

TERR-12 SPECIAL-STATUS BAT SPECIES

1.0 EXECUTIVE SUMMARY

During 2001 and 2002, review of existing information and focused bat surveys (roost, mist-netting, and acoustic surveys) were completed. Prior to the surveys, there were no known occurrences of special-status bat species within 1 mile of the Study Area. Ten special-status bat species were determined to potentially occur in the Study Area based on habitat and elevation. None of these ten species are state or federally listed, candidate, or proposed species. Three of these ten species are Forest Service Sensitive species (western red bat (*Lasiurus blossevillii*), Townsend's big-eared bat (*Corynorhinus townsendii*), and pallid bat (*Antrozous pallidus*)). The remaining seven of these species are federal or state species of special concern (Yuma myotis (*Myotis yumanensis*), long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanodes*), long-legged myotis (*Myotis volans*), western small-footed myotis (*Myotis ciliolabrum*), spotted bat (*Euderma maculatum*), and western mastiff bat (*Eumops perotis*)).

Nine special-status bat species were detected within the Study Area during surveys for this study plan. These include all of the species mentioned above with the exception of western red bat, which was not detected in the Study Area. Twenty-eight of the 71 Big Creek ALP facilities that were surveyed had signs of bat activity. Nine of the 28 facilities had signs of special-status bat activity. These include long-eared myotis at Florence Lake Work Camp; Townsend's big-eared bat at the 102" Valve House and at West Portal Glory Hole Winch House; long-legged myotis, pallid bat, and fringed myotis at Million Dollar Mile Road Adit 1; long-legged myotis, pallid bat, fringed myotis, Yuma myotis, and long-eared myotis at Million Dollar Mile Road Adit 2 and at Million Dollar Mile Road Adit 3. Three other facilities had signs of common bat species use, while the remaining 16 facilities had signs of bat species that could not be identified to species and may potentially support special-status species. There were no maternal roosts of special-status bat species detected on any of the facilities surveyed.

Mist-netting and acoustic surveys were used when species could not be determined from the roost surveys. Thirteen mist-netting locations were sampled to determine bat species. The following special-status bat species were captured in mist nets or were detected audibly during mist-netting: Yuma myotis, long-eared myotis, fringed myotis, long-legged myotis, western small-footed myotis, Townsend's big-eared bat, pallid bat, and spotted bat. Forty-six sites were sampled acoustically using an Anabat II® bat detector system (Titley Electronics). Long-eared bat, fringed bat, pallid bat, spotted bat, and western mastiff bat were detected acoustically. Several species (Yuma myotis, long-legged myotis, and western small-footed myotis) are not able to be distinguished to species acoustically and are instead grouped together with those species whose acoustic signals are similar.

2.0 STUDY OBJECTIVES

Determine the location of any active bat roosts or maternal roosts on or near Project facilities and Project-related recreational facilities. If roosts are found, determine what species are present.

3.0 STUDY IMPLEMENTATION

3.1 STUDY ELEMENTS COMPLETED

- Reviewed existing information on special-status bat species in the Study Area during 2001 and 2002. Any known occurrences of special-status bat species in the Study area were mapped and incorporated into a GIS database.
- Identified habitat for special-status bat species, and recorded incidental observations of special-status bat species during all other ALP field surveys in 2001 and 2002.
- Conducted focused roost surveys at or near Project facilities and recreational facilities during the summer of 2002. Facilities that could not be thoroughly searched were monitored at emergence time.
- If an active roost was identified at a facility, mist-netting and acoustic surveys were conducted to determine which species were present.

3.2 OUTSTANDING STUDY ELEMENTS

Conduct roost, mist-netting, and acoustic surveys at facilities not already surveyed during 2002. See Appendix A in TERR-2 – Invasive/Exotic Plant Species for a list of these facilities.

4.0 STUDY METHODOLOGY

4.1 REVIEW OF EXISTING INFORMATION

Information on special-status bats was compiled from literature review and agency consultation during 2001 and 2002. This included review of: (1) the *California Natural Diversity Database* (CDFG 2003); (2) *Wildlife Habitat Relationships System* (CDFG 2002); (3) *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988); (4) U.S. Forest Service's (USFS) *Threatened, Endangered, and Forest Service Sensitive Species Database for the Terrestrial Species of the Sierra National Forest* (USFS 2001); and (5) other documents that are referenced as appropriate in this document.

4.2 HABITAT MAPPING FOR SPECIAL-STATUS BAT SPECIES

Vegetation communities and wildlife habitats were mapped as part of TERR-1, Vegetation Communities, during the fall and winter of 2001/2002. Refer to TERR-1, Vegetation Communities, for a detailed description of methodology. Refer to TERR-5

Common and Special-Status Wildlife Species, for a description of wildlife habitats. Appropriate habitat for special-status bat species was determined to be all wildlife habitat types through literature review, particularly Mayer and Laudenslayer (1988), Zeiner et al. (1988-1990), and P. Heady (pers. com.). A map is not provided in this report. Refer to TERR-1, Vegetation Communities, for a map of wildlife habitats in the Study area. Refer to TERR-5, Common and Special-status Wildlife Species, for a description of these wildlife habitat types.

4.3 FOCUSED SURVEYS

Roost surveys were conducted to determine where bats were roosting on or near Project facilities. When species could not be detected during roost surveys, mist-netting and acoustic surveys were conducted to determine the bat species in or near the Project facilities. Each of the available survey methods for bats (mist-netting, acoustic, and roost surveys) has inherent biases and different detection likelihood for individual bat species (Kalko et al. 1996, Pierson et al. 1996, Pierson and Rainey 1996, Simmons and Voss 1998). Table TERR-12-1 presents the detection reliability for bat species with the three survey methods used for this study.

4.3.1 ROOST SURVEYS

Roost surveys were conducted in June, August, and September of 2002 during the reproductive season of most bat species in the Sierra Nevada when maternity colonies would potentially be present. A complete list of the Project facilities where roost surveys were conducted is included in Appendix A. Roost surveys were focused on Project-related structures such as powerhouses, dams, adits, and recreational buildings (e.g., campground structures). Several special-status bat species, including Yuma myotis, long-eared myotis, fringed myotis, long-legged myotis, pallid bat, and Townsend's big-eared bat, are expected to use human-made structures, as well as natural roosts such as rock crevices and caves in the Study area.

Each roost structure was searched for bats or bat sign (i.e., guano, characteristic staining, and culled insect parts). Any structure that could not be thoroughly investigated was monitored at emergence time using mist netting and acoustic equipment. Multiple survey techniques were used to identify which bat species were using these structures, to characterize the type of use (e.g., maternity roost, day roost, or night roost), and to evaluate the extent of bat use.

4.3.2 MIST-NETTING SURVEYS

Because most temperate zone North American bat species forage in association with water (Grindal et al. 1999, Pierson 1998, Rainey and Pierson 1996), the focus of mist-net and acoustic surveys was in riparian areas. Pallid bats tend to forage for terrestrial insects over roads, trails, and open woodland areas. Therefore, acoustic surveys and mist-netting efforts incorporated these areas for pallid bat detection as well.

Mist-netting was conducted in June, August, and September of 2002. During the summer, females who have given birth are discernable through a post-lactating condition of their nipples (Racey 1988). Young of the year are volant (i.e., flying) and can be identified through incomplete ossification (i.e., formation of bone tissue) of the finger joints (Anthony 1988). Mist-netting is a standard technique for capturing bats, although it does not sample different bat species with equal effectiveness. However, mist-netting offers the advantage of handling animals to confirm species identification and assess their biological condition (e.g., age, sex, and reproductive status). Reproductive status for females is determined by abdominal palpation and mammary condition, and females are classified as pregnant, lactating, post-lactating, parous (i.e., given birth, but not currently reproductively active), or nulliparous (i.e., never given birth). Males are considered reproductively active if the testes are scrotal (Racey 1988). Juvenile status is determined by lack of epiphyseal (i.e., bone joint) closure (Anthony 1988).

Captured bats were identified to species. Their sex, age (juvenile or adult), and reproductive status were determined, and their forearm measurements were recorded. Bats were not banded because of extremely low recapture rates of free-flying bats. Animals were released on-site and hand-release echolocation calls were recorded at the time of release.

4.3.3 ACOUSTIC SURVEYS

Acoustic sampling was conducted in June, August, and September of 2002. Acoustic sampling was conducted with an Anabat II® bat detector system (Titley Electronics). The Anabat system uses a bat detector to detect bat ultrasonic echolocation calls in the field and uses a z-caim unit to convert the detected signals into time/frequency (kilohertz (kHz)) graphs on a laptop computer. Acoustic units (Anabat bat detector, z-caim, and laptop) were placed in appropriate settings near Project facilities to collect bat calls. Appropriate settings included rock outcroppings, roadsides, creeks, snags, buildings, and adits. Acoustic units operated and collected data from sunset until midnight. Up to five detectors were placed at different sites each survey night. Acoustic data on the laptop was analyzed later in the lab.

Detecting and identifying bat species with acoustic sampling is bound by two constraints: ease of detecting a bat in the field and reliability of identifying a bat by its call parameters once detected. Detectability depends on call intensity, call frequency, and distance from the detector. In general, species with low frequency, high intensity calls are detected at the greatest distance, and, therefore, are more frequently represented in acoustic sampling surveys (Pierson et al. 2001).

Identifying bat species by echolocation calls involves analyzing several call parameters such as base frequency, call shape, call pattern, call duration, and interpulse time interval. Some bat species are more readily identifiable by their echolocation call features than other species. Knowledge of the local bat fauna and the ecology and biology of the bat species is necessary in analyzing acoustic data.

Three groups of bats are difficult to distinguish by Anabat call sequence. The first set, silver-haired bat (*Lasionycteris noctivagans*), big brown bat (*Eptesicus fuscus*), and Mexican free-tailed bat (*Tadarida brasiliensis*), all share similar call characteristics in the 20 kHz to 30 kHz frequency range. Some calls can be diagnostic, but most calls are difficult to differentiate. Calls that were indistinguishable between these species were labeled as 'Q25' in the analysis.

California myotis (*Myotis californicus*) and Yuma myotis both have call frequencies between 45 kHz and 50 kHz. Call shape can be diagnostic, although it is often difficult to discern. The two species are best differentiated by their foraging behavior and the location of the detector site. Yuma myotis flies close over water surfaces, foraging for emerging insects, while California myotis flies along vegetation edges, often at canopy height, in an erratic flight pattern. Calls that were indistinguishable between these two species were labeled 'M50' in the analysis.

Western small-footed myotis (*Myotis ciliolabrum*), long-legged myotis, and little brown myotis (*Myotis lucifugus*) comprise the third problematic group of taxa. These three species all have similar calls between 35 to 45 kHz and are very difficult to distinguish by call sequences. These calls were labeled 'M40' in the analysis to indicate the presence of one of these three species.

5.0 STUDY RESULTS AND ANALYSIS

5.1 REVIEW OF EXISTING INFORMATION

Information on known occurrences of special-status bats near Project facilities and bypass and flow-augmented reaches was collected. Prior to this study, there were no USFS or CNDDDB records of special-status bats within 1 mile of the Study Area (USFS 2001; CNDDDB 2002a). There was one CNDDDB record of California mastiff bat at the eastern edge of Table Mountain, more than a mile southwest of the Study area (CDFG 2003).

Ten special-status bat species may potentially occur in the Study Area. Three of these ten species are Forest Service Sensitive species (western red bat, Townsend's big-eared bat, and pallid bat). The remaining seven of these species are federal or state species of special concern (Yuma myotis, long-eared myotis, fringed myotis, long-legged myotis, western small-footed, spotted bat, and western mastiff bat). There are no federal or state listed, candidate, or proposed bat species with the potential to occur in the Project area. These species are described in detail below. Life history and habitat requirements are based on P. Heady (pers. com.) unless otherwise noted.

5.1.1 FOREST SERVICE SENSITIVE SPECIES

Western red bat (*Lasiurus blossevillii*; Forest Service Sensitive). Very little research has been done on the western red bat and little is known about this species. Much of the natural history is inferred from what is known about the eastern red bat, although the degree of similarity of the biology of these two species is unknown at

present. The western red bat is a solitary, foliage-roosting bat. The western red bat is in the genus *Lasiurus*, the hairy-tailed bats. These bats are adapted for exposed roosting behavior with their hairy tail membrane and small ears. In California, this species is known to roost in cottonwood trees and willows, but is commonly detected in a variety of habitats, including chaparral. Roost heights range from 10 to 50 feet (Pierson and Heady 1997). The range of the western red bat is from British Columbia to Central and South America. Migration occurs throughout its range and bats of Canada move into the coastal lowlands of California, and the California population is thought to winter in Central America (Nagorsen and Brigham 1993). Mating takes place in late summer and fall, sperm is stored over winter, and fertilization occurs in early spring. Gestation period is 80 to 90 days, and one to four young are born in late May to early July. The young are born small, naked, and underdeveloped (Nowak 1994). Females leave the young at the roosting site while foraging, but will carry them when moving to a new roosting site. Young are capable of sustained flight at 6 weeks. Large moths are the primary prey of the western red bat. This bat is a fast flyer, foraging in straight flights or large circles (Nagorsen and Brigham 1993). The echolocation calls are highly variable depending on the terrain. Though variable, these calls are very distinct. There are no known occurrences of western red bat in the Study Area (CDFG 2003; USFS 2001).

Townsend's big-eared bat (*Corynorhinus townsendii*; Federal Species of Special Concern, California Species of Special Concern, and Forest Service Sensitive) is a year-round resident in California, occurring from low desert to mid-elevation montane habitats. It is found primarily in rural settings, from inland deserts to coastal redwoods, oak woodland of the inner Coast Ranges and Sierra Nevada foothills, and low to mid-elevation mixed coniferous-deciduous forests. It typically roosts during the day in caves and mines, but can roost in buildings that offer suitable conditions (Kunz and Martin 1982). Night roosts are in more open settings and include bridges. It hibernates in mixed sex aggregations of a few to several hundred individuals. Hibernation occurs for prolonged periods in colder areas and intermittently in non-freezing areas. Townsend's big-eared bat arouses periodically and moves to alternative roosts, and actively forages and drinks throughout the winter. A single young is born per year between May and July. Females form maternity colonies of 35 to 200 individuals, while males roost individually (Kunz and Martin 1982). Townsend's big-eared bat feeds primarily on small moths that are gleaned from vegetation. There are no known occurrences of Townsend's big-eared bat in the Study Area (CDFG 2003; USFS 2001).

Pallid bat (*Antrozous pallidus*; California Species of Special Concern and Forest Service Sensitive), a year-round resident in California, is found in arid desert areas, grasslands and oak savanna, coastal forested areas, and coniferous forests of the mountain regions of California. Roost sites are typically rock outcroppings, caves, hollow trees, mines, buildings, and bridges (Hermanson and O'Shea 1983). Pallid bats make use of similar structures for night roosting and will use more open sites such as eaves, awnings, and open areas under bridges for feeding roosts. Pallid bats are largely inactive in the winter months, and there is evidence for both hibernation and migration. Hibernation aggregations tend to be much smaller than

summer aggregations. Pallid bats have been observed foraging during the winter when prey is available (Hermanson and O'Shea 1983). Copulation occurs in the fall, usually October through December, although in coastal California copulation has been observed as late as February. Females store the sperm, and ovulation occurs the following spring. Parturition timing is determined by local climate, and embryonic development usually takes about nine weeks with birth occurring in May or June. Twins are the norm in northern California, but in other areas the pallid bat is known to have triplets. Maternity colonies range from 20 to 200 individual adult bats. Males roost in much smaller groupings (Hermanson and O'Shea 1983). The pallid bat feeds on large insects (1 to 3 inches in length). Prey is most often caught on the ground. Jerusalem crickets, scorpions, and beetles make up most of the diet of pallid bat in central California. There are no known occurrences of pallid bat in the Study Area (CDFG 2003; USFS 2001).

5.1.2 FEDERAL AND/OR STATE SPECIES OF SPECIAL CONCERN

Yuma myotis (*Myotis yumanensis*; Federal Species of Special Concern) is a year-round resident in a wide variety of habitats from the coast to mid-elevations. It is very tolerant of human habitation and survives in urbanized environments. Day roosts occur in buildings, trees, mines, caves, bridges, and rock crevices. Night roosts occur in buildings, bridges, and other man-made structures. The Yuma myotis is presumed to be non-migratory and hibernates in winter, but no large winter aggregations have been reported. A single young is born per year between June and July. Females form large maternity colonies from two hundred to several thousand individuals. Males tend to roost singly or in small groups. The Yuma myotis forages by trawling with its large feet on open water surfaces for emergent aquatic insects, such as caddis flies and midges. Foraging occurs directly over the surface of still water ponds, reservoirs, or pools in streams and rivers. There are no known occurrences of Yuma myotis in the Study Area (CDFG 2003; USFS 2001).

Long-eared myotis (*Myotis evotis*; Federal Species of Special Concern) is a year-round resident in California, occurring in mixed hardwood/conifer forest and montane conifer forest in northern California, and in pinyon-juniper, mesquite scrub, and pine/oak woodland in southern California (Manning and Jones 1989). Its distribution is broad, but long-eared myotis usually does not occur in large numbers. The long-eared myotis typically roosts singly or in small groups in hollow trees, under exfoliating bark, crevices in rock outcroppings, and occasionally in mines, caves, and buildings during the day. Roost sites in these structures tend to be cryptic (i.e., in crevices and fissures). Night roosts are in caves, mines, bridges, buildings, and rock crevices (Nagorsen and Brigham 1993). It is presumed to be non-migratory, and thought instead to hibernate locally in caves (Manning and Jones 1989). A single young is born per year between June and July. Females may form small maternity colonies with less than 40 individuals in California (Manning and Jones 1989). The long-eared myotis feeds on moths, flies, and small beetles. It captures insects by gleaning vegetation and in aerial pursuits. It forages along rivers and streams, over ponds, and within cluttered forests (Nagorsen and Brigham 1993). There are no

known occurrences of long-eared myotis in the Study Area (CDFG 2003; USFS 2001).

Fringed myotis (*Myotis thysanodes*; Federal Species of Special Concern) is found in western North America from British Columbia to Veracruz and Chiapas, Mexico. Over most of its range, this species occurs at mid-elevations. It has been found at high elevations in New Mexico and was found in the Sequoia National Forest above 6,000 feet. Along the west coast, this bat is found at low elevations (O'Farrell and Studier 1980) and is associated with redwood forests. Maternity colonies are large, up to 300 individuals (Nagorsen and Brigham 1993). These colonies occur in caves, mines, and buildings. Given this species' association with redwood forests in coastal California, it is likely that the fringed myotis uses redwood hollows. Males roost separately from the maternity colonies. Night roosts are in similar features. In portions of its range, fringed myotis migrates to lower elevations and/or more southern locations, where the bats can be active during the winter months (O'Farrell and Studier 1980). In coastal California, such migrations may not occur. Only one young per year is common for the fringed myotis. Little is known of the reproductive cycle of this species. Ovulation and fertilization occur in late spring, from May 1 to May 15, with parturition occurring June 25 to July 7 (O'Farrell and Studier 1980). Young are capable of limited flight at 16 days and are adult size by 21 days. The fringed myotis primarily eats beetles (73 percent of its diet), moths, flies, leafhoppers, lacewings, crickets, and harvestmen (O'Farrell and Studier 1980). The presence of flightless insects in its diet suggests that some of its prey is gleaned from foliage (Nagorsen and Brigham 1993). There are no known occurrences of fringed myotis in the Study Area (CDFG 2003; USFS 2001).

Long-legged myotis (*Myotis volans*; Federal Species of Special Concern) inhabits western North America from southeast Alaska to central Mexico. It is found in an elevational range from sea level to 12,000 feet. Long-legged myotis is primarily a coniferous forest bat, although it may also be found in riparian and desert habitats (Warner and Czaplewski 1984). Maternity colonies can be up to 300 individuals. Maternity roosts are found in buildings, rock crevices, and under exfoliating bark. Males roost singly or in small numbers in rock crevices, buildings, and under tree bark. Night roosts are found under bridges, in caves and mines, and in buildings (Nagorsen and Brigham 1993). In the northern portion of its range, long-legged myotis commonly hibernates. It is unknown whether this bat migrates in the portion of its range where winters are less severe. Mating takes place in the fall, and sperm is stored over winter. Ovulation and fertilization take place from March to May, and parturition occurs from May to August. There is extensive variation in the timing of reproductive activity in this species. Long-legged myotis is known to live 21 years in the wild (Warner and Czaplewski 1984). Long-legged myotis feeds primarily on moths, but is also known to feed on other soft-bodied prey such as flies, termites, lacewings, wasps, bugs, leafhoppers, and small beetles. Long-legged myotis is a rapid, direct flier pursuing its prey over relatively long distances through, around, under, and over forest canopy (Warner and Czaplewski 1984). There are no known occurrences of long-legged myotis in the Study Area (CDFG 2003; USFS 2001).

Western small-footed myotis (*Myotis ciliolabrum*; Federal Species of Special Concern) occurs mainly in arid habitats across the western United States and appears to be uncommon throughout most of California (Heady, Pers. Obs.). This species is known to roost in rock crevices in rock faces and is associated with cliffs and talus fields. It has also been found roosting under bark crevices, as well as in barns. Western small-footed myotis emerges at dusk and is most active between 2200 and 2300 and again between 0100 and 0200 (Harvey et al. 1999). It forages along cliffs, 3 to 9 feet above the ground. Prey includes small insects, such as moths, beetles, and flies. One young, occasionally twins are born in June. There are no known occurrences of western small-footed myotis in the Study Area (CDFG 2003; USFS 2001).

Spotted bat (*Euderma maculatum*; Federal Species of Special Concern and Forest Service Sensitive) is a rare bat with a discontinuous distribution throughout its range across western North America. In California, this bat is found in the Sierra Nevada and the lower reaches of the Cascade Range (Nagorsen and Brigham 1993). The spotted bat typically roosts in rock crevices in vertical cliff faces, often 325 feet or more in height. The spotted bat is found from below sea level to high elevations in the Sierra Nevada. The distribution of the spotted bat is determined by availability of suitable cliff habitat. The females give birth to a single young in solitary roosts in late spring. Lactating females have been captured in Texas and New Mexico in June and July and as late as August in Utah (Nowak 1994). The diet of the spotted bat consists mainly of moths and other insects caught in flight. Foraging occurs over pine forests, meadows, and marshy areas (Nagorsen and Brigham 1993). Echolocation calls of the spotted bat (6 to 16 kHz) are audible to the human ear and can be heard from distances up to 800 feet. There are no known occurrences of spotted bat in the Study Area (CDFG 2003; USFS 2001).

Western mastiff bat (*Eumops perotis*; Federal Species of Special Concern and California Species of Special Concern) has an unusual distribution consisting of two widely separated populations. The northern population occurs from the southwestern United States to Southern Mexico, and the southern population occurs from northern South America to north central Argentina. In California, this species is found as far north as Butte County, and recent acoustic data has placed it in Shasta County (Pierson and Rainey 1998). The mastiff bat has been documented in the Sierra Nevada Mountain range at elevations of 7,200 feet and higher in Sequoia National Park and Yosemite National Park (Pierson and Heady 1996). This species is known from Fresno, Tulare, and Mariposa counties (Constantine 1998). Maternity colonies of western mastiff bat are usually small (<100 individuals). Males are often found roosting with the maternity colonies. Roosting sites are typically in crevices high in rock faces in arid places. The mastiff bat in California is found in cultivated areas, in mixed chaparral and live oak, and arid rocky regions where vegetation is sparse. The mastiff bat is not capable of achieving flight from the ground and requires an unobstructed drop to obtain flight speed. In southern California, western mastiff bat is known to roost in buildings and manmade structures (Best et al. 1996). As with most molossid bats, mating occurs in the spring. One young is born from June through August. Dates of reproduction for this species vary more than any

North American species, even within one colony. Little is known of the rate of development of the young or the longevity of adults (Best et al. 1996). Prey selection varies with geographic location. In Arizona, diet primarily consists of moths and other soft-bodied insects. A high level of weak flying insects found in guano and the stomachs of individuals suggest that western mastiff bat may forage low to the ground. The presence of diurnal insects suggest that foraging may have taken place at altitudes >3,200 feet where diurnal insects are trapped aloft. There are no known occurrences of western small-footed myotis in the Study Area (CDFG 2003; USFS 2001).

5.1.3 HABITAT MAPPING FOR SPECIAL-STATUS BAT SPECIES

Appropriate habitat for special-status bat species was determined to be coniferous forest, oak woodland, riparian, wetlands, grasslands, chaparral, and open water from literature review. These habitats include all of the wildlife habitats in the Study Area. Maps are not provided in this report. For a map of wildlife habitats present in the Project area, refer to TERR-1, Vegetation Communities. Refer to TERR-5, Common and Special-status Wildlife Species, for a description of wildlife habitats in the Study Area.

5.1.4 ROOST SURVEY RESULTS

Twenty-eight Project facilities showed signs of bat use (Figures TERR-12-1a through d; Appendix B). Of these 28 Project facilities, the three adits along Million Dollar Mile Road showed the most bat activity. Nine of the 28 facilities had signs of special-status bat activity. Three other facilities had signs of common bat species use only, while the remaining 16 facilities had signs of bat use and may potentially support special-status species. There were no maternal roosts of special-status bat species detected on any of the facilities surveyed. Each of these 28 facilities is described below:

- **Powerhouse 1:** Multiple day and night roost locations were identified on the third, fourth, and fifth floors. Stored objects and equipment provided crevice habitat for California myotis and *Myotis* spp. Crevice features in the ceiling and support beams provide day roosts for bats. The open area in the upper levels provides night roosting habitat for big brown bat and *Myotis* spp. The numbers of bats utilizing the building are low.
- **Powerhouse 2:** Multiple day and night roost locations were identified on the fourth and fifth floors. Hanging doors on the fourth floor provided day roosts for long-legged myotis. Day roosting Yuma myotis were observed under window trim and under pipes along ceiling and wall interfaces. Very little sign of bat use was detected elsewhere in the facility.
- **Six Facilities Associated with Powerhouse 3:** A large accumulation of guano in the flood pump room and reports of the area being referred to as the “bat cave” indicated heavy use by bats. A dead individual was identified as a Yuma myotis. Several small night roost locations, as well as one day roosting *Myotis* spp., were

identified under the machine shop. The Maintenance Ready Room had very light guano deposition in the attic. The 10 Stall Storage showed signs of light night roosting by *Myotis* spp. The 5 Stall Storage facility showed signs of very low levels of night roosting by *Myotis* spp. The Sheet Metal House and the Garage both showed signs of light night roosting by *M. spp.*

- **Powerhouse 8:** Three small day and night roost locations were identified in this facility. The second floor had signs of light night and day roosting by *Myotis* spp. The third floor had light staining and guano deposition indicating low levels of night and day roosting. The intake structure showed signs of very light night roost use.
- **Mammoth Pool Powerhouse:** One small day roost location and four night roost locations were identified in the external structure of the Mammoth Pool Powerhouse facility. The day roost was located in the stop lock chain cover and was occupied by big brown bat and *Myotis* spp.
- **Mammoth Pool Campground:** Three California myotis were found day roosting under the shingles of the restroom.
- **Mammoth Pool Dam:** A large night roost congregation was indicated by heavy accumulation of guano in the Fish Generator tunnel. Ten or more day roosting *Myotis* spp. were observed.
- **Two Facilities Associated with Florence Lake Work Camp:** Multiple structures were surveyed at the Florence Lake Work Camp. Many of the structures provide potential for bat use in the form of loose metal roofing, plywood window covers, and open areas under buildings and in sheds and attics. The Cookhouse had guano in the storage area under the building indicating night roosting by *Myotis* spp. One long-eared myotis was observed under a plywood window cover of the Recreation Room.
- **102" Valve House and Shed:** One California myotis was observed day roosting in the rafters of the 102' Valve House. A small shed near the 102" Valve House had guano deposits indicating day or night roosting by Townsend's big-eared bat. This structure had scattered guano deposition indicating low levels of night roosting by *Myotis* spp.
- **West Portal Glory Hole Winch House:** One Townsend's big-eared bat was observed day roosting in the rafters of the Winch House. Guano accumulation indicated that this structure is a regular roost for this species. Sign of light night roosting by *Myotis* spp. was also observed in this structure.
- **Huntington Lake Dam 1 Surge Chamber:** This structure provides excellent habitat for both day and night roosting. Guano levels indicate moderate use by *Myotis* spp. A bat detector unit was set up to record calls of bats using the tunnel throughout the night. The acoustic results are presented later in this report.
- **Shaver Lake Recreation Area Road 1 & 2 Restrooms:** These restrooms show moderate to heavy night roost activity. The entrance hall and interiors provide excellent night roosting habitat for *Myotis* spp.

- **Shaver Lake Recreation Area Boat Only Restrooms:** Evidence of heavy night roost activity by *Myotis* spp., most likely Yuma myotis, was found in the entry halls and interior of these facilities.
- **Shaver Lake Recreation Area Dorabella Campground Information Kiosk:** One day roosting big brown bat was found behind the campground map on the information kiosk. Guano deposition under the roost suggests that this feature provides a regular roost for one or two bats.
- **Shaver Lake Recreation Area Dinky Creek Rest Stop:** Evidence of very light night roosting by *Myotis* spp. was observed in the restroom facilities.
- **Shaver Lake Recreation Area Camp Edison Information Booth:** Two day roosting *Myotis* spp. were observed in the upper rafters of the information booth. Guano and staining levels were very light.
- **Shaver Lake Recreation Area Tanager Area Store:** This structure provides excellent roosting habitat under the metal roof. Ten day roosting California myotis were observed in what was likely a maternity roost.
- **Million Dollar Mile Road Adit 1:** Evidence of heavy night use and moderate day use by bats was found. Mist-nets and acoustic sampling units were set up to sample the night roosting bats. These results are presented later in this report.
- **Million Dollar Mile Road Adit 2:** Evidence of heavy night use and moderate day use by bats was found. Mist-nets and acoustic sampling units were set up to sample the night roosting bats. These results are presented later in this report.
- **Million Dollar Mile Road Adit 3:** Evidence of heavy night use and moderate day use by bats was found. Mist-nets and acoustic sampling units were set up to sample the night roosting bats. These results are presented later in this report.

5.1.5 BAT CAPTURE RESULTS

Thirteen sites throughout the Study Area were mist-netted (Figures TERR-12-2a through d). These sites were selected to identify bats roosting on facilities to species and to sample the bat fauna near facilities.

Twelve bat species were captured in mist-nets during the study (Appendix C). Of these twelve, six were special-status species. These were the following: Yuma myotis, long-eared myotis, fringed myotis, long-legged myotis, western small-footed myotis, and pallid bat. Two other species, western mastiff bat and spotted bat, were detected audibly during mist-netting activities, but were not captured in mist-nets. The results from mist-netting are described below:

FOREST SERVICE SENSITIVE SPECIES

- Western red bat was not captured during the study. This species is not frequently captured and may be in low numbers in the Sierras. Western red bat was also absent from the acoustic surveys suggesting that this species is either in very low numbers or not present in the Study Area.

- Townsend's big-eared bat was not captured during the survey efforts. This species is notably difficult to capture in mist-nets because of its slow flight and use of "whispering" echolocation. The absence of captures for this species in the Project area does not suggest that it is not present.
- Pallid bat was captured at two locations along Million-Dollar Mile Road, both in cave-like adits.

FEDERAL SPECIES OF CONCERN AND/OR CALIFORNIA SPECIES OF CONCERN

- Yuma myotis was the most frequently captured bat. Fifty-three individuals were captured at 10 of the 13 sites. Reproductively active individuals of this species were found throughout the elevational range.
- Long-eared myotis was captured at two sites, in an adit along Million-Dollar Mile Road and at the Bear Creek Diversion Dam. These two locations are at the elevational extremes of the Project area.
- Fringed myotis was captured at two sites, in an adit along Million-Dollar Mile Road and on Big Creek at Sierra Summit. Only three male individuals were captured so inferences to reproductive activity cannot be made.
- Long-legged myotis was captured at six sites from 2,026 feet to 7,029 feet. Eleven individuals were captured, with reproductively active females only being captured at the lower elevations.
- Western small-footed myotis was only captured at one location, Big Creek at Sierra Summit. These animals are not known to be widely distributed and are seldom locally abundant.
- Spotted bat was not captured during the survey efforts. The audible echo location calls were detected and noted at the following two mist-netting locations: Million Dollar Mile Road Adit 3 and Jackass Meadow.
- Western mastiff bat was not captured during the study, but their audible echolocation calls were observed and recorded at the following six mist-netting sites: Stevenson Creek below Shaver Dam, Million Dollar Mile Road Adit 3, Mammoth Pool Powerhouse, Big Creek at Sierra Summit, Jackass Meadow, and Mono Hot Springs. Due to their habit of foraging above the canopy this species is seldom captured in mist-nets. Audible observations and acoustic records suggest that this species is widespread and relatively abundant in the Study Area.

COMMON BAT SPECIES

- Little brown myotis was only captured at two sites, on Big Creek at Sierra Summit and on the San Joaquin River at Jackass Meadow. Both sites are above 7,000 feet. Reproductively active individuals of this species were captured at both locations.
- California myotis was captured at seven sites, and reproductively active females were captured throughout the elevational range of the Project area.

- Silver-haired bat is mentioned because of the notable lack of captures. The Project area is close to the southern extent of the Sierran range for this species.
- Western pipistrelle was captured at four sites, all of which are under 5,000 feet in elevation. Reproductively active individuals were captured at all four locations.
- Big brown bat was the second most frequently captured species with 29 individuals at eight locations. Three of the 29 big brown bats captured were females. This ratio is surprising and may indicate a sexual segregation of the population.
- Hoary bat was captured at three locations with elevations ranging from 3,050 feet at Big Creek just above Powerhouse 2 to 7,394 feet at Bear Creek Diversion Dam.
- Mexican free-tailed bat was captured at only two sites, both of them adits along Million-Dollar Mile Road. The setting of a night roost within an adit greatly increased the capture probability for this high foraging species. The lack of capture records for this species over the rest of the Project area does not suggest their absence.

5.1.6 ACOUSTIC SAMPLING RESULTS

Forty-six acoustic sampling sites were chosen in the Study Area (Figures TERR-12-3a through d). These sites were selected to determine bat species near facilities and to sample throughout the elevational gradient and across multiple habitat types.

Nine species and three indistinguishable groups of species were detected (Appendix D). This included five special-status bats (long-eared bat, fringed bat, pallid bat, spotted bat, and western mastiff bat). Several species including three special-status species (Yuma myotis, long-legged myotis, and western small-footed myotis) could not be distinguished to species acoustically.

FOREST SERVICE SENSITIVE

- Western red bat was absent from the acoustic surveys suggesting that this species is either in very low numbers or not present in the Study Area.
- Townsend's big-eared bat was not recorded acoustically during the study. The Townsend's big-eared bat is not easily detected with acoustic equipment.
- Acoustic data suggest that pallid bat is present throughout the Study Area with detections at nine sites with elevations ranging from 2,239 feet to 7,394 feet.

FEDERAL SPECIES OF CONCERN AND/OR STATE SPECIES OF CONCERN

- Yuma myotis are not acoustically distinct from California myotis. Both of these species could be represented by what has been (for the purposes of this study) categorized as 50 kHz calls. Fifty kHz calls were recorded at 37 of 40 acoustic sampling locations.

- Long-eared myotis was detected at 25 of 40 acoustic sites. This suggests that this species is much more widely spread than the capture data would appear to indicate. Long-eared myotis was the second most abundantly detected species during acoustic surveys.
- Fringed myotis was detected at four sites in the Project area at elevations ranging from 2,261 feet to 7,349 feet.
- Long-legged myotis are not acoustically distinct from little brown myotis and western small-footed myotis. All of these species could be represented by what has been (for the purposes of this study) categorized as 40 kHz calls. Long-legged myotis was captured in mist-nets at seven sites throughout the elevational range of the Project. This could suggest that the bulk of the 40 kHz calls recorded at 30 of the 40 locations could be from the long-legged myotis.
- Western small-footed myotis are not acoustically distinct from little brown myotis and long-legged myotis. All of these species could be represented by what has been (for the purposes of this study) categorized as 40 kHz calls. Western small-footed myotis was only captured in mist-nets at one location, Big Creek at Sierra Summit. This species is not known to be widely distributed and is seldom locally abundant. This suggests that the bulk of the 40 kHz calls was not western small-footed myotis.
- Spotted bat was observed by their audible echo location calls and noted at five acoustic sample sites. The detections of this species were made at sites ranging from 2,261 feet to 7,143 feet.
- Western mastiff bat was detected by their audible echolocation calls which were recorded at 17 acoustic locations. These audible detections and acoustic records suggest that this species is located throughout the Study Area.

COMMON BAT SPECIES

- Little brown myotis are not acoustically distinct from long-legged myotis and western small-footed myotis. All of these species could be represented by what has been (for the purposes of this study) categorized as 40 kHz calls. 40 kHz calls were recorded at 30 of the 40 acoustic sampling locations. The fact that little brown myotis was only captured at mist-nets at the higher elevations (above 7,000 feet) suggest that the bulk of the 40 kHz were not little brown myotis.
- California myotis are not acoustically distinct from Yuma myotis. Both of these species could be represented by what has been (for the purposes of this study) categorized as 50 kHz calls.
- Echolocation calls of silver-haired bat are not acoustically distinct from Mexican free-tailed bat, big brown bat, and occasionally hoary bat. All of these species could be represented by what has been (for the purposes of this study) categorized as Q25 calls. Q25 calls were recorded at 33 of 40 acoustic sampling locations.

- Western pipistrelle calls are very distinct and were recorded at 18 locations all of which are under 5,000 feet elevation suggesting a possible upper elevation limit to the distribution of western pipistrelle of roughly 5,000 feet.
- Big brown bat calls can be confused with other bats with calls in the 25 kHz range, yet they also can produce distinct calls. These distinct calls were recorded at 29 of the 40 acoustic sampling locations making big brown bat the most widely distributed species detected in the Study Area.
- Hoary bat was recorded at 14 of the 40 acoustic sampling sites throughout the elevational range of the Study Area. The Balsam Forebay had a notable 97 hoary bat call sequences out of a total of 175 recorded call sequences.
- Echolocation calls of Mexican free-tailed bat are often not acoustically distinct from silver-haired bat, big brown bat, and occasionally hoary bat. All of these species could be represented by what has been (for the purposes of this study) categorized as Q25 calls. Q25 calls were recorded at 34 of 40 acoustic sampling locations. Mexican free-tailed bat can produce distinct calls. These distinct calls were recorded at 12 acoustic sampling sites throughout the elevation range of the Study Area.

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TABLE

Table TERR-12-1. Method of Detection Reliability for Special-status Bat Species

Species	Roost	Mist-netting	Acoustic
Western red bat <i>Lasiurus blossevillii</i>	No information available	No information available	Readily Detected
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	Distinctive Guano	Low Capture Rate	Readily Detected, but rarely due to low intensity, high frequency call
Pallid bat <i>Antrozous pallidus</i>	Distinctive Guano	Low Capture Rate	Readily Detected
Yuma myotis <i>Myotis yumanensis</i>	No information available	No information available	Not Readily Detected, confused with California myotis (<i>M. californicus</i>)
Long-eared myotis <i>Myotis evotis</i>	No information available	No information available	Readily Detected
Fringed myotis <i>Myotis thysanodes</i>	No information available	No information available	Readily Detected
Long-legged myotis <i>Myotis volans</i>	No information available	No information available	Not Readily Detected, confused with western small-footed myotis
Western small-footed myotis <i>Myotis ciliolabrum</i>	No information available	No information available	Not Readily Detected, confused with long-legged myotis
Spotted bat <i>Euderma maculatum</i>	No information available	No information available	Readily Detected
Western mastiff bat <i>Eumops perotis</i>	No information available	No information available	Readily Detected

FIGURES

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APPENDIX A

List of Project Facilities Where Roost Surveys Were Conducted for Special-status Bat Species

APPENDIX A. List of Project Facilities Where Roost Surveys Were Conducted for Special-status Bat Species

Facility	Habitat Feature	Survey Date	Survey Type*	Notes
Florence Lake Work Camp 199	Buildings	6/27/2002	ST	Bat access, no bat use
Florence Lake Work Camp 200	Buildings	6/27/2002	ST	Bat access, no bat use
Florence Lake Work Camp 196	Buildings	6/27/2002	ST	Bat access, no bat use
Florence Lake Work Camp Garage	Buildings	6/27/2002	ST	Bat access, no bat use
Florence Lake Work Camp 101	Buildings	6/27/2002	ST	No bat access
Florence Lake Work Camp Metal Garage	Buildings	6/27/2002	ST	No bat access
Florence Lake Work Camp 102	Buildings	6/27/2002	ST	No bat access
Florence Lake Work Camp Cook House	Buildings	6/26/2002	ST	Bat access and sign
Florence Lake Work Camp Recreation Room	Buildings	6/26/2002	ST, AC	Bat access and sign
Florence Lake Work Camp 205	Buildings	6/27/2002	ST	No bat access
Florence Lake Picnic Area	Toilets	8/8/2002	ST	Bat access, no bat use
Jackass Campground	Toilet, watershack	8/8/2002	ST	Bat access, no bat use
Hooper Diversion Dam	Diversion dam	8/8/2002	ST	Bat access, no bat use
Camp 62 Adit	Adit	6/27/2002	ST	Bat access, no bat use
Camp 62 Area Building	Building	6/27/2002	ST	Bat access, no bat use
Bear Creek Diversion Dam	River	8/8/2002	ST, MN, AC	Bat access, no bat use
Portal Powerhouse	Powerhouse, surge chamber, energy dissipater,	6/27/2002	ST	Bat access, no bat use
Huntington Lake Dam 3	2 bridges, internal inlet works, release valve,	8/5/2002	ST	Bat access, no bat use
Huntington Lake Dam 2	Internal inlet works, valve house	8/5/2002	ST	Bat access, no bat use
Huntington Lake Dam 1	Overhang, surge chamber, syphon, gate house	8/5/2002	ST	Bat access and sign
Tunnel 7 Gate 2	Outlet structures	6/26/2002	ST	No bat use
Camp 72 Adit	Adit	6/26/2002	ST	No bat use
Eastwood Switchyard	Building	5/30/2002	ST	No bat use
Eastwood Powerhouse	Tunnel, powerhouse	6/26/2002	ST, MN, AC	Bat access, no bat use
Camp Edison	Recreational facilities, toilets	8/6/2002	ST	Bat access, no bat use
Shaver Lake Recreation Area Camp Edison Information Booth	Kiosk	8/6/2002	ST	Bat access and sign
Shaver Lake Recreation Area Road 1 Restroom	Toilets	8/7/2002	ST	Bat access and sign
Shaver Lake Recreation Area Road 2 Restroom	Toilets	8/7/2002	ST	Bat access and sign

APPENDIX A. List of Project Facilities Where Roost Surveys Were Conducted for Special-status Bat Species (continued)

Facility	Habitat Feature	Survey Date	Survey Type*	Notes
Shaver Lake Recreation Area Boat Only Restroom	Toilets	8/6/2002	ST	Bat access and sign
Shaver Lake Recreation Area Tanager Area Store	Store	8/6/2002	ST	Bat access and sign
Dorabella Campground	Toilets, day use areas	8/6/2002	ST	Bat access, no bat use
Shaver Lake Recreation Area Dorabella Campground	Information kiosk	8/6/2002	ST	Bat access and sign
Shaver Lake Recreation Area Dinky Creek Rest Stop	Toilets	8/6/2002	ST	Bat access and sign
Tunnel 2 Adit	Adit, bridge	5/30/2002	ST	Not suitable
Adit 8/Shoefly	Concrete structures	5/30/2002	ST	Not suitable
West Portal Glory Hole	Glory hole	8/6/2002	ST	No bat access
102" Valve House	Valve house and shed	8/6/2002	ST	Bat access and sign
West Portal Glory Hole: Winch House	Winch house	8/6/2002	ST	Bat access and sign
Powerhouse 1	Powerhouse	6/25/2002	ST	Bat access and sign
Big Creek Building Complex Division Office	Building	8/6/2002	ST	No bat access
Big Creek Building Complex Guest Lodge	Building	8/6/2002	ST	No bat access
Big Creek Building Complex Clubhouse	Building	8/6/2002	ST	No bat access
Big Creek Building Complex Cook House	Building	8/6/2002	ST	No bat access
Big Creek Building Complex 0177	Building	8/6/2002	ST	Bat access, no bat use
Big Creek Building Complex Sewage Facility	Building	8/6/2002	ST	Bat access, no bat use
Big Creek Building Complex Garage Facility	Building	8/6/2002	ST	Bat access, no bat use
Big Creek Building Complex Water Laboratory	Building	8/6/2002	ST	Bat access, no bat use
Big Creek Building Complex Guest House 0188 0196	Building	8/6/2002	ST	Bat access, no bat use
Big Creek Building Complex Chlorinator	Building	8/6/2002	ST	Bat access, no bat use
Big Creek Building Complex Substation	Building	8/6/2002	ST	Bat access, no bat use
Powerhouse 2	Large powerhouse	6/25/2002	ST	Bat access and sign
Powerhouse 8	Powerhouse, communication building	6/25/2002	ST	Bat access and sign
Dam 6	Platform, bridges	6/25/2002	ST	Bat access, no bat use
Mammoth Pool Powerhouse	1 powerhouse building	6/25/2002	ST	Bat access and sign
Mammoth Pool Dam	Fish generator valve	8/7/2002	ST	Bat access and sign
Mammoth Pool Campground	Toilets	8/7/2002	ST	Bat access and sign
Million Dollar Mile Road Adit 1	Adits	8/6/2002	ST, MN, NR	Bat access and sign
Million Dollar Mile Road Adit 2	Adits	8/6/2002	ST, MN, NR	Bat access and sign
Million Dollar Mile Road Adit 3	Adits	8/7/2002	ST, MN, NR	Bat access and sign
Powerhouse 3	Buildings	8/7/2002	ST	Bat access and sign

APPENDIX A. List of Project Facilities Where Roost Surveys Were Conducted for Special-status Bat Species (continued)

Facility	Habitat Feature	Survey Date	Survey Type*	Notes
Powerhouse 3 Maintenance Ready Room	Buildings	8/7/2002	ST	Bat access and sign
Powerhouse 3 10 Stall	Buildings	8/7/2002	ST	Bat access and sign
Powerhouse 3 Water Treatment	Buildings	8/7/2002	ST	Bat access, no bat use
Powerhouse 3 5 Stall	Buildings	8/7/2002	ST	Bat access and sign
Powerhouse 3 Sheet Metal House	Buildings	8/7/2002	ST	Bat access and sign
Powerhouse 3 Water Pump House	Buildings	8/7/2002	ST	Bat access, no bat use
Powerhouse 3 Garage	Buildings	8/7/2002	ST	Bat access and sign
Powerhouse 3 Carpenter Shop	Buildings	8/7/2002	ST	Bat access, no bat use
Powerhouse 3 Penstock Buildings	Buildings	8/7/2002	ST	Bat access, no bat use

* ST = Structure survey

MN = Mistnet survey

AC = Acoustic survey (with Anabat)

NR = Night roost survey (subset of ST)

APPENDIX B

Special-status Bat Roost Survey Results

APPENDIX B. Special-status Bat Roost Survey Results

Facility	Date	Species	Zone	UTM Easting	UTM Northing	Elevation (feet)	Roost Type*	Level of Use
Powerhouse 1	06/26/06	<i>Myotis californicus</i> , <i>M. spp.</i> , <i>Eptesicus fuscus</i>	11S	301330	4119660	4868	DR, NR	multiple DR and NR locations on top floors
Powerhouse 2	06/26/06	<i>M. yumanensis</i> , <i>M. volans</i>	11S	295416	4119200	3065	DR, NR	multiple DR and NR locations on top floors
Powerhouse 3	08/08/06	<i>M. yumanensis</i>	11S	288125	4113817	1459	DR, NR	multiple DR and NR locations
Powerhouse 3 Maintenance Ready Room	08/08/06	<i>M. spp.</i>	11S	288125	4113817	1459	NR	light night roost
Powerhouse 3 10 Stall	08/08/06	<i>M. spp.</i>	11S	288125	4113817	1459	NR	light night roost
Powerhouse 3 5 Stall	08/08/06	<i>M. spp.</i>	11S	288125	4113817	1459	NR	light night roost
Powerhouse 3 Sheet Metal	08/08/06	<i>M. spp.</i>	11S	288125	4113817	1459	NR	light night roost
Powerhouse 3 Garage	08/08/06	<i>M. spp.</i>	11S	288125	4113817	1459	NR	light night roost
Powerhouse 8	06/26/06	<i>M. spp.</i>	11S	293427	4120479	2277	DR, NR	3 small DR/NR locations
Mammoth Pool Powerhouse	06/26/06	<i>E. fuscus</i> , <i>M. spp.</i>	11S	292639	4121680	2269	DR, NR	1 small DR and 4 NR locations
Mammoth Pool Campground	08/08/06	<i>M. californicus</i>	11S	293354	4135484	3671	DR	3 individuals under wood roof shingles in restroom
Mammoth Pool Dam	08/08/06	<i>M. spp.</i>	11S	294637	4132818	3121	DR, NR	heavy NR activity, 10+ DR bats in fish generator
Florence Lake Work Camp Recreation Room	06/27/06	<i>M. evotis</i> , <i>M. spp.</i>	11S	325150	4126659	7368	DR, NR	1 <i>M. evotis</i> in window cover
Florence Lake Work Camp Cook House	06/27/06	<i>M. spp.</i>	11S	325150	4126659	7368	NR	Scattered guano in basement
102" Valve House	08/07/06	<i>M. californicus</i>	11S	295919	4117522	5222	DR	1 <i>M. californicus</i> (DR)
102" Valve House Shed	08/07/06	<i>M. spp.</i> , <i>Corynorhinus townsendii</i> (g)	11S	295815	4118097	4656	NR	moderate activity, <i>M. spp.</i> , <i>C. townsendii</i> (light NR guano)
West Portal Glory Hole Winch House	08/07/06	<i>C. townsendii</i> , <i>M. spp.</i> (g)	11S	295922	4117414	5351	DR, NR	1 <i>C. townsendii</i> (DR), <i>M. spp.</i> (light NR guano)
Huntington Lake Dam 1 Surge Chamber	08/06/06	<i>M. spp.</i> , <i>E. fuscus</i> , <i>M. evotis</i> , <i>Tadarida brasiliensis</i>	11S	303686	4122902	6916	DR, NR	moderate activity
Shaver Lake Recreation Area Road 1 Restroom	08/08/06	<i>M. spp.</i>	11S	296232	4113460	5445	NR	heavy activity
Shaver Lake Recreation Area Road 2 Restroom	08/08/06	<i>M. spp.</i>	11S	296272	4112770	5415	NR	moderate activity
Shaver Lake Recreation Area Boat Only Restrooms	08/07/06	<i>M. spp.</i>	11S	297944	4111081	5438	NR	heavy activity
Shaver Lake Recreation Area Dorabella Campground Information Kiosk	08/07/06	<i>E. fuscus</i>	11S	294539	4109556	5723	DR	1 <i>E. fuscus</i> (DR)

Shaver Lake Recreation Area Dinky Creek Rest Stop	08/07/06	<i>M. spp.</i>	11S	294813	4108829	5331	NR	trace activity
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APPENDIX B. Special-status Bat Roost Survey Results (continued)

Facility	Date	Species	Zone	UTM Easting	UTM Northing	Elevation (feet)	Roost Type*	Level of Use
Shaver Lake Recreation Area Camp Edison Information Booth	08/07/06	<i>M. spp.</i>	11S	294798	4110672	5516	DR	2 <i>M. spp.</i> (DR)
Shaver Lake Recreation Area Tanager Area Store	08/07/06	<i>M. californicus</i>	11S	295270	4110997	5456	DR	10+ individuals (DR) 18in metal roof; maternity colony
Million Dollar Mile Road Adit 1	08/07/06	<i>M. volans, T. brasiliensis, Antrozous pallidus, E. fuscus, M. thysanodes</i>	11S	292326	4118364	2261	DR, NR	heavy night roost, moderate day use
Million Dollar Mile Road Adit 2	08/07/06	<i>A. pallidus, E. fuscus, M. volans, M. californicus, M. evotis, M. thysanodes, M. yumanensis, Pipistrellus hesperus, T. brasiliensis</i>	11S	291029	4116086	2278	DR, NR	heavy night roost, moderate day use
Million Dollar Mile Road Adit 3	08/08/06	<i>A. pallidus, E. fuscus, M. volans, M. californicus, M. evotis, M. yumanensis, P.</i>	11S	289457	4114505	2239	DR, NR	heavy night roost, moderate day use

DR = day roost
 NR = night roost
M. spp. = *Myotis* species (unidentified)
 (g) = guano

APPENDIX C

Special-status Bat Mist-netting Survey Results

APPENDIX C. Special-status Bat Mist-netting Survey Results

Species	Date	Location	Adult						Juvenile			Age		
			Male	Female					M	F	Un	Unknown	Total	
				Lc	PI	NI	Par	Un						Preg 2
<i>Pallid bat (Antrozous pallidus)</i>														
	08/07/06	Million Dollar Mile Road Adit 2	6	-	-	-	-	-	-	-	-	-	-	6
	08/08/06	Million Dollar Mile Road Adit 3	1	-	-	-	-	-	-	-	-	-	-	1
		Subtotal	7	0	0	0	0	0	0	0	0	0	0	7
<i>Big brown bat (Eptesicus fuscus)</i>														
	08/08/06	Million Dollar Mile Road Adit 1	4	-	-	-	-	-	-	-	-	-	-	4
	08/08/06	Jose Creek at Powerhouse 3	1	-	-	-	-	-	-	-	-	-	1	2
	08/09/06	Bear Creek Diversion Dam	2	-	1	1	1	-	-	-	-	-	-	5
	06/26/06	Powerhouse 8	1	-	-	-	-	-	-	-	-	-	-	1
	06/26/06	Powerhouse 2	7	-	-	-	1	-	-	-	-	-	-	8
	06/27/06	Big Creek at Sierra Summit	4	-	-	-	-	-	-	-	-	-	-	4
	06/28/06	Jackass Meadow	2	-	-	-	-	-	-	-	-	-	-	2
	06/29/06	Mono Hot Springs	3	-	-	-	-	-	-	-	-	-	-	3
		Subtotal	24	0	1	1	2	0	0	0	0	0	1	29
<i>Hoary bat (Lasiurus cinereus)</i>														
	08/09/06	Bear Creek Diversion Dam	2	-	-	-	-	-	-	-	-	-	-	2
	06/26/06	Powerhouse 2	2	-	-	-	-	-	-	-	-	-	-	2
	06/27/06	Big Creek at Sierra Summit	-	-	-	-	-	-	-	-	-	-	1	1
		Subtotal	4	0	0	0	0	0	0	0	0	0	1	5
<i>California myotis (Myotis californicus)</i>														
	08/06/06	Pitman Creek at Big Creek	-	-	1	-	-	-	-	-	-	-	-	1
	08/06/06	Stevenson Creek below Shaver Dam	1	-	-	-	-	-	-	-	-	-	-	1
	08/07/06	Million Dollar Mile Road Adit 2	-	-	-	-	-	-	-	-	1	-	-	1
	08/08/06	Jose Creek at Powerhouse 3	2	-	2	-	-	1	-	-	1	-	-	6
	08/09/06	Bear Creek Diversion Dam	1	-	-	-	-	-	-	-	-	-	-	1
	06/26/06	Powerhouse 8	1	-	-	-	-	-	-	-	-	-	-	1
	06/27/06	Big Creek at Sierra Summit	-	1	-	-	-	-	-	-	-	-	-	1
		Subtotal	5	1	3	0	0	1	0	0	2	0	0	12
<i>Western small-footed myotis (Myotis ciliolabrum)</i>														
	06/27/06	Big Creek at Sierra Summit	2	-	-	-	-	-	-	-	-	-	-	2
		Subtotal	2	0	0	0	0	0	0	0	0	0	0	2
<i>Long-eared myotis (Myotis evotis)</i>														
	08/07/06	Million Dollar Mile Road Adit 2	1	-	1	1	-	-	-	-	-	-	-	3
	08/09/06	Bear Creek Diversion Dam	1	-	-	-	-	-	-	-	-	-	-	1
		Subtotal	2	0	1	1	0	0	0	0	0	0	0	4
<i>Little brown myotis (Myotis lucifugus)</i>														
	06/27/06	Big Creek at Sierra Summit	2	1	-	3	-	-	-	4	-	-	-	10
	06/28/06	Jackass Meadow	2	1	-	1	-	-	-	-	-	-	1	5
		Subtotal	4	2	0	4	0	0	0	4	0	0	1	15
<i>Fringed myotis (Myotis thysanodes)</i>														
	08/07/06	Million Dollar Mile Road Adit 2	1	-	-	-	-	-	-	-	-	-	-	1
	06/27/06	Big Creek at Sierra Summit	2	-	-	-	-	-	-	-	-	-	-	2
		Subtotal	3	0	0	0	0	0	0	0	0	0	0	3
<i>Long-legged myotis (Myotis volans)</i>														
	08/06/06	Pitman Creek at Big Creek	-	-	-	1	-	-	-	-	-	-	-	1
	08/07/06	Million Dollar Mile Road Adit 2	-	-	-	1	-	-	-	-	-	-	-	1
	08/08/06	Million Dollar Mile Road Adit 1	1	-	2	1	-	-	-	-	-	-	-	4
	08/08/06	Jose Creek at Powerhouse 3	-	2	-	-	-	-	-	-	1	-	-	3
	06/25/06	Mammoth Pool Powerhouse	-	-	-	-	-	-	1	-	-	-	-	1
	06/27/06	Big Creek at Sierra Summit	1	-	-	-	-	-	-	-	-	-	-	1
		Subtotal	2	2	2	3	0	0	0	1	0	1	0	11

APPENDIX C. Special-status Bat Mist-netting Survey Results (continued)

Species	Date	Location	Male	Adult					Juvenile			Age			
				Lc	PI	NI	Par	Un	Preg 2	Preg 3	M	F	Un	Unknown	Total
<i>Yuma myotis (Myotis yumanensis)</i>															
	08/06/06	Stevenson Creek below Shaver Dam	1	-	-	-	-	-	-	-	2	1	-	-	4
	08/07/06	Million Dollar Mile Road Adit 2	1	-	-	-	-	-	-	-	-	-	-	-	1
	08/08/06	Million Dollar Mile Road Adit 1	1	-	-	-	-	-	-	-	-	-	-	-	1
	08/08/06	Jose Creek at Powerhouse 3	-	1	-	-	-	-	-	-	-	-	-	-	1
	08/09/06	Bear Creek Diversion Dam	-	1	-	-	-	-	-	-	1	1	-	-	3
	06/25/06	Mammoth Pool Powerhouse	4	1	-	-	-	-	-	-	-	-	-	-	5
	06/26/06	Powerhouse 2	-	4	-	-	-	-	-	-	-	-	-	-	4
	06/27/06	Big Creek at Sierra Summit	17	-	-	-	-	-	-	-	-	-	-	-	17
	06/28/06	Jackass Meadow	4	-	-	3	-	-	-	-	-	-	-	-	7
	06/29/06	Mono Hot Springs	4	-	-	3	-	1	1	1	-	-	-	-	10
		Subtotal	32	7	0	6	0	1	1	1	3	2	0	0	53
<i>Western pipistrelle (Pipistrellus hesperus)</i>															
	08/06/06	Pitman Creek at Big Creek	1	-	2	-	-	-	-	-	-	-	-	-	3
	08/07/06	Million Dollar Mile Road Adit 2	1	-	-	-	-	-	-	-	-	-	-	-	1
	08/08/06	Million Dollar Mile Road Adit 1	-	-	-	-	-	-	-	-	-	-	-	1	1
	06/26/06	Powerhouse 2	5	2	-	-	-	-	-	1	-	-	-	-	8
		Subtotal	7	2	2	0	0	0	0	1	0	0	0	1	13
<i>Mexican free-tailed bat (Tadarida brasiliensis)</i>															
	08/07/06	Million Dollar Mile Road Adit 2	3	-	-	-	-	-	-	-	-	-	-	-	3
	08/07/06	Million Dollar Mile Road Adit 1	10	1	-	-	-	-	-	-	-	-	-	-	11
		Subtotal	13	1	0	0	0	0	0	0	0	0	0	0	14

Code: Lc = Lactating; PI = Post lactating; NI = Nulliparous; Par = Parous; Un = Unknown; M = Male; F = Female; Preg 2 = Pregnant 2nd trimester; Preg 3 = Pregnant 3rd trimester

*NOTE: Spotted bat and western mastiff bat were detected audibly during mist-netting activities. Therefore, they are not included in this table. However, they are mapped on the figure as audible detections and are discussed in the text in the mist-netting section.

APPENDIX D

Special-status Bat Acoustic Survey Results

APPENDIX D. Special-status Bat Acoustic Survey Results

DATE	GPS WAYPOINT	Zone	UTM Easting	UTM Northing	Elevation (ft)	Site Description	ANPA	EPFU	EUMA	EUPE	LACI	MYEV	MYTH	PIHE	TABR	MY40	MY50	Q25
06/25/06	246IBM	11S	293619	4120392	2387	Big Creek Bridge Above Powerhouse 8		x		x		x		x		x	x	
06/25/06	246CP1	11S	293211	4121177	2257	Dam 6 Lake				x	x			x	x		x	x
06/25/06	246NC1	11S	292708	4121661	2297	Mammoth Pool Powerhouse												
06/25/06	246NC2	11S	292804	4121794	2299	Mammoth Pool Powerhouse MN		x		x				x			x	x
06/25/06	246DL1	11S	292686	4121618	2321	San Joaquin River Downstream of Mammoth Pool Powerhouse		x				x		x	x	x	x	x
06/25/06	246MN1	11S	292819	4121810	2316	San Joaquin River Upstream of Mammoth Pool Powerhouse				x								
06/26/06	256DL1	11S	295738	4119321	3046	Big Creek MN Above Powerhouse 2	x	x			x		x	x		x	x	
06/26/06	256NC2	11S	293496	4120443	2367	Pool Above Powerhouse 8	x	x				x		x			x	
06/26/06	256IBM	11S	295346	4119254	2939	Powerhouse 2 Forebay		x			x			x			x	x
06/26/06	256CP1	11S	293422	4120510	2283	Powerhouse 8 Forebay				x				x			x	
06/27/06	266IBM	11S	300213	4114994	6681	Balsam Forebay			x	x	x					x	x	x
06/27/06	266MN1	11S	308508	4122924	7029	Sierra Summit at Big Creek				x								
06/27/06	266DL1	11S	308547	4122936	7028	Sierra Summit Big Creek Bridge	x	x			x	x				x	x	x
06/27/06	266NC2	11S	308689	4122987	7026	Sierra Summit Big Creek Upper		x			x		x			x	x	x
06/27/06	266CP1	11S	308389	4122934	7018	Sierra Summit on Big Creek Lower						x				x	x	x
06/27/06	266NC1	11S	301824	4114197	6758	Tunnel 7 Gate 2	x										x	x
06/28/06	276IBM	11S	325097	4126725	7398	Florence Lake Work Camp		x			x	x				x	x	x
06/28/06	276CP1	11S	326130	4127890	7143	MN at Jackass Meadow			x		x	x				x		x
06/28/06	276NC1	11S	322110	4131335	7241	Pond West of Ward Lake		x			x	x				x		x
06/28/06	276NC2	11S	326860	4129360	7135	San Joaquin River Downstream of Jackass	x	x								x	x	x
06/28/06	276MN1	11S	326138	4127860	7132	South Fork San Joaquin River Jackass Meadow			x	x								
06/29/06	286NC2	11S	321696	4132791	6596	Bridge at Mono Hot Springs		x			x	x				x	x	x
06/29/06	286IBM	11S	321507	4132800	6591	Mono Hot Springs at Net		x				x					x	x
06/29/06	286DL1	11S	321610	4132798	6600	Mono Hot Springs Downstream of Bridge		x		x	x	x				x	x	x
06/29/06	286NC1	11S	321765	4132719	6615	Mono Hot Springs Rocks		x			x	x				x	x	x
06/29/06	286CP1	11S	321258	4132562	6669	Snag in Meadow Mono Hot Springs		x			x	x				x	x	x
06/29/06	286MN1	11S	321620	4132802	6603	South Fork San Joaquin River at Mono Hot Springs				x								
08/06/06	058NC1	11S	301504	4119693	4912	Big Creek Bridge		x				x		x		x	x	x
08/06/06	058NC2	11S	302656	4122273	6917	Huntington Lake Dam 2		x								x	x	x
08/06/06	058CP1	11S	303657	4122841	6893	Huntington Lake Dam 1 Surge Chamber		x				x			x	x	x	x

APPENDIX D. Special-status Bat Acoustic Survey Results (continued)

DATE	GPS WAYPOINT	Zone	UTM Easting	UTM Northing	Elevation (ft)	Site Description	ANPA	EPFU	EUMA	EUPE	LACI	MYEV	MYTH	PIHE	TABR	MY40	MY50	Q25	
08/06/06	058DL1	11S	301638	4119614	4961	Pitman Creek at MN		x				x		x				x	x
08/06/06	058IBM	11S	301735	4119574	5103	Pitman Creek Upper Rocks		x				x		x	x	x	x	x	x
08/06/06	058DL2	11S	294992	4113243	5336	Rocks at Stevenson Creek Shaver Dam		x	x	x		x			x			x	x
08/06/06	058MN2	11S	295060	4113195	5244	Stevenson Creek Below Shaver Dam				x									
08/06/06	058CP2	11S	295055	4113182	5243	Stevenson Creek Below Shaver Dam				x		x			x	x	x	x	x
08/07/06	068DL2	11S	292326	4118364	2261	Million Dollar Mile Road Adit 1	x	x				x			x	x	x	x	x
08/07/06	068CP2	11S	291029	4116086	2278	Million Dollar Mile Road Adit 2		x				x		x		x	x		
08/07/06	068NC1	11S	292007	4118139	1998	Million Dollar Mile Road Stairs				x		x		x	x	x	x	x	x
08/07/06	068NC2	11S	291010	4115947	2441	Million Dollar Mile Road Stevenson Creek						x		x		x	x		
08/08/06	078NC1	11S	288650	4112807	2022	Jose Creek Bridge		x				x		x	x	x	x	x	x
08/08/06	068MN2	11S	292326	4118364	2261	Million Dollar Mile Road Adit 3			x	x									
08/08/06	078CP1	11S	289457	4114505	2239	Million Dollar Mile Road Adit 3	x	x				x		x		x	x	x	x
08/08/06	078DL1	11S	289380	4114475	2157	Million Dollar Mile Road Near Adit 3	x	x		x				x	x	x	x	x	x
08/08/06	078DE2	11S	292030	4118193	1993	Million Dollar Mile Road Stairs				x				x	x	x	x	x	x
08/09/06	088DL1	11S	325093	4133765	7349	Bear Creek Diversion Dam		x			x		x		x	x	x	x	x
08/09/06	088CP1	11S	325017	4133772	7363	Bear Creek Diversion Dam Rocks		x				x				x	x	x	x

- ANPA *Antrozous pallidus* - Pallid Bat
- EPFU *Eptesicus fuscus* - Big Brown Bat
- EUMA *Euderma maculatum* - Spotted Bat
- EUPE *Eumops perotis* - Western Mastiff Bat
- LACI *Lasiurus cinereus* - Hoary Bat
- MYEV *Myotis evotis* - Long-eared Myotis
- MYTH *Myotis thysanodes* - Fringed Myotis
- PIHE *Pipistrellus hesperus* - Western Pipistrelle
- TABR *Tadarida brasiliensis* - Mexican Free-tailed Bat
- MY40 Acoustic group including Western Small-footed Myotis (*Myotis ciliolabrum*), Long-legged Myotis (*M. volans*), and Little Brown Myotis (*M. lucifugus*)
- MY50 Acoustic group including California Myotis (*Myotis californicus*) and Yuma Myotis (*M. yumanensis*)
- Q25 Acoustic group including Silver-haired Bat (*Lasionycteris noctivagans*), Big Brown Bat (*Eptesicus fuscus*), and Mexican Free-tailed Bat (*Tadarida brasiliensis*)