarily carnivorous, eating mainly rodents (woodrats and mice) and rabbits. Also takes substantial amounts of birds and eggs, reptiles, invertebrates, fruits, nuts, and some carrion (Taylor 1954, Trapp 1978). Forages on ground, among rocks, in trees; usually near water. Hollow trees, logs, snags, cavities in talus and other rocky areas, and other recesses are used for cover. Nests in rock recesses, hollow trees, logs, snags, abandoned burrows, or woodrat nests. Usually not found more than 1 km (0.6 mi) from permanent water. Suitable habitat for ringtails consists of a mixture of forest and shrubland in close association with rocky areas or riparian habitats.

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