

5.3.6 Federally Listed Threatened and Endangered Species

There are five federally-listed threatened and endangered plant and animal species that may be affected by the Proposed Action: Pine Hill ceanothus, Pine Hill flannelbush, Laynes butterweed, valley elderberry longhorn beetle, and the bald eagle. (For a discussion of other threatened and endangered species that were considered, but eliminated from further analysis because of their absence in the project area, see Appendix D, SMUD's Draft Biological Assessment.) This section first describes the affected environment, detailing the conditions and locations of the various threatened and endangered species. This section next summarizes the Draft Biological Assessment prepared by SMUD. Because a small potential exists for the Proposed Action to result in take, as that term is defined in the ESA, SMUD will enter into consultation with the USFWS under section 7 of the ESA to obtain an incidental take permit. Therefore, SMUD, as FERC's designated non-federal representative, prepared a Draft Biological Assessment (BA) (Appendix D). That document contains measures that SMUD proposes to minimize effects on threatened and endangered species and to ensure that the Proposed Action would not result in jeopardy of any species.

5.3.6.1 Pertinent Technical Reports

In preparation for relicensing the UARP, SMUD prepared six technical reports relevant to these federally listed species:

- Special Status Plants and Invasive/Noxious Weeds – UARP (DTA 2004v)
- Special Status Plants – Iowa Hill Development (DTA 2004m)
- Valley Elderberry Longhorn Beetle – UARP (DTA 2004w)
- Valley Elderberry Longhorn Beetle – Iowa Hill Development (DTA 2004n)
- Bald Eagle and Osprey – UARP (DTA2004a)
- Bald Eagle Technical Report – Iowa Hill Development (DTA 2005a)

These reports are summarized in Sections 5.3.4.1 (plants) and 5.3.5.1 (VELB and bald eagle). The status, distribution, existing and proposed resource measures, and potential effects of the Proposed Action are presented below for each species.

5.3.6.2 Affected Environment

Five species listed as threatened or endangered could be affected by the Proposed Action (Table 5.3.6-1). These include two plant species listed as endangered (Pine Hill ceanothus and Pine Hill flannelbush), one plant species listed as threatened (Layne's butterweed), and two animal species listed as threatened (VELB and bald eagle).

<b>Table 5.3.6-1. Summary of Federally-listed Threatened and Endangered plant and animal occurrences documented in the UARP Project area from 2000 and 2004.</b>		
<b>Scientific Name/ Common Name</b>	<b>Status</b>	<b>Number and General Location of Occurrences</b>
<i>Ceanothus roderickii</i> Pine Hill ceanothus	Endangered	1 occurrence. Transmission line corridor near Pine Hill

<i>Fremontodendron decumbens</i> Pine Hill flannelbush	Endangered	4 occurrences. Transmission line corridor near Pine Hill
<i>Senecio layneae</i> Layne's butterweed (ragwort)	Threatened	2 occurrences. Transmission line corridor near Pine Hill
<i>Desmocerus californicus dimorphus</i> Valley elderberry longhorn beetle	Threatened	Eight shrubs located within transmission line right-of-way; no shrubs located near dams, reservoirs, powerhouses, switchyards or other facilities
<i>Haliaeetus leucocephalus</i> Bald eagle	Threatened	Two pairs of eagles were observed during the 2004 breeding season. A nest territory has been historically occupied at Union Valley Reservoir; a new nest was observed at Loon Lake Reservoir.

### Pine Hill Endemic Plants

In its final rule listing the species under the ESA, the USFWS cited fire suppression, habitat destruction related to development, assorted anthropogenic activities (e.g., ORV use), and the biological effects of restricted distribution as factors that may affect the three Pine Hill endemic plants, including Pine Hill ceanothus, Pine Hill flannelbush, and Layne's butterweed (ragwort) (USFWS 1996). Each of these factors represents a multifaceted threat. For example, development can simultaneously bring about direct habitat loss, increased habitat fragmentation, and changes to fire regimes (USFWS 2002). It is estimated that 23 percent of the Pine Hill formation has been developed (USFWS 2002, based on 1994 data). In addition, exotic species such as goatgrass and yellow starthistle are common in habitats supporting the endemic plants, although not to the degree found on adjacent non-gabbro substrates (DTA 2004v). Exotic plants are considered a lesser threat to these species. Additional threats may include "road widening and maintenance, off-road vehicle use, garbage dumping, horse paddocking, mining...and other human-caused conditions associated with increased development" (USFWS 2002). Aside from development, observations made during 2003 botanical surveys suggest that ecological succession poses the greatest risk to Pine Hill endemics over time (DTA 2004v).

Pine Hill ceanothus, Pine Hill flannelbush, and Layne's butterweed are three of six taxa addressed in a 2002 USFWS recovery plan for gabbro soil endemics in the Central Sierra Nevada foothills. The plan endorses a multi-species recovery and conservation strategy that emphasizes habitat acquisition and management. The overall objective of the plan is the protection and restoration of habitats and occurrences of the plants such that delisting is warranted. Four preserve units are described in the plan: Salmon Falls/Martel Creek, Pine Hill, Penny Lane, and Cameron Park. The project area crosses the Pine Hill and Penny Lane units. Collectively, the units are referred to as the Pine Hill Preserve, which is operated under a cooperative management agreement adopted in 2001 (Anonymous 2001).

### Valley Elderberry Longhorn Beetle (VELB)

The VELB was listed by the USFWS as a threatened species in 1980, largely due to loss of habitat throughout much of its former range owing to such factors as agricultural conversion, levee construction, and stream channelization (USFWS 1984).

According to the USFWS, general documented threats to persistence of the VELB include habitat loss and fragmentation, pesticide and herbicide use, and egg predation by the exotic Argentine ant (*Linepithema humile*) (USFWS 1984; Huxel 2000; Collinge et al. 2001). Riparian forests, the primary habitat of the VELB, have been severely depleted within the species' range over the last two centuries as a result of expansive agricultural and urban development (Thompson 1977; Katibah 1984; USFWS 2003). There is no comparable information on loss of non-riparian VELB habitat such as elderberry savanna, mixed chaparral-woodlands, or grasslands adjacent to riparian habitat, these habitats being more characteristic of elderberry locations along the project transmission line. However, urban and agricultural (e.g., vineyards, orchards) conversions along the transmission line corridor have resulted in loss of historical native habitat that could have supported elderberry plants.

Barr (1991) found that small, isolated habitat remnants were less likely to be occupied by the VELB than larger patches, suggesting that isolated elderberry shrubs do not typically provide long-term habitat for this species. Most of the elderberry plants located within the project transmission line corridor are single, isolated shrubs in upland habitats. As a result, occupancy of these shrubs by VELB, or at least long-term viability of any VELB subpopulations, is likely compromised by the species' limited dispersal capabilities (Barr 1991; Huxel 2000; Collinge et al. 2001; USFWS 2003).

Elderberry shrubs currently located within or adjacent to the right-of-way are all located on private lands upon which SMUD holds a right-of-way easement for purposes of accessing and performing both routine and emergency maintenance on the transmission line and management of the vegetation within the corridor in a manner that will ensure safe operation of the line. As a result, elderberry plants identified during this study may be at risk from both project (i.e., vegetation management activities) and non- project (i.e., private landowner) actions.

Searches for elderberry plants (not VELB presence or exit holes) were conducted in the project area via helicopter, automobiles, and on foot and included all areas where the SMUD had legal access (e.g., ownership/easement rights, public lands) within 100 feet (as per USFWS protocols for buffer zones) of project features below 3,000-foot elevation where VELB could be directly or indirectly affected by project construction (e.g., facility development or expansion, road construction), operation (e.g., recreational developments), and maintenance (e.g., vegetation clearing). The search area along the transmission line corridor included the area within approximately 200 feet of the transmission line centerline (i.e., 400-foot total width; this includes the 200-foot defined right-of-way (ROW) plus the 100-foot-wide buffer on each side of the ROW). Elderberry shrubs or clumps were located at eight sites within the 400-foot-wide search area along the project transmission line corridor during 2002 and 2003 surveys (Figure 8.8-1 and Table 8.8-1 in Draft Biological Assessment; Appendix D). Plants found at these locations were located directly beneath the transmission line or immediately adjacent to the line, and in one

location (Point 007 on Figure 8.8-1 1 in Draft Biological Assessment; Appendix D), a large plant was growing entirely within the steel lattice cage of the support tower.

With the exception of the plants found along the UARP transmission line corridor, no elderberry plants were found adjacent to existing project facilities (i.e., dams, powerhouses, switchyards, appurtenant facilities) below 3,000 feet (DTA 2004w). Similarly, no elderberry plants were found at the site of the proposed Iowa Hill Development (DTA 2004n). Stream reaches below UARP facilities were not included in the study area because elderberry plants growing along foothill streams generally occur above the high water mark unlike willow and cottonwood (pers. comm., R. Arnold, Entomological Consulting Services Ltd., April 19, 2002). As a result, elderberry plants that support VELB are not likely to occur in stream fluctuation zones and are not influenced by project operations. No elderberry plants were located at any of the key recreation access points surveyed (DTA 2004w). No federally-designated critical habitat for VELB occurs in the vicinity of the project area.

### Bald Eagle

The draft BA (Appendix D) provides a detailed discussion of the known reproductive history for the Union Valley Reservoir and Loon Lake Reservoir bald eagle nesting territories (Table 10.8-1; DTA 2004a). A summary of nesting activities for 2003 and 2004 is provided as follows.

Breeding bald eagles were first reported at Union Valley Reservoir in 1986 and have since fledged 11 young among three nest sites on the reservoir in eight of 19 years (USDA, Forest Service 1999; DTA 2004a). In 2003, the resident pair of eagles at Union Valley Reservoir nested unsuccessfully at the Granlees Point nest stand. Biologists observed courtship and mating activities by the Union Valley Reservoir from February through March 2003, and estimated that eggs were laid between March 30 and April 2. Throughout April and into early May, both sexes shared incubation duties, and nest construction and maintenance continued. A late season storm during the first week of May brought several inches of precipitation as both rain and snow, with freezing night and early morning temperatures. Observations during the first two weeks of May failed to confirm brooding postures, and biologists suspected that eggs were not viable. On May 15, 2003, the adult flew off the nest and did not return, at which point it was concluded that the nest had failed.

The 2003 nest failure, and possibly failures in other years since nesting was first confirmed at Union Valley Reservoir in 1986, may be influenced by, or a direct result of, late spring storms that bring unusual amounts of snow, rain, and sleet during the incubation period. Low nest productivity in specific years has been associated elsewhere with inclement spring conditions (Swenson et al. 1986, Gerrard et al. 1992; Helander 1983, cited *in* Swenson et al. 1986). The mid-elevation location of Union Valley Reservoir may subject nesting bald eagles to substantial thermal stress from alternating rain, sleet, and snow, which can saturate and freeze nest material, and compromise the ability of adults to maintain incubation temperatures necessary for embryo viability.

In 2004, courtship behavior and pair bonding by the Union Valley Reservoir eagles was observed, with the activity centered at the Granlees Point nest stand. Based on field

observations, egg-laying occurred sometime prior to March, approximately one month earlier than the presumed date of egg-laying in 2003. Incubation continued up to mid-April 2004. Brooding of one eaglet was confirmed in late April. In June, the eaglet first left the nest and began “branching” in the nest tree. A final observation was made that by July, the eaglet had fledged successfully but remained near the Granlees Point nest stand. In March 2005, ENF biologists confirmed that the pair had returned to nest in the Granlees Point nest stand and was again incubating eggs at that time (pers. comm., J. Ebert, Pacific Ranger District Biologist, ENF, March 28, 2005).

Prior to studies conducted for the Proposed Action, bald eagle nesting at Loon Lake Reservoir had not been observed (DTA 2004a). In May 2003, an adult male and a near-adult female were observed on the south shore of Loon Lake Reservoir. The birds were seen perched on and near a nest on several surveys, but biologists determined that the nest was either inactive or unsuccessful as no incubation, brooding, or food deliveries were observed. Through observations the following May, two eaglets were confirmed to have hatched from this nest. Adults tended to the eaglets; however, in June 2004, biologists discovered that the eaglets had fallen from the nest tree onto the ground; one chick was dead and the other apparently healthy and being provisioned by the adults. In July 2004, biologists found that the second chick had also died of unknown causes. Both chicks were retrieved and provided by the ENF to the USFWS for analysis.

Additional information on bald eagle occurrence and habitat utilization within the project area and surrounding region is available from a variety of sources including: 1) the ENF Bald Eagle Management Plan (USFS 1999); 2) CDFG Breeding Bald Eagle Database (pers. comm., R. Jurek, Species Conservation and Recovery Program, California Department of Fish and Game, March 17, 2005); 3) California Mid-Winter Bald Eagle Survey Database (pers. comm., J. Linthicum, Santa Cruz Predatory Bird Research Group, March 29, 2005); and 4) incidental observations reported during the relicensing process.

Based on these sources, nesting and wintering bald eagles can be expected to occur throughout the project area and vicinity on an irregular basis. Active nesting territories have been confirmed in the vicinity of the project area at two locations: 1) Stumpy Meadows Reservoir - first recorded nesting in 2004 with fledging of 2 young (pers. comm., J. Ebert, Pacific Ranger District Biologist, ENF, March 28, 2005); and 2) Sly Park Reservoir - first recorded nesting in 2004 with fledging of 2 young; nesting not confirmed in 2005 as of mid-March (pers. comm., J. Ebert, Pacific Ranger District Biologist, ENF, March 28, 2005). The ENF prepared a *Bald Eagle Management Plan* (USFS 1999), which mapped suitable nesting, summer, and winter bald eagle habitat at various sites.

### 5.3.6.3 Environmental Effects Under ESA

Although SMUD determined that the likelihood the Proposed Action would result in take of a listed species was small, SMUD nonetheless concluded that this remote possibility of take was sufficient under the ESA to require SMUD to enter into consultation with the USFWS and obtain an incidental take permit. SMUD has proposed measures to minimize the amount or effect of

incidental take, and it is likely that these measures will be adopted by the USFWS as reasonable and prudent measures for the incidental take permit.

### Pine Hill Endemic Plants

Development and its effects (e.g., habitat loss and fragmentation) are the dominant threats to Pine Hill endemics (USFWS 2002). These threats are not influenced by the Proposed Action. However, ongoing management and maintenance of the project transmission line corridor may affect individual plants, habitat, fire regimes, noxious weed distributions, or other factors relevant to Pine Hill endemics. An example of an ongoing maintenance activity is clearing the right-of-way for fire control and to facilitate access. Although some evidence suggests that clearing the right-of-way may renew habitat and benefit these species, as demonstrated by their current distribution in the project area (i.e., along roadsides and in clearings created by transmission towers), no data is available to quantify this effect. To reduce the potential effect of ongoing management and maintenance activities within the transmission corridor on Pine Hill endemics, the Proposed Action includes an Annual Employee Environmental Awareness Program that will reduce the accidental take of these species during such activities.

The Proposed Action may also indirectly affect Pine Hill endemics. For example, ongoing management and maintenance activities are reasonably certain to be associated with some degree of noxious weed dispersal because vehicles and personnel required for such efforts represent a dispersal vector. In addition, new road construction or the improvement of existing roads may result in increased public access to the transmission line corridor, which would be a noxious weed dispersal vector. No data are available to quantify this effect. SMUD has included as part of the Proposed Action an Invasive Weeds Management Plan that will limit the spread of noxious and invasive weeds throughout the project area. Other indirect influences that may be influencing local disturbance regimes include fire suppression. Pine Hill ceanothus, Pine Hill flannelbush, and Layne's butterweed are considered fire-dependent species and could be excluded from areas in which fire is infrequent or too frequent (USFWS 2002). Lack of fire has been cited as the most important factor in the impaired reproduction of Pine Hill flannelbush (Boyd and Serafini 1992).

Because there is a remote chance of take occurring, SMUD will consult with the USFWS under section 7 of the ESA and implement any reasonable and prudent measures required by USFWS. The following measures have been included in the draft BA and are proposed for these species to minimize the amount or effect of incidental take. In all cases, these measures are intended to be consistent with the continued operation and maintenance of the UARP transmission line.

### Existing and Proposed Management Measures

Existing conservation measures for Pine Hill ceanothus, Pine Hill flannelbush, and Layne's butterweed include federal and state listing, the establishment and support of the Pine Hill Preserve, and research efforts into the ecology and management of gabbro soil plants. Pine Hill Preserve lands are formally designated for the conservation of gabbro soil plants and are collectively managed under a cooperative management agreement entered into by the USBLM, CDFG, El Dorado County, USFWS, California Department of Forestry and Fire Protection

(CDFPP), El Dorado Irrigation District (EID), USBR, and the American River Conservancy (Anonymous 2001). A draft management plan for the Pine Hill Preserve is in preparation (pers. comm., A. Franklin, Botanist, USBLM, February 21, 2005).

- Cooperative Management Agreement – SMUD will enter into the existing Pine Hill Preserve cooperative management agreement, including adoption of the goals of the agreement, as they pertain to conservation of listed plant species within the Project area, with allowances for specific maintenance activities SMUD may conduct that are necessary for the safe and dependable operation of the transmission line.
- Vegetation Management Plan – Within one year of license issuance, SMUD will prepare a plan that formalizes approaches to managing operation and maintenance activities that could affect federally listed plant species within the transmission line corridor. The plan will consider any reasonable and scientifically supported best management practices (BMPs) that may be proposed by the Pine Hill Preserve managing entities, including formal monitoring efforts to refine these BMPs.
- Annual Employee Environmental Awareness Program – SMUD will provide an annual environmental awareness program for employees and key contractors directly involved in the day-to-day operation and maintenance of the project. The workshop will provide specific information on local resource issues, including but not limited to: known occurrences of special-status species, sensitive habitats, and noxious weeds; SMUD's requirements for protection of special-status species and habitats; and procedures for reporting observations of special-status species to appropriate state and federal resource agencies. Within 30 days following the workshop, SMUD will file with FERC a summary of the presentation, including any materials provided to attendees.
- Invasive Weeds Management Plan – SMUD will develop and implement an Invasive Weeds Management Plan that is designed to limit the spread of noxious and invasive weeds. The primary purpose of the plan is to minimize infestation of noxious weeds throughout the project area. The potential means of infestation, or spreading of noxious weeds, are associated with maintenance and operation of the project as well as project-related recreation.

### VELB

Operation and maintenance of the project transmission system and rights-of-way (ROW) are conducted according to standard industry procedures and in accordance with the requirements of State of California law for public health and safety, including California Public Utilities Commission (CPUC) General Order 95, Rule 35, Public Resources Code 4293 (Tree Trimming and Removal), Public Resources Code 4292, and CPUC General Order 112-E, to keep facilities clear of trees and other fire hazards. Other governmental requirements specify maintenance practices to prioritize, inspect, and maintain overhead electrical transmission lines placed under the control of the California Independent System Operator. These maintenance activities are a direct effect of the Proposed Action.

ROW maintenance includes routine inspections of linear facilities and identification of potential hazards/trees that may violate conductor clearance laws and requirements. Management of vegetation may include cutting, trimming, pruning, or clearing vegetation by manual or mechanical means as well as directed herbicide applications or stump treatments to comply with state laws and requirements, protect the integrity of SMUD's facilities, and/or maintain safe and reliable access to facilities for purposes of inspection and operation. In most situations, clearing of low-growing trees and shrubs such as elderberry is not needed to accomplish these safety and maintenance objectives because elderberry plants can be identified, marked, and avoided.

Routine maintenance activities associated with the project transmission line that have the potential to directly affect elderberry plants include, insulator replacement, cross arm replacement, fiber optic cable inspections and road maintenance (occasional blading of existing access roads). Emergency activities may be required in the event of disaster (50 CFR §402.05). Events such as fire, landslides, and intense storms may disable electric transmission systems and appropriate emergency response actions must be taken to prevent or mitigate loss of, or damage to life, health, property, or essential public services. Although the possibility of take of VELB appears remote, SMUD will initiate consultation with the USFWS to obtain an incidental take permit, and proposes the following measures in the draft BA to minimize the amount or effect of incidental take.

#### Existing and Proposed Management Measures

Existing conservation measures for VELB include federal listing, designation of critical habitat, implementation of a formal recovery plan (USFWS 1984), and conservation guidelines issued by the USFWS (1999b).

The following measures are proposed to preclude the potential for adverse effects on VELB.

- Comply With USFWS Conservation Guidelines – Prior to conducting any ground or vegetation disturbing actions within the Project area, SMUD will comply fully with the USFWS Conservation Guidelines for VELB (USFWS 1999). These guidelines include: 1) protocols for surveys (results valid for two years) of the area to be disturbed for the presence of VELB and its elderberry host plant; 2) protection measures; and 3) compensation requirements for elderberry plants with one or more stems measuring 1.0 inch or greater in diameter (at ground level) that may be directly or indirectly affected. Elderberry plants lacking stems 1.0 inch or greater in diameter (at ground level) are considered unsuitable for use by the beetle and are not protected under the guidelines.
- Annual Employee Environmental Awareness Program – SMUD will provide an annual environmental awareness program for employees and key contractors directly involved in the day-to-day operation of the project. The workshop will provide specific information on local resource issues, including but not limited to: known occurrences of special-status species, sensitive habitats, and noxious weeds; SMUD's requirements for protection of special-status species and habitats; and procedures for reporting observations of special-status species to appropriate state and federal resource agencies. Within 30 days

following the workshop, SMUD will file with FERC a summary of the presentation, including any materials provided to attendees.

### Bald Eagle

Human activity associated with the construction, operation, and maintenance activities of the Proposed Action along with visitor activities at recreation sites could potentially affect resident or wintering bald eagles in the project area by discouraging and/or preventing nesting attempts, disrupting feeding patterns and causing bald eagles to expend energy and time on relocating foraging sites. Displacement of a bald eagle would require the bird to expend energy and time without an energetic gain, thereby causing a potential decrease in fitness. However, eagles using the project area appear to be co-existing relatively well with current levels of human activity. Nonetheless, the exact tolerance threshold level of bald eagles to increased disturbance is not known. Therefore, even though risk of take is small, SMUD will consult with the USFWS under section 7 of the ESA, and implement any reasonable and prudent measures to minimize the amount or effect of incidental take.

### Analysis of General Project Operation and Maintenance Effects

Anticipated future operation and maintenance of project facilities to be authorized by the Proposed Action are described in Section 1.6 of the Draft BA (Appendix D).

Bald eagles commonly use reservoirs throughout California and the rest of the United States for nesting and foraging (Busch 1981, Hunt et al. 1992, Jenkins 1992). Research suggests that reservoir operations associated with hydroelectric projects are generally compatible with eagle-nesting activity, provided reservoirs are not drawn down excessively during the nesting season (Jackman et al. 2001, Hunt et al. 2002). Such excessive drawdowns are possible in below normal or dry water years in conjunction with unusually high electrical demand; however, the majority of annual drawdown and fill cycles result in reservoir levels that comport with eagle foraging. CDFG data from 1997 indicates that of 171 bald eagle nest territories known at that time in California, 63 percent were located on reservoirs, 18 percent on natural lakes, 16 percent along rivers and streams, and four percent on the coast (pers. comm., R. Jurek, CDFG Non-game Bird and Mammal Program, January 17, 2002.) Activities related to future operation and maintenance of project facilities will generally be limited in spatial extent, duration, and intensity. In addition, patterns of bald eagle habitat utilization at Union Valley Reservoir, Loon Lake Reservoir, and other project features, suggests a level of habituation to normal operation and maintenance activities with birds demonstrating little or no response to such activities during relicensing studies. In contrast, recreation and weather appear to have a greater effect on eagles at Union Valley Reservoir and Loon Lake Reservoir.

### Analysis of Helicopter Effects

Bald eagle tolerance to normal project operation and maintenance notwithstanding, bald eagles may be affected by helicopter flyovers. SMUD staff uses helicopters on occasion for inspection and maintenance of project facilities, particularly those at remote locations such as Rubicon Reservoir and Buck Island Reservoir. These flights originate from helipads located immediately

west of Loon Lake Reservoir and adjacent to the Loon Lake Chalet. Prior to the confirmation of nesting by bald eagles on the south shore of Loon Lake Reservoir, flights often passed near that location. Since confirmation of the nest site, SMUD has advised pilots to observe a 0.5-mile air-space buffer around the nest site. Given this advisement, future flights at either Union Valley Reservoir or Loon Lake Reservoir will not likely disturb eagles at those locations.

Watson (1993) reported 68 percent of 270 nesting bald eagles flushed when approached by helicopter during surveys in the State of Washington. Stalmaster and Kaiser (1997) observed flushing responses to low-altitude (60-120 m aboveground) helicopter approaches in 47 percent of 919 wintering eagles at one of their study areas also in Washington. They speculated that these flushing responses were caused by the closeness, sudden appearance, loud noise, and air vibration of helicopters. Stalmaster and Kaiser (1997) also noted that few eagles flushed when subjected to high-altitude (> 300 m) helicopter traffic and that sub-adults flushed more readily than adults, suggesting that eagles learn by experience that helicopters are not a threat.

#### Analysis of Transmission Line Effects

The potential for collision-caused mortality and electrocution of birds, including bald eagle, due to operation of the project electric transmission system was identified as a key interest of stakeholders in the UARP relicensing process. As a result, SMUD conducted an intensive evaluation of the existing transmission line to compare the design specifications for this line relative to standards and guidelines developed by the Avian Powerline Interaction Committee (APLIC) for the protection of birds from electrocution and collision mortality. Detailed methods, analysis and results, for this study were documented in the *UARP Bird-Powerline Associations Technical Report* (DTA 2004c).

The key design and siting standards for minimizing risk of collision mortality are removal of overhead ground wires and avoidance of major bird flight paths (APLIC 1994). Collision-caused mortality in birds can be affected by the location and configuration of a transmission line, behavior and age of the bird, and weather conditions. Raptors are generally most vulnerable to collisions while pursuing prey, defending territories, during courtship, and while escaping predators or other aggressive eagles. Although bald eagles cross the project transmission lines occasionally, there is minimal risk of collision because raptors have relatively low rates of collision mortality due to their keen eyesight and exceptional maneuverability in flight.

The key standard established by APLIC for avoidance of bird electrocutions is a minimum spacing of 60 inches between energized phases (i.e., energized electrical conductor) or between a phase and a grounding source (APLIC 1996). All support structures used on the UARP 230 kV transmission lines exceed the 60-inch minimum spacing guideline. Support structures used on the Loon Lake-Union Valley and Loon Lake-Robbs Peak 69 kV transmission lines have minimum spacing of approximately 54 inches; however, perching at such locations is generally precluded by the angled (approx. 45 degrees) configuration of the cross-arms. The Jones Fork-Union Valley 69 kV transmission line includes some jumper wires that pass over, rather than under, cross-arms, which is inconsistent with APLIC design standards. Finally, the Brush Creek 12 kV tap line includes configurations that do not meet APLIC spacing standards and guidelines. However, no observations or reports have been made of bald eagles perching on the UARP

transmission line support structures, nor are there any records or reports of avian mortality due to electrocution or collision attributable to the project transmission system.

### Analysis of Recreation Effects

Detailed information on recreational use of the UARP is available in the following UARP reports: *UARP Visitor Use and Impact Technical Report* (DTA and LBG 2005e), *UARP Recreation Demand Technical Report* (DTA and LBG 2004b), *UARP Recreation Supply Technical Report* (DTA and LBG 2004c), and the *UARP Recreation Carrying Capacity Technical Report* (DTA and LBG 2005c).

A variety of developed public recreational facilities are located on Union Valley Reservoir, which are owned, operated, and maintained by the ENF: 11 campgrounds, three public boat launch ramps, and a paved public bike/pedestrian path that extends along the eastern side of Union Valley Reservoir and passes directly under the nest stand at Granlees Point. Similarly, the ENF owns, operates, and maintains a number of developed public recreation facilities at Loon Lake Reservoir including developed and undeveloped campgrounds, boat launches, day-use facilities, ORV areas, and numerous trails, including the Rubicon Hiking Trail, which extends from the Loon Lake Wilderness Trailhead to Rubicon Reservoir and passes within 100 meters of the nest tree. This trail is open to hiking, horseback riding, and mountain biking throughout the recreation season. In addition, a large private campground is located within one mile of the bald eagle nest at Loon Lake Reservoir. In general, public use of Union Valley Reservoir and Loon Lake Reservoir is greatest during summer months, although winter recreation also occurs (camping, cross-country skiing, snowshoeing, snowmobiling, and fishing). The potential for these activities to result in take of a bald eagle was assessed based on the results of relevant research as described below.

Relationships between human activity and eagle responses are highly complex, difficult to quantify, and often site-specific (Hamann et al. 1999). Responses vary depending on type, intensity, duration, timing, predictability, and location of human activity (Boyle and Samson 1985; Buehler et al. 1991; Grubb and King 1991; Joslin and Youmans 1999; Knight and Knight 1984; McGarigal et al. 1991; Schueck and Marzluff 1995; Stalmaster and Kaiser 1997, 1998). The ways in which these variables interact depends on the age, gender, physiological condition, sensitivity, residence, and mated status of affected eagles. Prey base, season, weather, geographic area, topography, and vegetation (plus other variables probably not perceived by humans) also influence eagle responses. Cumulative effects of many seemingly insignificant or sequential activities may result in disruption of normal behavior (Montopoli and Anderson 1991) and certain levels of human activity can exceed a threshold level that make areas unsuitable to any eagles (i.e., on a population level) (Jackman and Jenkins 2004). Many studies have evaluated the thresholds at which human activities elicit individual response from eagles (Stalmaster and Newman 1978, Knight and Knight 1984, Grubb et al. 1992, Steidl and Anthony 1996). Responses of eagles may vary from ephemeral, temporal, and spatial avoidance of an activity to total reproductive failure and abandonment of breeding or wintering areas. Less adequately documented is that bald eagles may tolerate what most would consider significant disturbances (Harmata and Oakleaf 1992).

Nesting and foraging bald eagles tend to avoid areas of human use or development (Buehler et al. 1991, McGarigal et al. 1991, Brown and Stevens 1997). Stalmaster and Kaiser (1998) found wintering eagle numbers and feeding activity to be negatively correlated with recreation along a river in northwest Washington. Anthony and Isaacs (1989) reported that recently occupied bald eagle nests had fewer roads and recreational facilities nearby than older nests in the same territory, suggesting a shift away from human activities. Disturbances to eagles may result in increased energy expenditures due to flushing response and avoidance flights, decreased energy intake due to interference with feeding activity, and reduced reproductive success (Anthony and Issacs 1989, McGarigal et al. 1991, Stalmaster 1983, Stalmaster and Kaiser 1998). Human induced nesting failures are likely one-time catastrophic events (e.g., camping, woodcutting, or firearm target practice) occurring too close to nests early in the nesting season.

In contrast to anecdotal accounts of disturbance-caused nesting failures at individual sites, most published data show little direct effect of human activities on bald eagle nesting attempts (Mathisen 1968, Fraser et al. 1985, Anthony et al. 1994). In fact, reservoir development (as is the case with Union Valley and Loon Lake reservoirs) has greatly expanded the distribution and availability of suitable nesting and foraging habitat throughout the species' range. Some recreation activities, especially hunting and fishing, facilitate predation (Ewins and Andress 1995, Jackman et al. 2001). Examples include crippled waterfowl from duck hunting and unintentional mortality associated with catch-and-release fishing or deliberate discarding of undesirable fish species (Jackman and Jenkins 2004).

Because human activities can adversely affect bald eagles by altering habitats, interrupting eagle foraging and loafing activities (which deplete energy reserves, especially in winter), or excluding eagles from preferred habitats, SMUD will consult with the USFWS under Section 7 of the ESA to obtain an incidental take permit, and proposes the following measures in the draft BA to minimize the amount or effect of incidental take.

#### Existing and Proposed Management Measures

Current conservation measures suggested for the bald eagle by the ENF Land and Resource Management Plan (USFS 1988) are to follow the federal species Recovery Plan. The Pacific Bald Eagle Recovery Plan (USFWS 1986) states the primary objective of a bald eagle management plan is to outline steps that will provide and protect secure habitat for bald eagles and increase populations to levels where it is possible to delist the species. These goals can be achieved through protection and management of habitat, direct augmentation of populations, public awareness, increased law enforcement, and continued research on the biological requirements of eagles that will provide direction to managers.

The Pacific Bald Eagle Recovery Plan (1986) identifies many locations throughout the Pacific Northwest and California where recovery efforts should be implemented for the eagle. Union Valley Reservoir is identified as one of many recovery territories. The plan also identifies a list of recovery priorities and tasks. The Pacific Ranger District has met its target of one breeding territory on Union Valley Reservoir, and continues to meet or exceed all other task objectives. The ENF prepared a *Bald Eagle Management Plan* (USFS 1999) intended to provide guidelines that meet the requirements of the ESA and the ENF Land and Resource Management Plan to

improve and enhance habitat for the bald eagle and to prepare site-specific management plans. The ENF has implemented a number of habitat protection and enhancement measures for eagles at Union Valley Reservoir. In fall 1997, the Union Blues Forest Health Project was implemented to reduce fuel load in the vicinity of the nest tree. One of the benefits of this project was that it created a more open stand for the nesting eagle. This stimulated larger tree growth, and the threat of a wildfire destroying the nest stand was reduced. In 1988, buoys were installed near the entrance to Fashoda Cove west of Granlees Point to restrict boater access to the nest stand. In fall 2002, a prescribed burn was implemented at Granlees Point to further reduce fuel load levels and protect the nest stand. The Pacific Ranger District establishes a seasonal closure around the Granlees Point nest stand from January 1 to August 15, or until eaglets fledge or the nest fails. Employees of the Pacific Ranger District are informed each year on the breeding status of the pair and whether the closure is in effect. District employees and volunteers are involved with patrolling and enforcing the closure area restrictions. The El Dorado County Sheriff's Department patrols Union Valley Reservoir by boat on the weekends and is notified of the status of the pair to provide assistance in enforcing the closure area. Detection of an active bald eagle nest at Loon Lake Reservoir in 2004 prompted the Pacific Ranger District to establish an emergency closure of the Rubicon Hiking Trail to minimize the potential for adverse effects on nesting eagles. Further protection and enhancement measures at Loon Lake Reservoir will likely be developed if bald eagles continue to nest in the area.

The following measures are proposed to preclude the potential for adverse effects on bald eagle due to future operation and maintenance of the UARP<sup>13</sup>:

- SMUD will comply fully with any restrictions on project-related activities imposed by the ENF Bald Eagle Management Plan (ENF 1999), including any future amendments or emergency closures.
- SMUD will advise all helicopter pilots operating under SMUD's direction to observe a one-half mile air-space buffer around the Granlees Point and Loon Lake Reservoir nest stands, or any other nest stands that may be discovered within the project area, from January 1 through August 15, or until eaglets fledge or the nest fails in any given year.
- SMUD will provide an Annual Employee Environmental Awareness Program for employees and key contractors directly involved in the day-to-day operation of the project. The program will provide specific information on local resource issues, including but not limited to: known occurrences of special-status species, sensitive habitats, and noxious weeds; SMUD's requirements for protection of special-status species and habitats; and procedures for reporting observations of special-status species to appropriate state and federal resource agencies. Within 30 days following the workshop, SMUD will file with FERC a summary of the presentation, including any materials provided to attendees.

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<sup>13</sup> The bald eagle has been proposed for delisting. In the event that the species is removed from the federal endangered species list and if the ESA-mandated five-year review of the status of the species results in a determination that the species no longer requires the protections of the ESA, SMUD will re-evaluate the need for its proposed measures in accordance with current ENF guidelines.

